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UNIVERSITY OF ILLINOIS

Budget Request for Operating and Capital Funds
Fiscal Year 1987

PREPARED FOR PRESENTATION TO THE
BOARD OF TRUSTEES
SEPTEMBER 12, 1985

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INTRODUCTION TO THE FISCAL YEAR 1987 OPERATING AND CAPITAL BUDGET REQUEST

GENERAL PERSPECTIVES FOR THE DEVELOPMENT OF THE FY 1987 OPERATING BUDGET REQUEST

During much of the recent deliberation over the State's budget, FY 1986 was heralded as "the year of education." At all levels, from elementary schools to university laboratories and classrooms, discussions focused on ways to improve Illinois education, and on how a limited amount of expanded State resources could be channeled most effectively to strengthen the basic educational experiences which Illinois students receive. At the elementary/secondary level, major educational reforms were developed, along with funding increases. Those reforms will touch a number of significant areas, including the creation of a "bar examination" for teachers, testing for students entering teacher preparation programs, mandatory testing of pupils in grades 3, 6, 8 and 10, and numerous curricular reforms. For higher education, special emphasis continued on ways in which colleges and universities can be linked more closely to the State's overall economic development, particularly in the attraction of new industries. Attention also centered on ways in which the basic core of undergraduate education could be improved. Without question, these are improvements of significant scope for all levels.

From a budget perspective as well, FY 1986 emerged as a year of substantial attention to education. General improvements in the Illinois economy, combined with several new revenue-producing measures dedicated for education, produced an overall growth rate of 7.1% in appropriations from the State's General Revenue and Common School Funds. As shown in Table 1, however, that rate did not apply evenly to all State agencies and organizations. Higher education appropriations of General Revenue and Common School Funds (GRF) increased by 11.1% for FY 1986, while those for elementary/secondary education grew by 16.6%. In sharp contrast, GRF appropriations for all other State agencies and organizations rose by only 2.9%. Clearly, education was the paramount budget priority for Illinois for FY 1986.

TABLE 1
GENERAL REVENUE AND COMMON SCHOOL FUNDS APPROPRIATIONS
FY 1985 AND FY 1986
(Dollars In Millions)

	FY 1985	FY 1986	% Increase
Higher Education	$1,122.1	$ 1,246.5	11.1%
Elementary/Secondary Education	2,259.3	2,635.1	16.6%
All Other Agencies	6,145.8	6,324.5	2.9%
Total	$9,527.2	$10,206.1	7.1%
Higher Education as a Percent of Total GRF	11.8%	12.2%	

Source: FY 1985 from Illinois State Budget 1986.
FY 1986 from Illinois Bureau of the Budget.

The University of Illinois shared in the success which higher education achieved. Incremental funds in the University's FY 1986 operating budget will permit solid progress toward several fundamental objectives upon which recent budget requests have been built. Having moved from the brink of fiscal crisis when the "doomsday" budget was under consideration two years ago, the FY 1986 increment of $42.9 million represents the second largest annual operating increment the University has received in nearly two decades. The FY 1986 increment was topped only by the FY 1984 increment of $44.4 million, which the University received following the tax increase action of the General Assembly in response to the "doomsday" budget.

The FY 1986 increment of $42.9 million represents 82% of the amount sought by the Board of Trustees one year ago--again the largest share of the University's original request in two decades. Equally significant, the overall increment was achieved with a tuition increase of 5%--the lowest in the past seven years, and a sharp difference from the recent past when tuition income has been vital in providing additional resources to stem an erosion of quality in university programs.

As can be seen in Figure 1, the FY 1986 budget increase compares very favorably with the increments received in the past two years not only in the overall size of the increment, but in the fact that a significant portion of the new funds have been assigned to expanded or improved academic programs. As might be expected, the now familiar themes of scientific and technological advances and economic development were prominent features of the program advances for FY 1986, since they relate so directly to the State's efforts to rejuvenate its economic base. Equally encouraging, the FY 1986 increment also includes significant funds devoted to the Colleges of Liberal Arts and Sciences at both campuses to begin the improvement of the fundamental educational experiences which all students should achieve in their undergraduate years. This application of new resources to a broader range of program improvements than has been possible in past years is one of the hallmarks of the "year of education" for the University of Illinois. Other important elements of the progress which the FY 1986 budget will provide include the following:

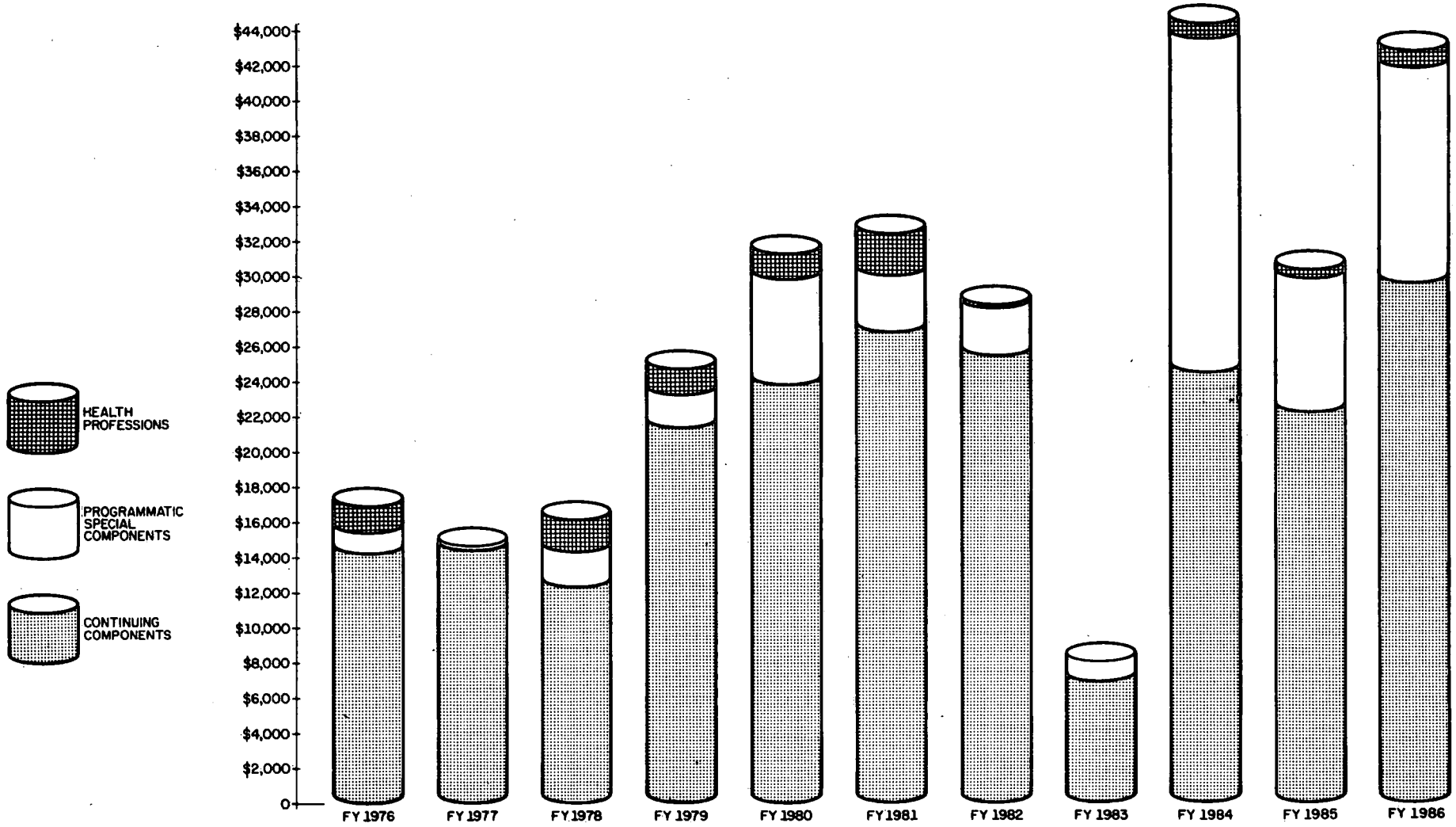
- Improvement in faculty and staff salaries which will likely close a portion of the competitive gap between the University of Illinois and peer institutions. Although funding for salary increases was

FIGURE 1

FY 1976-86 STATE INCREMENTAL FUNDS RECEIVED BY THE UNIVERSITY OF ILLINOIS

(GENERAL REVENUE, INCOME AND SPECIAL FUNDS EXCLUDING RETIREMENT, IBA AND CAPITAL GRF)
(DOLLARS IN THOUSANDS)

COMPONENT	FY 1976	FY 1977	FY 1978	FY 1979	FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986
PREVIOUS YEAR'S BASE	$218,424.5	$235,375.1	$250,019.4	$265,925.8	$290,681.4	$321,158.3	$353,550.3	$381,884.9	$389,861.2	$434,289.0	$464,718.2
NET INCREMENT	16,950.7	14,644.3	16,140.0	24,755.6	31,279.3	32,391.9	28,334.6	7,976.3	44,427.8	30,429.3	42,857.3
NET INCREMENT AS A PERCENT OF PREVIOUS YEAR'S BASE	7.8%	6.2%	6.5%	9.3%	10.8%	10.1%	8.0%	2.1%	11.4%	7.0%	9.2%
CONTINUING COMPONENTS	14,230.7	14,488.0	12,347.1	21,422.9	23,803.4	26,840.1	25,461.0	6,913.0	24,579.1	22,248.7	29,782.3
PERCENT OF TOTAL INCREMENT	84.0%	98.9%	76.5%	86.5%	76.1%	82.9%	90.4%	86.7%	55.3%	73.1%	69.5%
PROG. & SPEC. COMPONENTS	1,220.0	156.3	2,001.4	1,859.7	6,008.4	3,242.0	2,733.2	1,138.3	18,998.7	7,680.6	12,095.0
PERCENT OF TOTAL INCREMENT	7.2%	1.1%	12.4%	7.5%	19.2%	10.0%	9.6%	14.3%	42.8%	25.3%	28.2%
HEALTH PROFESSIONS	1,500.0		1,791.5	1,473.0	1,467.5	2,309.8	140.4	−75.0	850.0	500.0	980.0
PERCENT OF TOTAL INCREMENT	8.8%		11.1%	6.0%	4.7%	7.1%	0.5%	−1.0%	1.9%	1.6%	2.3%



cut slightly below the amount recommended in the Governor's Budget, the University expects to achieve the 8% level for continuing employees. Salary increases for other Big Ten institutions are expected to average 6%.

- Continued revitalization of engineering education at both campuses through the addition of $3.25 million in incremental resources, primarily for new staff and the maintenance of competitive salaries, along with funds to expand off-campus professional engineering education.
- $2.5 million to strengthen basic education programs at the University and secondary school levels. $1.0 million will be available to each of the Colleges of Liberal Arts and Sciences to add critically needed new staff and equipment and to reduce class sizes in many areas. The University will also expand its efforts to improve secondary education in mathematics, writing, and foreign languages through teacher workshops, in-service training, and other areas.
- Approximately $1.5 million is available to expand and improve professional education in the areas of veterinary medicine, commerce and business administration, gerontology, nursing, pharmacy, medicine, and agriculture. A new effort to examine ways to curb growing medical costs will also be started.
- $1.3 million is provided for scientific and technological advances in biotechnology, artificial intelligence, academic computing, and equipment replacement.
- $1.2 million is available to match National Science Foundation grants for the Center for Supercomputing Applications and other private gifts of computer equipment.
- More than $600,000 is available to expand minority student retention and recruitment programs at both campuses, with a portion of the funds targeted to special efforts for engineering students in Chicago and for the Principal's Scholars Program in Urbana-Champaign.

- Finally, although the funds were appropriated in the capital budget legislation, one of the most critically important program elements to be funded for FY 1986 is the Repair and Renovation Program within the Build Illinois initiative. The University of Illinois will receive $7.8 million to begin crucial renovations, particularly in science and engineering laboratories. These improvements will have an immediate and direct impact on both the scope and type of University of Illinois research and instructional activities.

Clearly, the University will be able to make solid progress during FY 1986 toward meeting some of the most central needs which have been serious concern throughout the last decade. The effects of a decade-and-a-half of substantial underfunding still linger in key areas, however, and they cannot be overcome in a single year nor in several. Obsolete equipment must be replaced; library acquisitions must be increased; outmoded and ineffective laboratories must be renovated; new advances in economic development must be pursued; and the full range of academic programs must be enhanced.

Most simply stated, the University must continue to improve its competitive standing among its peer institutions--institutions which are among the very top universities, public or private, in the nation. While the overall budget picture is good for FY 1986, Illinois was by no means alone in turning strong attention to improvements in its higher education system. As noted in the Chronicle of Higher Education (August 14, 1985) a number of states, particularly those in industrial areas, recorded budget advances of significant proportions for higher education. Ohio, for example, increased higher education funding by nearly 25% including an eight-fold increase (to more than $60 million) in a major program designed to spur economic growth by shifting the state's economic base away from obsolete industries and toward new technologies. Higher education funding in Minnesota increased by 16.4% for FY 1986; by 14.3% in Michigan; by 14.1% for the University of California system and by 13.6% for the California State College system.

Virtually all of these increases are tied, at least in part, to economic development themes. Nearly every region of the country, from Boston's Route 128 ring to California's silicon valley have increased their efforts to attract the new industries spawned by technological advances. The "silicon prairie" around Dallas, Texas; the "silicon apple" in the New York City-Westchester County-Long Island area; Atlanta's "technology crescent"; North Carolina's "research triangle"; Detroit-Ann Arbor's "robot range"; and Salt Lake City's "bionic valley" all publicize the advantages their regions offer to new industries in the high technology mode (New York Times, March 24, 1985). Almost without exception, those advantages include direct links to university-based research programs. None of those represents any stronger an asset than the University of Illinois. But all are continuing to grow in ways which the University must match if Illinois' competitive strength is to be improved.

The University's FY 1986 budget enhances program development in a number of areas which are key both to the immediate need to expand economic opportunity by attracting new industry, and to the longer range need to strengthen education at all levels. They will help to assure a talented, able workforce with a productive and prosperous quality of life in Illinois. The FY 1986 budget provides a measure of fiscal strength to the continued academic and intellectual leadership of the University. Indeed, it is the recognition by legislative leaders and the Governor that the University of Illinois, with its particular research strengths and its breadth and excellence of instructional programs, can play a significant--perhaps pivotal--role in helping to attract new industries to Illinois which may be the most positive outcome of the FY 1986 budget process.

Priorities for FY 1987

Both the University's recovery from a lengthy period of underfunding and the State's rejuvenation of its economy require expanded energy and resources over a multi-year period. The University is firmly committed to its role in helping to expand an economic base which will serve the entire State. The University is equally committed to broadening the focus of those

efforts to include some of the longer term problems which must be addressed if Illinois is to strengthen its economic base to carry it into the next century.

As in earlier years, the FY 1987 operating budget request must focus on the basic elements which affect faculty and staff in every segment of the University. The cornerstone of the academic enterprise is the individual faculty and staff member whose talents and abilities represent the most fundamental factor in achieving excellence. The University has long stressed that attracting and retaining top-quality faculty and staff must be the paramount concern of any budget proposal, and providing a salary and compensation program adequate to attract and retain superior faculty and staff has been the University's overriding first priority. While the competitive strength of the University's salary levels remains an obvious concern, attention is increasingly being focused on other benefits which make up the overall compensation package as an area which demands attention if competitiveness is to be achieved. The University's benefits program is demonstrably below those of many peer institutions, and steps must be taken in FY 1987 to reverse that situation.

It is also becoming clear, particularly as expanded program funds are available at institutions across the country, that the recruitment and retention of top-quality faculty and staff requires a comprehensive effort to provide adequate compensation along with adequate facilities, equipment, and other resources to support top-quality teaching and research programs. The University remains underfunded in several of these key support areas, with deficiencies in areas of crucial importance to the support of literally every instructional and research program. Obsolete instructional and research equipment continues to plague a number of academic programs, to the detriment of students' education and faculty research. Library acquisitions, particularly in the sciences, must be increased if the University is to reamin at the forefront of current knowledge in a comprehensive way. New resources must be made available to maintain facilities and equipment adequately if the University is to avoid enlarging its present deferred maintenance deficiency.

Programmatically, the themes of scientific and technological advances and of professional and economic development which have formed the backbone of the University's budget requests in recent years will continue for FY 1987. The success which the University has achieved in revitalizing engineering education and research must be continued, for no area is more central to economic growth and development, and no area within the University holds greater promise for making direct contributions to the State's economic base. FY 1987 must also bring expanded efforts to incorporate the computer into virtually all academic programs. It is now widely accepted that the computer will become a basic tool for instruction and research in nearly every academic discipline, and University of Illinois students and faculty simply must have access to and use of all forms of computers if their educational and research activities are to be complete.

The effort to strengthen basic disciplines, begun in FY 1986, will be repeated in FY 1987 with an expanded emphasis. Improving instructional efforts in mathematics, in writing, in foreign languages, and developing students' abilities to think clearly, to reason soundly, to communicate effectively, to recognize and appreciate the diversity of their own culture and history as well as those of others will serve, in the long run, to develop an educated population in Illinois which will enhance the State's social and political vitality as well as its economic base.

Additional attention must also be directed to ways in which the University can help elementary and secondary schools strengthen the central core of their educational programs. Equally important, the State must recognize that the very nature of its population is changing, and it must be prepared to respond to an aging populace in which fundamental changes in virtually all aspects of day-to-day life will occur. Illinois must redouble current efforts to ensure that all of its citizens become and remain effective, productive members of society. Special efforts are required to make certain that minority members of society receive the educational opportunities which have eluded them in the past, and these efforts must include a number of new initiatives for the recruitment and retention of minority students and faculty at the University of Illinois.

Finally, special and separate attention must be given to the remarkable ability which the University of Illinois has demonstrated in attracting support from Federal and corporate sources for major educational and research activities. That support provides a direct boost to the State's current economic base and holds the potential for significant longer term enhancement as well. Federal and corporate support for supercomputer activities are expected to generate $150 million over the next five years. Major equipment gifts from corporations such as IBM, AT&T, Texas Instruments, Control Data, and others have already provided more than $20 million, with excellent prospects for additional grants. The University must be able to match these gifts with sufficient funds to ensure that the equipment is used fully and maintained properly. Those matching requirements represent a very modest but crucial investment which holds the potential for returning substantial benefits for students and faculty, as well as for the entire State.

As was the case a year ago, a special plea must be reiterated for continued support for the renewal of the physical facilities at both campuses. Under the Build Illinois Program $20 million will be made available annually for five years for higher education, with $7.8 million allocated to the University of Illinois. Those funds will be targeted to the University's most critical needs for program-related remodeling and renovation and for deferred maintenance projects, but they will only scratch the surface of the overall problem. Remodeling and renovation needs are now so severe that they impede basic instruction and, in some cases, limit not only the scope but the type of research activities which University scientists and scholars can pursue. The funds available in the Build Illinois Program must be regarded as a minimum level of activity for the next five years, and their continued appropriation must be assured.

The FY 1987 Operating Budget Request

Given the priorities just outlined, the FY 1987 Operating Budget Request for incremental funds has been developed as shown in Table 2. The specific requests for funds to expand and improve academic programs are outlined in Table 3. The request includes the following highlights:

TABLE 2
UNIVERSITY OF ILLINOIS
FY 1987 OPERATING BUDGET REQUEST
(Dollars In Thousands)

I. Continuing Components		
A. Compensation Improvement		$34,793.9
1. Annualization of FY 1986 Increases	($ 4,529.1)	
2. FY 1987 Increment (7.5%)	(23,364.8)	
3. Fringe Benefit Improvements	(6,900.0)	
B. General Price Increases (6%)		4,019.8
C. Utilities Price Increases (6.4%)		2,468.8
D. Library Price Increase		980.0
1. Regular Increase (7%)	($ 480.0)	
2. Restoration	(500.0)	
E. Operations and Maintenance Support		1,368.7
1. New Areas	(368.7)	
2. Preventive Maintenance Improvements	($ 1,000.0)	
Subtotal, Continuing Components		$43,631.2
% of FY 1986 Base*		(8.60%)
II. Programmatic Components		
A. Equipment Replacement		$ 1,750.0
B. Expanded/Improved Academic Programs		11,335.0
C. Engineering Revitalization		4,000.0
Subtotal		$17,085.0
% of FY 1986 Base		(3.37%)
III. Resource Matching Requirements		$ 2,210.0
% of FY 1986 Base		(.44%)
IV. Special Services/Funding		
A. Soil and Water Conservation		$100.0
B. Financial Management for Illinois Farms		150.0
C. Economic Development for Illinois		100.0
D. Fire Service Institute		47.0
Subtotal		$397.0
V. Total Request		$63,323.2
% of FY 1986 Base		(12.47%)

*FY 1986 Base = $507,575.5 excluding nonrecurring appropriations.

TABLE 3
FY 1987 PROGRAM BUDGET REQUEST
(Dollars in Thousands)

	UIC	UIUC	CA	TOTAL
I. Equipment	$ 750.0	$1,000.0		$1,750.0
II. Expanded/Improved Program Themes				
A. Scientific and Technological Advances				
1. Biotechnology (incl. Biotech & the Law)	$ 800.0	$ 700.0		$1,500.0
2. Environmental Toxicology		200.0		200.0
3. Surface Chemistry and Catalysis		120.0		120.0
4. Artificial Intelligence/Cognitive Science		180.0		180.0
5. Rehabilitation Engineering		200.0		200.0
6. Academic Computing	850.0			850.0
Subtotal	$1,650.0	$1,400.0		$3,050.0
B. Economic and Professional Development				
1. College of Veterinary Medicine		$ 750.0		$ 750.0
2. Acting and Design for Television		130.0		130.0
3. Strengthening Commerce and Business Administration	$ 500.0	300.0		800.0
4. Health Administration	200.0	120.0		320.0
5. Retaining Medical Graduates in Illinois	100.0			100.0
6. Pharmacy Continuing Education	150.0			150.0
7. Planning/Technology/Economic Development	200.0			200.0
8. Undergrad Program in Computer Science	200.0			200.0
9. Office for Advanced Engineering Studies			$350.0	350.0
10. Technology Transfer Specialists			250.0	250.0
Subtotal	$1,350.0	$1,300.0	$600.0	$3,250.0
C. Increasing International Involvement				
1. International Programs	$ 350.0			$ 350.0
2. Arms Control, Disarmament and International Security		$ 110.0		110.0
Subtotal	$ 350.0	$ 110.0		$ 460.0
D. Responding To The Impact of An Aging Society	$ 500.0			$ 500.0
E. Strengthening Basic Instruction at all Levels of Illinois Education				
1. Undergraduate Initiatives	$ 700.0	$1,050.0		$1,750.0
2. Program Support for Elementary and Secondary Schools	100.0	450.0		550.0
Subtotal	$ 800.0	$1,500.0		$2,300.0

	UIC	UIUC	CA	TOTAL
F. Advancing Minority Educational Achievement				
1. Outreach Activities	$ 75.0	$ 100.0		$ 175.0
2. Attracting Minorities to UI	465.0	675.0		1,140.0
3. College Based Retention	315.0			315.0
4. Campus Coordination of Minority Programs	145.0			145.0
Subtotal	$1,000.0	$ 775.0		$ 1,775.0
Expanded/Improved Programs Total	$5,650.0	$5,085.0	$600.0	$11,335.0
III. Engineering Revitalization	$1,375.0	$2,625.0		$ 4,000.0
FY 1987 UNIVERSITY PROGRAM BUDGET REQUEST TOTAL:	$7,775.0	$8,710.0	$600.0	$17,085.0

- A compensation improvement package which addresses both the need to improve the competitive position of faculty and staff salaries and the need to address directly the serious deficiencies which exist in the area of fringe benefits. The salary increase request totals 7.5% and is based upon two elements: a 5% increment to offset projected inflation costs for FY 1987 and an additional 2.5% to continue to close the gap between current University of Illinois salaries and those at peer institutions. The fringe benefits improvement element consists of funds to provide an average of $50 per month to each employee in a State-funded position to improve the specific array of benefits which he or she now receives.
- Cost increases of 6% for most goods and services, including a 5% increment to match projected inflation increases and an additional 1% to help offset the cummulative effects of steady losses to inflation over the past decade.
- Special cost increases of 7% for library acquisitions, again to match inflation projections and to recover a portion of the ground lost to inflation in the past. In addition, $500,000 is sought to help restore library collections to a more adequate level of support for existing academic programs.
- Utilities cost increases of 6.4%, well below the double-digit increases required in the past several years.
- Operations and Maintenance increases of $368,700 to support the operation of new facilities at the Urbana campus. A $1 million increment is also sought to address major deficiencies in building and equipment maintenance requirements.
- $4 million to continue the revitalization of the University's Colleges of Engineering, focusing principally upon the addition of new staff and equipment.
- $1.75 million to expand existing efforts to replace obsolete instructional and research equipment.
- A total of $17.1 million for strengthened academic programs organized around six major themes: <u>Scientific and Technological Advances</u>, including major initiatives in biotechnology at both campuses, environmental studies, artificial intelligence and

cognitive science, rehabilitation engineering, and academic computing; Economic and Professional Development, including veterinary medicine, commerce and business administration, technology transfer initiatives and advanced engineering studies, the health professions, including medicine, pharmacy, and health administration, and a professional program in acting and design for television; Increasing International Involvement, including expanded efforts in the health professions and an arms control program; Responding to the Impact of an Aging Society, including significant expansion in gerontological studies in many health professions curricula; Strengthening Basic Instructions at All Levels of Illinois Education, including expanded initiatives in undergraduate education in the liberal arts and sciences, along with renewed efforts to improve Illinois elementary and secondary education; and Advancing Minority Educational Achievement through significant efforts at both campuses to recruit and retain minority students, faculty and staff members.

- A separate increment of $2.2 million to provide matching funds for significant federal and private grants for computer equipment.

The University's total FY 1987 request for incremental operating funds is $63,323,200 and represents a 12.47% increase over the FY 1986 operating base. If the request presented here were appropriated in full, the University's State-funded FY 1987 operating budget would reach $570,898,700.

The Enrollment Picture

As the number of high school graduates in Illinois continues its pattern of decline, concerns arise about corresponding enrollment decreases in higher education. On a statewide basis Illinois Board of Higher Education data show that headcount enrollment in all of Illinois higher education has declined by 4% over the past four years with public universities declining by about 3%, public community colleges by slightly more than 6%, and private universities holding relatively constant with a .2% decline. University of Illinois enrollments declined by 2% during the same period, primarily as a result of reduced enrollment limits in medicine and dentistry, and planned enrollment reductions at Urbana-Champaign.

Overall, University of Illinois enrollments are expected to remain quite stable over the next five years, as outlined in Table 4. Declines in the size of high school graduating classes in the City of Chicago may present some cause for concern about enrollment levels at the Chicago campus. That campus continues to attract a sizeable portion of its enrollment from a somewhat older age-group than the traditional 18-21 year old population, providing a broader range of potential students. Recent program funding improvements in the areas of engineering and business administration have enabled the campus to relax earlier enrollment restrictions in these areas, and strengthened efforts to recruit and retain minority students should also help to keep overall enrollment levels stable.

Enrollment at the Health Sciences Center has long been limited primarily by the amount of fiscal resources available, rather than by a lack of applicants for admission. Health professions enrollments are highly likely to remain stable, or to increase slightly over the next five years. The Health Sciences Center data on Table 4 do reflect a projected addition of about 200 new graduate students over the next five years as program expansion continues. The Health Sciences Center data also show a technical change in accounting for pharmacy students who now pursue the Doctor of Pharmacy degree and who had previously been classified as undergraduates.

Demand for admission to programs at the Urbana-Champaign campus continues to be very high. Enrollment levels have been constrained far more by resource limitations than by decline in well-qualified applicants. New efforts aimed at enhancing the diversity in the undergraduate student body by adding a slightly higher number of exceptionally well qualified students from outside the State are also underway. As at Chicago, recent funding improvements in engineering and commerce and business administration have made it possible to offset the effects of forced enrollment reductions required in these areas in the face of overwhelming student demand several years ago. If adequate resources are made available, both campuses will be able to surpass former enrollment ceilings in these areas.

Overall enrollments are projected to be stable at the 20,000 level at the Chicago campus, excluding the Health Sciences Center; at approximately 5,000 at the Health Sciences Center; and at approximately 35,500 at Urbana-Champaign.

TABLE 4
FALL TERM ON-CAMPUS HEADCOUNT ENROLLMENT
UNIVERSITY OF ILLINOIS

	Actual			Projected				
	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	FY 1990
	HDCT	HDCT	HDCT	HDCT	HDCT	HDCT	HDCT	HDCT
Chicago								
Lower Division	9,071	7,889	7,762	7,800	7,800	7,800	7,800	7,800
Upper Division	8,245	8,020	8,459	8,200	8,200	8,200	8,200	8,200
Total Undergraduate	17,316	15,909	16,221	16,000	16,000	16,000	16,000	16,000
GI	2,712	2,858	2,735	2,900	2,900	2,900	2,900	2,900
GII	975	1,054	1,126	1,100	1,100	1,100	1,100	1,100
Total Graduate	3,687	3,812	3,861	4,000	4,000	4,000	4,000	4,000
Total - Chicago	21,033	19,821	20,082	20,000	20,000	20,000	20,000	20,000
Health Sciences Center								
Lower Division	217	225	138	140	140	140	140	140
Upper Division	1,177	1,173	920	758	615	619	619	619
Total Undergraduate	1,394	1,341	1,058	898	755	759	759	759
Medicine	1,355	1,319	1,317	1,313	1,329	1,336	1,324	1,324
Dentistry	576	537	507	544	544	544	544	544
Dental Post Graduates	51	43	42	51	50	50	50	49
Pharm.D.	13	14	154	266	397	517	527	527
Total Professional	1,997	1,913	2,020	2,174	2,320	2,447	2,445	2,444
GI	615	650	629	721	754	794	826	885
GII	253	283	278	305	319	329	345	347
Total Graduate	868	874	907	1,026	1,073	1,123	1,171	1,232
Residents and Interns	551	586	621	560	562	562	562	562
Total (Excludes residents and Interns)	4,259	4,244	3,985	4,098	4,148	4,329	4,375	4,435
Total - Health Sci. Ctr.	4,811	4,830	4,606	4,658	4,710	4,891	4,937	4,997
Urbana-Champaign								
Lower Division	12,851	12,465	12,632	13,450	13,100	12,850	12,850	12,850
Upper Division	13,456	13,524	13,480	13,400	13,400	13,150	13,150	13,150
Total Undergraduate	26,307	25,989	26,112	26,850	26,500	26,000	26,000	26,000
Law	633	648	630	630	630	630	630	630
Veterinary Medicine	343	328	312	315	320	320	320	320
Total Professional	976	976	942	945	950	950	950	950
GI	3,414	3,421	3,374	3,400	3,400	3,400	3,400	3,400
GII	4,217	4,246	4,332	4,200	4,200	4,200	4,200	4,200
Total Graduate	7,631	7,667	7,706	7,600	7,600	7,600	7,600	7,600
Total - Urbana-Champaign	34,914	34,632	34,760	35,395	35,050	34,550	34,550	34,550
GRAND TOTAL University of Illinois (Excludes residents and interns)	60,144	58,697	58,827	59,493	59,198	58,879	58,925	58,985
GRAND TOTAL University of Illinois	60,727	59,283	59,448	60,053	59,760	59,441	59,487	59,547

GENERAL BACKGROUND FOR THE DEVELOPMENT OF THE FY 1987 CAPITAL BUDGET REQUEST

Substantially increased attention has been given during the past year to the University's overall need for improved physical facilities. A steadily growing array of difficulties have combined to diminish the adequacy of the University's academic buildings to the point that it has become clear that inadequate facilities now constitute the single most important threat to the quality of the University's academic programs.

The nature and scope of the University's facilities problems derive principally from two separate but related areas: on the one hand, the structural integrity of existing facilities, and of the campus-wide utilities systems which support them, must be assured. On the other hand, the capacity and configuration of academic facilities must be adequate to support a changing mix of academic programs as well as constantly changing emphases within programs. New knowledge and technology is evolving at an accelerating pace, particularly in laboratory sciences and engineering. To remain current with instructional and research activities, let alone to work at the forefront of knowledge development, often requires modification or upgrading of facilities and of support systems. The use of sophisticated equipment for teaching and research, frequently requiring specialized environmental controls, also demands space renovation. And those programs which are not faced with rapid changes in the state-of-the-art technology are confronted with the inevitable need for refurbishing aging facilities in which the cumulative effects of more than a decade of operating budget deficiencies have produced a monumental backlog of deferrred maintenance projects.

A comprehensive audit of the condition of nearly 290 buildings in which the University conducts its academic programs was completed during FY 1985. That study describes the need to replace certain facilities, and to renovate and remodel others. The overall deficiency approaches $600 million, which seems staggering in magnitude. From a capital budget planning perspective, however, the major thrust of the building condition audit is not so much the total size of the deficiency, but, rather, that the critical facilities problems now confronting the University will require a long-term solution which cannot be accomplished in a single year or two of increased activity and financial support.

In conducting the Building Condition Audit, a team of University engineers, architects, physical plant personnel, capital and space programming and planning experts, and faculty members from every college within the University rated virtually every academic building at both campuses. All structural components of each facility were reviewed (foundation, super-structure, exterior skin, plumbing, electrical, heating, ventilating, and air conditioning systems, etc.) and were assigned a representative number of deficiency points, which totaled 100. The total points assigned to any single category corresponded to its proportion of the building's replacement cost. By cummulating the points for each building, an assessment can be made of the total deficiency for each campus and for the University as a whole.

The Audit has produced an immense amount of information about University of Illinois facilities, about the major systems which support those facilities, and about the academic programs most in need of facilities improvements. As an indication of the type of information which can be gleaned from the Audit results, Table 5 shows a general outline of the major categories which can be compiled based upon the action required to eliminate the deficiency. For example, buildings with 61 or more deficiency points should be considered for razing and replacement. As can be seen, the buildings with these ratings would require $131.9 million to eliminate all deficiencies, but their entire replacement costs are only slightly higher, at $168.1 million. It would be far wiser to raze and replace these buildings than to attempt to repair or remodel them.

Buildings with deficiency ratings between 51 and 60 points should be considered for use for a purpose other than that which they now serve. For example, the Natural History Building now houses a major portion of the Urbana-Champaign campus life sciences facilities. Based on Audit data which show that facility with 55 points, it has been determined that it would be inefficient and ineffective to attempt to renovate Natural History to create adequate life sciences laboratory space. For other purposes, perhaps offices, classrooms, etc., the renovation of the building might prove appropriate, but not for the life sciences laboratory use. Note that the replacement costs for facilities in this category are nearly twice the size of the total deficiency, making remodeling a potentially sounder investment than for facilities in the first classification.

Buildings in the other two categories identified in Table 5 will require varying degrees of remodeling to remove the deficiencies identified in the Audit. Some of that remodeling can be accomplished with the R & R funds provided in the Build Illinois Program. The University's share of those funds--$7.8 million per year or nearly $40 million in total--can alleviate a portion of the deficiency in the minor remodeling category, but by no means the total. In addition, the R & R funds will have to address existing programmatic renovation or realignment needs, not all of which were included in the Audit, as well as those new needs which arise in future years.

Figure 2 displays another type of information which can be derived from Audit data. It examines the degree of deficiency in University facilities by age and type of facility. Separate trend lines are shown for buildings which have no laboratories, for those which have "dry" laboratories (e.g. drafting labs, statistical labs, computer labs, etc.), and for those which have "wet" laboratories (e.g. labs with fume hoods, special air, gas, or water lines, etc.). Interestingly, for the first twenty years of a building's life, the space deteriorates at nearly identical rates, regardless of type. After that point, however, differences begin to develop; by age forty, sharp distinctions begin to emerge, with facilities with the most complex and costly systems showing the greatest deficiencies. Not surprisingly, some of the University's highest priority capital needs--those affecting engineering, the life sciences, physics, chemistry, and basic medical sciences--are housed in facilities with a high proportion of "wet" laboratory space.

FY 1986 Capital Budget Progress

As with the operating budget, FY 1986 has proven to be a year of progress toward meeting some of the University's most critical capital needs. Along with the regular legislative capital budget process which appropriates funds to the Capital Development Board for State agencies and organizations, FY 1986 saw the creation of the Build Illinois Program. Build Illinois was designed as a series of capital initiatives to enhance the State's ability to attract new commerce and industry, and the University of Illinois figured prominently in Build Illinois appropriations for higher education.

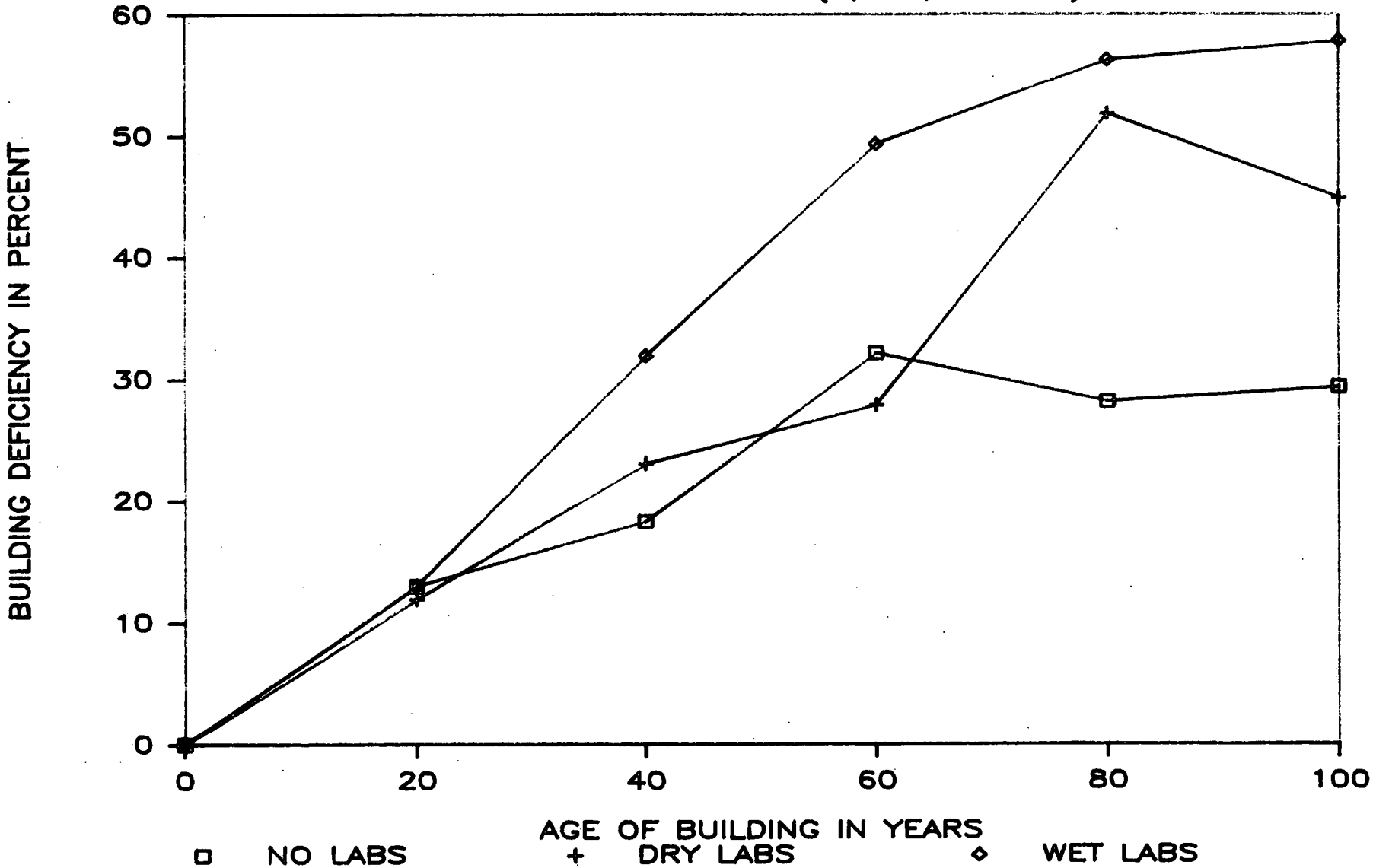
TABLE 5
GENERAL BUILDING CONDITION CATEGORIES
(DOLLARS IN MILLIONS)

	GENERAL GUIDELINE	REPLACEMENT COST	DEFICIENCY COST
61 AND ABOVE	CONSIDER REPLACEMENT	$ 168.1	$131.9
51 - 60	REALIGN USE/PROGRAM	148.4	79.3
21 - 50	MAJOR REMODELING	812.1	268.8
0 - 20	MINOR REMODELING	1,062.8	115.3
	TOTAL	$2,191.4	$595.3

FIGURE 2
UNIVERSITY OF ILLINOIS

COMPARISON OF DEFICIENCY TO AGE

FOR 167 BUILDINGS--(9,253,946 ASF)



The University received FY 1986 capital appropriations totaling nearly $47 million--again, the largest annual appropriation for academic facilities in two decades. The capital appropriations were divided roughly equally between two sources of funds, with $24.9 million coming from "regular" CDB funds and $21.9 million from Build Illinois. The following individual projects were approved by the General Assembly:

Regular Capital:	
Pharmacy Building Renovation--Chicago	$ 5.2 million
Library Improvements--Chicago	5.3 million
Admission Office Relocation--Chicago	1.2 million
Computer Lab Addition (Planning)--Urbana	1.1 million
Microelectronics Research Center--Urbana (to be combined with $10 million in Build Illinois)	3.7 million
Environmental Sciences Renovation--Urbana	3.5 million
Swine Research Facilities--Urbana	1.7 million
Food for Century III Equipment--Urbana	.6 million
Fire Service Institute--Urbana	2.6 million
Subtotal	$24.9 million
Build Illinois:	
Microelectronics Research Center--Urbana	$10.0 million
Engineering Research Building (Planning)--Chicago	2.4 million
Animal and Dairy Science Lab (Planning)--Urbana	1.0 million
Repair and Renovation Program--both campuses	7.8 million
Western Illinois Agriculture Center	.7 million
Subtotal	$21.9 million
Total Appropriation	$46.8 million

Governor Thompson has already signed the Build Illinois appropriation bill, although he has indicated that the release of funds for some projects may be delayed pending a review of the availability of funds. At the time this document was printed, the Governor had not yet acted upon the appropriation of regular capital funds.

FY 1987 Capital Budget Request

The projects which are expected to be approved for FY 1986 represent a significant step forward in meeting some of the most critical facilities needs at the University. As is clear from a review of the Building Condition Audit, however, the University's overall capital needs are of such magnitude that FY 1986's success should be viewed as a starting point for a prolonged period of attention to the backlog of capital requirements which must be met if the quality of University of Illinois instructional and research programs is to be maintained, and if new economic development initiatives are to be undertaken. Facilities needs have received comprehensive attention at both campuses, and continuing studies are underway. Extensive surveys have been completed of major utilities system needs, and they have documented the urgent requirement for upgrading the electrical capacity for both the north and south sectors of the Urbana-Champaign campus, for the emergency electrical distribution system at the Chicago campus, and for the Urbana-Champaign steam distribution system. Ongoing studies are examining the long range need for land acquisition in view of the growing reliance on both campuses of the University of Illinois for direct help in attracting new industry and technology to Illinois. Those efforts are beginning to be successful, and they carry a corresponding need to accommodate private sector research and development interests on or near both campuses.

While remodeling needs represent the largest single category within the FY 1987 request, the need to secure a steady flow of planning and construction funds for new facilities remains equally important. In some instances--such as the Digital Computer Laboratory Addition at Urbana-Champaign, or the Architecture and Art Addition, or the Engineering Research Laboratory Addition at Chicago--new facilities are required to accommodate growth in programs. In other cases, new facilities are required to replace outmoded facilities, particularly in the sciences and engineering, following which the old facilities can be razed, or remodeled more cost-effectively for a new use. Both campuses have completed an extensive review of the need for new or replacement space for their academic programs, and new construction, as well as remodeling, will be an integral part of the capital budget for a number of years to come.

Table 6 presents the FY 1987 Capital Budget Request project list is priority order. The Request seeks a total of $58.7 million for a combination of remodeling, new construction, utilities improvement and planning projects from "regular" capital resources. In addition, the request anticipates continued funding in the Build Illinois Program for the second year of the R & R Program, and for construction of the Engineering Research Facility in Chicago for which planning funds were appropriated this year. As noted in greater detail later in this document, it is also expected that Build Illinois revenues will be available for construction of the Animal and Dairy Science Laboratory, the final project in the University's Food for Century III Program. The projects and priorities reflected in Table 6 are based on the assumption that the Governor will approve all of the University of Illinois projects in the FY 1986 capital budget legislation which is awaiting his action at this time. Should that not be the case, some adjustments of the FY 1987 request may be requested.

A number of encouraging signs points to a recognition of the need for substantially increased support for the University's facilities needs. Funds for the Repair and Renovation Program in Build Illinois will make an immediate impact on a number of academic programs, and their availabiltiy for the next five years will significantly improve the planning process for additional remodeling work. Critical remodeling needs and planning funds for new facilities at both campuses are included within the FY 1986 budget as well. But those expanded efforts, welcome as they are, must be viewed as the beginning of a long term commitement to help the University maintain the quality of its academic programs by providing adequate support facilities, if the size and scope of the present facilities deficiency is to be reduced in any significant way, and if the University is to continue to grow as a major force for economic development in Illinois.

TABLE 6
UNIVERSITY OF ILLINOIS
FY 1987 CAPITAL REQUEST
PRIORITY LIST
(Dollars in Thousands)

Priority	Campus	Project	Budget Category	FY 1987 Request	Cumulative Cost University	Cumulative Cost Chicago	Cumulative Cost Urbana
1	U	Electrical Infrastructure	UTIL	$ 3,478.0	$ 3,478.0		$ 3,478.0
2	U	Computer Lab Addition	BLDG/UTIL	18,517.4	21,995.4		21,995.4
3	C	Clinical Sci. Bldg. Remd.	REMD	7,232.2	29,227.6	$ 7,232.2	
4	C	Physics Clean Room	REMD	1,025.0	30,252.6	8,257.2	
5	C	Architecture & Art Bldg. Addition	PLAN	611.9	30,864.5	8,869.1	
6	U	Life Sciences Research Lab	PLAN	1,200.0	32,064.5		23,195.4
7	U	Environmental Sciences Bldg. Remd.	REMD	3,750.0	35,814.5		26,945.4
8	C	Engineering Library Bldg. Addition	PLAN	389.7	36,204.2	9,258.8	
9	U	English Bldg. Remd.	REMD	3,200.0	39,404.2		30,145.4
10	C	Associated Health Sci. Bldg. Remd.	REMD	2,186.0	41,590.2	11,444.8	
11	U	Chemistry Lab Renovation	PLAN	200.0	41,790.2		30,345.4
12	C	Chemistry Lab Remd.	REMD	1,075.0	42,865.2	12,519.8	
13	U	Steam Distribution System	UTIL	730.0	43,595.2		31,075.4
14	C	College of Med - West Tower Utilities System Upgrade	PLAN	380.0	43,975.2	12,899.8	
15	U	Painting and Pottery Lab	BLDG	672.8	44,648.0		31,748.2
16	U	Core Campus Land Acquisition	LAND	685.0	45,333.0		32,433.2
17	C	Pharmacy Bldg. Remd.	REMD	1,493.8	46,826.8	14,393.6	
18	U	Pilot Training Facility	BLDG/UTIL	965.7	47,792.5		33,398.9
19	U	WILL Radio-TV Bldg.	PLAN	450.0	48,242.5		33,848.9
20	C	Alumni Hall Remd. for Student Services	REMD	1,150.0	49,392.5	15,543.6	
21	U	Mechanical Engr. Bldg. Remodeling	REMD	2,800.0	52,192.5		36,648.9
22	U	Vet. Med. Lab Remd.	PLAN	280.0	52,472.5		36,928.9
23	C	Campus Emergency Electrical Dist. System	UTIL	1,513.5	53,986.0	17,057.1	
24	C	Campus Fire Alarm Upgrade	REMD	1,007.3	54,993.3	18,064.4	
25	C	Computer Center Elect. System Upgrade	UTIL	1,500.0	56,493.3	19,564.4	
26	U	Federal Research Facility Site Dev.	BLDG/SITE	2,220.0	58,713.3		39,148.9
Build Illinois Projects							
*	C	Engineering Research Facility	BLDG	22,499.9			
*	C/U	Renovation/Rehabilitation	REMD	7,834.0			

FISCAL YEAR 1987 OPERATING BUDGET REQUEST

INTRODUCTION

Table 7 presents an historical summary of the Board of Trustees Operating Budget Requests from FY 1976 through FY 1986. As discussed in the previous section, and as can be seen in Table 7, the current year's new revenues continue the improvement over earlier years in the total amount of new funds received by the University. On the other hand, the University's requests for FY 1984, FY 1985, and FY 1986 were significantly larger than any in the past decade, reflecting the damage incurred when the FY 1983 increment was substantially below the amount needed even to meet unavoidable cost increases. Seen in a four year context, the FY 1984, FY 1985, and FY 1986 increments represent a four-year compounded annual increase of approximately 5.0%--a much more modest growth rate than the FY 1986 figure alone would suggest.

The FY 1987 Operating Budget Request is presented in four major sections: Continuing Components--those activities necessary to maintain the University's current level of operation, Programmatic Components--those new, expanded, and improved efforts which will enable the University better to respond to the demands for its services, Resource Matching Requirements--an amount required to support major equipment grants which the University has received from the Federal government and from corporate gifts, and Special Services/Special Funding Components--those activities carried out at the University by direct legislative mandate, often with specifically dedicated funds to support them, but which are outside the traditional instructional, research, and service areas. Table 8 displays the full incremental request, while Table 9 identifies individual programs included in the request.

In addition to these major sections, two appendices are included. Apprendix I presents FY 1987 Retirement funding needs and Appendix II includes technical data for the calculation of incremental needs for continuing components.

TABLE 7
University of Illinois
History of the Operating Budget Action FY 1976 - 1986
(Dollars in Thousands)

	(1) Previous Year's Base[1]	(2) University Request	(3) IBHE Rec.	(4) Allocation of Gov. Budget	(5) Legislative Action	(6) Governor's Action	(7) Final	(7 ÷ 1) % Final of Previous Base	(7 ÷ 2) % Final Of System Request
FY 1976	$218,424.5	$32,343.5	$23,899.4	--	$29,375.8	$16,950.7	$16,950.7	7.8	52.4
FY 1977	235,375.5	26,780.3	21,233.3	$10,064.5	15,950.7	10,172.5	14,644.3	6.2	54.7
FY 1978	250,019.4	31,036.0	23,305.4	16,551.6	17,423.0	15,906.3	15,906.3	6.4	51.3
FY 1979	265,925.8	34,106.6	26,415.5	24,568.1	24,799.6	24,755.6	24,755.6	9.3	72.6
FY 1980	290,681.4	37,473.3	28,320.4	27,550.8	31,279.3	31,279.3	32,188.6[2]	11.1[2]	85.9
FY 1981	321,158.3[3]	41,086.4[4]	33,830.6	32,391.9	34,688.3	32,391.9	32,391.9	10.1	78.8
FY 1982	353,550.3	47,995.7	41,307.8	28,164.6[5]	28,164.6	28,164.6	28,334.6[6]	8.0	59.0
FY 1983	381,884.9	48,733.5	34,627.5	3,935.7	9,622.5[7]	7,976.2[7]	7,976.2[7]	2.1	16.4
FY 1984	389,861.2	61,587.8	43,695.0	-1,941.6	43,427.8	43,427.8	44,427.8[8]	11.4	72.1
FY 1985	433,288.9[9]	58,580.2	35,675.4	24,989.3	30,429.3	30,429.3	31,074.3[10]	7.2	53.0
FY 1986	464,718.2[11]	52,088.7	48,269.0	43,936.2	42,857.3	42,857.3	42,857.3	9.2	82.3

[1]Excludes Retirement and IBA.

[2]Includes non-recurring funds of $401.00 for flood damages and $508.3 for Division of Services for Crippled Children override; percentage without these funds is 10.8.

[3]Excludes non-recurring funds of $401.0 flood damage, $508.3 DSCC override. FY 1981 funding no longer includes an appropriation of $802.4 for Refunds.

[4]BOT printed request of $40,445.4 plus DSCC price and salary increases of $641.0.

[5]Represents amount in Governor's Revised Budget. Governor's original recommendation was $28,563.3.

[6] Includes an additional $170.0 appropriated to the University from Real Estate Research and Education Fund in HB 774.

[7] Excludes $1.0 million for lease/purchase of Chicago Medical School facility.

[8]Includes $1.0 million for operation of Chicago research and technology facility.

[9]Base does not include $1.0 million for operation of Chicago technology facility, since it was nonrecurring.

[10]Includes non-recurring funds of $645.0 thousand for fire damage.

[11]Excludes non-recurring funds of $645.0 thousand for fire damage. Includes $1.0 million for Supercomputing Research.

TABLE 8
UNIVERSITY OF ILLINOIS
FY 1987 OPERATING BUDGET REQUEST
(Dollars In Thousands)

I. Continuing Components		
A. Compensation Improvement		$34,793.9
1. Annualization of FY 1986 Increases	($ 4,529.1)	
2. FY 1987 Increment (7.5%)	(23,364.8)	
3. Fringe Benefit Improvements	(6,900.0)	
B. General Price Increases (6%)		4,019.8
C. Utilities Price Increases (6.4%)		2,468.8
D. Library Price Increase		980.0
1. Regular Increase (7%)	($ 480.0)	
2. Restoration	(500.0)	
E. Operations and Maintenance Support		1,368.7
1. New Areas	(368.7)	
2. Preventive Maintenance Improvements	($ 1,000.0)	
Subtotal, Continuing Components		$43,631.2
% of FY 1986 Base*		(8.60%)
II. Programmatic Components		
A. Equipment Replacement		$ 1,750.0
B. Expanded/Improved Academic Programs		11,335.0
C. Engineering Revitalization		4,000.0
Subtotal		$17,085.0
% of FY 1986 Base		(3.37%)
III. Resource Matching Requirements		$ 2,210.0
% of FY 1986 Base		(.44%)
IV. Special Services/Funding		
A. Soil and Water Conservation		$100.0
B. Financial Management for Illinois Farms		150.0
C. Economic Development for Illinois		100.0
D. Fire Service Institute		47.0
Subtotal		$397.0
V. Total Request		$63,323.2
% of FY 1986 Base		(12.47%)

*FY 1986 Base = $507,575.5 excluding nonrecurring appropriations.

TABLE 9
FY 1987 PROGRAM BUDGET REQUEST
(Dollars in Thousands)

	UIC	UIUC	CA	TOTAL
I. Equipment	$ 750.0	$1,000.0		$1,750.0
II. Expanded/Improved Program Themes				
A. Scientific and Technological Advances				
1. Biotechnology (incl. Biotech & the Law)	$ 800.0	$ 700.0		$1,500.0
2. Environmental Toxicology		200.0		200.0
3. Surface Chemistry and Catalysis		120.0		120.0
4. Artificial Intelligence/Cognitive Science		180.0		180.0
5. Rehabilitation Engineering		200.0		200.0
6. Academic Computing	850.0			850.0
Subtotal	$1,650.0	$1,400.0		$3,050.0
B. Economic and Professional Development				
1. College of Veterinary Medicine		$ 750.0		$ 750.0
2. Acting and Design for Television		130.0		130.0
3. Strengthening Commerce and Business Administration	$ 500.0	300.0		800.0
4. Health Administration	200.0	120.0		320.0
5. Retaining Medical Graduates in Illinois	100.0			100.0
6. Pharmacy Continuing Education	150.0			150.0
7. Planning/Technology/Economic Development	200.0			200.0
8. Undergrad Program in Computer Science	200.0			200.0
9. Office for Advanced Engineering Studies			$350.0	350.0
10. Technology Transfer Specialists			250.0	250.0
Subtotal	$1,350.0	$1,300.0	$600.0	$3,250.0
C. Increasing International Involvement				
1. International Programs	$ 350.0			$ 350.0
2. Arms Control, Disarmament and International Security		$ 110.0		110.0
Subtotal	$ 350.0	$ 110.0		$ 460.0
D. Responding To The Impact of An Aging Society	$ 500.0			$ 500.0
E. Strengthening Basic Instruction at all Levels of Illinois Education				
1. Undergraduate Initiatives	$ 700.0	$1,050.0		$1,750.0
2. Program Support for Elementary and Secondary Schools	100.0	450.0		550.0
Subtotal	$ 800.0	$1,500.0		$2,300.0

	UIC	UIUC	CA	TOTAL
F. Advancing Minority Educational Achievement				
1. Outreach Activities	$ 75.0	$ 100.0		$ 175.0
2. Attracting Minorities to UI	465.0	675.0		1,140.0
3. College Based Retention	315.0			315.0
4. Campus Coordination of Minority Programs	145.0			145.0
Subtotal	$1,000.0	$ 775.0		$ 1,775.0
Expanded/Improved Programs Total	$5,650.0	$5,085.0	$600.0	$11,335.0
III. Engineering Revitalization	$1,375.0	$2,625.0		$ 4,000.0
FY 1987 UNIVERSITY PROGRAM BUDGET REQUEST TOTAL:	$7,775.0	$8,710.0	$600.0	$17,085.0

CONTINUING COMPONENTS

SALARY AND BENEFIT INCREASES
($34,793,900)

The quality of the academic programs offered by any university depends, to a large extent, upon the strength of financial support for its research and teaching facilities, equipment, libraries, support staff and faculty. While no single element of this mix alone can sustain academic excellence, faculty and staff represent the keystone of the enterprise. The quality and accomplishments of University of Illinois faculty and staff are widely acknowledged; and the University must work constantly to attract and retain the high quality employees who sustain the strength of these academic programs and their national and international prestige. The University's salary and benefits program must support these objectives, as well as ensure that the University can maintain a competitive position relative to peer institutions who seek equally well-qualified faculty and staff.

A salary and fringe benefits program which is competitive with programs offered by peer institutions is essential to attract and retain the highest quality faculty and staff. Erosion in the competitiveness of salaries, or of fringe benefits, can increase the number of highly productive employees who accept more attractive offers at other institutions or in the private sector; it can reduce the ability of the University to attract the best qualified candidates to new or vacant positions; and it can reduce the productivity and morale of current staff. In contrast to the private sector, the nature of the academic and public sector market place is such that it is relatively easy for University employees to determine whether or not their compensation is "competitive." To compete successfully with programs offered by peer institutions, the University must establish an overall program of salary and other benefits which is commensurate in all respects with the overall quality of the institution. It is not sufficient to be competitive in just one area of an overall compensation program; all segments must be addressed.

To evaluate the compensation program offered by the University, compensation must be viewed as a package consisting of both cash salary and fringe benefit components. Faculty and staff appraise the competitiveness of the University's total compensation package on the basis of both of these components. While the adequacy of the fringe benefits package varies

based on each individual's unique financial situation and personal need for benefits, employees assess the University's current fringe benefit program on the basis of both the type of coverage offered by the University and the amount of the University's contribution toward the cost of the benefits package. To maintain a competitive benefits program, the University must give sufficient attention to these elements of the program.

Direct cash salary can be regarded as the central, though by no means the exclusive, element within the total compensation package. As the most visible element within the overall package, it is the one which tends to receive initial attention when peer comparisons are made. As the competition for top-ranked faculty and staff has intensified over the past several years, however, all elements of the total benefits package have come under close scrutiny. The growing competition for faculty and key staff members forces attention to the entire benefits package which the University offers.

The overall quality of the University's academic programs, as measured by a wide variety of national assessments, place the University among the top three Big Ten institutions; and the University has set that target as a minimum achievement for its compensation program for several years. To assess the University's competitive standing, numerous analyses are performed annually to determine its overall standing among appropriate peer groups. Cash salary and employer contributions to fringe benefits for academic employees are assessed through comparisons with Big Ten and other peer institutions, while nonacademic salary comparisons are made with equivalent employee groups outside the University.

Benefit comparisons are commonly made among the basic elements of the fringe benefits package. Since it is difficult to provide a quantitative assessment of the value of the actual benefit coverage provided, the employer contribution to fringe benefits is most often used to measure differences in fringe benefit packages. While most institutions offer a variety of supplemental options to the fringe benefits package, certain basic coverages are generally offered by all institutions. Benefits most often used for comparative purposes include the employer contributions to life, health, dental and disability insurance costs and contributions to the institution's employee retirement plan. Compensation analyses are conducted

separately for the central element of salaries, and for overall compensation, as described in the following sections.

Faculty Salaries

For the past several years, the University of Illinois has endeavored to achieve the objective of at least third place among Big Ten institutions in average cash salary. Although progress has been made toward achieving this goal, the University is still 4.3% behind third place. The following table shows the University's average faculty cash salary relative to third place in the Big Ten for FY 1979 through FY 1985. Salaries displayed represent full-time budgeted faculty, and are displayed on a nine-month basis for all academic ranks combined and weighted to the University of Illinois' distribution of faculty among the ranks.

	FY 1979	FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985
Illinois	$23,249	$25,187	$27,592	$30,171	$31,640	$34,563	$37,050
Third Place	23,676	25,485	28,012	31,021	33,733	36,048	38,654
$ Difference	427	298	420	850	2,093	1,485	1,604
% Difference	1.8%	1.2%	1.5%	2.8%	6.6%	4.3%	4.3%

(It should be noted that the average salaries shown above for FY 1982 and FY 1983 have been adjusted to represent rate increases in effect during those years rather than actual increases. FY 1983 was a particularly problematic year due chiefly to a mandated reduction of $8 million in the University budget base, requiring staff reductions and a delay in the implementation of the mid-year salary increase. Although the average salary rate for budgeted full-time faculty increased by 4.9% in that year, the actual cash increase received by University employees amounted to only 1.2%.)

In FY 1985, the University of Illinois continued to lag behind third place by 4.3%, the same percent gap experienced in FY 1984. While a substantial improvement over the FY 1983 gap of 6.6%, the University continues to find itself farther behind third place than in the years preceding FY 1983 when the percent gap ranged from 1.2% to 2.8%.

Table 10 displays average salaries of faculty at Big Ten institutions for FY 1984 and FY 1985. All salaries are displayed on a nine-month basis for all ranks combined, and are weighted to the distribution of faculty rank and term of appointment at the University of Illinois. The percent increase in weighted average cash salary is also displayed. As mentioned above, the University of Illinois continued to rank in fourth place in FY 1985. While the University received an overall increase in average salary of 7.2%, other Big Ten institutions averaged a 6.9% increase in FY 1985. However, salary increases at the top three institutions averaged slightly over 7%, allowing the University of Illiniois no gain on the third place position. The 7.2% increase includes incremental state funds for salary increases of 6% (calculated on 95% of the Personal Services base), internal reallocation of approximately 1%, and a special salary increment for faculty in Engineering programs averaging an additional 2%.

In essence, the comparative data presented here reflect the dilemma which the University has faced over the past several years. Concerted efforts to improve faculty salaries have been made, and have succeeded. Yet those institutions with which the University must compete have also been successful in increasing their salaries as well, intensifying the pressure for maintaining competitive faculty salaries.

Figure 3 displays the FY 1985 ranking of Big Ten faculty salaries graphically. Note that while the top three institutions are rather closely clustered, the University of Illinois' fourth place position is substantially below the top cluster. It is critically important for the University to close the salary gap to the top institutions, as well as to achieve a specific ranking within the Big Ten. Should the top two institutions move significantly above the rest, the University's competitive position would be damaged, regardless of whether a third place ranking had been achieved.

The FY 1986 University appropriation provides a general salary increase program which includes a 7.5% increment (calculated on 95% of the Personal Services Base). A second increment equal to .5% of the Base will be provided for special merit, market or equity concerns. These increases should result in an overall average increase in salaries of about 8% for most disciplines. The FY 1986 appropriation also includes funding for the third year of the Special Engineering Program. Within these funds are salary

TABLE 10
AVERAGE SALARIES FY 1984-FY 1985
BIG TEN INSTITUTIONS

(9-month basis)

Institution	FY 1984 Weighted Average Salary	RANK	FY 1985 Weighted Average Salary	RANK	% Increase
ILLINOIS	34,563	4	37,050	4	7.2%
I	30,138	10	31,922	10	5.9%
C	32,824	7	36,085	5	9.9%
F	36,371	2	38,862	2	6.8%
H	31,789	8	33,428	8	5.2%
A	33,250	5	35,434	6	6.6%
X	36,823	1	39,584	1	7.5%
E	36,048	3	38,654	3	7.2%
B	33,108	6	35,389	7	6.9%
J	30,648	9	32,304	9	5.4%
MEAN	33,556		35,871		6.9%
MEAN LESS ILLINOIS	33,444		35,740		6.9%

Source: University of Minnesota Comparison of Average Salaries and Fringe Benefits.

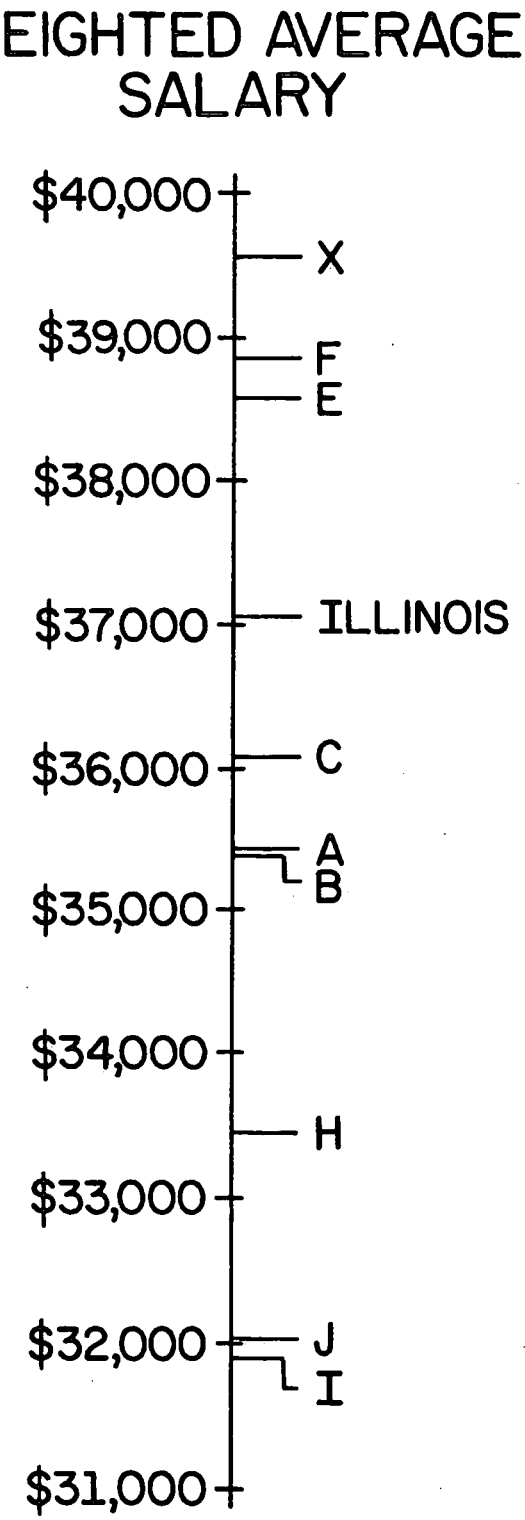
Data represents total institutions' full-time faculty, excluding clinical departments, whose primary responsibilities are teaching, research or public service. Weighted to the distribution of faculty rank and term of appointment at the University of Illinois.

Distance to 3rd Place--Average Salaries

	FY 1984	FY 1985
ILLINOIS	$34,563	$37,050
3rd Place	$36,048	$38,654
$ Difference	$ 1,485	$ 1,604
% Difference	4.3%	4.3%

FIGURE 3

FY1985 AVERAGE SALARY AMONG BIG TEN UNIVERSITIES



enhancement dollars which will permit the College of Engineering to maintain its competitive position in the specialized market in which it must compete.

Current information indicates the increase in FY 1986 salaries at other Big Ten institutions will average approximately 6%, and, based on preliminary data, the University's salary ranking is not expected to change from fourth place. The gap to third place could well be reduced, although the precise size of the gap can not be calculated until final information on FY 1986 salaries by faculty rank is received from other Big Ten institutions.

Figure 4 provides a graphic recap of the University's progress toward achieving a salary ranking within the top of the Big Ten. As noted, early progress toward closing the salary gap was offset in later years, first by significant increases at other institutions, and then by a severe drop in the University of Illinois increase in FY 1983. While the past three years have provided some recovery from that loss, the gap remains larger in FY 1986 than it was in FY 1979, placing continued emphasis on the need to improve the University's competitive salary position for FY 1987.

Salary increases tied to inflation projections of 5% represent the best current estimates of salary increases for other Big Ten institutions in FY 1987. An increment of this magnitude plus an additional 2.5% to reduce the gap to third place represents the University of Illinois' request for FY 1987.

Faculty Fringe Benefits

While the University has made progress toward closing the gap to third place in terms of average cash salary, the distance to third place is greater in terms of total compensation. Table 11 compares the University's ranking among Big Ten institutions for FY 1985 based on weighted average salary versus weighted average compensation. Weighted average compensation is calculated by adding the dollar value of the employer contribution to fringe benefits to weighted average cash salary. Employer contribution to fringe benefits is displayed as a percent of average salary.

Although the University ranked fourth among Big Ten institutions in average cash salary in FY 1985, its average faculty compensation ranked seventh. The gap to third place in terms of total compensation was 8.9%.

FIGURE 4

U of I AVERAGE FACULTY SALARIES vs. THIRD PLACE BIG TEN AVERAGE

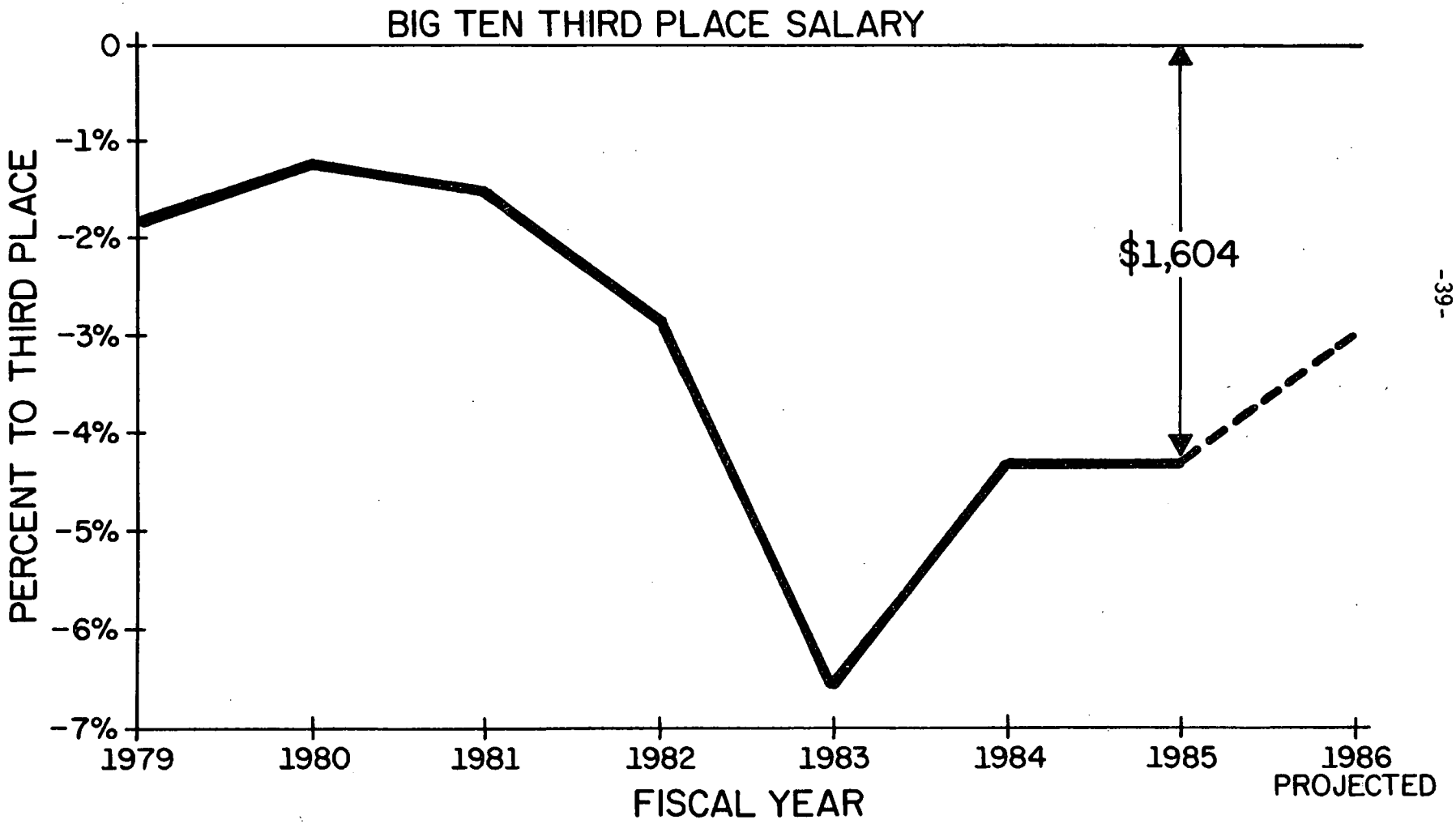


Figure 5 displays the University's relative position in both average cash salary and total compensation for faculty members. Note that while most other institutions retain the same competitive position in the total compensation comparisons as in the salary comparisons, the University of Illinois' position drops dramatically. In the compensation comparisons, it is clear that the top two institutions are significantly ahead of the others. It is equally clear that the University of Illinois is clustered near the bottom of the rankings, rather than in the upper range of the middle cluster of institutions, as in the salary comparisons.

Again, the total compensation figures in Table 11 and Figure 5 represent the combination of salaries and the dollar value of employer contributions to a set of common fringe benefits. When the latter category is separated from salaries and fringe benefit contributions are reviewed on their own, the University of Illinois comparisons are even more serious. For FY 1985 the University ranked last in the percent of average salary contributed to fringe benefits, contributing only 12.8% compared to employer contributions averaging over 23% for other Big Ten institutions. While some of this difference is attributable to the fact the University does not participate in Social Security, the University also lags behind other Big Ten institutions in the amount paid for other elements of the fringe benefits package.

A recent comparison of FY 1985 employer contributions to fringe benefits in the Big Ten yielded the following information:

1. The University of Illinois is one of two Big Ten institutions not participating in Social Security and <u>ranks last in overall employer contributions to retirement</u>.
2. The University of Illinois is competitive in regard to employer contribution to employee health insurance, but <u>ranks last in employer contribution to dependent health insurance</u>.
3. The University of Illinois <u>ranks last in the amount of employer-paid life insurance.</u>
4. The University of Illinois <u>ranks last in the percent of salary ensured under the long term disability plan</u>.

TABLE 11
AVERAGE COMPENSATION FY 1985
BIG TEN INSTITUTIONS

(9-month basis)

Institution	FY 1985 Weighted Average Salary	Rank	FY 1985 Weighted Average Compensation	Rank	Benefits as a Percent of Average Salary
ILLINOIS	$37,050	4	$41,793	7	12.8%
I	31,922	10	40,617	9	27.2%
C	36,085	5	43,781	6	21.3%
F	38,862	2	47,606	2	22.5%
H	33,428	8	41,369	8	23.8%
A	35,434	6	44,464	4	25.5%
X	39,584	1	48,530	1	22.6%
E	38,654	3	45,512	3	17.7%
B	35,389	7	44,363	5	25.4%
J	32,304	9	40,316	10	24.8%
MEAN	35,871		43,835		22.2%
MEAN LESS ILLINOIS	35,740		44,062		23.3%

Source: University of Minnesota Comparison of Average Salaries and Fringe Benefits.

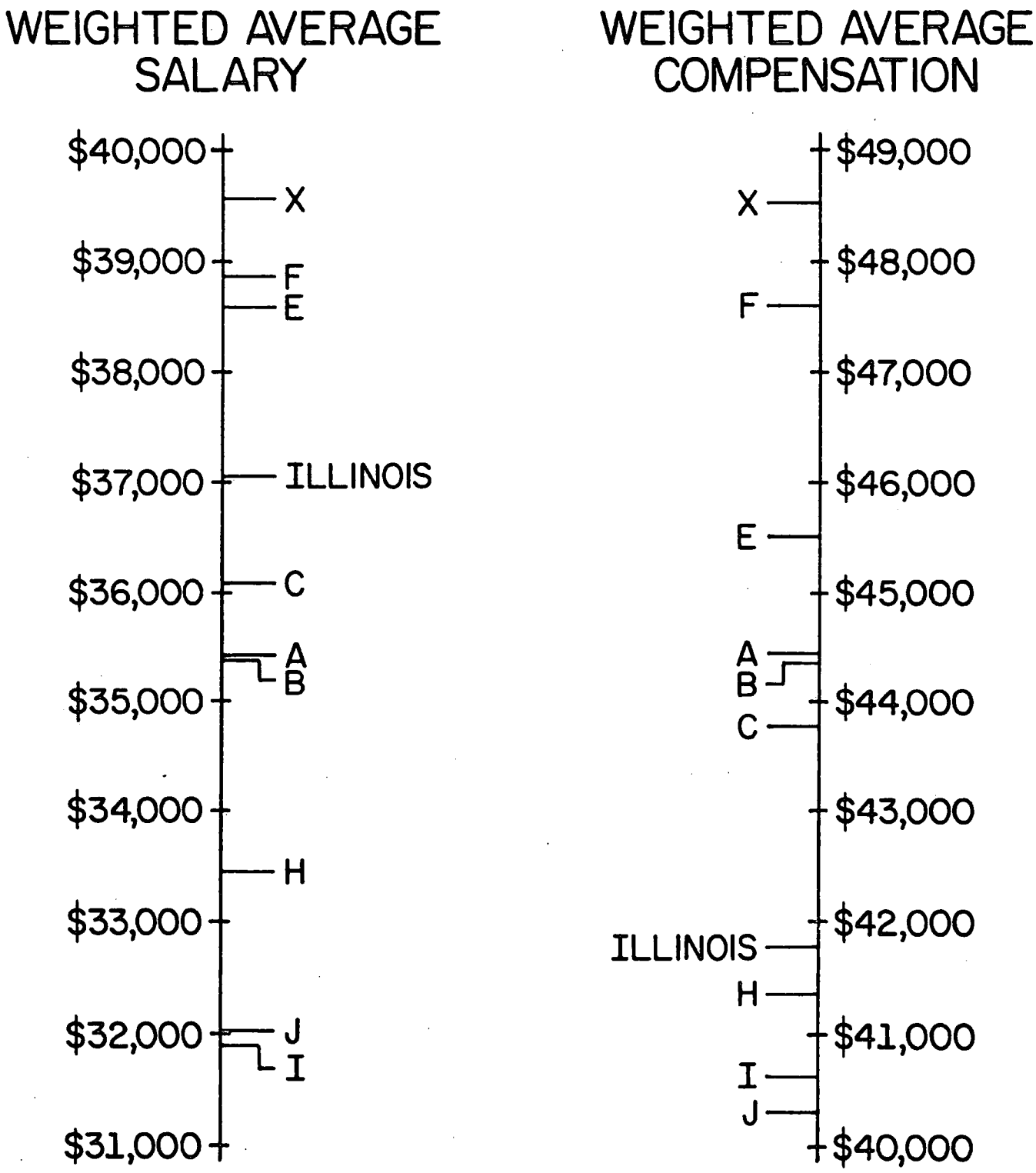
Data represents total institutions' full-time faculty, excluding clinical departments, whose primary responsibilities are teaching, research and public service. Weighted to the distribution of faculty rank and term of appointment at the University of Illinois.

Distance to 3rd Place--Average Compensation

	FY 1985
ILLINOIS	$41,793
3rd Place	45,512
$ Difference	3,719
% Difference	8.9%

FIGURE 5

FY 1985
AVERAGE SALARY & COMPENSATION AMONG BIG TEN UNIVERSITIES



5. Six of the Big Ten institutions pay some portion of the premium cost of dental insurance for employees and dependents. The University Illinois offers no employer-paid dental coverage to its employees.
6. Five of the Big Ten institutions grant a partial reduction in tuition and fees to staff dependents. The University of Illinois offers no tuition waiver of any kind for dependents of employees.

The University's low ranking in the amount of employer contribution to fringe benefits substantially weakens its competitive standing in terms of faculty compensation. To be competitive, the fringe benefits package offered by the University must not detract from the salary component which is beginning to reach an appropriate level. A recent survey of the faculty indicated that they do indeed recognize that the University's fringe benefits package is deficient, compared with fringe benefits offered by peer institutions. The widely held perception that the fringe benefits program at the University of Illinois is deficient in certain basic but essential areas is borne out by the comparative data just cited. It has become clear that the University must address the adequacy of its fringe benefit program if it is to continue to compete successfully for top faculty members.

Among the benefit comparisons cited above, the health of the State Universities Retirement System (SURS), as well as the University's relative competitiveness among other institutions with respect to retirement benefits has been a matter of prime concern for several years for both individual employees and for leaders within higher education institutions and the SURS system. Any discussion of fringe benefit improvements for higher education in Illinois must include a strong call for adequate funding of the existing SURS program, to insure that existing benefits will remain secure.

It should also be understood, however, that while achieving adequate funding for SURS remains a key concern for FY 1987 and for future years, funding improvements for SURS will not, in and of themselves, improve either the benefits available to University employees or the University's competitive position among peer institutions. It is urgent that the University move forward on both fronts. The adequacy of SURS fiscal support must be assured. So, too, must improvements in the University's competitive position in total compensation be achieved. Appendix I contains a more

complete discussion of the SURS funding situation, while the FY 1987 proposal for funds to address the University's competitiveness in total compensation is included at the end of this section.

Nonacademic Salary Comparisons

For nonacademic staff, annual salary comparisons are normally made with employers outside the University who are most directly competitive for the services of that staff. In some cases, comparisons are made with local employers; in other cases, broader comparisons are made if the market for particular employee skills is statewide or greater. The composite survey of the market, which compares the salary range midpoints for comparable employment levels, is incomplete at this time. However, preliminary market data show increases ranging up to 5% with numerous increases of a lesser percentage. A 4% average market increase is being assumed at this time.

The data in the table below compare selected University of Illinois grade midpoints with estimated market midpoints.

Grade/ Location	UI FY 1985 Midpoint	Projected Market as of 9/1/85	UI FY 1986 Grade Midpoint	% Behind Market
5 Chicago	$10,740	$12,303	$11,223	9.6%
5 Urbana	$ 9,923	$11,450	$10,370	10.4%
14 (both)	$15,945	$18,860	$16,664	13.2%
19 (both)	$20,622	$24,735	$21,551	14.8%
33 (both)	$42,641	$51,990	$44,560	16.7%

(Salaries displayed represent University and market midpoints for employees within each pay grade. Actual average salaries are substantially lower.)

In addition to market comparisons among competing employers, salary comparisons between nonacademic employees and State of Illinois Code Departments are reviewed annually to gain a general impression of relative equity among University of Illinois employees and their counterparts in State government. Based upon data compiled by the Board of Higher Education, the following comparison can be made.

Salary Deficiencies Between University of Illinois
Nonacademic Employees and State of Illinois
Code Department Employees, FY 1980 - FY 1985

	FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985
Chicago Campus				- 8.57%	- 5.58%	- 5.11%
University Center	- 4.93%	- 5.09%	- 7.52%			
Health Sciences	- 4.63%	- 2.69%	- 2.83%			
Urbana-Champaign	-18.76%	-20.41%	-20.44%	-20.99%	-17.40%	-14.83%

(FY 1983 comparison data includes the University's delayed FY 1983 increase of 3% granted in March, 1983.)

These comparisons make no attempt to adjust salaries for regional differences in cost of living, nor for regional differences in market competition. Thus, they are most useful to gauge changes over time, rather than absolute differences. However, regardless of which measure is employed, it is clear the University's nonacademic salary levels significantly lag behind those of other comparable employers.

For FY 1986, the overall salary increase for nonacademic employees on the Step Plan will roughly match the increase for academic salaries of 8%. This increase will be comprised of a 4.5% "market movement" increase, a 4% step increase for eligible employees (approximately 80% of those on the Step Plan) and additional funds for superior performance raises.

For FY 1987, salary increase funding is requested to keep pace with the projected level of inflation and to reduce a portion of the gap between salaries of the University's nonacademic employees and external market salaries. In general, nonacademic employees as a group tend to be even further behind their peer salary comparison groups than do academic employees. Based upon existing studies of fringe benefits comparisons for nonacademic employees, it appears that as a group, nonacademic employees are somewhat more competitive with external peer groups than are academic employees, although it is clear that individual benefits need to be improved for all University of Illinois employees. Further analyses are underway to attempt to determine more precisely the extent to which the University's

fringe benefits program for nonacademic employees lags behind benefit programs for appropriate comparison groups.

FY 1987 Benefits Improvement Request

The University's overall objective for FY 1987 is to enhance its salary and benefits programs to become more competitive with its peers. Whereas the external labor market is different for academic and nonacademic employees, the University recognizes that salary and compensation deficiencies exist for both. To address the needs of all employees, the University seeks $6.9 million in incremental FY 1987 funds to target its compensation improvement program toward resolving the most pressing deficiencies of each employee group. Funding of this magnitude would permit the University to make approximately $600 per year available to all employees in State-funded positions. Employees could then apply the $600 against the cost of the particular set of benefits which applied to them. Current information indicates no significant changes in the fringe benefits packages offered at other Big Ten institutions. Thus, an addition of $6.9 million to the funds which the University of Illinois is able to provide for fringe benefits would begin the improvement of the University's competitive position with respect to total compensation. If the University is unable to secure funds to address specific improvements in the fringe benefits program available to its employees, the only alternative is to secure more substantial improvements in cash salaries, improving the competitive position in total compensation through only one portion of the total compensation package for employees.

Recent Improvements to the Fringe Benefits Program

Senate Bill 840, which was recently signed by the Governor and is awaiting implementation, permits State employees to enter into agreements with their employers to elect to receive, in lieu of salary or wages, benefits which are not taxable under the Federal Internal Revenue Code. These agreements may include the acceptance of a reduction in earnings, or the foregoing of an increase in earnings by an employee. The premium amounts currently paid by the individual with after-tax dollars, can be paid by the employer, thus reducing the individual's taxable income.

University benefits eligible for tax exemption include dependent health insurance, dental insurance and optional State life insurance. Individuals currently enrolled or wishing to enroll in these benefit options would benefit from a "tax savings", and thus an increase in "take-home" pay. Whereas implementation of this plan would benefit the individual, the change will not increase the University's competitive standing in terms of employer contribution to fringe benefits.

PRICE INCREASES

General Price Increases ($4,019,800)

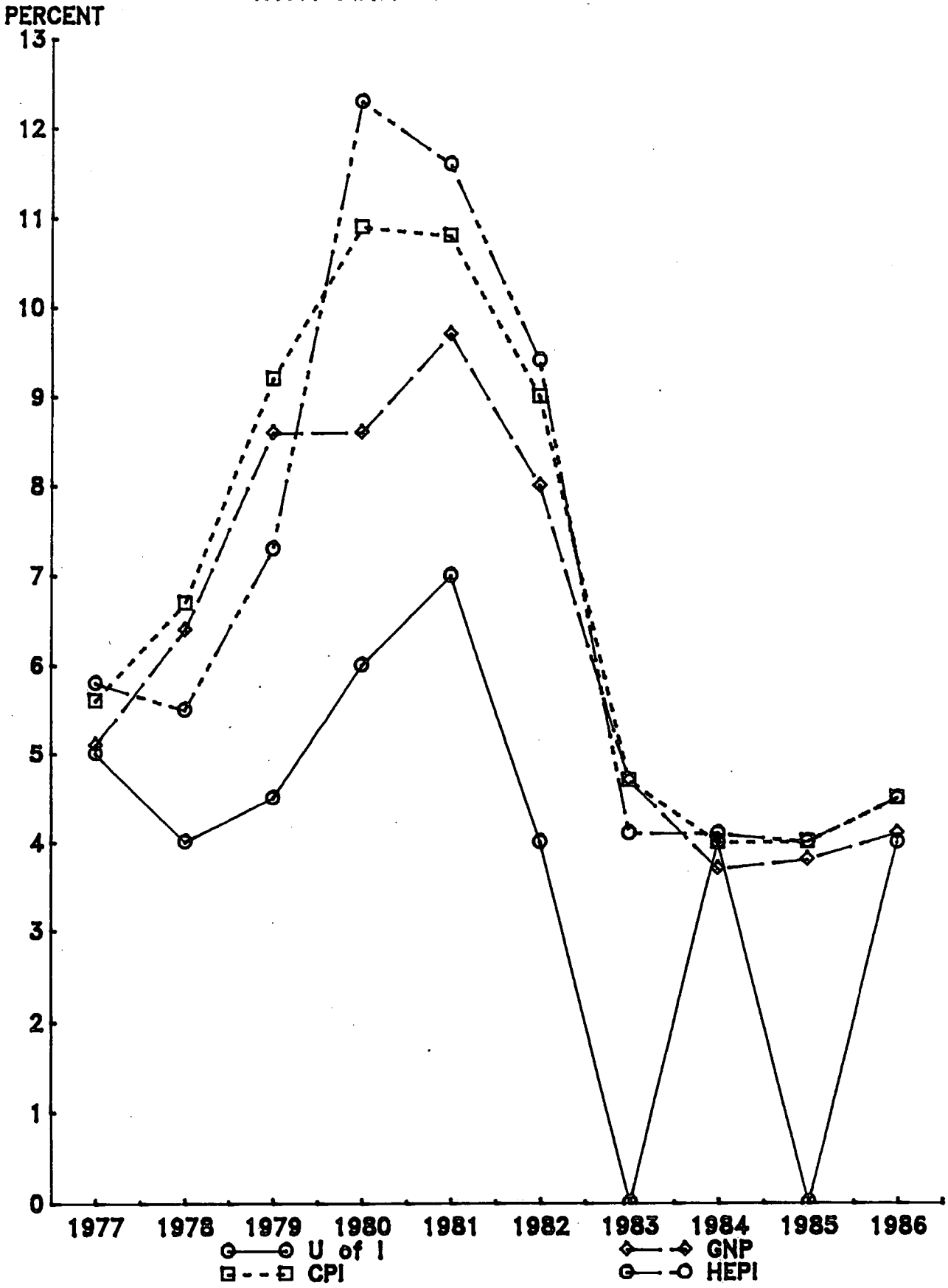
The requirements for general price increase funding are determined through a comparison of the University's past funding levels with inflation, quantified by several economic indicators. In addition to historical comparisons which focus on cumulative gains and losses to inflation, the University relies upon economic forecasts to project the impact of inflation on prices during the budget year. Collectively these analyses yield a general price increase request which would permit the University to regain some of its past losses to inflation and to maintain its purchasing power during the budget year.

The three price increase measures used to assess the impact of inflation on the University are all of the "market basket" variety which combine several differentially weighted cost components into a single index. Although all three indices share a common model, there are differences in the market basket compositions and in their sensitivity to various segments of the economy. The first index, the Gross National Product Implicit Price Deflator, defines that portion of overall GNP growth that is attributable to factors other than real growth in the production of goods and services by business and industry. The second indicator, the Consumer Price Index (CPI) measures the change in prices paid by urban households for items such as food, housing, and transportation. The third index, the Higher Education Price Index (HEPI), measures changes in the levels of general expenditures made by colleges and universities from current funds for items supporting instructional programs and departmental research activities. Sponsored research and auxiliary enterprises expenditures are excluded from the HEPI. Specifically, the index measures price changes for items such as data processing, communications, transportation, supplies and materials, and books and periodicals.

A graphic display of these three price measures and University general price increases for the period FY 1977-1986 is provided in Figure 6. The FY 1985 and FY 1986 inflation rates for the HEPI are projections based on CPI inflation data, excluding energy costs. (Since the University has

FIGURE 6

COMPARISON OF UI GENERAL PRICE INCREASE APPROPRIATIONS WITH ANNUAL INFLATION RATES



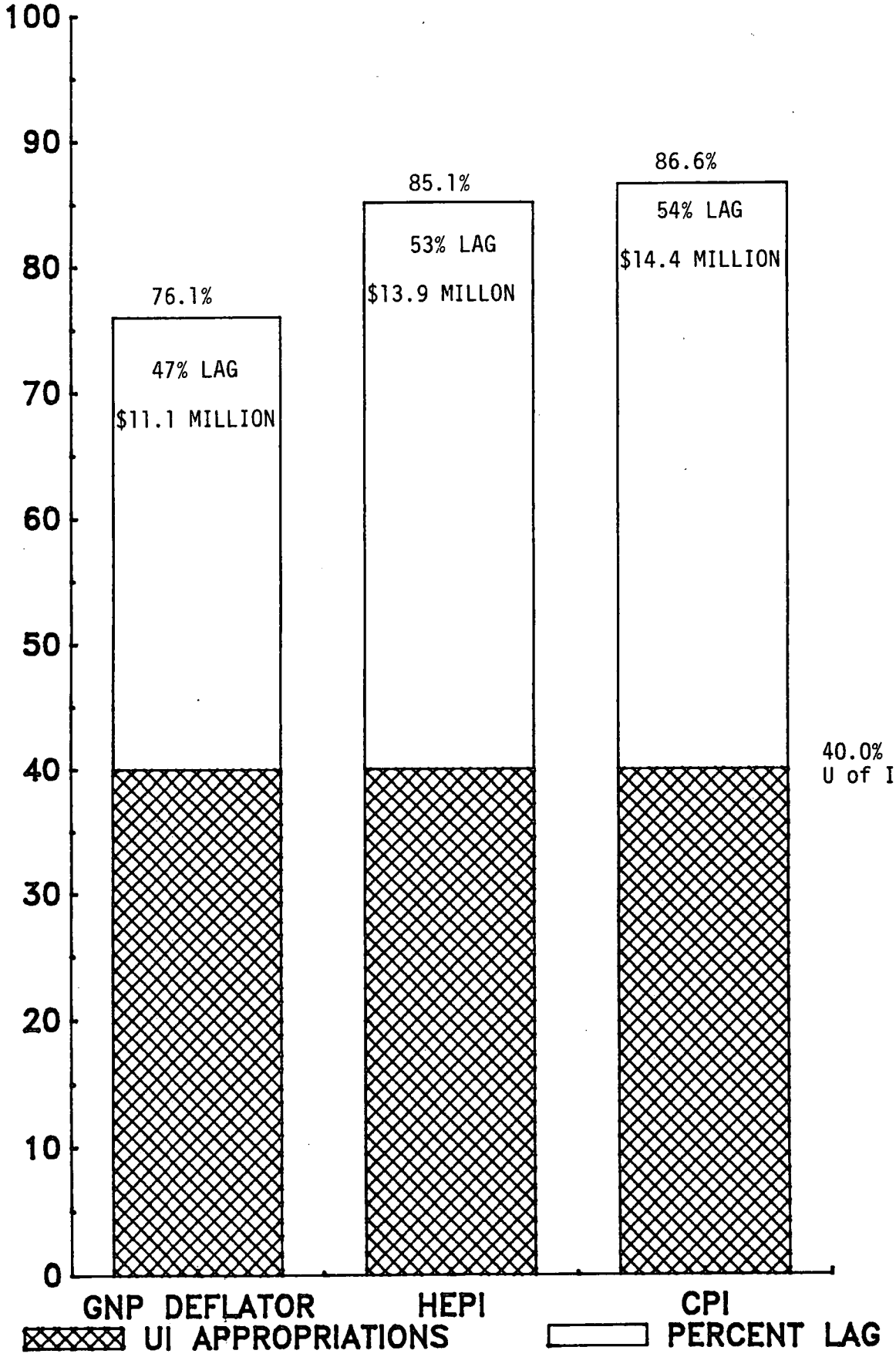
received differential price increases for utilities needs, energy costs are excluded from CPI figures.) The inflation rates for the GNP deflator and the CPI for FY 1986 are projections from Chase Econometrics. The graph illustrates the strong relationship between the three inflation indices and the pronounced difference between inflationary trends and University appropriations during the ten year period. Even when inflation rates moderated in recent years, the University's appropriations for general cost increases have lagged inflation by a considerable amount, with no incremental funds available in two of the past three years. For FY 1986 the University appropriation bill contains a four percent increase for general price increases, a provision which will only at best match projected inflation rates, and which will not help to make up for prior losses to inflation.

A review of the compounded inflation rates, as displayed in Figure 7, confirms that a wide disparity exists between actual University appropriations and the inflation experienced for the period FY 1977 through FY 1985. Based on the indicators during this nine year period, University appropriations lagged inflation by amounts ranging between approximately $11.1 million to $14.4 million.

For FY 1987 the general price increase segment of the budget request will contain the dual objectives of obtaining funding sufficient to prevent further losses to inflation and to seek partial recovery from past losses. Both Chase Econometrics and Data Resources, Inc. project the GNP deflator and CPI to increase between four and five percent during FY 1987. The FY 1987 request includes a funding increase of six percent for general price increases. This request is comprised of a five percent cost increase factor and an additional one percent increase to compensate partially for previous price increase underfunding.

Differential price increases of eight percent for utilities and seven percent for library acquisitions are included in the FY 1987 request, also. Separate discussions of the differential price increases are contained in this section of the budget document.

FIGURE 7
CUMULATIVE IMPACT OF INFLATION FY 1977 - 1985
UI GENERAL PRICE INCREASE APPROPRIATIONS VS. INFLATION



Utilities ($2,468,800)

The request for incremental funds to support the University's annual utilities budget is based upon an assessment of future energy consumption requirements and predictions of fuel and purchased power unit cost trends. During the past several years the University's energy consumption requirements have remained relatively constant. The steady activation of energy conservation projects has, for the most part, offset additional energy requirements related to increased research and instructional activity in such disciplines as Engineering, Computer Science, and Biological Sciences. Expanded activity in these areas required more energy to power sophisticated equipment and to operate additional laboratories. This increased energy demand occurred as a number of capital energy conservation projects were being completed. While increased energy demand due to new programmatic initiatives did not correspond directly to reductions resulting from energy conservation projects, the overall trend was fairly stable.

A review of anticipated levels of research activity and corresponding energy consumption trends for FY 1987 indicates that the operation of two supercomputer centers and the expansion of micro-electronics, robotics, and medical science research programs will result in the utilization of more electrical energy at both campuses. A few minor energy conservation projects remain in the construction "pipe line", and these projects should help curb consumption growth to some extent. However, a modest growth in energy consumption must be expected if new and expanded high technology research efforts are conducted as planned.

Forecasting the behavior of fuel prices has been a difficult task since the mid 1980's, due to the many social, economic, and political factors which influence these trends, The precipitous fuel price increases which characterized the late 1970's and early 1980's have abated and appear to be returning, at least temporarily, to a more modest growth rate nationally. However, it is important to note that the recent moderation in fuel pricing is not a reliable predictor of a long term trend at either the national or local levels.

The sources used to develop price projections for the University's FY 1987 budget include national power plant operators trade publications, results of recently negotiated regional contracts with utilities companies,

consumer agency publications, and consultations with local utility company representatives and the University's Directors of Operations and Maintenance. Based upon this information, it appears that local fuel and power prices for both Chicago and Urbana-Champaign will increase at substantially higher rates than those generally predicted for the nation as a whole.

Nationally, the energy price index for natural gas is expected to increase approximately 2% and the index for electricity is expected to increase 6%. Natural gas and fuel oil prices in Chicago are expected to rise at roughly the same rates as those anticipated at the national level. In sharp contrast, natural gas in Urbana-Champaign is expected to increase approximately 10% due to a reduction in the volume price advantage which is currently available to the Abbott Power Plant. As a high volume gas customer, the Plant has been able to negotiate a "direct purchase" gas contract with the gas producer. Even when transportation charges are included, the direct purchase contract results in a significant price advantage compared to the local utility company price. A reduction in natural gas usage projected for FY 1987 will cause the gas pricing structure to approximate that which is charged by the local utility company to its commercial customers.

The anticipated reduction in the volume of purchased natural gas is a result of a partial year's operation of the Plant using coal. Although coal will be burned by the Abbott Power Plant in FY 1987, the plant is not expected to reach its maximum coal usage until FY 1988.

Electricity prices are expected to increase 10% in Chicago and 18% in Urbana-Champaign as a result of general fuel price increases and the activation of two nuclear power plants. The high cost of constructing the Byron plant in the Chicago area and the Clinton plant near Champaign will become more apparent in their respective electricity rates once the plants come "on line", but their impact will be felt in the pricing structure during the next fiscal year.

The combined effect of minor energy consumption increases and projected utility rate increases yield an estimated composite 6.4% increase in the University's FY 1986 overall utilities expenses for FY 1987.

Library Price Increases ($480,000)

The Libraries of the University of Illinois represent the cornerstone of essential support to academic programs and research activities throughout the University. To achieve adequate support, the libraries must maintain collections both diverse in nature and current with respect to new knowledge. It is essential that adequate funding be provided to maintain an appropriate level and quality of library acquisitions. This funding must be maintained at a level adequate to meet annual price increases and to meet demands on library budgets from increased statewide usage of the collection, the explosion of information being published, and new and expanded programs requiring additional resources.

The Urbana-Champaign library, which is the third largest academic research library in the country, serves an audience well beyond the boundaries of the campus. It is a statewide resource which reaches out through eighteen state and regional public library networks to serve every citizen in Illinois. In 1984 by lending 121,930 volumes through inter-library loans primarily to the statewide networks, the UIUC library was second among all other Association of Research Libraries (ARL), representing a 56% increase over the FY 1980 rate. In that same period the UIUC library only ranked ninth place among ARL libraries in binding and material expenditures--the two principal measures of the degree to which existing collection quality and size are maintained on an annual basis. It is significant that the third largest collection, lending the second highest number of titles, ranked only ninth in binding and material expenditures. If the quality and utility of this collection are compromised, a large number of state institutions as well as the University will suffer a negative impact.

Both the number of published materials and their costs have escalated dramatically in recent years, particularly in areas of science and technology. The number of science and technology books and journals increased 22% between FY 1983 and FY 1984 while the price of periodicals for that same area has increased 13% since 1977. Since many of the new and expanded programs are in highly technical fields, e.g., supercomputing, biotechnology, and artifical intelligence, the cost of providing and maintaining current materials is extremely high.

In order to respond to these budgetary pressures as well as anticipate FY 1987 price increases University of Illinois libraries require a differential price increase of 7% above the FY 1986 base.

Library Acquisitions: Improvements in Collection ($500,000)

The libraries at the University of Illinois require a strong and competitive funding base to preserve their quality and leadership. Analysis of the libraries collections--UIUC library having the largest collection among public universities in the nation--reveals a disturbing trend. Rising costs for acquisitions which began to escalate dramatically in 1971 made it impossible for the libraries to maintain their earlier pattern of growth. During several years of high inflation, incremental funding failed to match the rate of inflation, and a significant differential accumulated between the cost of acquisitions and funds available for library materials. Although the rate of library price increases has moderated in recent years, the legacy of earlier inflation continues to undermine incremental appropriations, and the University has been unable to offset the resultant acquisitions shortage from other fund sources to meet campus and statewide needs.

Figure 8 illustrates the discrepancy between price increases for periodicals and monographs versus budget increases since FY 1969. These trends are reflected in Table 12 which displays FY 1978 to FY 1986 annual percentage increases in state funded acquisitions versus actual price increases for library materials measured by the Higher Education Price Index for Books and Periodicals. The table uses the FY 1978 acquisitions base as a benchmark since it is the last year in which library funding may be considered adequate. A "required" acquisitions budget is projected from FY 1978 by inflating the base each year by the Higher Education Price Index. This amount is then compared with incremental state funds received for library materials. Since the FY 1985 and estimated FY 1986 Higher Education Price Index data are not currently available, the C.P.I. is used as an alternate measure of price increases for these years. The table shows that state funded increases from FY 1978 to FY 1985 averaged 7.0% compared with increases in the Higher Education Price Index averaging 9.4%. One of the

FIGURE 8

UIUC LIBRARY PRICE INCREASES

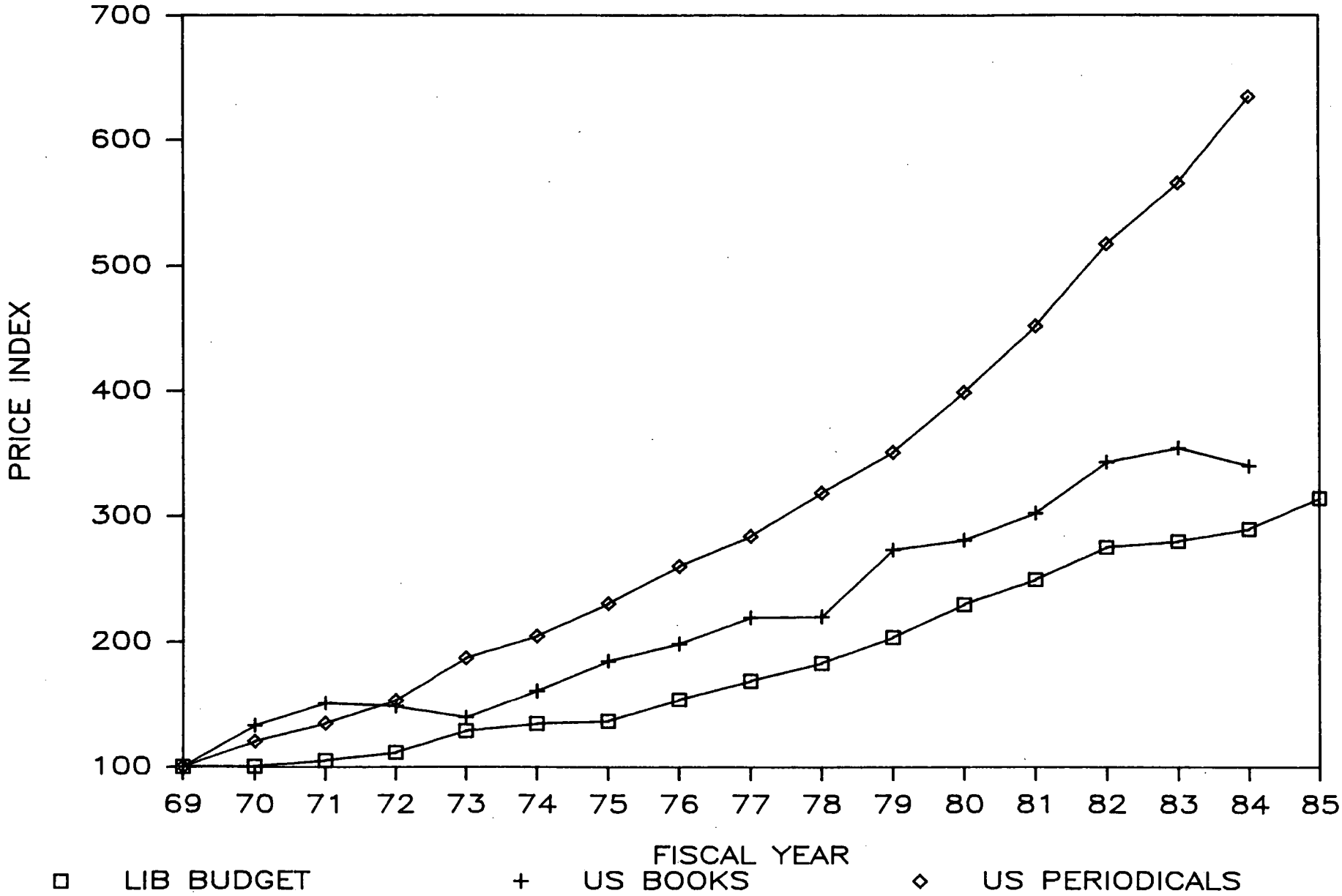


TABLE 12
UNIVERSITY OF ILLINOIS LIBRARY DEFICIENCY
(Dollars in Thousands)

	1978	1979	1980	1981	1982	1983	1984	1985	1986
1. Acquisitions Base	3,193.0								
2. State Funded Price Increase		10%	15%	7%	4%	0	4%	10%	7%
3. "Theoretical" Base (1 x 2)[1]		3,512.3	4,039.1	4,321.9	4,494.8	4,494.8	4,674.6	5,142.1	5,502.0
4. Higher Education Price Index for Books and Periodicals		10.4%	15.0%	9.9%	8.0%	14.8%	4.0%	4.5%[2]	4.5%[2]
5. "Required" Base (1 x 4)		3,525.1	4,053.8	4,455.2	4,811.6	5,523.7	5,744.7	6,003.2	6,273.3
6. Deficiency (5 - 3)		12.8	14.7	133.3	316.8	1,028.9	1,070.1	861.1	771.3

[1]Represents prior year's base adjusted for incremental increases. Does not include reallocation.

[2]A 1985 index for library material was unavailable at this time, thus, Chase Econometric's estimated inflation rate for the year was applied.

most damaging years was FY 1983 in which a 14.8% increase in the Higher Education Price Index was accompanied by a 0% price increase allocation. By FY 1986, it is estimated that the difference between State funds received and the "required" base will be $771,300.

In addition to falling behind inflation, price increases have also failed to respond to program-related needs at both campuses. In FY 1985 a survey of thirty-nine Urbana-Champaign campus library managers revealed a need for $300,000 in new funds beyond normal price increases, targeted primarily toward acquisitions of periodicals not now held in the Library. The Chicago campus library has moved from a basically undergraduate resource to a research library, requiring developmental efforts to build pre-eminent collections to support that research. However, the increase in permanent allocations for acquisitions in FY 1985 was below the budget request for price increases alone, and therefore addressed neither these program-related needs nor previously unmet needs.

The disparity between library cost increases and appropriations for library materials has most severely affected periodical and serials purchases which presently account for 48% of the Library's acquisition budget. Annual increases for American periodical subscriptions have averaged approximately 12% since 1977. Moreover, prices for technical periodicals, an area in which the University of Illinois purchases heavily, have risen at an even faster rate. For example, during the same period, price increases for chemistry, mathematics, physics, and engineering subscriptions averaged 13% annually.

Most, if not all, of the thirty-seven departmental libraries on the UIUC campus have been forced into a pattern of curtailing monograph acquisitions and, in some cases, cancelling serials subscriptions. The Engineering Library has cancelled over $22,000 in journal subscriptions since 1983, and the Biology Library has cancelled $3,000 to $4,000 in journal subscriptions for each of the last several years. A significant shortage of journal resources exists in agriculture, nutrition and food science, communications and psychology, to name only a few areas.

The emerging Chicago campus emphasis on growing program emphases in engineering, biotechnology (including mammalian genetics and gerontology),

and life sciences research require additional expenditures. The creation of new centers and specializations, such as the Institute for the Humanities, the Committee on Neuroscience, the Large Scale Integrated Systems Laboratory, and the technology commercialization program will require specialized sources to support their work. The revision of established programs and the establishment of new programs across a wide range of disciplines, including accounting, anthropology, architecture, biological sciences, engineering, and criminal justice demonstrate that additional purchases across the entire spectrum of library acquisitions are necessary. Basic annual price increases are insufficient to support the wide-range of new endeavors in which the campus is engaging.

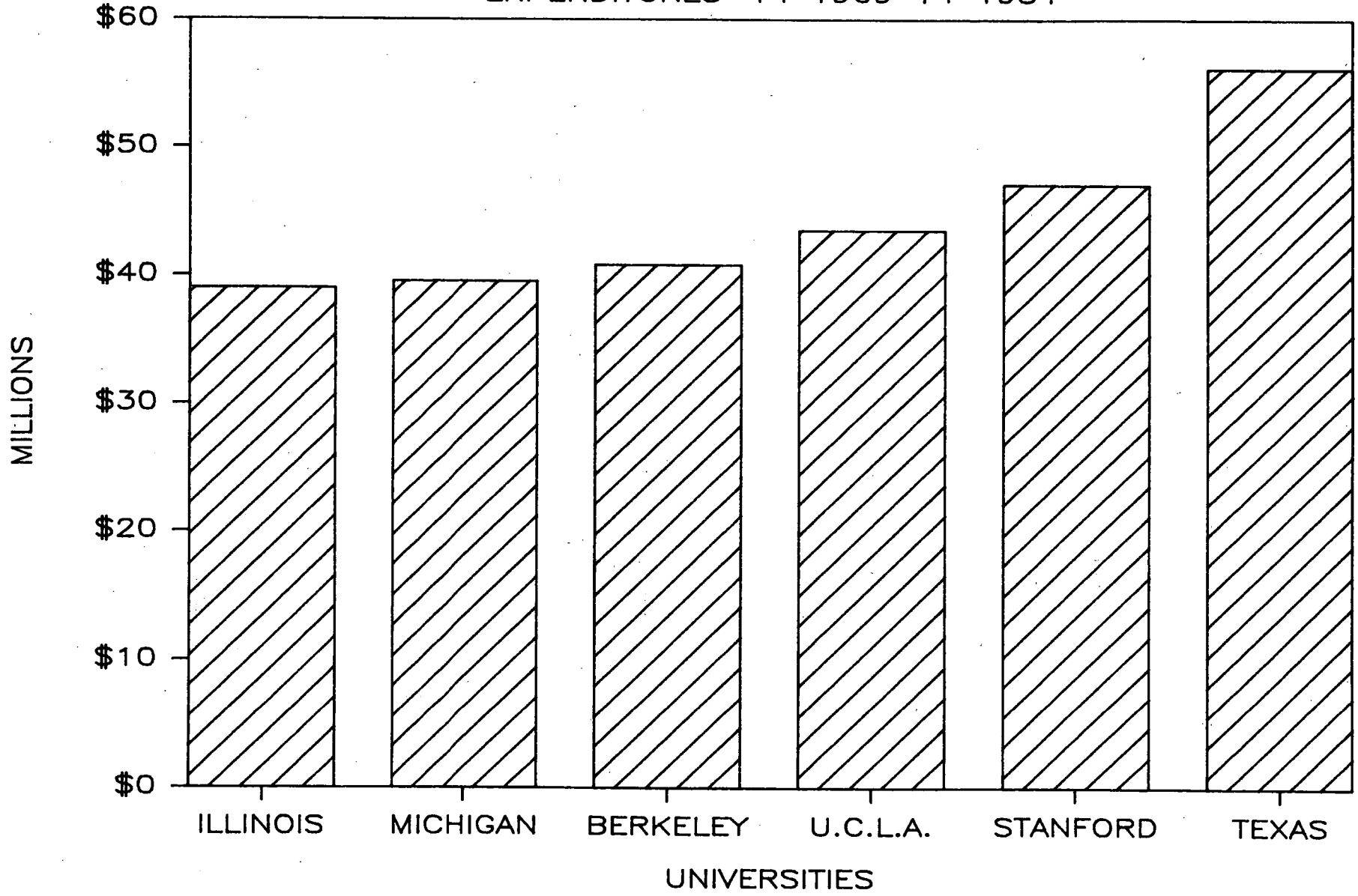
The UIUC library collection has lost ground relative to collections at several peer institutions. Figure 9 illustrates that from FY 1969 through FY 1984 the University of Michigan, the University of Texas, Stanford University, the University of California at Los Angeles and the University of California at Berkeley have devoted more funds to acquiring library materials than has UIUC. The differential in cumulative funding relative to UIUC ranges from $524,792 at Michigan to $17,792,909 at Texas. In terms of volumes held, the library at Berkeley with 6.5 million volumes is approaching parity with the UIUC library which contains 6.6 million volumes. Although the other institutions in Figure 9 have smaller collections than UIUC at the present time, it is apparent that if current funding trends continue these institutions will surpass the Library in total holdings within a few years. Should this occur the University will lose an important advantage it currently enjoys in recruiting and retaining faculty, and the prestige of its internationally acclaimed library will decline if it is unable to meet adequately the research and instructional needs of its faculty, students and users across the state.

The UIUC library has streamlined its acquisitions procedures and appointed a Director of Library Collections to ensure that the acquisitions budget is both effective and focused. The University of Illinois library operates extremely efficiently, and the existing resources available for materials expenditures are well utilized. There is no excess that can be trimmed from the operation to facilitate savings and ease pressure on the acquisitions budget. One measure of efficiency is the cost of adding new

FIGURE 9

CUMULATIVE LIBRARY MATERIAL

EXPENDITURES FY 1969—FY 1984



resources to the collection. When compared with the five peer institutions shown in the following table, the UIUC Library had the lowest operating cost per volume added:

FY 1984
Operating Costs per Volume Added*

UIUC	$ 43.86
Texas	60.37
Stanford	106.78
UCLA	81.97
Berkeley	63.47
Michigan	82.00

*ARL (Association of Research Libraries) Data: Total Operating Costs minus Materials divided by total volumes added (gross).

If the budgetary stress described above continues for the University libraries, it will affect students and faculty alike. Research resources will be diminished, damaging both the quality of education University students receive and making the University of Illinois a less attractive option for productive scholars in all disciplines. The University Library's ability to serve as a statewide resource will also diminish, impacting educational and research activities throughout the state. Not only must the FY 1987 budget provide adequate resources to maintain and enhance current acquisition rates, but a significant element of recovery from past losses should be introduced if the quality of this crucial educational resource is to be maintained. In order to begin the process of recovery, $500.0 thousand of the estimated deficiency created by price inflation is requested in FY 1987, to be divided equally between the two campuses. The remainder of the deficiency will be requested in following years.

OPERATION AND MAINTENANCE OF NEW AREAS
($368,700)

Funds are requested for operation and maintenance costs associated with the addition of new or significantly remodeled State supported space on the campuses. The needs for these funds vary according to the operating requirements of each facility. The FY 1987 request is outlined in Table 13. The individual components of the request are described below.

Computing Services Office Support Building

With the completion of remodeling work for the Center for Supercomputing Research and Development in Talbot Laboratory, attention has shifted to the remodeling of space in the Astronomy Building for the National Center for supercomputing applications. This new center will require facilities for housing researchers as well as personnel to support the system. Space will not be available on campus until the completion of the high technology facility proposed by the College of Engineering. As an interim solution, a two-story wood frame, brick veneer office building has been proposed. This facility will provide 5,800 square feet of space and will require $24,500 annually to operate.

Burrill Hall Addition

This project is designed to enclose a covered ground-level loading area of Burrill Hall. This small, but functional, area will provide a source of relief to the overcrowding in Burrill and Morrill Halls. Semi-wet laboratory space can be created because drains are located in the structural pillars and other utilities hookups are in the ceiling. Every winter the O and M Division constructs a temporary enclosure at this site to combat the problem of freezing pipes. This addition will eliminate that problem. The project provides the basis for a sound long term investment because the remodeled area will be located in a permanent building in the core of the School of Life Sciences space. An amount of $22,400 will be required to operate the new 6,000 square feet addition for FY 1987.

Glass Sculpture Building

The present limitations of the glass program at the University of Illinois are directly related to the lack of adequate studio space. This project includes the remodeling of warehouse space into a glassworking studio for the School of Art and Design. Warehouse space will be remodeled into five individual areas: glassblowing, cold glass working, all purpose rooms for critique, lecture and/or slide room, graduate student space, and a research studio for the professor in charge of the program. Also to be included will be the construction of walls, installation of lighting and insulation, and ventilation for the glassblowing room to reduce heat buildup and vapors from furnaces and electrical kilns. It will require an annual sum of $6,000 to operate 4,000 GSF remodeled facility.

State Water Survey Addition

This addition to the State Water Survey facility will provide essential office and laboratory space in a one story wood and brick structure. The addition will house research staff including those persons working on University related projects (e.g. the National Acid Precipitation Assessment Project). The addition will be adjacent to and connect with the chemistry laboratory area via a glass enclosed corridor. The addition will provide 4,270 square feet of space and will require $30,800 annually to be operated and maintained.

Illinois State Water Survey - Adler Center

Title to all real property at the site formerly know as the Adler Zone Center reverted to the University when the Department of Mental Health and Developmental Disabilities transferred its clients to other facilities. At that time plans were made to remodel the vacant facility for occupancy by the Illinois State Water Survey. The State Water Survey directs research on environmental and meterological topics for its parent organization, the Illinois Department of Energy and Natural Resources. Through a long standing agreement with the State of Illinois, the University is responsible for the operation and maintenance of the State Water Survey facilities.

Even though the facility remained unoccupied while remodeling work was being conducted, the vacated facility presented an operation expense for the

University. Expenses were incurred for heating the building during the winter months to prevent temperature-related damage to the interior of the structures, providing limited grounds maintenance, and patrolling the isolated buildings to avoid potential vandalism. To accomplish these tasks the University received $112,500 in FY 1984.

Full occupancy of the former Adler Center will occur in FY 1986. This request for additional operations and maintenance funds is required to utilize the laboratories and laboratory support areas recently constructed in the newly renovated building. The majority of the laboratories are served by fume hoods, natural gas, distilled and/or deionized water, and auxiliary temperature control devices. Offices, a library, and conference rooms comprise the remainder of the space in the facility. An amount of $270,000 will be needed in FY 1987, in addition to the FY 1984 funding, to support the State Water Survey's research operations.

Staff Air Transportation Service (SATS) Building Addition

This project will house the Staff Air Transportation Service (SATS). At present, SATS operates from two locations. One is a borrowed area in Hangar #2 which the Institute of Aviation must return to research activities, the other is located in the Snack Bar and Service Facility at Hangar #1. The latter facility is not conducive to an effective SATS operation. Structural and operational problems, such as roof leaks, transient traffic, variable Snack Bar activities, lack of convenient parking and waiting facilities for passengers, and the necessity of operating from two areas strongly suggest consolidation in a single facility. Construction of an addition to Hangar #2 will accomplish this objective. Upon completion, the SATS operation will be consolidated, the considerable expense of moving aircraft between hangars will be eliminated, passengers will have convenient parking and waiting facilities, and an area now used by SATS will become available for research projects. This 1,500 GSF facility will require $6,600 annually to operate.

907 W. Illinois, Urbana

The building at this location is a wood frame house that was used by the Housing Division until July 1, 1985. The Housing Division relinquished the building because it was not economically feasible to make the modifications needed to bring the building into compliance with the strict code requirements for residential facilities. The building was made available to the Urbana-Champaign campus for academic use because the code requirements for such use are less stringent than those for residential use. The building is currently being remodeled for the Department of Art and Design's Graduate Art Painting Studios to replace space currently used for such purposes in Davenoprt Hall. The released space in Davenport Hall will be remodeled to help solve space problems for the Schools of Life Sciences and Chemical Sciences. The building at 907 W. Illinois will require an annual sum of $11,700 to operate and maintain its 4,980 GSF of space.

TABLE 13
FY 1987 REQUEST FOR OPERATION AND MAINTENANCE
SUPPORT FOR NEW AREAS

	Gross Square Feet	Total Unit Cost $/GSF	Date of Occupancy	No. of Months Funding	Annual Cost	FY 1987 Amount
Computing Services Office Support Building	5,800	$4.22	July 1, 1986	12	$ 24,500	$ 24,500
Burrill Hall Addition	6,000	3.73	July 1, 1986	12	22,400	22,400
Glass Sculpture Building	4,000	1.50	July 1, 1986	12	6,000	6,000
State Water Survey Addition	4,270	7.22	July 1, 1986	12	30,800	30,800
State Water Survey - Adler Center	56,643	4.77	July 1, 1985	12	270,000	270,000
SATS Addition	1,500	4.33	Feb., 1986	6	6,600	3,300
907 W. Illinois, Urbana	4,980	2.35	July, 1985	12	4,980	11,700
Total						$368,700

OPERATION & MAINTENANCE DEFICIENCY IN PREVENTIVE MAINTENANCE ($1,000,000)

The University's Operation & Maintenance function serves the essential purpose of developing and maintaining adequate facilities for the support of educational and research programs. Since FY 1971, the funding of this function has not been sufficient to provide these services at an adequate level.

Inadequate repair and maintenance services results in a gradual deterioration of the University's physical plant assets as minor projects are deferred until they reach the status of major problems which require immediate and often costly action. This overall problem, compounded by escalating costs due to the inflation of the late 1970's and early 1980's, physical plant staff reductions, resulting from budget reductions, and the addition of facilities, many of which required specialized maintenance, has prompted the University to critically examine resources needed to adequately support the Operation and Maintenance function.

Fortunately, the Build Illinois program will address a portion of this overall problem by providing funds to renew and reconfigure facilities that no longer provide adequate support for academic programs. The Repair and Renovation Program which Build Illinois will make available will permit the University to address a portion of the most critical deferred maintenance needs which have accumulated over the past decade-and-a-half. It will also permit the University to upgrade or reconfigure teaching and research laboratories to meet current technology requirements of academic programs. In many respects, however, the Repair and Renovation Program within Build Illinois is retrospective in nature - it provides solutions to a portion of the cummulative deficiency in operations and maintenance support <u>only after</u> those deficiencies have taken on crisis proportions. While such a program permits some attention to past problems, it does not provide resources which, on a recurring basis, can be used to upgrade existing maintenance and service levels so that a prospective program of preventive maintenance can be implemented to offset <u>future</u> deficiency accumulations.

The methodology used to evaluate the adequacy of the University's Operation and Maintenance funding level for preventive maintenance entails a comparison of current expenditures with those levels that were deemed adequate in the past, specifically, FY 1971, for the portion of total Operations and Maintenance activity most directly related to preventive maintenance efforts. Specifically, janitorial services, building maintenance services, and grounds maintenance services are included in this computation. During FY 1984, actual expenditures for these operation and maintenance activities were approximately $24.3 million. A comparison of recent funding levels with a theoretically adequate level obtained by applying prevailing inflation rates and productivity adjustments to the FY 1971 base yields a preventive maintenance deficiency for FY 1984 of $5.4 million. When this deficiency is inflated to FY 1987 dollars, the resulting gap is $6.3 million. Table 14 illustrates the calculation of this deficiency.

While annual budget requests often include funds to support newly constructed or remodeled space, these needs are independent of the general deficiency described here. Furthermore, the level of O & M support obtained for new facilities during the past decade has been insufficient to maintain even the new facilities in an acceptable manner. The result of the O & M deficiency has been the curtailment of janitorial services, deferral of building maintenance (such as roof repairs, mechanical systems repairs and tuckpointing projects) and reduced grounds maintenance services (such as repair of exterior concrete stairways and sidewalks). Continuing with this lack of support for basic Operation & Maintenance activities will result in costly future requests to restore critical physical facilities resources.

Responsible management of the $2.2 billion investment the State and the University have in instructional, research and public service facilities requires that proper attention be given to the Operation & Maintenance function. Therefore, the University is requesting $1,000,000 to begin reestablishing an adequate preventive maintenance program. The allocation of this amount to the campuses will be made in accordance with the relative deficiencies shown in Table 14 as follows: Chicago - $590,000; Urbana - $410,000.

TABLE 14
FY 1987 PROJECTED O & M DEFICIENCY
FOR PREVENTIVE MAINTENANCE ONLY[1]

	Chicago	Urbana	Total
1. FY 1984 Deficiency	$3,236,156[2]	$2,247,317	$5,483,473
2. Add: Impact of Inflation on Deficiency (FY 1985) 4.3%	139,155	96,634	235,789
3. Less: FY 1985 Incremental Dollars	0	0	0
4. FY 1985 Projected Base Deficiency (1 + 2 - 3)	3,375,311	2,343,951	5,719,262
5. Add: Impact of Inflation on Deficiency (FY 1986) 4.6%	155,264	107,822	263,086
6. FY 1986 Projected Base Deficiency (4 + 5)	3,530,575	2,451,773	5,982,348
7. Add: Impact of Inflation on Deficiency (FY 1987) 5.4%	190,651	132,396	323,047
8. FY 1987 Projected Base Deficiency (6 + 7)	3,721,226	2,584,169	6,305,395
% Distribution by Campus	59.02%	40.98%	100.00%

[1]Preventive Maintenance includes janitorial services, building maintenance services and grounds maintenance services activities.

[2]The Chicago deficiency does not include an amount for janitorial services for the hospital ($40,173) because the hospital finances its own housekeeping services.

PROGRAMMATIC REQUESTS

PROGRAMMATIC REQUESTS

The programmatic emphases of the FY 1987 budget request are derived from the basic role of the University to investigate those developing areas of knowledge which significantly impact the social, economic, and technological elements shaping the future of the State of Illinois. Reaffirming the importance of quality and emphasizing revitalization of the State's economy are familiar themes for the University of Illinois. The University has always stressed quality in its teaching and research and a continued commitment to public service. It has also stressed that its programs must be open to all who are qualified, regardless of race or socioeconomic background. In order to retain its leadership role, the University must respond to societal demands, continue and expand its efforts in the creation of new knowledge through research, and apply that knowledge through instruction and public service. Funds requested for FY 1987 will provide the University with the opportunity to keep academic programs current, to initiate new program emphases, to meet enrollment pressures in specific areas of study, and to maintain its research and public service leadership. These funds will also be used to encourage the recruitment and retention of minority groups which historically have been underrepresented in higher education in Illinois.

The expanded/improved programs presented for approval for FY 1987 fall into six major categories: (a) Scientific and Technological Advances, (b) Economic and Professional Development, (c) Responding to the Impact of An Aging Society, (d) Increasing International Involvement, (e) Strengthening Basic Instruction at All Levels of Illinois Education, and (f) Advancing Minority Educational Achievement. These themes encompass a diverse set of programs aimed at enhancing educational quality, fostering new research, and serving the critical needs of the State.

Evidence from major research universities throughout the nation, including the University of Illinois, demonstrates that faculty strengths and institutional resources are more effective and productive within the structure of interdisciplinary research groups which have the capacity to organize large and complex long-term research efforts. The University of Illinois, with its diversity of high-quality disciplines, is ideally suited to initiate nationally competitive interdisciplinary programs in

such fields as biotechnology, artificial intelligence, toxicology, health care administration, and international programs. A majority of the programs proposed for FY 1987 are strongly oriented toward interdisciplinary cooperation.

The nation's lagging productivity and increased international competition in highly technical areas have been reported widely. The internal revitalization of key colleges and departments is having and will continue to have important external implications in assuring high quality graduates and the continuation of essential research. Enhanced science and technology programs directly impact the revitalization of the Illinois economy through the application of University expertise and its base of knowledge to specific problems within the State, as well as the development of technology which can be applied throughout the nation and the world.

The programs included in Scientific and Technological Advances represent the next phase of the University's continuing response to the diverse needs of the State's high technology development goals. Biotechnology and artificial intelligence can contribute both basic and applied research to help shift the Illinois economy from traditional heavy industry to high technology industry. The Environmental Toxicology program will support the study of the health effects of toxic substances in the environment and will provide an informational resource on the latest research to Federal, State, and local authorities. The program in surface chemistry will engage in research that is timely, including the utilization of coal as a source of chemical derivatives as well as energy and the desulfurization and conversion of coal to other fuels by catalytic processes. Rehabilitation engineering will focus on using computer technology to bring many disabled individuals back into the economic mainstream, enabling them to be productive and gainfully employed.

With the advent of microcomputers, computer networking, increased access to mainframes by microcomputers and easily transportable software, more and more faculty and students at the University have access to these facilities, enabling them to conduct research and instruction more effectively and efficiently. The FY 1987 Academic Computing program requests funds to enable the Academic Computer Center at Chicago to procure additional academic computing equipment and technical support staff.

Programs classified under the Economic and Professional Development theme are designed to meet the demands of new technologies and institutional structures and to address the changing roles of professionals throughout the State. These programs are concerned with shifting emphases in health care administration, medical and pharmacy education and veterinary medicine. New emphases in international commerce and the futures markets are sponsored by the College of Business Administration at UIC. Also addressed are responses to continuing enrollment pressures in the College of Commerce at UIUC and the Department of Computer Science at UIC, a new emphasis in the theatre curriculum, and an increase in the mutually beneficial interaction between the University and Chicago-area businesses and governmental agencies in the form of practicums and cooperative research programs.

Many benefits to the State can accrue through these programs. The Health Administration program responds to the need for training personnel to cope with problems in the health care system such as unequal access, escalating costs and inefficiency. The International Commerce and Futures Markets program focuses on identifying and examining issues relating to international trade and the complex factors governing commodities and futures markets. Findings from this program may be used by business firms to compete more effectively in foreign markets and by both business and government to facilitate economic forecasting and financial planning. The program to retain medical graduates in Illinois endeavors to protect the State's investment in medical training by increasing the incentives for graduates to remain in the State to practice medicine. The Pharmacy program reaches out to practicing pharmacists in the State and provides an avenue for them to augment their knowledge and advance their careers. The practicum and collaborative research efforts sponsored by the Planning, Technology and Economic Development Program will not only benefit the students and staff of the University, but the cooperating businesses and governmental agencies in the Chicago area will also benefit from having access to University expertise. The Office of Advanced Engineering Studies provides an outreach service to the State whereby the University shares its expertise by providing continuing professional engineering education as well as consulting services to local businesses and industry.

The Technology Transfer Program represents the first phase of a multi-year effort to provide the specialized, professional staff support essential for the long term success of major programs which stimulate technology transfer through expanded industry-university cooperation.

Due to its economic strength, its strategic location and its multi-cultural composition, Illinois has been involved traditionally with matters of international policy, commerce and culture. The State is one of the major export centers in the U.S., and Chicago is recognized as a world finance center. The two programs classified under the theme of "Increasing International Involvement" focus on an interdisciplinary effort to establish technological and informational linkages with other countries, to raise the awareness of international issues, and to foster an understanding of issues relating to arms control and international security. A greater understanding of international issues cannot help but benefit those engaging in trade, commerce and the exchange of ideas with citizens, businesses and governmental agencies in other countries.

Demographic studies show that the median age of the nation's population is increasing and is expected to continue to increase as the baby-boom generation approaches middle and old age. This aging trend has significant implications for all elements of American society, but particularly for the health care system which will experience unusual stress as the number of patients experiencing gerontological difficulties accelerates. The program theme "Responding to the Impact of an Aging Society" describes an increased emphasis on research and instruction on issues of aging in all of the health disciplines with the goal of establishing a model of an integrated, cooperative system of health and medical care for the aged which will be characterized by cost-effective, high-quality care coupled with concern for the preservation of the freedom and dignity of the patient. The development and implementation of such a model will benefit the citizens of the State by helping them to remain healthy and productive for as long as possible.

Additional funds are needed to continue the "Strengthening Basic Instruction" initiative begun last year which was designed to strengthen the quality of instruction for students at all levels of Illinois education. This multi-faceted program includes strategies for reducing class

size in overcrowded general education and laboratory courses, providing needed instructional materials and equipment for these courses, expanding pedagogical training for graduate teaching assistants, developing more meaningful general education sequencing patterns and curricular options outside of the field of major concentration, establishing honors seminars, and implementing programs designed to improve the quality of education in elementary and secondary schools. The Strengthening Basic Instruction at All Levels of Illinois Education program reflects the University's recognition and response to a problem of national scope - the steady deterioration of measurable verbal and quantitative skills of students at all levels. A reversal of this trend for students in higher education will benefit the State by ensuring that the college-educated workforce available in Illinois will be able to master the complex problems they will encounter in the future.

The University is concerned that minority students and faculty at higher education institutions continue to be underrepresented. Demographic data indicate that, in years to come, minority groups will become an increasingly important part of the workforce of the State and the nation. It is essential that the talents and leadership roles of these groups be encouraged and developed through educational initiatives at both the secondary and higher education levels. In response to this need, the University established a special program in FY 1986, Advancing Minority Educational Achievement. In FY 1987, the University requests funding to continue and significantly expand this program to provide early outreach programs which target economically and educationally disadvantaged secondary school students for academic enrichment programs, to offer more minority scholarships and fellowships, to support the recruitment and retention of minority faculty, and to sponsor special programs to respond to the academic, social and occupational needs of minority students. Since recent studies indicate that a significant number of academically well-prepared minority students matriculate at higher education institutions outside of the State, an important benefit of these programs may be that many of these graduates will now choose to enroll in Illinois institutions and will also choose to remain within the State to pursue their careers.

The FY 1987 budget request includes funds for the fourth phase of the University's program to revitalize engineering disciplines at both campuses. Considerable progress has been made in improving faculty salaries, support staff levels, and student/faculty ratios. This program already has enhanced the University's ability to recruit and retain superior engineering faculty members. The emphases for the FY 1987 request are to preserve competitiveness in salary levels, hire additional faculty in areas that are still experiencing stress, acquire up-to-date instructional equipment, and improve physical facilities through remodeling.

The specific programs identified in the FY 1987 budget request are outlined in Table 15.

Although incremental State appropriations for equipment replacement over the past several years have begun to ease the problem of replacing obsolete teaching and research equipment, a continuing commitment is required to reduce the current cumulative deficiency.

Funding of the programmatic components of the FY 1987 Budget Request will ensure that the University's leadership in instruction, research and public service in the most current areas of knowledge will continue. New discoveries and developments in these areas by University faculty and staff will continue to enhance the reputation of both the University and the State. This reputation will, in turn, attract the investment of funds, expertise and energy which will have a significant economic and cultural impact on the State and its citizens.

The specific proposals to implement programs in each of the areas which has been described are outlined in the following section. Specific funding levels are identified, along with staff additions where appropriate.

TABLE 15
FY 1987 PROGRAM BUDGET REQUEST
(Dollars in Thousands)

	UIC	UIUC	CA	TOTAL
I. Equipment	$ 750.0	$1,000.0		$1,750.0
II. Expanded/Improved Program Themes				
A. Scientific and Technological Advances				
1. Biotechnology (Incl. Biotech & the Law)	$ 800.0	$ 700.0		$1,500.0
2. Environmental Toxicology		200.0		200.0
3. Surface Chemistry and Catalysis		120.0		120.0
4. Artificial Intelligence/Cognitive Science		180.0		180.0
5. Rehabilitation Engineering		200.0		200.0
6. Academic Computing	850.0			850.0
Subtotal	$1,650.0	$1,400.0		$3,050.0
B. Economic and Professional Development				
1. College of Veterinary Medicine		$ 750.0		$ 750.0
2. Acting and Design for Television		130.0		130.0
3. Strengthening Commerce and Business Administration	$ 500.0	300.0		800.0
4. Health Administration	200.0	120.0		320.0
5. Retaining Medical Graduates in Illinois	100.0			100.0
6. Pharmacy Continuing Education	150.0			150.0
7. Planning/Technology/Economic Development	200.0			200.0
8. Undergrad Program in Computer Science	200.0			200.0
9. Office for Advanced Engineering Studies			$350.0	350.0
10. Technology Transfer Specialists			250.0	250.0
Subtotal	$1,350.0	$1,300.0	$600.0	$3,250.0
C. Increasing International Involvement				
1. International Programs	$ 350.0			$ 350.0
2. Arms Control, Disarmament and International Security		$ 110.0		110.0
Subtotal	$ 350.0	$ 110.0		$ 460.0
D. Responding To The Impact of An Aging Society	$ 500.0			$ 500.0
E. Strengthening Basic Instruction at all Levels of Illinois Education				
1. Undergraduate Initiatives	$ 700.0	$1,050.0		$1,750.0
2. Program Support for Elementary and Secondary Schools	100.0	450.0		550.0
Subtotal	$ 800.0	$1,500.0		$2,300.0

	UIC	UIUC	CA	TOTAL
F. Advancing Minority Educational Achievement				
1. Outreach Activities	$ 75.0	$ 100.0		$ 175.0
2. Attracting Minorities to UI	465.0	675.0		1,140.0
3. College Based Retention	315.0			315.0
4. Campus Coordination of Minority Programs	145.0			145.0
Subtotal	$1,000.0	$ 775.0		$ 1,775.0
Expanded/Improved Programs Total	$5,650.0	$5,085.0	$600.0	$11,335.0
III. Engineering Revitalization	$1,375.0	$2,625.0		$ 4,000.0
FY 1987 UNIVERSITY PROGRAM BUDGET REQUEST TOTAL:	$7,775.0	$8,710.0	$600.0	$17,085.0

INSTRUCTIONAL EQUIPMENT SUPPORT

INSTRUCTIONAL EQUIPMENT SUPPORT
($1,750,000)

Although higher education is a labor intensive enterprise, it is heavily reliant upon scientific equipment to achieve its instructional and research objectives. The limits of scientific discovery and instructional innovation are still determined by the faculty and scientists who direct the University's research and instruction efforts; however, the availability of up-to-date equipment is essential to fully utilize their knowledge and talents. Similarly, student access to modern scientific and technical equipment must be maintained if the quality of their educational experience is to remain high. Even students enrolled in traditionally non-scientific programs must have the benefit of exposure to computers and other types of microprocessors which are commonly used in all sectors of society.

The relationship between scientific advances and the development of more sophisticated instrumentation is quite strong and certainly well documented throughout history. The invention and refinement of such instruments as the electron microscope and the mass spectrometer have contributed significantly to our knowledge of the physical properties of inorganic matter and the biochemical composition of living organisms. In fact, the contribution of these instruments to society extends far beyond the facilitation of basic scientific research into practical and applied problems of medicine, manufacturing, and materials testing. Such applications, in turn, have had a pronounced impact on local and national economies.

Maintaining a comprehensive and up-to-date inventory of instructional equipment for instruction and research has been difficult, due in part to the limited financial resources available for equipment acquisition and to the accelerated rate of technological obsolescence which characterizes modern instruments. To help establish a sound base of financial support for equipment acquisition the University has requested incremental funds during the past several years under programs related to equipment deficiencies or equipment replacement. Funding of these programs has occurred at a more modest rate and at a lower cumulative amount than the University's total needs require. Nonetheless, the University has increased its State funded

equipment base substantially over the last four years, and these funds have helped arrest the decline in the availability and quality of instructional equipment. In addition, the University has been successful in attracting major equipment grants from industry, especially those which have provided personal computers and other specialized computers for a variety of innovative instructional applications.

In spite of the success in recent years in obtaining additional support to finance instructional equipment acquisitions, the problems of technological and functional obsolescence which plague the existing equipment inventory remain. Further, escalating equipment prices and an expanding equipment market have combined to diminish the impact of new funds targeted for modernization of laboratory equipment. Overall, it is clear that an instructional equipment deficiency of substantial size still exists. It is a deficiency which can be attributed to three factors: (1) New Technology--expansion of the equipment market to include new devices which were previously impossible or impractical to produce; (2) Technological Improvements--vastly improved existing equipment with expanded applications; and (3) Functional Obsolescence--the cumulative effect of continued long term use which results in a gradual deterioration of the instruments.

Equipment has historically been an essential ingredient of scientific advancement, and its importance to modern research has grown dramatically over the past two decades. Technological developments, especially in the electronics industry, have occurred at an extremely rapid pace recently, resulting in a correspondingly swift development of new and improved instrumentation. With improved production and quality control techniques, microelectronic circuitry can now be economically produced and utilized in a myriad of scientific instruments. Instruments which formerly were operated by human researchers are now controlled by minute microprocessors, which are often integral to the machines themselves. Advances in laser and magnetic resonance imaging technologies have also contributed to the design and construction of a new generation of instrumentation useful to biotechnology research and surgical procedures. Devices such as the laser scanning fluorescent microscope, the NMR mass spectrometer, and the fluorescent cell sorter, have only recently become or are about to become commercially available to universities. Literally every scientific and technical field

of study is confronted annually with a growing array of new instruments and devices which are products of new discoveries and innovations in the instrumentation industry. In some cases, entirely new fields of study are created when major technology and instrumentation advances are made.

In addition to equipment which represents new methods of measuring and analyzing materials and processes, a number of instruments which employ an older technology have been improved to better serve modern research methods. Examples of technologically improved equipment include electronic digital balances, micro-processor ionalyzers, spectrophotometers, and a variety of computer controlled graphic equipment. Through use of microprocessors many of these devices are now more reliable, portable, and/or more accurate than the first generation products. The improved instruments, in many cases, can make immediate and significant contribution to research productivity and the quality of the results obtained. Many pieces of technologically improved equipment are currently needed to enhance efforts already underway rather than simply to replace an earlier model of a device that has worn out.

The distinction between purely research equipment and equipment used for instruction is becoming progressively more difficult to identify. Most of the equipment identified above functions in a dual role, when the items can be acquired. It is especially important that students in graduate and professional programs have exposure to, and preferrably experience with, state-of-the-art equipment used in their particular fields of study. Upon graduation students will be expected to perform effectively as practitioners and scientists in external environments which rely regularly upon similar equipment. The University simply cannot adequately prepare these students for future work in their chosen fields without adequate equipment resources.

Even at the undergraduate level, the need for exposure to and experience with highly sophisticated equipment is growing. While undergraduate instructional equipment needs may vary in degree from those of graduate programs in that the necessary equipment is somewhat less esoteric and expensive, the items are usually required in larger quantities. The availability of modern equipment for these laboratories is as important to maintaining the quality of undergraduate instruction as equipment is to maintaining the quality of graduate and research programs. Examples of undergraduate laboratory equipment needs range from oscilloscopes to desk top

computers and from microscopes to scintillation counters. Virtually all of these types of equipment are sufficiently available in industry that experience with them is a basic expectation for undergraduate degree holders seeking employment.

Currently there are over 67,000 pieces of scientific equipment inventoried by instructional units on both campuses--an inventory representing an investment of over $113.6 million based on the original acquisition costs of the items. While the age of these devices can range to beyond 50 years in age, the average age of the entire inventory is slightly over 11 years. There are many different types of equipment within the scientific equipment catergory and it is difficult to determine an average useful life or average condition of the inventory as a whole. Most of the highly sophisticated scientific equipment on the market today is considered to have useful life of from four to eight years. Applying the upper limit of this range to the existing inventory suggests that, on an average, most items are obsolete and should be replaced.

While it is clear that not all instructional equipment at the University is obsolete, it is equally clear that a substantial portion of the inventory is either functionally or technologically deficient. Preliminary estimates indicate that the replacement value of these obsolete items could exceed $100 million. Further study is necessary to confirm the magnitude of the existing deficiency, and to determine precisely what level of additional funding would be necessary to solve the deficiency problem.

EXPANDED/IMPROVED PROGRAMS
A. SCIENTIFIC AND TECHNOLOGICAL ADVANCES

INTERDISCIPLINARY RESEARCH IN BIOTECHNOLOGY
($1,500,000)

The Biological Sciences are in the early stages of revolutionary change which is producing a veritable explosion of new knowledge, affecting all disciplines within biology from evolutionary theory to biochemistry. Profound changes are occurring in the industrial, agricultural, pharmaceutical and social applications of biological knowledge. These changes are offering numerous opportunities for faculty in biotechnology to work with researchers and faculty members from a wide array of disciplines on projects that are of critical importance. The application of this research is important not only to the biotechnology industry, but to engineering firms, pharmaceutical companies and industrial laboratories. Centers of expertise in biotechnology are important to the State because of their potential to attract high technology industry which will in turn support employment and potentially elevate State revenue levels.

The University of Illinois is suited ideally to mount and sustain an outstanding program in biotechnology. The productive vitality of scientific research at Urbana-Champaign and the tremendous potential for growth of high technology industry in the Chicago area provide ideal bases for establishing and maintaining a dynamic program.

The FY 1987 request represents the third-year phase of the biotechnology program. Much has already been accomplished on both campuses toward the successful implementation of the program. These accomplishments, outlined in the following proposals, include the establishment of new interdisciplinary research and teaching initiatives, the support of biotechnology research seminars, and the acquisition of external funds. FY 1987 funding will allow this progress to continue and will enable investigations into newly-developing areas as well. A new initiative for FY 1987 is the proposal to establish an Office of Biotechnology Law and Policy Studies within the UIUC College of Law to address environmental, regulatory, medical and other issues related to the impact of the biotechnology revolution on the legal framework of society.

Biotechnology Initiatives at Chicago
($800,000)

The State's recognition that the University of Illinois is ideally suited to extend its outstanding programs in biotechnology to take advantage of these new opportunities has enabled the University to build several exciting and productive programs on its Chicago campus. The UIC budget request for FY 1987 extends program development in several biotechnology areas, and includes a new and potentially excellent investment in pharmaceutical engineering. All of the existing programs attract significant outside funding, multiplying the State's investment several fold. Each program is described briefly below.

The Laboratory for Cell, Molecular, and Developmental Biology (LCMDB) is in its third year of development. The LCMDB brings together faculty and students in the most promising areas of research in microbiology, physiology, ecology, entomology, plant sciences, vertebrate biology, mammalian tissue culture, and evolutionary and population genetics. Two-thirds of the core faculty are primarily engaged in recombinant DNA research, with the remaining one-third engaged in RNA metabolism and protein synthesis.

The ability to manipulate DNA has been pivotal to the development of modern biotechnology. Even at this early stage in the formation of the Laboratory, the externally funded research projects of its faculty seek understanding of a wide range of biological phenomena involving DNA rearrangement. These range from mechanisms of mutation to the mechanism of evolution, from natural gene exchange to in vitro genetic engineering, from bacterial drug resistance transposons to the mobile genetic elements of plants and animals, and from the massive chromosomal dynamic of the citiales to the rare chromosomal aberrations leading to Downs' Syndrome. In addition to this emphasis on DNA rearrangements, other active research projects deal with light modulation of photosynthesis in agriculturally important plants, the molecular basis of behavior, and genes fundamental to animal development.

While primarily a research unit, the Laboratory serves a significant teaching role, particularly for graduate students at the doctoral level who are engaged in original research. A total of $263 thousand from

FY 1985 and FY 1986 biotechnology program funds have been allocated to the Laboratory. Funding in FY 1987 will provide much-needed support staff, enabling researchers to submit more proposals for external funding. The funds will provide the basic commodities and equipment support needed to bring ideas to the funded proposal stage. Total funds requested for FY 1987 are $262.5 thousand. Of that amount, $116.5 thousand is for graduate assistantships and nonacademic support staff; $100 thousand is for equipment; and $46 thousand is for contractual services, commodities, and expenses.

The College of Medicine seeks funds in FY 1987 for two programs: The Center for Genetics and the Microbiology Department. The Center for Genetics has been particularly successful in attracting outside funding; its researchers average more than $180 thousand per person annually in direct funding. All of its work is in mammalian genetics, one of the most promising areas under investigation in the biological revolution. The Center's work in genetics focuses chiefly on the structure of genes and the mechanisms that activate and deactivate them; on drugs that affect the genes; and on genetic changes in various human diseases. Research in these areas will help to conquer diseases that are genetically linked, including such killers as sickle cell anemia, cystic fibrosis, hemophilia, immune deficiency diseases, and cancer. The results of this research have major implications for problems in birth defects and aging. A total of $281.4 thousand has been provided from FY 1985 and FY 1986 funds received by the campus for biotechnology programs to the Center for the development of its research and teaching programs. Funds requested for the Center in FY 1987 include $130 thousand for faculty, staff, and student support and $95 thousand for equipment and expenses. If the faculty included in this request are as successful as those already on staff in attracting research funds, this investment will be matched with outside funding in roughly two years.

The Microbiology Department supports advanced research in bacterial plasmid genetics. One noted researcher in this area, who recently developed a bacterium which "eats" oil spills, is now working on the development of a microorganism which will break down 2,4,5-T, the toxic ingredient in Agent Orange. Research is also being conducted to determine how

bacteria that are ordinarily non-pathogenic become toxic. Genetic encapsulation studies currently being carried out should help to conquer several kinds of bacterial infection, including the kind leading to cystic fibrosis and toxic shock syndrome, among others. As these bacteroids become a greater medical problem, it will be essential to have basic scientists well trained in these areas teaching medical students. In addition, this area is likely to be ripe for substantial research support from pharmaceutical, food, and other companies. The output in this research area could increase significantly if other faculty with interest in this specialization were available for collaboration with existing faculty. Additional faculty with experience in this area of specialization are likely to increase the University's productivity in this important research field. The request in this area is for $80 thousand to add one new faculty member in FY 1987 and to provide additional staff support and supplies for expanded research activities.

The third request for funds to extend an existing program is in the Center for Research in Periodontal Disease and Oral Molecular Biology. A total of $52 thousand was allocated from FY 1986 biotechnology program funds to assist the Center in the recruitment of a senior biochemist with expertise in the mechanisms of cell proliferation and differentiation, enabling the Center to move ahead in two of its most promising research areas, immunobiology and host-microbial interactions. These areas of research show promise of unlocking some of the biological mechanisms that lead to cancer, osteoporosis, and arthritis. The addition of 1.5 FTE faculty and two technicians to the Center in FY 1987 will facilitate progress in these important areas of work. The Center's success in such work, which has already interested a number of corporations, bodes well for the early matching of this investment by private funds. Total support requested for FY 1987 is $132.5 thousand, with $107.5 thousand of that required to pay for personnel and $25 thousand to be used for equipment and expenses.

In addition to the existing programs, which have already proven to be worthwhile investments, the University of Illinois at Chicago is proposing one new development in Interdisciplinary Research in Biotechnology for FY 1987. The proposal is the result of ongoing collaboration between the

Colleges of Engineering and Pharmacy and represents an opportunity to develop new links with the pharmaceutical industry in Illinois. Each College had dedicated funds to the program to begin development in FY 1985 and will dedicate more in FY 1986. For example, the College of Pharmacy received $203.3 thousand in FY 1985 and FY 1986 from biotechnology program funds to support the development of these interdisciplinary research activities. In FY 1986, the College used $85 thousand from these funds to support a newly-recruited senior researcher from the G. D. Searle Company. By FY 1987, there will be a need to add additional faculty and staff.

The interdisciplinary collaboration between faculty in Engineering and Pharmacy will have as its focus the development of unique drug delivery systems; the processing of pharmaceuticals for large-scale manufacture; and the design and evaluation of mechanical/electrical systems for drug development. The Colleges will bring together researchers in the physical and biological sciences as applied in pharmacy and experts in the engineering sciences as applied to pharmaceuticals. The proposed collaboration can result in the development of innovative and creative approaches to more effectively target already developed chemical entities with known biological activity to particular body sites.

The design of drug delivery systems such as transdermal patches requires a combined focus of basic characteristics of plastic/polymer matrices, kinetics of large molecules, absorption characteristics of varied skin layers, and physical models of solubility. The development of a process for the preparation of certain antibiotics and bio-recombinant DNA products begins after the work of the biologist has been completed. In short, pharmaceutical dosage form development and its subsequent manufacture require the active collaboration of basic and applied scientists. The funds requested for FY 1987 total $100 thousand to support a faculty position in the College of Engineering and post doctoral fellows in pharmacy. Additional funds will be requested in FY 1988 and FY 1989 to complete development in this program area.

In sum, FY 1987 will mark the end of the development stage of one project, the LCMBD, and the beginning of new projects, such as the Pharmaceutical Engineering initiative. In each case, there is reason to

believe that knowledge will be advanced and the citizens of the State will benefit from sponsored research that could generate new jobs and improve life and health for all.

The FY 1987 budget request is itemized below:

Academic Staff	
6.50 FTE Faculty	$272,500
4.00 FTE Graduate Assistants	46,000
1.00 FTE Postdoctoral Fellow (Pharm.)	40,000
Nonacademic Staff	
3.00 FTE Clerical	50,000
5.00 FTE Technical/Clerical	110,500
Expenses	113,500
Equipment	167,500
Total	$800,000

Additional funding of $500 thousand will be required in FY 1988 and FY 1989 to fully implement the program.

Biotechnology Initiatives at Urbana-Champaign ($700,000)

Interdisciplinary Research in Biotechnology ($600,000)

This program, which began with a State appropriation of $250,000 in FY 1985, is designed to accomplish several goals:

1. to begin new research and teaching initiatives in biotechnology;
2. to provide the faculty, support personnel, and expense and equipment funds needed to expand research activities;
3. to develop a campus-wide program of research seminars, shared resources, and curriculum enhancement;

4. to provide a State-funded base for acquisition of substantial external support for research; and
5. to provide State support for the Biotechnology Center to form the nucleus of a proposed industrial affiliates program in biotechnology.

Progress has been made toward many of these goals with the incremental funds amounting to $250 thousand in FY 1985 and $300 thousand in FY 1986. The Biotechnology Center has been established, and recruiting is underway for the Industrial Affiliates Program. Several corporations joined during FY 1985, but continued development efforts are needed. The Center operates two central laboratories that serve the needs of biotechnology researchers from across the campus. The Genetic Engineering Facility is now offering protein microsequencing, DNA synthesis, and amino acid analysis. The Cell Science Laboratory will house two state-of-the-art cell sorters with associated computer support. The Center also serves to bring researchers from diverse parts of the campus together to consider issues related to biotechnology teaching and research, including the exploration of funding sources for interdisciplinary biotechnology research and training. A campus-wide seminar series is being planned for FY 1986.

Because of the improved visibility and support for biotechnology, the campus has been successful in attracting a number of new faculty members who bring with them expertise essential for the growth of biotechnology at Urbana-Champaign. For example, one new faculty member in the Department of Agronomy has expertise in vectors for introducing genes that control for desired traits in economically important plants. Another investigates neuroendocrine and immunopharmocological influences on lymphoid cells--the cells that are involved with the body's immune system. Another has developed a methods course for genetic engineering techniques; yet another studies the functions of small RNAs in eukaryotic cells (cells of higher organisms) using yeast gene replacement techniques to assay the effects of mutations.

An interdisciplinary group from the Departments of Veterinary Pathobiology, Animal Science, Biochemistry, and Microbiology have successfully competed for a USDA training grant in biotechnology and infectious diseases. The first year USDA funding provides six traineeships for Ph.D. students.

Further evidence of the growing strength in biotechnology research is the SOHIO-UIUC Center of Excellence in Crop Molecular Genetics and Genetic Engineering. This Center was created by a $2 million grant from the Standard Oil Company--Ohio. The program, concentrating primarily on research and graduate education, is conducted by six principal investigators and fifteen collaborators representing the departments of Agronomy, Food Science, Forestry, Horticulture, and Plant Pathology in the College of Agriculture; units of the Illinois Natural History Survey and the USDA Agricultural Research Service; and the Departments of Genetics and Development and Plant Biology in the School of Life Sciences.

Although biotechnology research at UIUC is gaining strength and international stature, many research areas still require essential expertise in order to complement developing efforts. The following are representative of research areas that require new faculty expertise and support:

1. Fermentation design--maximizing the production of economically important microbes. Activity in this area is crucial to the processors of agricultural products in Illinois. There is great economic potential in the production of value-added chemicals using new fermentation processes.
2. Microbial physiology--extracting synthesized products from microbial cells. This research is important to the State's pharmaceutical industry.
3. Plant genetics--measuring the extent to which splicing foreign genes in plants results in desired genetic changes. Naturally, the firms in Illinois that are involved with plant agriculture and the entire agricultural base of the State are dependent on research in this area.
4. Eucaryotic cell and molecular genetics--studying the molecular genetics of higher plants and animals. Since the cell is the common denominator of all living systems, investigation at the molecular level of cell structure and function are basic to the understanding of the biological structure and integration of all higher systems.

5. Animal reproductive physiology--investigating the molecular mechanisms of reproductive endocrinology. Livestock production and reduction of livestock losses caused by disease will be affected significantly by research in this area.
6. Cell biology--including monoclonal antibody, hybridoma, and cell culture techniques. This area is extremely important to those Illinois firms concerned with human and animal health. It represents a major factor in the development of a stronger research program in biotechnology that will expand the national visibility of the program and increase its outside funding.
7. Molecular basis of animal diseases--including retroviral gene transfer and hormonal control of immune function and its relation to cancer. Research in this area is of importance to livestock production and to human medicine as well.
8. Mammalian genetics--including the search for suitable vectors to introduce foreign genetic material into animal cells, the study of genetic regulation of biological processes, and the study of embryologic techniques such as embryo transfer and egg inoculation. This area is important in livestock production, particularly in breeding new strains of livestock with desirable traits.

Of special note is the area of bioprocessing. A significant opportunity exists to combine the historic strength of engineering at UIUC with the emerging expertise in biotechnology. The important area of bioprocessing is being developed by researchers in the Colleges of Engineering and Agriculture. It is hoped that this area can be strengthened to the point where it can compete for major funding opportunities afforded by industry and the Federal government.

The budget request for FY 1987 is shown on the following page:

Academic Staff	
2.00 FTE Professors	$120,000
1.00 FTE Assistant Professor	32,000
1.00 FTE Postdoctoral Research Associates	21,000
3.00 FTE Graduate Research Assistants	44,000
4.00 FTE Academic Professionals	88,000
Nonacademic Staff	
1.00 FTE Laboratory Technicians	24,000
2.00 FTE Medical Technologists	37,000
3.00 FTE Secretary	43,000
1.00 FTE Administrative Secretary	22,000
1.00 FTE Accounting Clerk	15,000
Expense	
Commodities	65,000
Contractual Services	42,000
Computing Support	15,000
Travel	8,000
Telecommunications	12,000
Equipment	12,000
TOTAL	$600,000

The full development of the Biotechnology Program will require additional increments of funding in FY 1988, FY 1989, and FY 1990 at the rate of $475 thousand per year.

Office of Biotechnology, Law, and Policy Studies ($100,000)

The rapid developments in the field of biotechnology pose many urgent questions for the legal system. Biotechnological developments as disparate as recombinant DNA procedures, artificial body organs, transplants, and other new medical technology for ways of beginning, preserving, and prolonging life raise important medical, ethical, and social issues that

ultimately will have to be addressed in the context of social and legal policy. A partial list will serve to illustrate some of these issues: What legal controls are needed to protect individuals as well as society at large against abuses of new technology by government? What is the role of the courts or of other governmental agencies in deciding when "extraordinary" measures that may save or prolong life are appropriately provided or denied? How should government regulate research directed toward manipulation of genetic material--what lines must be drawn? Who should bear the risk of damage or loss from harm caused by applications of new technology if harm results either to one or a few individuals or to a large number of people as a result of a catastrophic event? To what extent should the law recognize property rights (e.g., patents) in new or modified life forms developed through biotechnologic manipulation? How must the legal concepts of heirship and kinship (family status) be modified to apply to persons who are conceived and nurtured through techniques in which more than two persons combine to provide partial reproductive functions, such as sperm and egg donations, and "surrogate motherhood"? A host of environmental concerns overlap law, agriculture, agricultural engineering, and engineering. A particular environmental concern is evaluation and control of deliberate releases of genetically engineered organisms into the ambient environment for either research or commercial purposes.

The College of Law is in a strong position to play a leading role in the research and dialogue which will be necessary to produce sound solutions to these and other questions. A number of members of the faculty of the College of Law already have done and are doing relevant work on legal implications of the new biotechnology, work on environmental law, and work in intellectual property law. The location of the College of Law at UIUC, one of the leading universities in the development of the new technology, gives it a major advantage among its peers in developing a strong biotechnology law program.

The present proposal contemplates the establishment, within the College of Law, of an Office of Biotechnology Law and Policy Studies, possibly combined with the present Office of Environmental and Planning Studies, since the new biotechnology raises many environmental issues.

However, the biotechnology issues dealt with under the aegis of the proposed office will not be limited to those involving environmental protection, but will cover the range of regulatory, damage, medical, and family-law related issues already mentioned. The Office will coordinate, focus, and amplify present activities of individual law faculty members in the biotechnology area. It also will encourage additional effort in that area by providing released time for research and for study in related disciplines.

The Office will permit the College to take advantage of strength in biotechnology elsewhere on campus by providing funds for joint appointments between the College of Law and other units such as Agriculture, Life Sciences, Engineering, Medicine, and Veterinary Medicine. These appointments will permit law professors and specialists in relevant disciplines to work together in exploring important legal/social policy issues. Such interaction is essential if public policy is to take account properly of both the scientific realities and the existing legal/social matrix within which new policies and legal rules must be developed.

The Office will arrange for faculty to offer additional courses and seminars in the area. A reasonable goal is to offer three to four such courses or seminars per year. Some of these courses will be cross-listed with other units such as the College of Medicine and the School of Life Sciences. Further, some courses will be taught jointly by law faculty and faculty from other departments. Some likely course or seminar titles are Bioethics and the Law; Law, Medicine and Science; Intellectual Property Rights of Developers and Sponsors of Biotechnological Research; and Legal and Ethical Issues in Human and Animal Experimentation. (Two courses--Law and the New Biology and Law, Medicine and Science--have been taught in the past, but on an irregular basis.) Some students will be encouraged to pursue joint degree programs, analogous to the present J.D./M.D. program for medical scholars.

The Office should also foster the examination of the ways in which other countries are dealing with sociolegal issues related to biotechnology. Many of the existing faculty have strong international ties, and comparative and cooperative international studies should evolve quite naturally.

The Office will serve as a conduit and focal point for grant applications to finance research efforts by faculty members of the College of Law and faculty in other related disciplines. It will also handle contract research, as does the present Office of Environmental and Planning Studies. In addition, the Office will sponsor colloquia and symposia at which problems in biotechnology and their proposed solutions will be discussed, and it will encourage publications on biotechnology law in the University of Illinois Law Review.

Creation of the Office of Biotechnology Law and Policy Studies will build on current strengths, provide a vehicle for continued growth, and provide the framework for the College of Law to participate in the increasing contributions in biotechnology being made at UIUC. As a source of policy and legal recommendations firmly based in law and the sciences, the office will benefit not only the College and the University but also, more importantly, the State of Illinois and the nation.

The proposed budget for FY 1987 is outlined below:

Academic Staff	
1.00 FTE Professor	$ 60,000
1.00 FTE Graduate Assistant	16,000
Expense	
Commodities and Contractual Services	19,000
Telecommunications and Travel	5,000
TOTAL	$100,000

An additional increment of $150 thousand will be requested for FY 1988 to complete the funding of the program.

SUMMARY OF FY 1987 BIOTECHNOLOGY REQUEST
(Dollars in Thousands)

	UIC	UIUC	TOTAL
Interdisciplinary Biotechnology			
Personal Services	$519.0	$446.0	$ 965.0
Equipment and Expenses	281.0	154.0	435.0
Biotechnology and the Law			
Personal Services		76.0	76.0
Equipment and Expenses		24.0	24.0
Total	$800.0	$700.0	$1,500.0

INTERDISCIPLINARY PROGRAM IN ENVIRONMENTAL TOXICOLOGY
($200,000)

Illinois ranks as the second largest producer of toxic wastes in the nation. The importance of health-related environmental toxicology has increased dramatically with public concern over PB's in Michigan; PCB's in the Great Lakes; dioxin in Missouri; formaldehyde, asbestos, and lead in the general environment; and EDB in food. The 1980 Harris Poll demonstrated that 86% of the nation favored retaining the Clean Air Act or making it stricter, and 83% believed that the government should screen chemicals for safety before they reach the market.

Proper control and management of these toxic substances in the environment and prevention of their adverse health effects will require increased expenditures for control and increased numbers of scientists to conduct the research required to define more clearly the health effects of environmental toxins. This must be accomplished to assess and to prevent acute and long-term risks to man. Currently the demand for toxicologists in government, industry, and academic life far exceeds the number of students being trained throughout the country. To meet current and future demands for trained personnel in toxicology, the University of Illinois at Urbana-Champaign must expand its current strengths in Environmental Toxicology to include a strong program in the health-related aspects of toxicology.

UIUC already has in place an impressive research faculty and the facilities to carry out an effective interdisciplinary program in environmental toxicology. Since 1975 the Institute for Environmental Studies (IES) has administered the Environmental Toxicology Program, offering M.S. and Ph.D. students and post-doctoral trainees a strong background in characterization and evaluation of toxic substances in the environment. More recently, several new scientists whose research interests are closely related to the health aspects of environmental toxicology have joined the faculty of various UIUC departments. Effective coordination of the expertise represented by this growing number of faculty will allow the campus to develop a viable interdisciplinary program.

To satisfy the concerns of the public and to strengthen the University's expertise in the biological effects of toxins, UIUC plans to

expand the Environmental Toxicology Program to focus on the health effects of toxic substances in the environment. Specific objectives of the program are:

1. to conduct fundamental research on the effects of toxins on man and animals,
2. to train students to fill the current shortage of professionals in biomedical toxicology, and
3. to coordinate the research efforts of UIUC environmental toxicology faculty members so as to provide an informational resource to Federal, state and local authorities.

Environmental toxicology, interdisciplinary by definition, spans the colleges of Agriculture, Engineering, Liberal Arts and Sciences, Medicine, Veterinary Medicine, and the Institute for Environmental Studies. Because the Institute is organized outside traditional departmental structures, it enjoys a unique ability to foster and to support interdisciplinary programs. The program herein proposed will be administered by the Institute and decisions concerning the academic program will be made by participating faculty from approximately 20 academic departments under the leadership of the Program Director.

Students must be enrolled for an advanced degree in the department of their major advisor. Acceptance of students into the graduate program will be the combined responsibility of the faculty of the Environmental Toxicology Program and the department of the student's major advisor. Students will meet all degree requirements of their specific department and will participate in a common core of interdisciplinary courses and seminars devoted to environmental toxicology; they will conduct their research in the laboratory of their major advisor. Depending upon the research problem, however, a student may work in more than one laboratory. Such a course of study can only be realized if it is supported by a coordinated academic program.

Five new faculty positions are required to fill existing gaps in the health-related aspects of environmental toxicology. The close interaction of the program with the Colleges of Medicine and Veterinary Medicine will enable faculty to explore the manifold effects of environmental toxins on human and animal health. The current plan calls for adding two scientists to the faculty in FY 1986 and three in FY 1987 as joint appointments--

usually 75% in IES and 25% in the appropriate department. These faculty will extend, invigorate, and unify the Environmental Toxicology Program. Each new faculty member will develop new courses, will develop a disciplinary research program, will conduct collaborative research to augment the interdisciplinary nature of the Environmental Toxicology Program, and will educate graduate students to become the toxicologists of the next decade and beyond.

The expanded Environmental Toxicology Program will place UIUC at the forefront of toxicologic research and education in the United States, so that Illinois may compete successfully for extramural funding in research and graduate education. To this end, the proposed program expansion will provide the foundation for a National Institute of Health (NIH) training grant in Environmental Toxicology; planning for this NIH training grant is already in process, and its success depends upon the funding being requested.

The $144 thousand provided in FY 1986 served to establish a firm base for the Environmental Toxicology Program. The new faculty that will be hired will further the planning of the program and will form the core around which the program will be built. An increment of $200 thousand is requested for FY 1987, and another increment of $220 thousand will be requested for FY 1988, completing the funding for the program.

The details of the proposed budget for FY 1987 are provided below:

Academic Staff	
3.00 FTE Faculty	$115,000
2.00 FTE Graduate Assistants	33,500
Nonacademic Staff	
1.00 FTE Secretary	$ 16,000
Expense	
Commodities	15,000
Contractual Services	12,000
Computer Time	6,000
Telecommunications	1,000
Travel	1,500
Total	$200,000

PROGRAM IN SURFACE CHEMISTRY AND CATALYSIS
($120,000)

Some of the most dramatic and far-reaching developments in science and engineering during the past several years have occurred in surface science. The study of surfaces, though little heralded in the popular press, is of great importance in fields such as corrosion, preparation of microelectronic devices, performance of new engineering materials in chemical catalysis and in many other areas.

The proposed program in Surface Chemistry and Catalysis at UIUC is devoted to graduate instruction and research. It involves the preparation and characterization of catalysts and of catalytically active surfaces and the study of the reactions which they generate. Research in this area is central to developments in energy utilization, both directly, in terms of making existing technology cleaner and more efficient, and indirectly, in terms of leading to new devices and processes.

The importance of catalysis in modern day chemistry has recently received considerable attention, even in non-technical publications. A recent Wall Street Journal article noted that "Catalysts will be the key, for example, to whether gasoline can be made economically from coal, and to whether benzene and other major chemicals can be made more cheaply than at present. New catalysts are emerging as the major weapon in the chemical industry's battle against inflation..., helping to reduce energy consumption..., and reducing the amount of undesirable by-products, including pollutants."

The economic ramifications of such developments are immense. For example, most of the U.S. petroleum cracking capacity has been changed from silica-alumina to catalysts based on zeolites. By converting a larger fraction of crude petroleum to gasoline rather than to coke and light hydrocarbon gases, this change is saving the U.S. economy more than $2 billion per year, including a decrease in the amount of crude oil that has to be imported to maintain the economy. In terms of long-range needs, catalytic chemistry based on carbon monoxide and hydrogen has been described as a way of obtaining fuel when current petroleum supplies become exhausted. This technology will produce a new set of raw materials

from coal that the chemical industry will have to use as building blocks for its products.

All agricultural crops, including corn, wheat, and soybeans, are critically dependent on the availability of nitrogen-containing compounds in the soil. These compounds, such as ammonia or nitrates, must ultimately be obtained from nitrogen in the air, either by the catalytic action of bacteria in the soil, or by large-scale catalytic production by the chemical industry. Research chemists in the surface chemistry and catalysis fields at UIUC are studying the mechanism by which bacteria utilize nitrogen in the air, how the industrial catalytic processes work, as well as investigating new and better catalysts in an effort to make essential nitrogen-containing compounds more available and less expensive for agricultural uses.

Several problems relating to the efficient use of coal are also being studied. The treatment of high-sulfur coal to yield low-sulfur coal by catalytic desulfurization and the catalytic conversion of coal to other fuels, such as natural gas, gasoline, and kerosene, are just two projects that are being pursued in order to reduce the nation's dependence on foreign petroleum supplies.

Related work in the catalysis field may lead to the development of better fuel cells, new micro-structures for the electronics and computer industries, and new plastics, pharmaceuticals, and other chemicals that could have a large beneficial impact throughout the State. The new catalysis and surface program will also help development of high speed electronic circuits that depend critically on understanding the electronic structure of solid-solid interfaces (heterojunctions).

Basic research in catalysis and surface science has undergone a renaissance in recent years because of the development of powerful new instrumental tools for study of the systems. A major graduate program in chemistry and chemical engineering must reflect a greatly increased level of activity in catalysis and surface science. It is important to generate new basic knowledge, which can lead to further advances in the area, and to train chemists and chemical engineers who can apply that knowledge to the improvement of current technology. Catalytic reactions at surfaces are very complex, and their study requires the integration of a wide range

of technical expertise and experimental capabilities. The Departments of Chemistry and Chemical Engineering already have taken significant steps in this direction, involving four faculty on a part-time basis in Chemistry and one faculty member on a full-time basis in Chemical Engineering. These departments propose to build upon their existing strengths in this area and to expand and to broaden them by bringing additional faculty committed entirely to this area to UIUC and by encouraging greater involvement of current faculty.

The main purposes of this program are to make major research contributions in an area of great national importance and to prepare graduate students for work in the area. The demand for Ph.D. chemists and chemical engineers in general is high. Moreover, the employment opportunities for graduates of this program are expected to be even better for the foreseeable future, because of the importance of the field in terms of the state and national economies. Because of the existing strengths and strong reputation of the School of Chemical Sciences at UIUC, this will be a highly successful and visible program.

The total cost of such an initiative will be $280 thousand, of which $120 thousand is requested for FY 1987. The proposed budget for the initial year is provided on the following page. Once the budget has been fully funded, it will be possible to offer new graduate courses and seminars in this area and to enrich lecture and laboratory offerings at the advanced undergraduate level. It should be noted that the nature of this program is such that significant levels of outside funding will be available to support some of the start-up costs and a major fraction of the continuing operating costs associated with the program.

Academic Staff		
1.00 FTE Professor	$	60,000
Nonacademic Staff		
1.00 FTE Electronics Technician		30,000
Expense		
Commodities		19,000
Contractual Services		10,000
Telecommunications		1,000
TOTAL	$	120,000

An additional $160 thousand will be requested for FY 1988.

RESEARCH IN ARTIFICIAL INTELLIGENCE/COGNITIVE SCIENCE ($180,000)

Artificial Intelligence (AI) is the most rapidly-growing aspect of computer science. Many believe that an intensive development of AI will be the hallmark of the next phase of development of computer science. If Illinois is to play a major role in the computer science industry in the next generation, it must develop a reputation for frontier research in this area. In addition, the demand for computer scientists trained in AI is very intense, and the capacity of the University of Illinois to produce well-trained graduates of its computer science programs, at levels ranging from the B.S. through the Ph.D., is an essential aspect of the State's capacity to attract high-tech industry to Illinois.

The long-term goal of studies in AI is to make it possible for computers to perform tasks that require the intelligent use of knowledge. Ultimately, this capacity should allow computers and computer-controlled devices (e.g., scientific or industrial robots) to perform tasks for which humans are inherently unsuited (e.g., tasks that are too dangerous and/or cognitively or physically impossible).

Recently, interactions between AI, cognitive psychology, theoretical linguistics, and other disciplines have given rise to a field called Cognitive Science, a critical aspect of which is the search for an understanding of cognition, be it real or abstract, human or machine. The goal of Cognitive Science is to develop intelligent devices that can augment human capabilities in important and constructive ways and to understand the principles of intelligent, cognitive behavior in the hope that they will lead to a better understanding of the human mind, of teaching and learning, and of mental abilities. Thus, Cognitive Science is necessarily an interdisciplinary endeavor to which theories about learning, experiments, and computer models all make unique contributions. New advances will require a high degree of interaction between researchers from such disciplines as computer science, engineering, linguistics, psychology, and even philosophy.

The development of next generation work stations, for use with supercomputers, is one example of the need for AI/Cognitive Science

development. Increased cooperative interactions with major corporations, such as IBM, Texas Instruments, AT&T Information Systems, Gould, and others, will depend on the University's capacity to develop a broadly-based, high-quality program of research and instruction in AI/Cognitive Science.

A growing number of universities in this country are making multi-million dollar commitments to programs that focus on AI and Cognitive Science. Many of these institutions are among the nation's best in computer science and/or the relevant behavioral sciences (e.g., Carnegie Mellon, MIT, Stanford, Texas). Their willingness to respond to the AI/Cognitive Science challenge is likely to contribute to the maintenance of their positions of preeminence and is bound to help them attract and retain top quality faculty and students. These gains, in turn, are likely to affect the attractiveness of the states or regions surrounding those institutions as locations for new industry that will make use of new development in AI/Cognitive Science. Given the exceptional strengths of UIUC in these areas, it would seem prudent for the State to enhance an already strong effort. Total external support for research at Illinois that has an AI/Cognitive Science orientation has risen to about $4 million per year in FY 1985.

During the past year, a mailing list of more than 70 faculty with research interests in the broad area of AI/Cognitive Science has been established. Of these faculty members, more than two dozen could immediately become involved as key faculty in the proposed campus-wide program. The College of Engineering is moving aggressively to integrate the activities of faculty in that College that are involved in artificial intelligence research. At the same time, a campus-wide program committee is bringing together faculty from across campus, including the Departments of Computer Science, Electrical and Computer Engineering, Linguistics, Philosophy, Psychology, the Center for the Study of Reading, the School of Clinical Medicine, and the Coordinated Science Laboratory. A seminar program has been established, and efforts are underway to formulate curricular proposals and broad research agendas.

Interested faculty at the Urbana-Champaign campus and a supportive administration are moving rapidly to develop a campus-wide AI/Cognitive

Science organizational structure. The AI/Cognitive Science program will concern itself with language, perception, reasoning, and learning. In each of these areas there are already a number of independent research efforts by investigators from different departments. These researchers bring different backgrounds and use different methodologies in their research, but they are attempting to answer similar questions. For example, a number of investigators in Electrical and Computer Engineering, Psychology, Education, and Computer Science are interested in the acquisition of knowledge by machines and people. Some of these researchers investigate how machines can acquire new information; others study the structure of knowledge in experts, while others study how children acquire new knowledge. Currently each of these groups work somewhat independently. Yet, because of the common intellectual issues involved, each individual research effort would greatly benefit from closer interaction with the others. A new interdisciplinary AI/Cognitive Science program would significantly facilitate this intellectual interchange. The existence of a formal program and organizational structure will also greatly improve the University's ability to attract new faculty in this very competitive area.

The resources available to date have not permitted establishment of an adequate coordinating activity for the campus-wide efforts. If the AI/Cognitive Science effort is to reach its full potential, a Director for the program is essential, along with supporting staff and equipment, to aid in networking--a particularly critical ingredient in developing this campus-wide effort. To date Texas Instruments has provided thirteen Explorer LISP computers at a total cost of $845 thousand to further the research efforts in this area. It is expected that further equipment gifts will be provided in the future. Because computer science technology is changing so rapidly, recurring equipment funds will be required in future years to upgrade and to replace existing equipment at frequent intervals.

The details of the proposed budget for FY 1987 are included on the following page:

Academic Staff		
1.00 FTE Director, AI/Cognitive Science Program	$	75,000
1.00 FTE Computer Software Specialist		25,000
1.00 FTE Computer Maintenance Specialist		30,000
Nonacademic Staff		
1.00 FTE Electronics Technician		22,000
Expense		
Commodities		12,000
Contractual Services		16,000
TOTAL	$	180,000

Additional increments of $570 thousand will be requested for FY 1988, FY 1989, and FY 1990, and $150 thousand will be requested in FY 1991 to complete this program.

REHABILITATION ENGINEERING--ADAPTING MICROCOMPUTER SYSTEMS FOR USE BY DISABLED STUDENTS ($200,000)

More than 35 million Americans suffer from some form of physical or mental handicap. For many, such simple tasks as eating a meal, dialing a telephone or saying "Hello" may be impossible without the aid of others. Disabilities take a toll on these individuals, who want more independence, and on their families, who often must cope with the emotional strain and demands of caring for them. Rehabilitation engineers and health researchers are working to lessen that burden and to increase potential for independence, adapting some of today's most sophisticated technologies to create aids for the disabled.

Perhaps the greatest potential for enhancing the functional capabilities of individuals with disabilities lies in exploiting recent advances in microcomputer technology, cognitive science, artificial intelligence, robotics, and related fields. However, effective programming and interfacing of computers for individuals with disabilities can only be accomplished with the careful study of their real needs by educators, scientists, and engineers who are on the cutting edge of their disciplines. The University of Illinois at Urbana-Champaign, with its unusual strengths in rehabilitation-education, computer engineering, cognitive sciences, and other relevant areas of knowledge, already has the essential academic ingredients to develop a strong interdisciplinary research program in the challenging area of rehabilitation engineering.

It is widely acknowledged that the microcomputer is certain to be one of the dominant forces in shaping the way people live, work, and play in the future. For the disabled, computers--particularly microprocessors--represent an unprecendented breakthrough. Already they have greatly improved services and aided disabled individuals.

Computers are already extensively used in research, referral, record-keeping, and information services for disabled people. They are used to evaluate functional abilities and handicaps, to design sophisticated aids of all sorts, and to aid in rehabilitation therapy. Computer-assisted instruction (CAI) techniques are being widely employed for groups of disabled individuals, and the employability of disabled persons has been

markedly enhanced by computer technology. This technology also represents the core of rehabilitation engineering for the present and future.

The creative and wide use of modern microcomputers can make the difference between an individual with a severe handicap working in a job setting commensurate with his or her talents, interests, and abilities or being underemployed for the sake of having a job, or worse still, having no job at all. For economic and humanitarian reasons, it is imprudent to continue the current high cost of disability payments through Federal support, social security payments, private enterprise pensions, and the expenditures by voluntary health agencies, and state and municipal programs when the technological potential now exists to bring many disabled individuals back into the mainstream of American life and to enable them to achieve gainful employment. Such an accomplishment would work not only to the advantage of the individual, but would move him or her from the category of recipient of financial aid to that of a self-sufficient taxpaying member of society.

The existing resources available to the proposed program are quite substantial. A very special resource is the substantial and talented population of disabled students who enroll in a wide range of academic pursuits at the University of Illinois at Urbana-Champaign. During the 1987 academic year, it is anticipated that approximately 50 visually-impaired and hearing-impaired students will be enrolled at the University along with 150 students who have various severe physical disabilities--including spinal cord injuries (paraplegic and quadraplegic) and cerebral palsy.

Another important resource is the faculty from several colleges on the UIUC campus, including Applied Life Studies, Engineering, Liberal Arts and Sciences, and Law, along with the PLATO-CERL group who are already working part-time on adapting microcomputers to the needs of the disabled. All have expressed a strong interest in participating in a concerted program that would maximize the benefits of their research. An interdisciplinary faculty group representing the above units would work closely with a core faculty based at the Rehabilitation-Education Center. The Center, with the necessary experienced supporting staff and disabled students, would serve as the ideal setting to foster the ongoing and critically important interaction between the users and those who can help

bring modern microcomputer technology to bear on the unique problems of the various disabled student populations.

Although the proposed program will concentrate initially on research until a critical mass of faculty are available and until outside research funds become more plentiful, it is expected that in several years a considerable number of graduate students will become involved in the program. Graduate students will come largely from the College of Engineering, with most from the interdisciplinary program in bioengineering. The Rehabilitation Engineering Program will give graduate students an opportunity to apply engineering to human welfare.

The basic objectives of the program are:

1. to conduct basic and applied research in adapting microcomputer systems for use by individuals with disabilities;
2. to evaluate new computer hardware that facilitates the use of computers by individuals with various disabilities;
3. to evaluate existing software to determine its propriety and, as necessary, to recommend modifications to serve individuals with various disabilities better;
4. to work closely with students with diverse disabilities who are willing to participate in the research, development, and evaluation of new computer-related technology appropriate for business, professional preparation, and higher education applications;
5. to facilitate research in the adaptation of input technology (switches, modified keyboards, braille, etc.) for individuals with physical or sensory (vision and/or hearing) impairments;
6. to facilitate research on speech input technology and its implications for computer use by disabled individuals;
7. to establish a research base for the evaluation of output technology (print, braille, speech synthesis, etc.) to meet the needs of disabled individuals;
8. to create an opportunity for faculty and disabled students to develop cooperative research efforts that will focus on new developments in computer-aided instruction and other computer applications for individuals with disabilities; and

9. to explore applications of microcomputer technology pertinent to other areas of concern for the disabled, e.g., environmental control, independent living, household management and leisure activities.

The details of the FY 1987 operating budget request are shown below:

Academic Staff		
3.00 FTE Faculty	$	125,000
.50 FTE Administrator		20,000
Nonacademic Staff		
2.00 FTE Clerical		32,000
Expenses		
Commodities (office and computer-related)		10,000
Travel		3,000
Telecommunications		3,000
Computer Services		2,000
Consultants		5,000
TOTAL	$	200,000

An additional increment of $100 thousand will be requested for FY 1988.

ACADEMIC COMPUTING
($850,000)

The character of academic computing changes almost daily. As recently as six or seven years ago, the computing environment in a contemporary university could be described as a large mainframe computer for general use and, in research universities, one or more highly specialized machines tucked away in laboratories for scientific research. Faculty and occasionally students made use of the mainframe for particular problems, usually of a mathematical nature, or to learn "programming."

With development of microcomputers (desktop models), networking, easily transportable software for almost every business, industrial and professional application, and the growth of large data bases of national and international scope, the academic computing environment has changed rapidly. Indeed, computing technology and computing experience have become essential to the academic researcher, the professional educator, and students in almost every field of academic inquiry. It would be unthinkable today to train accountants, auditors, chemists, doctors, nurses, architects, physicists, mathematicians, graphics designers, psychologists, social scientists, or humanists without training them in effective use of modern computing technology. Every modern university must integrate computing technology into the undergraduate and graduate curricula, just as these tools must be provided for the faculty to increase research productivity and to improve classroom instruction. The University of Illinois at Chicago must provide these essential tools to its faculty and students. In order to meet this goal, the UIC budget request for FY 1987 seeks $850 thousand in additional support for academic computing.

The Academic Computer Center at UIC now serves almost 25,000 students and more than 3,000 faculty and professional staff. In order to meet the present and future needs of these users the campus is developing a comprehensive program for academic computing for the 1980's and 1990's.

The Mainframe Environment

The UIC Academic Computer Center operates an IBM 3081 mainframe system. This machine, now almost two years old, is a moderately large

mainframe by today's standards. It performs 10 million instructions per second, has a semiconductor memory of 32 million bytes and online disk storage for 21 billion bytes. It supports interactive computing for more than 300 individuals at any one time, as well as background computing for students and faculty. The workload on the present system has quadrupled in less than five years as both student and faculty demand for computing services increases. Among the most useful indicators of the load placed on such a system are the number of jobs performed within a given period of time, the hours the central processing unit (CPU) is engaged, the hours of connect time, the number of people using the system and the average peak-load number of users. These measures demonstrate the growing use of a mainframe system, both in numbers of users and the increased usage of computing technology among those users:

	Spring 1983	Spring 1985	% Increase
Jobs	326,991	444,300	35.9
CPU hours	350.6	1,176.8	235.6
Connect hours	87,776	163,252	86.0
Users	6,347	7,266	14.5
Avg. Peak Users	150	254	69.3

On a typical weekday during the academic year approximately 1,800 individuals will use the academic computing services of this system. The scope of services provided by the academic computing program at UIC will continue to grow as the needs of the users change and grow. In response to these changes the Academic Computer Center at UIC has developed a five-year plan which is assessed and updated each year to incorporate technological advances in the computing field. A very important--and already very successful--component of the program is the Academic Data Network (ADN). The ADN is being developed with a focus on economical acquisitions of equipment which can provide the needed flexibility and compatibility in all important areas of academic computing. Faculty and students can access the ADN from every point on campus via inexpensive terminals for text processing, manuscript formatting, file transfer, electronic communications, search of the library catalogs, statistical

analysis, and other purposes. Because the system operates 24 hours a day, the user with appropriate equipment has access from office, home, or any place which has adequate telephone service. Presently, almost 700 terminals are linked to the mainframe through the ADN, and the usage is expected to grow significantly over the short term, since the Health Sciences Center has been only recently added to the network.

The program to bring effective academic computing within the experience of every student and every faculty member requires that the ADN be expanded, enhanced and maintained at a high level of efficiency. The need for remote terminals, printers, and graphics devices is growing at a rapid pace. Concomitant with the growing uses of these services is a growing need to train people in the effective use of this technology. The ADN is a resource which can be incrementally enhanced to support and interconnect more terminals, microcomputers, printers and plotters. It allows for the increasingly important twenty-four hour data transfer among students and researchers. Through the ADN, graphics output devices (CRT terminals and plotters) can be made available to a variety of users.

The campus anticipates additional funding of $225 thousand in FY 1986 to support the growth in academic computing. These funds will provide four additional nonacademic positions in the Academic Computer Center and $127 thousand in expenses and equipment. The additional personnel will allow improved maintenance of the ADN and full 24-hour services, better support for the remote printing services, and a slight expansion of the program to provide training and support to departments in effective use of computing technology for particular uses.

The campus is requesting a total of $500 thousand in additional support for the ADN in FY 1987. The budget additions being requested will support ten additional FTE technical and support staff and will provide $200 thousand in expenses and equipment for the expansion and maintenance of the ADN. The additional staff are needed in almost every area. The request is for two technical staff for the mainframe environment, one full-time person for the training program, one additional operator to allow full twenty-four hour operation of the ADN, one additional specialist in software tools, one person for support for the Library access systems, one specialist in large data bases, two people trained in access

to the supercomputer soon to be installed at the University's Urbana campus, and additional staff trained in the use of microcomputers.

Together with the additional support in FY 1986, it is anticipated that the funds in this request will bring the total appropriated funds support for the Academic Computer Center to approximately $2.7 million in FY 1987. The staffing will have increased from 38 in FY 1985 to 52 positions in FY 1987, including 19 professional personnel. Although advances in computing technology require that needs and effective means of meeting them must be carefully reassessed each year, planning at the present time indicates that budget requests through FY 1989 must include approximately $1 million in additional support. These funds would allow staffing in the Academic Computer Center to grow to about 70 FTE, including 25 professional positions. By way of comparison, recent surveys taken among computing center directors in the Big Ten show Iowa, the closest to UIC in size of student body, with an FY 1985 budget of about $4 million and a total staff of 74 FTE.

Computing in the Colleges and Departments

As important and effective as the ADN has proven to be, this approach cannot meet all needs of the expanding use of computing technology in the contemporary university setting. Many academic units are developing this technology as an important tool in direct classroom instruction. This is especially true in the professional training curricula such as business, nursing, applied mathematics and computer science, as well as in architecture and graphics design. The specialized nature of these uses, as well as the development of applications based on the microcomputer in these professions, requires that the faculty in the responsible departments develop effective methods for incorporating microcomputers into their curricula. For this reason, the campus has developed a second component to the larger program for academic computing at UIC. This program is designed to encourage effective use of the technology, while emphasizing the need for academically sound programs and cost-effective ways of achieving them.

It is recognized that most of the costs of integrating computing technology into the curriculum will be related to acquisition of hardware

and software, with a smaller portion being devoted to new personnel. The campus intends to encourage each academic unit to carefully assess its instructional and research programs in terms of the use of computing technology, to prepare detailed and comprehensive plans for using this technology, including the anticipated benefits and the total costs. Not all academic units will be able to, or desire to, develop these plans within the same time frame. Therefore, it will be feasible to review such proposals as are completed within one fiscal period and to fund them over a period of years. For this program UIC is requesting $350 thousand for FY 1987.

Several units have submitted proposed programs for incorporating microcomputers and other forms of academic computing technology into their activities by summer of 1986. Many of these proposals are still under review, and others need additional planning time. The campus has identified several well designed proposals which are important to the undergraduate curriculum as well as beneficial to the graduate training and research programs, and will be cost effective over the longer term. Among these programs is the critical need to establish a twenty-station Computer Aided Design (CAD) laboratory to be shared by the School of Architecture and the Department of Art and Design in the College of Architecture, Art, and Urban Planning. Another program which has already proven successful, but is much in need of expansion in order to accommodate the growing demand, is the computer laboratory in the Department of Mathematics, Statistics, and Computer Science. The Department has been trying to build a fifty-station microcomputer laboratory for instruction at the undergraduate level and to aid the faculty in the development of new courses in computer science and applied mathematics.

The College of Associated Health Professions (CAHP) has been able to integrate microcomputers into parts of its mission. All departments now use this equipment to support research as data handlers and text processors. The Department of Nutrition and Medical Dietetics has established itself as a center for the collection and dissemination of dietetics data for Chicago area hospitals. This and other units are now beginning to utilize computing technology in the undergraduate curriculum. The College has developed a program to permit each department to make effective use of

the technology, including linking the microcomputers to the ADN for maximum benefits of this equipment. Most of the funding required for these programs, as well as for the programs now being developed in other colleges, will be for equipment. Necessarily, new personnel must be added to some departments to facilitate these programs and to develop software, maintain the equipment and to provide training in use of the technology to new cohorts of students each year.

The FY 1987 budget request is itemized below:

Academic Staff	
5.00 FTE Academic Professionals	$151,000
Nonacademic Staff	
8.50 FTE Technical/Support Staff	224,000
Expenses	75,000
Equipment	400,000
Total	$850,000

Additional funding of $500 thousand in FY 1988 and FY 1989 will be required to fully implement this program.

EXPANDED/IMPROVED PROGRAMS
B. ECONOMIC AND PROFESSIONAL DEVELOPMENT

COLLEGE OF VETERINARY MEDICINE
($750,000)

Veterinary medical education has changed dramatically in the past fifteen years. The profession requires greater sophistication than ever before. Veterinarians must have expertise in preventive medicine, the safety of drugs and toxic effects of pollutants, single and complex infectious disease processes, as well as clinical medicine. Veterinarians have an expanding role in public health and medical research, and their skills in treating and preventing diseases of livestock have a direct effect on the success of one of the leading industries in Illinois--animal agriculture.

The need for, and importance of, animal science and veterinary medicine to support and to protect animal agriculture in one of the nation's leading agricultural states is unquestioned. The College of Veterinary Medicine was given high priority in the Food for Century III capital construction program because of its important multiple roles in Illinois. Its facilities are now among the best in the world. As a result of that construction program and the promise of commensurate operating funds, a number of new faculty with strong commitments to research have been recruited. Major efforts were placed on the recruitment of faculty in areas of current and emerging research importance. The University of Illinois College of Veterinary Medicine is now ranked sixth nationally among veterinary colleges in the generation of extramural research funds. Its record for attracting outside research funds over the past six years is shown below.

Annual Extramural Research Fund Expenditures
(in thousands)

FY 1979	$ 1,155.7
FY 1980	1,428.8
FY 1981	2,125.2
FY 1982	2,270.4
FY 1983	3,285.9
FY 1984	4,161.8

The College, however, still lacks the faculty and staff depth to sustain its research programs and to deliver on its commitments of top quality veterinary education. A series of national studies[1] predict continued shortages of specialty-trained veterinarians. Graduate programs in clinical medicine, pathology, microbiology, pharmacology, toxicology, laboratory animal medicine, and epidemiology are identified as producing inadequate numbers of veterinarians with postdoctoral research training.

Even though the College now has some of the best physical facilities in the world and its faculty has made significant progress in generating additional extramural research funds, it remains at a static rank of thirteenth out of twenty-seven veterinary colleges in total state-appropriated operating support. Worse, the total dollar support for the leading institutions like the University of California, the University of Pennsylvania, and Cornell University has grown to levels two to three times that provided in Illinois. New programs such as those at North Carolina State and the University of Florida have appropriated support levels of over $15 million and $10 million, respectively. These and other institutions continue to compete vigorously for the best faculty. It is imperative that the College receive incremental support to achieve and to sustain a level of excellence that will assure its place among the best colleges of veterinary medicine.

The funds requested for FY 1987 will both improve the professional veterinary curriculum and provide for the expansion of research programs and graduate assistantships in a number of the disciplines experiencing acute manpower shortages in veterinary colleges, Federal and state governmental agencies, and industrial firms. The incremental funds requested in FY 1987 will be used in the following areas:

1. A new curriculum will be implemented and escalating medical supply and equipment costs will be met in the Veterinary Medicine Teaching Hospital Program. Funding is also needed to address the dramatically increased operating costs of the two basic science departments and of the college administration resulting from the move into the larger Basic Sciences Building.

[1]e.g., Specialized Veterinary Manpower Needs Through 1990, Committee on Veterinary Life Sciences of the National Research Council, National Academy of Sciences

2. Greater emphasis will be placed on educating veterinary and graduate students in intensive herd-health programs dealing with food animal production systems. These efforts will include the development and use of computerized systems for disease surveillance and the study of environmental, nutritional, and management systems by clinical epidemiologists and biostatisticians. The use of computer-driven knowledge couplers and artificial intelligence systems for both animal disease diagnosis and prevention must be developed. Such programs will also include training dealing with infectious diseases, biotechnology, toxicology, pharmacology, and reproduction in food-animal herds. The utilization of selected adjunct clinical appointments will be an essential component of this important area. Teaching associate positions are required to establish both more effective recruitment and flow of graduate students through departmental research programs and to provide laboratory assistants in professional student laboratory courses.
3. The toxicology program, housed in the new diagnostic laboratory facilities, has been designated as the National Animal Poison Control Center by USDA. Additional emphasis is being placed on the broad areas of environmental and experimental toxicology, as well as pharmacology, dealing with both drug and antibiotic residues and other chemical hazards to both animals and man. A broad-based computerization of data dealing with chemicals and natural toxins is being developed to meet agricultural needs more effectively.
4. Further development and expansion of the College's biotechnology and bioengineering programs are planned. The College is developing sensitive diagnostic systems for the early detection of disease utilizing hybridoma-monoclonal antibody procedures and biotechnology, where appropriate. It will expand biotechnology programs in the areas of immunogenetics, immunoregulation, molecular virology and bacteriology, embryology, and embryo transfer research, and will develop the use of procedures such as ultrasonography for the diagnosis of pregnancy and infertility in animals. The expansion of comparative research programs dealing

with diseases important to man, such as hyperthermia research for cancer therapy and effective vaccines produced by both conventional and genetic engineering techniques, must continue.

Many of the diseases that reduce production in the modern, intensive livestock industry are intimately associated with new housing and management systems. Careful study of the complex interactions among disease agents, animals, and the environment are now possible through epidemiological and biostatistical methods. Computerized herd-health records make it feasible for clinical faculty and diagnosticians to analyze effectively the masses of data that are being collected. The College is working with APHIS, USDA, and other governmental agencies in determining the feasibility of a computerized national animal disease detection system.

New strategies for disease diagnosis and control are based on biotechnology and biomedical engineering. Monoclonal antibodies and serological testing procedures are being developed for a number of viral, bacterial, and parasitic diseases. The genetic analysis of virulence factors of viruses, bacteria, and protozoa is opening new methods for the control of diseases in both man and food animals. Modifying or enhancing the immune response via immunogenetics is another important facet of disease control.

The College has developed a plan for sustained excellence. A $750 thousand increment of that plan is being requested for FY 1987. A faculty member in clinical theriogenology and an academic professional trained in drug/hormone radioimmunoassay procedures will be added in the animal reproduction areas. A one-half time adjunct clinical professor with expertise in swine herd health will also be added to this major area. Faculty members in molecular pharmacology and neurocellular biology and an academic professional chemist will be added to the pharmacology/toxicology group to strengthen the College's efforts in the areas of drug and chemical residues and environmental toxicology. Faculty members in the areas of virology or bacteriology will be added to strengthen the College's programs in biotechnology dealing with respiratory and enteric diseases. Veterinary technical support personnel will be added to the staff of the Veterinary Medicine Teaching Hospital to support the clinical teaching programs and to assist teaching efforts in the basic sciences departments.

Eight teaching associates will be added to assist in a number of veterinary professional and graduate student laboratories. They will be trained in areas dealing with embryo transfer, respiratory diseases, biotechnology, toxicology, pharmacology, immunogenetics, and molecular virology where major deficiencies in numbers of trained veterinary researchers now exist. Existing faculty in these areas will provide extramural research funds to support the graduate research projects of these individuals.

It is fully expected that the College can match every operating dollar provided by the State in new incremental program funds with another dollar of research support from outside agencies. The recurring increment of $280 thousand provided to the College for FY 1984 was used largely to establish three new faculty positions--Director of Laboratory Animal Care, Professor of Reproductive Pathology, and Assistant Professor of Veterinary Biosciences Toxicology--and to augment six vacant positions for faculty hired to join the College's Biotechnology Program and four positions for faculty members in the Toxicology Program. These faculty members already are generating more than $1.2 million in outside funds.

Additional increments of $125 thousand for FY 1985 and $300 thousand for FY 1986 will make it possible to hire nine teaching associates and a graduate assistant to support the new faculty and to add four faculty members in critical programs: Clinical Oncology, Food Animal Medicine, Molecular Genetics, and Histology.

The current climate for outside funding in many areas of biotechnology, toxicology, and animal research is very promising from both Federal and industrial sources. If the College is to achieve a sustained research and teaching program commensurate with its new facilities and competitive with its peers, it is essential that it gain the resources being requested over the next four years.

Illinois ranks first in the nation in the export of agricultural commodities. It is second in the production of crops, and it is ninth in the production of livestock. Nationally, crop and livestock sales have an annual dollar value of approximately $70 billion each. Almost every national food animal commodity organization has consistently listed economic loss related to death and disease as the most significant problem facing its particular industry. Animal diseases cost the American farmer,

and thus the American public, nearly $17.5 billion annually. Diseases account for about 20% of the economic losses in production potential.

Livestock sales in Illinois totaled $2.4 billion in 1982. Income loss to Illinois livestock producers during that year because of disease was nearly $480 million.

The total funds requested for program improvement for the College of Veterinary Medicine -- $3 million over the next few years -- represent approximately 0.6% of 1% of the annual losses sustained by the Illinois livestock industry because of disease problems. The College is the primary and, in a number of instances, the only organization in Illinois with the capacity to address problems of animal disease losses for animal owners in Illinois.

The details of the FY 1987 operating budget request are shown below:

Academic Staff	
1.00 FTE Associate Professor	$ 50,000
.50 FTE Adjunct Clinical Professor	25,000
4.00 FTE Assistant Professors	160,000
8.00 FTE Teaching Associates	150,000
2.00 FTE Academic Professionals	59,000
Nonacademic Staff	
6.00 FTE Technical	74,000
3.00 FTE Clerical	32,000
Expenses	
Commodities	110,000
Contractual Service	65,000
Equipment	
Teaching Equipment	25,000
TOTAL	$ 750,000

Additional increments of $750 thousand per year will be requested in FY 1988 and FY 1989, followed by a final incremental request of $450 thousand in FY 1990.

ACTING AND DESIGN FOR TELEVISION
($130,000)

In the Spring of 1980, the Theatre Department acquired television facilities in the Krannert Center for the Performing Arts to teach a class in acting for the camera. Demand for this class from both on and off campus has been extraordinary. Acting students not only learn the special techniques necessary in acting for the camera, but they gain familiarity with basic technical problems (editing, camera angles, lighting, etc.) which affect their performances. By the end of the course, acting students have assembled a small collection of videotapes of themselves for use in professional auditions in the television industry when they leave the University.

Because of shortages in staffing, technical support, and maintenance funds, however, the course has had to be limited severely in scope and enrollment and, at present, can only be offered every other semester. Proper sets, costumes, and properties have never been available, and inordinate amounts of class time have been spent in studying highly technical problems and in mounting and lighting the scenes in far less than professional conditions.

The Theatre Department now sees the opportunity to create a truly unique program within its acting and design curricula--a training program designed to prepare advanced theatre students for careers in television acting and design. Recent graduates have fared well in entering the theatre profession, but it is clear that the television and film industries offer the largest share of real career opportunities to theatre students. A thorough training in contemporary television practice would make UIUC students especially attractive for future employment because no other department in the Midwest teaches acting for the camera and none in the entire country teaches television design. Thus, the implementation of this proposal would quickly establish the University of Illinois Theatre Department as a unique and highly visible training program.

The purpose of the program is to provide theatre students entry-level expertise in performance and design for television and film. After students have studied basic principles of acting and design in their first

three years (B.F.A.) or first two years (M.F.A.), they would take two or more courses specifically planned to teach the very different techniques required in television and film. Acting students would take performance classes in television drama, soap opera, situation comedy, newscasting, interviewing, and commercials. Design students would take classes in television lighting, set design, sound recording, costuming, and makeup.

Several members of the current Theatre faculty possess the expertise needed to teach some of these courses. One faculty member has acted extensively in film and on English television. Another has designed settings for productions on NBS, CBS, and PBS. With the addition of two new faculty members (one specializing in television acting and directing, another in television lighting), these classes should provide a thorough survey of the skills required to enter the profession. The addition of an academic-professional technical director will ensure that the television studio will be managed and maintained on a professional model and the sets and costumes executed with professional standards.

Although the goal of the program is entirely educational, it should also be noted that such a facility and program could become an important and exciting resource for fostering the reputation of the performing arts at the University of Illinois. With the continuing replacement of selected equipment, the facility and personnel involved could produce television tapes of high quality which could record Krannert Center productions, produce commercial spot advertisements for the performing arts, and document important workshops by guest artists at little cost to the resident departments at the Krannert Center for the Performing Arts.

Acting and design programs across the country have been inexplicably blind to the clear trend toward television and film as the primary employers of their students and as leading forces in the artistic growth of American performance media. The Department of Theatre feels that this program in acting and design for television would place the University of Illinois at Urbana-Champaign in an ideal position to participate actively in the development of educational and professional performance practice in the next decade.

The proposed budget request for FY 1987 appears on the following page:

Academic Staff		
2.00 FTE Professors	$	70,000
1.00 FTE Academic Professional		30,000
Expense		
Commodities		30,000
TOTAL	$	130,000

STRENGTHENING COMMERCE AND BUSINESS ADMINISTRATION
($800,000)

Chicago Program
($500,000)

International Commerce and Futures Markets

The College of Business Administration (CBA) at the University of Illinois at Chicago proposes significant research and graduate training initiatives to expand the potential of the College as a productive participant in the revitalization and growth of the Illinois economy. Specifically, the CBA proposes to develop organized research programs in the areas of commodities and futures trading and of international business and trade. These programs will encompass theoretical and applied approaches to critical issues and problems, with particular emphasis on those factors which influence the economic and social fabric of the State of Illinois. In addition these expanded research programs will have a direct impact upon the instructional program within the College at both the advanced undergraduate and graduate levels. Graduate students will benefit from practical as well as enhanced instruction through participation in the research projects. Special efforts will also be made to disseminate the knowledge developed in these programs to the broader public through publications, lectures, seminars and workshops, as well as more direct communication with government organizations, and private firms, groups and individuals through executive training programs.

The College will build on a strong instructional foundation already established among the 90 FTE faculty and will augment this faculty strength with appointments of nationally recognized scholars with significant records of accomplishment in the two areas of research. The end result will be a faculty with top-rank instructional and research strengths.

In fall 1985 the College enrolled 2,944 undergraduate and 557 graduate students. Most of these students are residents of the metropolitan Chicago area, and many of them will remain in Illinois as productive employees after graduation. In the 1983-1984 academic year 563 CBA students earned a bachelor's degree and 115 earned the master's degree.

Five students achieved a doctoral degree in Public Policy Analysis with a concentration in economics. Assuming these graduates follow the pattern of earlier CBA graduates, 55% of them will be employed in Chicago, another 33% will be employed in other areas of Cook County, and over 95% of them will be employed in the State of Illinois. They will be distributed among some 200 firms and government agencies, and 15% to 20% of them will be employed in a broadly defined community of financial institutions. Future graduates will enter this marketplace with the benefits of training and instruction enhanced by the knowledge gained through the research programs in this proposal.

The College of Business Administration requests a total of $1.1 million over a period of three years to support this proposal. Funding will begin in FY 1987 at a level of $500,000 with increments of $300,000 in each of the next two years. These funds will be used to add 11 FTE faculty, 4 FTE teaching assistants, 4 FTE technical and clerical staff, and to provide the necessary equipment and expenses to establish and maintain the activities of the programs. It is expected that all six of the academic departments in the College will participate in research and instructional programs which are funded through this proposal.

A. Research in International Business and Trade

International business and trade is becoming increasingly important to the economy of the State of Illinois. Development of global markets for Illinois' agricultural products, the growing influence of international financial markets for Illinois' business community, and the rapidly changing economic environment affecting Illinois' traditional manufacturing community are forces which will have a profound and lasting impact on the social and economic well-being of the State. Recognition of these forces and their potential effects on the citizens of Illinois has already stimulated efforts from the Governor, legislative groups, the Major of Chicago, and many business and professional leaders in the State to improve the State's international trade position and to encourage foreign investment in Illinois.

Presently the Chicago area lacks a strong interdisciplinary academic program in international business. The multidimensional program being

proposed by the CBA would place UIC at the forefront of efforts supporting international economic development in the State of Illinois. Advanced undergraduate and graduate courses, combined with a well designed and sharply focused research program to identify and examine issues and problems confronting Illinois in the international trade arena will improve significantly opportunities for many sectors of the State's economy to participate and compete successfully in international markets.

The College presently offers six graduate courses related to international trade and business, and a number of faculty have research interests which encompass aspects of international business. Although the CBA has significant faculty strength in this area, it has not been possible within the constraints of present funding to establish multidimensional programs of instruction and research in international business. Investment of additional funding will permit the CBA to attract outstanding senior scholars, to augment the existing faculty strength and to build on a base already provided by UIC's activities in the international academic community. UIC has established liaisons with Europe and with the nations of the Pacific. Faculty and graduate student exchange programs are in effect with universities in Poland and in China. The College of Business Administration has recently extended a very successful cooperative education program for MBA students into the international arena by placing students in jobs with participating firms in several European countries.

The proposed research programs will be geared to examine on the one hand the flow of commodities and services, and on the other the means of payment and movement of capital. This approach provides a large area of intersection between the study of international trade and research in the commodities and futures markets. Problem areas to be examined include the availability of financing, credit and currencies; expediting and executing trade; location of production and transport; legal, cultural, political, and environmental differences affecting trade; organizational effectiveness and labor relations; and economic assistance to underdeveloped countries. These studies will examine social, political, and cultural factors underlying the success or failure of international business and financial enterprises. Comparative analyses will be undertaken to yield information and models with which Illinois firms can plan more efficiently and compete more effectively in foreign markets.

Results of these research efforts will be introduced into the curricula of the CBA in the form of new courses, as well as improvements in existing courses, providing better trained students with a more complete understanding of the international business environment and the factors affecting a firm's ability to compete successfully in international markets. Since most CBA graduates find employment in Illinois, these benefits will be directly transferred to Illinois firms, and through those firms to an improved Illinois economy. Research will also be disseminated to a broader public through publications of theoretical and empirical studies. It is anticipated that some research projects will be undertaken in cooperation with, and partially funded by, government agencies, professional organizations, industry groups and firms which will apply the findings to their own activities in international business and trade. Most of the traditional methods of distributing information derived from this research will be employed, including lectures, seminars and workshops designed to explore a set of issues or themes.

B. Commodities and Futures Research

For more than one and a half centuries farmers, food processors and their lending institutions in the Midwest have used commodity futures trading to help manage price fluctuations and smooth the relationship between supply and demand. In recent years this agricultural marketing device has evolved into a sophisticated mechanism for management of the risks associated with a broad range of production and financial transactions. The Chicago Board of Trade (CBOT), founded in 1848, is the world's oldest and largest commodities futures exchange. The CBOT has 1,402 full members, more than 700 associate members, and a large number of traders with limited trading privileges. These members include independent traders, producers, processors, exporters and brokerage houses, banks and investment bankers,who trade in grains, precious metals and financial instruments. The Chicago Mercantile Exchange (CME), founded in 1919, claims to be the world's second largest commodity exchange. The CME has 2,659 members and provides a marketplace for trading in livestock, meat, lumber, currencies, equity related instruments and interest rates. The Chicago Board Options Exchange (CBOE) is the world's largest options marketplace.

These major exchanges, together with national and international banking institutions, major brokerage houses, and other financial institutions, help to make Chicago one of the nation's principal financial centers. The strength of the financial community in Chicago is an important asset to the entire State, one of the most important factors in making the City and the State attractive locations for national and international business enterprise.

Understanding and management of the risks associated with production, processing and marketing is growing in importance for many sectors of the American economy as the world experiences increasing volatility in prices and interest rates. Today, a broad cross-section of American and international businesses, including banks and other financial institutions, corporations, ranchers and farmers, food processors, manufacturing firms, and managers of pension funds, are active participants in futures markets. These commercial participants use futures trading to plan more efficiently the costs of production and the pricing of their products, to preserve capital, and to stabilize interest expense or income. Agricultural lenders, in particular, utilize futures and options markets as a means of transferring some of the risks accompanying the development of a global market for U.S. agricultural products, the severe effects of inflation, fluctuating interest rates, and a "strong dollar."

Research focusing on the factors which influence pricing in commodities and futures markets can make important contributions to economic forecasting and financial planning by business and government throughout Illinois and the nation. Futures markets are a form of forward pricing, and may be viewed as an expression of expected future price levels for the commodities being traded. These markets are influenced by the basic forces of supply and demand. They are also influenced by political, social, and economic factors, as well as by technical factors introduced by traders as they translate historical price trends into their market strategies.

The College of Business Administration is uniquely situated to undertake an effective research and education program in commodities and futures research, a program which can be expected to help anchor this financial resource and to broaden its benefits to Illinois. This program will

build on already established ties between the College of Business Administration and the financial community in Chicago. The UIC Library is a depository for CBOT data; several faculty in the College have professional and research links with a number of these financial institutions; and the Board of Trustees has only recently appointed a new Dean of the CBA with a strong record of both scholarly and managerial interest in and involvement with elements of the Chicago financial community. UIC has the added advantage of being located literally at the doorstep of this giant financial complex in the Chicago Loop. Potential direct beneficiaries of such a program number into the thousands in the metropolitan Chicago area.

The CBA is in a strong position to share the results of this research with a broad spectrum of corporate and financial interests, government agencies and institutions throughout Illinois. Currently a comprehensive program does not exist in the Chicago area to provide the support necessary for Illinois' participants in these markets to improve training for the work force employed as traders, lenders, and producers and processors. There is strong evidence that the broader financial community recognizes the need for such a program and would be willing partners in this development.

To establish a broad based program of research in commodities and futures markets, the College will require new funding over a three year period to support four faculty appointments and to provide them with adequate technical and clerical resources. The funds being requested for FY 1987 will permit the appointment of nationally recognized scholars in this area to provide leadership for the research program and to begin development of advanced and graduate courses to be incorporated into the CBA curricula.

The FY 1987 budget request for both initiatives proposed here is itemized on the following page:

Academic Staff	
5.0 FTE Faculty	$355,000
Nonacademic Staff	
2.0 FTE Clerical	30,000
Expenses	40,000
Equipment	75,000
Total	$500,000

Additional increments of $300,000 will be requested in FY 1988 and FY 1989 to complete the program.

Urbana-Champaign Program
($300,000)

Accommodating Enrollment Shifts to the College of Commerce and Business Administration

During the past several years, student enrollments have shifted from physical education, the fine arts, education and some areas in liberal arts and sciences to physics, engineering, computer science, accounting, business administration, economics, and finance. The campus administration has attempted to respond to these shifts in student preferences by reallocating hundreds of thousands of dollars to the high-demand units. However, due to the effect of past inflation, it has been apparent for several years that it is impossible to transfer enough funds to the high-growth units to meet the demand for increased faculty, support staff, and related costs. For this reason the University has requested incremental funds through Engineering Revitalization to address the over-enrollment problems in the College of Engineering. This proposal focuses on the serious underfunding problem in the College of Commerce and Business Administration.

The growth in student enrollments in courses offered by the College of Commerce and Business Administration has been extensive during the past fifteen years. From fall of 1970 to the fall of 1981 the instructional units generated in those courses increased by nearly 75%.

The campus administration in FY 1984 conducted a study to determine the costs required to reduce the extremely high teaching loads (as measured by instructional units generated per FTE academic staff) in the College of Commerce and Business Administration to levels that would approximate average teaching loads for the past twenty years. The calculated deficit was approximately $1.6 million. Increments of $300 thousand have been provided by the State in FY 1984, FY 1985, and FY 1986 to begin to address this problem. The funds provided in FY 1984 and FY 1985 made it possible to add 3.00 FTE faculty members in the Department of Accountancy, 3.50 FTE faculty in the Department Business Administration, 3.00 FTE faculty in the Department of Economics, and 2.50 FTE faculty in the Department of Finance. In addition, a Director has been hired for the College's new instructional computer facility. The funds provided in FY 1986 should provide additional critical faculty members for the College. If one considers the effects of inflation during the past several years, the balance still required to eliminate the underfunding problem is approximately $650 thousand.

In FY 1984, when over-enrollment and underfunding in the College reached their respective peaks, the campus administration was forced to set enrollment ceilings on entering freshmen and transfer students in an effort to reduce enrollments and to restore some balance between student enrollments and available resources. Student transfer and admission quotas are not popular either with those students who are denied access or to those administering them, but it was determined that further growth could not be permitted unless attendant increases in resources were provided.

Since students are admitted on the basis of "best-qualified-first," the entrance standards for the College have risen steadily as the demand has grown. The mean high school rank of entering freshmen in the College is now well above the 90th percentile, and the mean ACT scores for the group is approximately 26. The pressures have become intense as students

seek admission in those areas which they believe will provide them with the best job opportunities upon graduation.

Because the State has recognized the severity of the financial problems of the College of Commerce and Business Administration and has contributed incremental funds in recent years to ease the stress in the College, the campus administration will be increasing the number of freshmen that it will admit to the College in the fall of 1985. This increase in enrollment is being made in anticipation that the remainder of the funding deficit that has been identified will be eliminated through future state allocations. The enrollment level will then return to its FY 1984 peak by FY 1988 if the necessary incremental funds are provided.

The details of the FY 1987 operating budget request are shown below:

Academic Staff	
5.0 FTE Assistant Professors	$190,000
5.00 FTE Graduate Assistants	70,000
Nonacademic Staff	
2.00 FTE Secretaries	30,000
Expense	
Commodities	10,000
Total	$300,000

An additional $350 thousand will be requested in FY 1988.

HEALTH ADMINISTRATION
($320,000)

The health care system in the United States today is large, complex, and expensive, consuming more than ten percent of the country's Gross National Product. Despite this enormous investment, the system is plagued by problems of unequal access, inappropriate utilization, uneven quality, and escalating costs. Dissatisfaction is widespread, and proposals for reform are plentiful. The current situation has created a substantial demand for health administrators who can apply leadership and management expertise to all levels of the system to accomplish necessary reforms. Health-care institutions, whether for-profit or not-for-profit require management technologies and philosophies more aligned with those utilized by other sectors of society. These include skills in organizational behavior, planning, marketing, finance, economics and cost accountancy.

The University is responding to this need by proposing interdisciplinary initiatives in health care administration at both campuses. Each campus is proposing a different and unique approach; both programs, however, are designed to prepare students to successfully encounter the complexities of the health-care arena and to encourage faculty to engage in critical research in this area.

Chicago Program
($200,000)

Integrated Health Administration

UIC is located in a metropolitan area viewed by many as the hub of the U.S. health care industry. Chicago serves as headquarters for many national providers and professional associations and accrediting bodies. Several large pharmaceutical firms and medical equipment and supply companies are based in the area. Despite this wealth of medical centers and facilities, health agencies and programs serving diverse populations, the deficiencies associated with health care delivery are as apparent in Chicago as elsewhere in the country. The city is thus an ideal location for a program designed to increase the pool of qualified individuals who can respond to the need to improve the health-care system through better planning, organization, financing, evaluation, and policy formulation.

Although several UIC academic units now provide some aspect of education necessary for development of administrative talent in the health care field, the efforts have been fragmented. Many students have sought to build their own health administration programs, but without a systematic institutional support for that effort, the undertaking is difficult. The proposed concentration of studies in Health Administration at UIC recognizes the potential for an integrated approach designed to ensure that those charged with managing and reforming the country's complex array of health services have advanced, specialized education, firmly grounded in business and management disciplines.

The proposed Health Administration initiative will build on the strengths of existing UIC units. The program will consolidate, redefine, and expand elements of current programs, improving the educational experience and increasing the identity and visibility of administration in the health care field. Coordinated curriculum planning will prevent unnecessary duplication and promote better use of the University's resources.

This cooperative project is sponsored by several UIC academic units including the College of Business Administration, the College of Nursing, the College of Pharmacy, the School of Public Health, the School of Urban Planning and Policy, and the University of Illinois Hospital. In addition to a strong instructional component, the program will encourage interdisciplinary research and service addressing current health topics such as cost containment, quality assurance, and public accountability.

Specific goals include the following: 1) to prepare, through professional graduate education and a multi-disciplinary approach, individuals who possess the requisite knowledge, skills, and values to perform managerial roles in health service organizations; 2) to participate in the preparation of individuals who will function in the administration, formation, and evaluation of national, state, and local health policy; 3) to provide opportunities for research directed at improving the organization of health services and promoting management effectiveness and efficiency; 4) to serve as a resource for students throughout the University who wish to increase their understanding of health service organizations and to enhance their managerial skills; 5) to serve as a resource for the continuing professional development of practicing managers, and to provide advisory resources to organizations involved in the financing, provision,

and regulation of health care services; and 6) to maintain a climate that facilitates effective interaction among faculty, staff, alumni, and practitioners for their professional development and to further the positive organization and operation of the country's health service system.

The integrated program will operate as an intra-campus consortium drawing upon the resources of participating colleges and schools. It will require a Coordinator to provide staff leadership. A coordinating committee, composed of representatives from each unit, will generally oversee the program and develop the curriculum. Academic units will retain control of their respective degree programs and maintain authority over unit-wide degree requirements.

A student electing a health administration specialization will enroll in the degree program of a participating academic unit. In addition to meeting the requirements for his or her respective degree, he or she will fulfill core course requirements for the health administration specialization.

It is projected that 50 students will participate each year in the integrated Health Administration Program. Full-time students will generally require 6 to 8 quarters to complete their respective degree programs; thus the program is being planned eventually to accommodate 100 students. Additional faculty resources are necessary to initiate the program and ensure availability of core courses and recommended optional courses.

Funds are requested to provide necessary program coordination and to increase faculty availability for initiation of research and service activities supportive of the program goals. Since it is important that students engage in actual problem-solving in health care systems, funds are also requested for student internships.

The Program Coordinator will be responsible for the following: coordinating curriculum planning; implementing marketing and recruitment strategies; providing information to potential applicants; advising students who select the health administration track; and coordinating practica, research, and service projects which may be undertaken under the sponsorship of the integrated health program. A small budget for preparation of program brochures, marketing the program, clerical support and other operation expenses is also needed.

Faculty recruited to serve the integrated program will be selected based on research interests which have potential impact on effective and efficient management of quality health services.

Additional funding of $150 thousand will be required in FY 1988 and FY 1989 to provide additional faculty and to ensure quality practicum experiences for students. The FY 1987 budget for the Integrated Health Administration Program is summarized below.

Academic Staff	
0.50 FTE Coordinator	$ 15,000
4.50 FTE Faculty	150,000
1.00 FTE Graduate Assistant	13,000
Nonacademic Staff	
0.50 FTE Clerical	7,000
Expenses	15,000
Total	$200,000

Urbana-Champaign Program
($120,000)

Health Administration - A New MBA Option

The following considerations serve as a basis for a program in health administration that is being proposed by the College of Commerce and Business Administration at Urbana-Champaign, in cooperation with the Department of Health and Safety Studies, as an option within the existing MBA program:

1. A very high demand for health administrators with a firm grounding in constituent disciplines of business and management exists. This demand is a response to the changing nature of health-care industries.

2. Business-oriented management techniques and procedures applicable to health care administration are developing.
3. The quality of the existing MBA program will enhance the quality of training of health administrators and will provide a basis for developing the program in a cost-efficient manner. The strength of the Department of Health and Safety Studies will provide a strong health services component to the program.

Since the birth of private health insurance, followed by the passage of the Medicare and Medicaid legislation, organizations that deliver health care services generally have been reimbursed on a fee-for-service basis. These private and public sector programs have had two substantial influences on the health-care sector. First, private and public insurance programs, by reducing the cost of health care to patients, have generated a substantial increase in demand for health-care services. Second, the fee-for-service reimbursement system used by these programs has created an incentive for providers to maximize the number and, in some cases, the costs of services provided. Providers have been reimbursed on the basis of cost incurred.

To counteract the inflation in total health care costs caused by these policies, the Federal Government promoted an expansion of supply by subsidizing the construction of space for more hospital beds and facilities for medical education. The private sector further attempted to contain health-care costs through the development of delivery systems that provided incentives to promote the efficient use of health-care resources, e.g., Health Maintenance Organizations and Preferred Provider Organizations. For the same purpose, the public sector developed prospective pricing systems for Medicare coverage whereby prices paid for provider services are set in advance of delivery.

These cost containment measures, coupled with excess capacity in the industry, have placed significant pressures on traditional organizational forms and management styles. Competition for health-care dollars has replaced a philosophy of cost enhancement to increase revenues.

Consequently, health-care providers are turning to MBA programs to find individuals who possess the skills to deal with this environment. Some university health/hospital administration programs are filling this need by a careful affiliation with MBA programs.

The proposed program will meet the existing need by providing a study option in health administration within one of the nation's leading MBA programs. This provides an efficient mechanism for offering a high-quality program with a minimum of overlap between the two programs. The program will require the addition of only one graduate credit unit to the regular MBA program by permitting students to substitute health management and health courses for electives in that program. The proposed program will provide the essential background for a variety of career paths in health administration, hospital administration, group practice management, insurance, government policy analysis, and planning and management of service organizations.

An additional 35 MBA students (one regular section size) are proposed to be admitted per year to the new health administration option. These students will take, over the two-year duration of the program, the core MBA requirements. However, they will be placed in special sections of marketing, finance, business law, and production. A new course, entitled Management of Health Organizations, will be substituted for the second course in organizational behavior. The following additional courses will be required: Health Economics, Epidemiology in Health Administration, and Seminar in Medical-Care Systems and Practices. In addition to the special courses required in the Health Administration option, each student will be required to take a summer internship in which he/she will work in a health-care facility approved by the program. The Seminar in Medical Care Systems and Practices will provide a follow-up of planning projects undertaken during the internship. The program is designed to provide a balance between theoretical concepts, quantitative skills, and practical problem solving.

The program will require one new faculty member in the first year of the program and four in the second year. Four of these appointments will be made in the College of Commerce and Business Administration and one in the Department of Health and Safety Studies. The appointments will include faculty members in the areas of health economics, management or organizational behavior, epidemiology and health-systems finance, and accounting (with emphasis on management information systems, including some knowledge of the use of artificial intelligence in medical evaluation and record keeping).

The program has benefits for the University beyond those of training students for careers in health administration. First, it will create a group of highly qualified faculty members who will be devoted to the development of teaching, policy, and research programs in health care. Second, the internship program will develop very close ties to the constituent group being served that could result in benefits to the research efforts of the faculty members involved in the program. Third, it will provide a very high benefit/cost ratio for the State. Approximately $1 billion in Medicaid funds and $1.6 billion in Medicare funds are spent annually in the 278 hospitals and other health-care institutions in Illinois. If, through the provision of better trained managers, the health-care sector experienced an increase in efficiency of as little as 0.1%, the annual savings in Medicaid expenditures alone would be $1 million, over three times the annual cost of this program. Fourth, the program has a high probability of success because it will be incorporated in the solid foundation of the existing MBA program. The proposed program can contribute positively to the State and nation by responding to the demand for business-trained managers capable of dealing efficiently and effectively with the substantial changes now occurring in health care markets, provider organizations, and government planning and budgeting agencies.

The proposed budget for 1987 is outlined below:

Academic Staff	
.50 FTE Director	$ 35,000
1.00 FTE Associate Professor	45,000
1.50 FTE Graduate Assistant	21,000
Expense	
Commodities	10,000
Contractual Services	7,000
Travel	2,000
TOTAL	$ 120,000

An additional increment of $180 thousand will be requested for FY 1988 to complete the program.

SUMMARY OF FY 1987 HEALTH ADMINISTRATION REQUEST
(Dollars in Thousands)

	UIC	UIUC	TOTAL
Personal Services	$185.0	$101.0	$286.0
Equipment and Expenses	15.0	19.0	34.0
Total	$200.0	$120.0	$320.0

RETAINING MEDICAL GRADUATES IN ILLINOIS
($100,000)

The Medical Education Committee of the Illinois Board of Higher Education (IBHE) has reaffirmed the State's commitment to reduce the number of Illinois medical graduates leaving the State to practice elsewhere. One problem is the lack of first-year residency positions in Peoria, Rockford, and Urbana-Champaign, particularly since undergraduate medical education is available in those communities. To address the problem, the College of Medicine has begun to implement a multi-year plan to provide needed support for graduate medical education at each of its regional sites.

The affiliated hospitals in these communities lack both full-time directors of medical education and a faculty to create and conduct residency programs. While most of the support for residencies in regional programs must come from affiliated hospitals, a minimum level of support from the University will accelerate program development and insure that quality of the educational components of the program is closely monitored. In FY 1984 the College allocated $150 thousand to Peoria to strengthen existing residency programs in pediatrics, surgery, emergency medicine, internal medicine, psychiatry, and family practice. That relatively small investment has yielded greater university-hospital cooperation in improving the design of the education component of the residencies.

Both the Rockford and Urbana faculty have program plans which will lead to unique residency programs in those two communities. The College in Rockford, from its inception, has emphasized primary care training at both the undergraduate and graduate levels through its programs in the Community Health Centers. The College has had an accredited family medicine residency program for a number of years. Traditionally the two sources of primary care physicians from residency programs are those that either train family practitioners or general internists over a three-year period. Each of these training programs possesses advantages and disadvantages which, because of the changes in health care delivery, are becoming apparent.

Family Practice, for example, provides the breadth of medical knowledge necessary for comprehensive care of patients regardless of sex or

age, either ambulatory or hospitalized. Increasingly, however, there has been some curtailment in obstetrical and surgical training, and attainment of certain hospital privileges, and a perceived inadequacy in the depth of training in those fields that contribute to the major portion of Family Medicine. On the other hand, Internal Medicine, with its emphasis on the treatment of the hospitalized, has not provided training in ambulatory care and in other disciplines in which these physicians serve in a consultative capacity, particularly in the office setting.

Faculty of the College have proposed and developed a unique four-year graduate program which combines Internal Medicine and Family Medicine. The program proposal will lead to expanded capabilities in both disciplines, and graduates of the program will be prepared to meet the eligibility requirements of both Specialty Certification Boards. It is expected that the result will be a more confident and competent primary care physician who will be more able to serve rural populations.

Total resource requirements for the program at Rockford are $132 thousand. The College will employ two half-time faculty, one each in Internal Medicine and Family Medicine, to direct the program. In addition, funds will be allocated to and matched by funds from the three affiliated community hospitals to employ full-time coordinators. The remainder of the funds will be used to support the ongoing program. FY 1986 program funds totaling $50 thousand will be applied towards development of the Rockford program and the remaining $82 thousand for the program is requested in FY 1987.

The College of Medicine in Urbana has had interest in the development of the internal medicine residency program in that community. Faculty of the College have developed a program which would provide a unique opportunity to combine clinical medical training in Internal Medicine with graduate study and research. The American Board of Internal Medicine allows a clinical investigation pathway consisting of two years of accredited residency training followed by two years of research. Throughout the two years of research training, the resident must have continuing primary responsibility for patient care in general internal medicine.

The program is a natural extension of the undergraduate Medical Scholars Program which has been operational for a number of years at

Urbana. Because of their experience with the Medical Scholars Program, the graduate departments of the Urbana campus will be able to provide a solid foundation for the proposed Resident Scholars Program. Total resource requirements for implementing the Resident Scholars Program are $200 thousand. A total of $50 thousand from the FY 1986 funds received for the development of the regional medical graduate education programs have been allocated to Urbana, leaving $18 thousand and $132 thousand to be funded in FY 1987 and FY 1988 respectively. Funds received in FY 1986 and funds requested in FY 1987 will be used to support faculty positions in the community hospitals. These funds will enable the hospitals to employ full-time directors of medical education. Of the funds to be requested in FY 1988, $32 thousand will be used to support the clinical research faculty necessary for the Resident Scholars Program and the remaining funds will be used to complete the funding base for the program in Urbana.

The FY 1987 budget request is itemized below:

Academic Staff	
2.00 FTE Directors	$ 93,000
Expenses	7,000
Total	$100,000

DOCTOR OF PHARMACY CURRICULUM FOR PRACTICING PHARMACISTS ($150,000)

Beginning with the Fall 1984 entering class, the College of Pharmacy implemented its revised curriculum leading to the Doctor of Pharmacy degree. Practicing pharmacists, like other practicing health professionals, must continually refine and upgrade their knowledge and skills to provide effective care and assistance to patients requiring drug therapy. In a survey conducted by the Illinois Pharmacists Association and the Illinois Council on Hospital Pharmacists Task Force on the External Pharm.D. degree, in cooperation with the UIC College of Pharmacy, it was found that 62% of a sample of 868 registered pharmacists in Illinois had an interest in continuing their professional development through a Pharm.D. external degree program. Of these respondents, half indicated they would very likely enroll in such a program. Reasons given for seeking an advanced degree include the need for increased knowledge and skills to better serve clients and patients and to advance their careers.

The College received $85 thousand in FY 1986 to begin the curriculum development for the external degree program. These funds will be combined with reallocated nonrecurring funds to support the design of a student assessment model which will be used to identify didactic course requirements for each student. Because the College plans to deliver the course modules to remote sites, the development of audio and video tapes, home study materials, computer assisted instructional modules, and telecommunications with an electronic blackboard are considered essential to the success of the program. With assistance from faculty and staff of the Center for Educational Development, the developmental work for the instructional material will be done in FY 1986 so that the first students can be enrolled in the summer of 1986.

Clinical clerkships will be arranged for the students in or near the communities in which they reside. Site coordinator positions will be created to identify and develop clerkship positions and supervise each student's clerkship training and to provide academic counseling and ongoing support and assistance to the students during their study. Under the plan developed by the College, site coordinators would be located in

four separate communities. If program enrollment exceeds the College's projections, additional site coordinators will be added. Resources also will be required to provide counseling and diagnostic assistance, student record maintenance, telecommunications and transportation for the program.

Additional funding totaling $150 thousand will be required in FY 1987 and a final installment of $35 thousand will be requested in FY 1988 to complete the funding support for the program. When the program is fully developed and implemented, practicing pharmacists enrolling in the program will be expected to pay tuition rates at a level sufficient to generate funds to cover more than 90% of the direct and indirect program costs. Funding is requested for FY 1987 to establish the base level support for the program at an estimated 10% of the total cost. Upon complete implementation, the College expects to enroll 120 students annually.

The FY 1987 budget request is itemized below:

Academic Staff	
4.00 FTE Site Coordinators	$140,000
Nonacademic Staff	
.50 FTE Clerical	7,500
Expenses	2,500
Total	$150,000

PLANNING, TECHNOLOGY AND ECONOMIC DEVELOPMENT ($200,000)

One of the most important institutional advantages enjoyed by the University of Illinois at Chicago is its central location in the third largest metropolitan area in the United States. This location permits it to link undergraduate and graduate education and faculty research with local economic, governmental, and professional agencies in a variety of mutually beneficial ways. The Urban Transportation Center (UTC) and the Center for Urban Economic Development (CUED) are two existing campus organizations which have provided these important links between the University and the City of Chicago.

At UIC, a substantial majority of undergraduate majors in such fields as economics, political science, business, engineering, sociology, architecture and urban planning will eventually be employed by businesses, governmental agencies, and professional associations in the Chicago area. It is thus important that they work with and learn from faculty in these departments who are engaged in research in urban planning, business, economics, urban transportation and related fields - research which is carried out and applied in the Chicago area. In addition to the direct educational benefits, this work also has an important payoff for local governmental and business organizations who benefit from the findings as well as from the trained students who are their future employees.

Through the work of the UTC and the CUED, faculty and students at UIC have provided innovative, practical and efficient solutions to some of the most complex urban problems that face the Chicago metropolitan region. Specifically, CUED has created an innovative program to share important new technological developments with small business, while UTC has helped a number of commuter rail services develop practical ways to reduce their operating costs.

The FY 1987 budget request includes $200 thousand in funding for the two Centers ($100 thousand for each). The return on investment through additional government grants and foundation support will be greater than 3 to 1.

Center for Urban Economic Development ($100,000)

The CUED was established in the School of Urban Policy and Planning in 1978. It is a technical assistance and research organization whose work focuses in two areas: industrial development and urban economics. Research projects are developed jointly by Center staff and interested faculty. Funded by grants and contracts with Federal, State and local agencies and private concerns, these projects provide training to graduate and undergraduate students and technical assistance to an important variety of groups. They also develop UIC faculty knowledge of local economic conditions, an important asset for their effective teaching.

The Chicago area has a large number of industrial development agencies working to retain, strengthen, and expand the region's commercial base. These include the City of Chicago Department of Economic Development with some 80 delegate agencies throughout the city, the Department of Planning and the Department of Human Services. Dozens of smaller suburban governments rely on outside technical assistance when planning local industrial development projects. In addition, numerous community organizations, social service programs, and private development organizations are involved in economic development activities. At one time or another, the Center has provided technical assistance to all of these agencies and community groups.

During 1984, more than 25 projects on topics as diverse as energy conservation, the re-use of commercial buildings and job retention were supported through the Center. Two of its most successful were the West Side Jobs Network and the Technology Transfer Program. The West Side Jobs Network was developed in conjunction with the Midwest Center for Labor, and has four objectives: create a network of community, labor, and business groups on Chicago's west side that can take appropriate action on potential plant closings before the closing occurs; develop a system for monitoring local manufacturing firms; conduct research that will facilitate the monitoring process; and develop models of alternatives to plant closings for the use of the network. The Technology Transfer Program, funded by the U.S. Department of Commerce, examined technology transfer in the Chicago area and developed a model for Federal laboratories to follow. This model provided the basis for work with Fermilab and the

Technology Commercialization Program to be managed by the Center for the State of Illinois.

Since its establishment, core funding for the Center has been provided on a year-to-year basis by the School and the College of Architecture, Art and Urban Planning. This seed money has permitted CUED to prove its success as a model for linking the educational and research interests of UIC to economic growth in the Chicago area. It has generated almost $300 thousand in funded research, an amount expected to grow to $500 thousand by FY 1986.

Within the last year, the College of Architecture, Art and Urban Planning has identified the need to strengthen substantially its educational and research program in the area of physical planning. With the funds which have been used as "seed money" for CUED on a non-recurring basis, the College plans to recruit new faculty for this area of growing importance in planning. The funds will also be used to relieve pressure in the very high student demand area of graduate education in architecture.

The FY 1987 budget request will place funding for the Center on a firm footing by providing support for the Director, several staff and space expansion. This Center will lease additional office space to house new staff, along with the staff of the Technical Communication project.

The FY 1987 budget request for the Center for Urban Economic Development is listed below:

Academic Staff	
1.00 FTE Director	$ 45,000
.50 FTE Faculty	14,250
Nonacademic Staff	
.50 FTE Clerical	8,750
Equipment	2,000
Expenses	30,000
Total	$100,000

Urban Transportation Center ($100,000)

The Urban Transportation Center (UTC) coordinates an active research program involving faculty, graduate students and undergraduate students in a variety of urban transportation sponsored research projects. The UTC currently supports 20 graduate students on research projects relating to transportation issues primarily in the Chicago area. The excellent work which has been done by the Center, along with the recognized capability of its staff and associated faculty, has gained national recognition for UIC and enabled the Center to compete successfully with other national centers for funds in transportation planning, system evaluation and policy development.

The UTC is currently conducting research for the Illinois Central Gulf Railroad on innovative ways to increase worker productivity and to decrease operating costs. The Chicago Department of Public Works sponsors projects to support interns in the field of transportation management, measure the effectiveness of alternative work schedules, and train staff in the use of microcomputers for public transportation. The Center also receives support from the Urban Mass Transportation Authority and the Federal Railway Administration.

UIC is one of five State universities that comprise the Illinois Universities Transportation Consortium. The Consortium is a unique association of academically-based transportation professionals with a wide range of experience in the field of public transportation. The work of these professionals covers the full spectrum of transit problems facing the State of Illinois and the nation.

The interdisciplinary focus of the Center encourages faculty to work together on the development of research ideas and to submit joint grant proposals. Faculty from the School of Urban Policy and Planning and the Departments of Economics, Civil Engineering, Psychology, Systems Engineering and Geography have participated as investigators on grants with the Center. Graduate students from these programs have had the opportunity to work on these projects, applying what they are learning in the classroom to research on critical public policy problems. The Center maintains an extensive transportation library with current periodicals and reports that can be used by researchers. There are also numerous lectures

and seminars which are held throughout the year under the sponsorship of the Center.

The Center has been widely-recognized as a resource for helping to solve state and city transportation problems. The Illinois Department of Transportation asked it to conduct a seminar for its staff on traffic problems in the State. The UTC directed a transportation energy symposium at Argonne National Laboratory, and the Director of the Center chaired a conference for the City of Chicago on "Mass Transit in the Chicago Area." The Center has also done a great deal of work for both the Chicago Transit Authority and the Regional Transportation Authority.

The UTC will reach a critical stage in its development as a significant research and educational resource at UIC by the end of FY 1986. Its core funding needs to be stabilized and expanded to support the very diverse faculty and student interests required to respond to research and outreach educational opportunities in the Chicago area, to provide a focal point for the development of an interdisciplinary educational program in urban transportation management and policy, and to develop new, innovative interdisciplinary research proposals for Federal, State and local funding.

The FY 1987 budget request of $100 thousand will provide this core support, stabilizing the program and its link to the community and to various colleges and academic programs on campus. It will provide $49 thousand for a full-time academic support position and one non-academic support position, plus another $21 thousand for recurring expenses and equipment needs. It is important to maintain the commitment of a group of faculty and students from several disciplines to the Center. The balance of this request will be used for released faculty time for planning new research activities and strengthening the core work of the Center.

The FY 1987 budget request for the Urban Transportation Center is listed on the following page:

Academic Staff	
2.00 FTE Faculty	$ 60,000
Nonacademic Staff	
1.00 FTE Clerical	19,000
Expenses	16,000
Equipment	5,000
Total	$100,000

UNDERGRADUATE PROGRAM IN COMPUTER SCIENCE
($200,000)

The Department of Mathematics, Statistics, and Computer Science at the University of Illinois at Chicago offers both a major and a minor in its undergraduate program in mathematics and computer science. The number of students in this program has more than doubled over the past five years, increasing from 312 in Fall 1979 to more than 600 in Fall 1984. In addition, the general interest in computer science courses has grown at a rapid pace. The need for a basic education in the use of computers has become obvious to faculty and students alike. The responsibility for providing that general education coursework falls most directly on the Mathematics Department. During the academic year, the Department offers approximately 84 computer-related sections which serve about 4,500 students. At the advanced level, only about one-third of the students who request computer science courses can be accommodated.

The Department of Mathematics, Statistics, and Computer Science has established a strong national reputation based on the work of its faculty in mathematics research. The Department has been very successful in attaining grants for support of its activities, and it has received excellent rankings in recent surveys of mathematics programs. The University needs to continue to build upon the success of the program. The funds for this request will allow the Department to recruit new faculty in the computer science area. There is also a critical need for additional graduate student support, which helps to attract and retain the most highly qualified graduate students. These students play an important role as teaching assistants for the undergraduate students. Besides the grading and indirect help which they provide, the graduate students lead small, very intensive discussion sections where undergraduates can receive help with specific problems. The Department also plans to add equipment in its Microcomputer Laboratory to allow greater access for computer science majors.

Computer science education is one of the most critical areas of need for the University. It is basic education which is required for all students, and it is a technological field where the demand for

well-trained professionals will continue to increase. The support for this program is perhaps one of the best investments the State can make to assure it remains in the forefront in the field of high technology. The budget request for the UIC Computer Science Program is summarized below:

Academic Staff	
5.00 FTE Faculty	$161,000
Equipment	39,000
Total	$200,000

Additional funding of $200 thousand will be required in FY 1988 and FY 1989 to fully implement this program.

OFFICE FOR ADVANCED ENGINEERING STUDIES
($350,000)

The ability to attract and retain industry has a direct impact upon the economy of the State of Illinois. Universities and colleges can play a vital role by providing (1) a supply of qualified engineering and technology graduates, (2) a means by which practicing engineers can continually update their skills, and (3) an opportunity for industries to obtain technological advice and consultation or to conduct research related to their specific needs.

To aid in the accomplishment of these goals, the Office for Advanced Engineering Studies (OAES) offers four major programmatic components: (1) continuing professional education in engineering and related fields; (2) access to consultants with the expertise required by local businesses and industry; (3) collaborative efforts with industry to solve industrial problems through research; and (4) technical assistance opportunities which are designed to update and/or upgrade the skills of community college faculty and the technical programs at those institutions. The OAES has its headquarters in the Colleges of Engineering at Chicago and Urbana, but will operate through satellite facilities in communities with demonstrated needs in engineering education and research. The first such satellite office has been established in Rockford.

New opportunities were explored as a result of increased FY 1985 funding. Both the Chicago and Urbana-Champaign campuses declared their intentions to offer master's degrees off campus. The Chicago campus intends to offer master's degree programs in mechanical engineering and electrical engineering and computer science at selected suburban community college sites.

The Urbana campus has requested permission to offer a master's degree program in general engineering and electrical engineering statewide. In addition, the Urbana campus has stated its intention of expanding currently approved programs in mechanical engineering and in theoretical and applied mechanics. It is anticipated all of these program requests will be approved by the Illinois Board of Higher Education by September 1985.

Increases in enrollments were noted in credit class offerings this year, thus giving an added indication of the need for quality degree

programs. Noncredit offerings to engineers in the Rockford area continue to expand and the placement of the Illinois Resource Network in Rockford will generate new program thrusts in FY 1986. Noncredit programs have also been made available to engineers in Springfield, Peoria and the Quad Cities. In FY 1986 incremental funds will be used to develop additional credit classes in electrical engineering and computer engineering and theoretical and applied mechanics.

The development of cooperative (University and industry) research projects and the conduct of programs which meet community college faculty needs were also achieved in FY 1985. In FY 1986, resources will be allocated to summer institutes to update community college engineering faculty in areas of special interest. The goal for FY 1987 will be to expand the community college programs into new geographic areas.

The needs for the kinds of services and programs provided by OAES is recognized nationwide. A recent comprehensive study prepared at the request of NSF[1] concluded that continuing education is an increasing necessity in this period of rapidly changing technology if engineers are to stay abreast of the most recent advances. Expansion of OAES activities will be incremental and will focus on areas where the University determines it can best meet expressed needs. The intention is to keep Illinois engineers on the "cutting edge" through continuing professional engineering education and cooperative research activities that will permit Illinois industry to assume a leadership role in the economic development of the state.

To move this expansion forward, funds are requested in FY 1987 to develop the OAES effort in the Chicago western suburbs, an area where industry and high technology are in need of the services and programs of OAES. Advanced degree opportunities in civil, chemical, mechanical and electrical/computer science engineering will be made available in five locations, all designed to develop superior industrial/business capability in Illinois. Furthermore, immediate industrial needs for educational programs will be met by offering short courses and seminars for engineers in the area. Other geographical areas, such as Quad Cities, Springfield,

[1] Engineering Education and Practice in the United States: Foundations of our Techno-Economic Future. National Academy Press, 1985. ISBN 0-309-03539-2

and Peoria, will also be considered, but the primary effort will focus on the western suburbs of Chicago. Additional professional staff and increases in support for continuing professional engineering education and cooperative research opportunities will be required to mount these expanded efforts.

Funds requested to expand the OAES program in FY 1987 will be distributed as follows:

Staff	
1.00 FTE Academic Professional	35,000
1.00 FTE Technical/Clerical	15,000
Expenses	
Continuing Professional Education	85,000
Access to Consultants	10,000
Cooperative Fundamental Research	80,000
Technical Assistance to Community Colleges	25,000
Supplies, Wages and Travel	15,000
Equipment	
Electronic Blackboards, Videotapes, Etc.	85,000
Total	$350,000

TECHNOLOGY TRANSFER SPECIALISTS
($250,000)

Relationships between major research universities such as the University of Illinois and industry are widely recognized as significant contributors to the innovative process that many view as a means to secure a competitive technological advantage in the world marketplace. For this reason, strong research universities are magnets for industrial firms.

Since its inception, the University of Illinois has utilized a variety of strategies to assist in the economic development and growth of the State, by successfully transferring technology and knowledge from the University to Illinois business and industry for use in new products, processes, and services. These mechanisms for industry-university interaction include:

1. Research agreements between corporations and the University. Research activity conducted under corporate sponsorship represents the fastest growing segment of the sponsored program budget. Agreements are becoming larger in number, scope, and complexity. Unlike Federal research agreements that normally have well-established, widely accepted provisions, agreements with commercial sponsors have widely varying terms and conditions and many require special procedures for implementation. Policies and practices have been revised to encourage even more research agreements with industry, including those firms which are spin-offs created by University faculty and staff.
2. University-based technology parks. Research parks and incubators ordinarily increase interaction as the result of placing businesses in close physical proximity to faculty and students. It is not unusual for some of the incubated businesses to include faculty and graduate students among their equity participants. UIC is a major participant in the Chicago Technology Park; UIUC is considering a Technology Center and has incubated a faculty-initiated business using available warehouse space on campus.
3. Industrial affiliates programs. Industrial affiliates programs are proven mechanisms for technology transfer. There are a

number of such programs at the University, including newly founded ones in Biotechnology on both campuses. In establishing these programs, it is often necessary to reach a rapprochement with potential affiliates on matters of concern in the area of intellectual property.

4. Technology licensing. Until relatively recently, the University's major interaction with industry (outside of the Agricultural Experiment Stations and Cooperative Extension Service) was the licensing of patented University-owned technology to commercial firms for use in new products, processes, and services. A significant limiting factor in this area has been that relatively few potentially useful discoveries are patented and licensed. This is true largely because there is a gulf between conceptualization of an idea and its development to the point of commercial viability which established funding mechanisms for research and development often fail to bridge.
5. University-community cooperation for industrial development. The University is participating more and more in helping to attract industry to the State. The University contributed to the effort to attract the General Motors Saturn Project to Illinois. Both campuses are involved in numerous activities to attract new or relocating firms to the state.
6. Matching faculty research expertise with industrial needs. Problems arise frequently in industry that tend to be more limited in scope than those addressed by research agreements with universities. In these cases, firms often turn to faculty as consultants on a short-term or intermittent basis. In some cases, industry personnel are sufficiently well-acquainted with the University to locate this expertise themselves, but in many cases, they are not. University personnel, often through the use of the Illinois Resource Network, a computerized faculty research inventory, help industry locate this expertise among its faculty.

These and other similar activities characterize the University's efforts to improve the climate for technological innovation in the State and nation by applying its technical strengths to problems in industry.

All of these activities are now occurring on a much larger scale than was the case even a year or two ago. Because the relationships between the University and industry provide many benefits to both parties, and because of the important implications of these relationships for the State's economic development, it is important that adequate administrative staffing be provided to continue this rapid and promising growth.

The success of these technology transfer strategies in stimulating increased industry-university interaction has strained considerably the University's organizational capacity to manage these efforts effectively. In many cases, individuals have assumed responsibilities for these efforts on a released time or overload basis. As these programs succeed and grow, they must be sustained by professionals who specialize in certain aspects of technology transfer. Specialists are needed, for example, to negotiate research agreements or licenses, to develop industrial affiliate programs, to screen and refer requests for assistance, and to manage research parks and incubators.

The University's approach has been to utilize grants, contributions, and other non-recurring funds sources to support a few such specialists during the initial phase of their activities. Permanent funds are allocated only when it is determined that the initial success of a program is likely to merit permanent staffing, and then only in competition with other University needs for such funding. For example, limited recurring funds have been reallocated to support additional positions needed to negotiate research agreements with industrial sponsors. However, all essential specialists cannot be supported through reallocation, and sufficient non-recurring resources cannot be generated each year to sustain the programs at desirable levels.

The University is requesting $250 thousand for the first year of a multi-year program to provide recurring support for specialists in the most successful technology transfer programs. These first-year funds will be used to support 5 to 7 FTE positions (including associated expenses) in some or all of the above mentioned activities. A major national study* reports that such industrial extension activities offer the greatest

*The Federal Role in Fostering University-Industry Cooperation, U.S. General Accounting Office, Washington, D.C., 1983.

return on investment of the identified modes of stimulating technology transfer through increased industry-university interaction. Funding in subsequent years will be allocated to other high priority modes identified through activities financed with non-recurring resources. The FY 1987 budget request is as follows:

Academic Staff		
4.0 FTE academic professionals		$165,000
Nonacademic Staff		
3.0 FTE technical/clerical		45,000
Expenses		40,000
	TOTAL	$250,000

EXPANDED/IMPROVED PROGRAMS
C. INCREASING INTERNATIONAL INVOLVEMENT

INCREASING INTERNATIONAL INVOLVEMENT
($460,000)

The University is committed to upgrading its visibility and involvement in the international realm. The recent revolution in transportation and communication has diminished the time required to travel between cultures - the world is perceived as being smaller and more interconnected. International politics, commerce and culture are playing an increasingly important role in our lives. Many consumer products on which the State and Nation depend are manufactured in other countries, and much of what is produced in Illinois is exported.

It is essential that University students, faculty and staff have an understanding of how events in the world arena affect economic and social trends, the educational milieu, and their individual academic disciplines. Certainly, in an age of mankind uniquely threatened by nuclear annihilation, it is incumbent on the University to provide scholarship and leadership in international issues to help ensure that rationality and understanding are fostered as appropriate modes of conduct rather than open hostility when inevitable differences arise between countries.

Two interdisciplinary programs are proposed that focus on increasing the University's involvement with international issues. The Chicago program proposes the expansion of the role of the Office of International Programs to provide administrative support for various international programs and activities. It also proposes developing an Asia/Pacific Research Center by broadening the focus of activities of the existing Pacific/Asian American Mental Health Research Center. The Urbana-Champaign program expands the scope and activity of the successful ACDIS (Arms Control, Disarmament and International Security) program which was established in 1978. The program has grown to such an extent that recurring funding is required to sustain and enhance its effectiveness.

Chicago Program
($350,000)

International Programs

The international character of Illinois and the City of Chicago is apparent from the ethnic composition of their populations and the scope of their trade and commerce. The State of Illinois is one of the major export centers of the U.S. and is particularly noted as a leading exporter of agricultural commodities and agriculturally related products including farm machinery. Chicago is also recognized as a world financial center, and the multicultural population of City is a microcosm of the world's population.

The University of Illinois at Chicago, located at the hub of this international activity, has long been involved with international programming. For instance, the College of Medicine has been engaged in a university-development project in Chiang-Mai, Thailand, for many years; the Center for Education Development is recognized as a leader in medical education development throughout the world; the Pacific/Asian American Mental Health Research Center has participated in international collaborative research and training activities since its founding in 1974; and the Colleges of Engineering and Liberal Arts and Sciences have long been involved in international collaborative research and educational programs. Through these ongoing activities the campus has an established international reputation.

Because international activities are so important to the economic and political future of the nation and the State of Illinois, the campus has increased its international programming efforts. Several years ago the campus established an International Council to help develop a plan for a more integrated and cohesive approach to international programming. The Council developed a plan which the campus has begun to implement. The five-year program outlined by the Council includes the following international programming objectives:

1. Promote institutional, multi-disciplinary projects for Asian studies with particular emphasis on China and projects with emphasis on Latin American nations.

2. Develop strong participation in the World Health Organization (WHO) and the WHO Universities program with an emphasis on traditional medicine and Third World University development.
3. Develop curricula and other academic programs to focus on international issues and problems of the contemporary world.
4. Promote and facilitate collaborative research and/or training projects through academic exchanges and conferences with overseas universities.
5. Disseminate results of joint international research resulting from collaborative projects.
6. Develop an international reputation in the academic and diplomatic communities.

There are several reasons for a more directed campus focus on international activities. First, it has been demonstrated that formalized educational and cultural activities with foreign countries often lead to commercial and industrial relationships which will benefit the national and state economy. It is now recognized that two of the most important resources the U.S. has to offer are technology and information. Universities are the primary resources for technology and information, thus it is important that they lead in developing international project activities. These international programs will assist the State of Illinois in the development and expansion of important world markets for Illinois products. Because many countries being served by the University have underdeveloped economies, international activities by UIC faculty can lead to the application of new technologies to solve long-standing problems.

Second, international activities often provide clues to solving the problems related to the large influx of foreign populations to cities. Because Chicago has had several such migrations, UIC is particularly interested in learning more about the cultures and habits of the people who are coming to Chicago to seek a better life.

Third, involvement in international actitities will lead to a greater international awareness on the part of Illinois students enrolled at UIC. A keen international awareness is essential because many students will enter professional careers in which international travel and living will be required.

Finally, international activity will provide opportunities for faculty to engage in collaborative research activities with overseas colleagues. Through these exchanges, faculty will have access to new data bases and they will learn about new, and perhaps old, technologies which are used successfully in other countries.

To achieve these international program objectives, a two-pronged approach is being implemented. First, the campus has established an Office of International Programs. The Office will provide needed administrative support for international programs and activities such as: contracting with universities in foreign countries and international organizations for educational and research support and services by UIC faculty; serving as campus liaison with the Midwest Universities Consortium for International Activities, Inc. (MUCIA), a consortium of 8 Big Ten universities; arranging foreign visits; facilitating international exchange professors for UIC faculty; and linking with the State of Illinois and City of Chicago international agencies, offices, and international consulates and the broader international community in Chicago.

Staff of the Office of International Programs must be expanded to include employees versed in international protocol. The UIC faculty and staff understanding of international protocol must be enhanced as the level of international activity expands. Additional staff are required to assist in the development of close working ties with Federal, State and local governmental units which have responsibility for internationally related activities and to develop networks within the Chicago international community in which UIC students, faculty and staff can participate in discussions and more formalized group sessions involving international affairs. Through these experiences, UIC students, faculty and staff can develop a growing awareness of international affairs. Staff also are required to assist student and faculty of UIC colleges to develop individual programs proposals including foreign travel and study, collaborative research activity with faculty from foreign countries and to identify possible funding sources. Finally the Office will require expanded clerical and technical support staff.

In addition to the activities of the Office of International Programs, it will be necessary to expand the special international support

activities established in the Office of Student Affairs by employing a full-time overseas advisor who will be available to assist UIC students and faculty who study and travel abroad. The assistance will include counseling of students who are contemplating study abroad, the acquisition of passports and visas, and support for foreign students who come to UIC for study. Total funding required for the Office of International Programs and the Office of Student Affairs is $250 thousand.

The second major component in the development of international programming at UIC is the development of the Pacific/Asian American Mental Health Research Center into an Asia/Pacific Research Center. During the decade since its founding in 1974, the Pacific/Asian American Mental Health Research Center has been dedicated to comparative research activity in the field of mental health problems of Asian Americans and to the establishment of a nationwide network of mental health researchers who have a focus on mental health needs of Pacific/Asian American peoples. Because the Center has achieved successfully its objectives, the plan is to broaden the focus of the Center to primary health care, nutrition, health education, maternal/child health, sanitation, immunization, the diagnosis and treatment of simple diseases, and drug therapies. The Center will develop and maintain a data bank and information source for Asian/Pacific Islanders, including information of health services research, personnel, and training projects conducted by UIC faculty. A total of $100 thousand is requested to expand the Center to serve this broader role. The funds will be used to employ two additional faculty who have education, experience in international health services research activity and to provide necessary expense and travel support for expansion of the Center. Because the initial focus of the UIC international programs will be directed towards Southeast Asia, the Center will be an important resource for developing and directing multi-disciplinary teams in various international project activities.

For a modest investment of $350 thousand in State funds, UIC will be able to develop a coordinated, multi-disciplinary approach to international programs. In the next five years the campus expects to have an even greater international reputation and to play a leading role in developing cultural and economic ties to foreign countries. These

international program developments will have important beneficial effects on UIC students and on the economic future of Chicago and the State of Illinois. The City of Chicago will not only be known as a world financial center, but also a world resource for information about technology, world health problems, and many other worldwide issues. The base for this exciting development is in place with more than 300 UIC faculty already involved in international activities.

The incremental funds requested for FY 1987 are itemized below:

Pacific Asian American Mental Health Research Center

Academic Staff	
2.00 FTE Faculty	$ 52,000
Expenses	48,000

Office of International Programs and Student Affairs

Academic Staff	
1.00 FTE Study Abroad Advisor	25,000
4.00 FTE Academic Professionals	118,500
Nonacademic Staff	
2.15 FTE Clerical	43,500
Expenses and Travel	63,000
Total	$350,000

$200 thousand will be requested in FY 1988 to complete the funding of the program.

Urbana-Champaign Program
($110,000)

Program in Arms Control, Disarmament and International Security (ACDIS)

Initiated in 1978 and subsequently developed by faculty from the sciences, social sciences, humanities, and law, the Program in Arms Control, Disarmament and International Security (ACDIS) brings together the talents and expertise of faculty from a broad spectrum of disciplines. Non-partisan, non-ideological, and non-advocatory in nature, it is dedicated to the application of disciplinary knowledge to the understanding of arms control and international security problems and to the search for ways to resolve these problems and enhance security. By relying on proven faculty in established disciplines for its intellectual base, the ACDIS program ensures objectivity, rigorous analysis, and relevance in addressing one of the most important issues of the day. Its activities complement, rather than duplicate, the work of existing units.

The success and maturity of the ACDIS program and the need to establish it on a stable basis at UIUC are demonstrated by three key developments:

1. Innovative courses have been introduced into the undergraduate and graduate curricula as a result of ACDIS faculty initiatives. Three undergraduate courses, offered by Physics, Political Science, and Asian Studies are open to students of all disciplines. ACDIS has also created a student-faculty honors seminar for advanced undergraduates. Enrollments in some of these courses, which reach over 200 students each year, have had to be limited for lack of adequate support. Specialized seminars and reading courses are also offered to advanced graduate and professional students.
2. ACDIS has attracted approximately $700 thousand in grants from governmental agencies and private sources, including the Ford Foundation and most recently the MacArthur Foundation. A grant pending before the Department of Defense will raise the total to $1 million.

3. An increasing number of ACDIS faculty consult regularly with governmental bodies, sit on national and international professional and policy advisory panels, and teach and publish in ACDIS-related areas.

Recurring funding is now required to sustain the ACDIS program. It has achieved a level of activity, national visibility, and success that cannot be maintained over the long run by volunteer contributions of faculty as an overload to their regular duties and by the infusion of modest funds on a short term basis, as has been the case to date.

There is a need to integrate the program into the existing disciplinary and professional programs on campus and to involve additional faculty from disciplines currently unrepresented or under-represented in ACDIS, such as economics, engineering, life sciences, psychology, and philosophy. Many faculty are willing to contribute if the ACDIS program is funded on a permanent basis.

An institutionalized ACDIS program can better respond to the general education needs of all students as well as to the training requirements of students planning to specialize in the arms control and security field. Also, a secure base is needed to enhance the ability of ACDIS and participating campus units to compete for funds from governmental, foundation, and private sources, thereby strengthening the campus' leadership role in arms control and security studies.

Given rising student demand, strong and widespread faculty interest, and favorable prospects for additional funding from external sources, investing now in ACDIS at UIUC will yield a stable high-quality program with growing national impact.

The incremental funds requested for FY 1987 are itemized on the following page:

Academic Staff	
.50 FTE Director	$ 30,000
1.00 FTE Professor	37,500
1.00 FTE Academic Professional	21,500
Nonacademic Staff	
1.00 FTE Secretary	14,000
Expense	
Commodities	7,000
TOTAL	$110,000

An additional, final increment of $140 thousand will be requested for FY 1988.

SUMMARY OF FY 1987 INCREASING
INTERNATIONAL INVOLVEMENT BUDGET REQUEST

	UIC	UIUC	TOTAL
Personal Services	$239.0	$103.0	$342.0
Equipment and Expenses	111.0	7.0	118.0
Total	$350.0	$110.0	$460.0

EXPANDED/IMPROVED PROGRAMS
D. RESPONDING TO THE IMPACT OF AN AGING SOCIETY

RESPONDING TO THE IMPACT OF AN AGING SOCIETY ($500,000)

The U.S. Bureau of the Census recently reported that the nation's median age rose 27.9 years in 1971 to 31.2 years in 1984. The nation's population increased overall 4.2% between 1980 and 1984 but the 35 to 44 age group grew by 19.5% and the number of Americans older than 85 by 19.4%. This aging trend will continue as the baby-boom generation approaches middle and old age. Unless American society makes significant changes in how the elderly are treated, many of these people will find growing old a frightening and painful experience. At the University of Illinois at Chicago, a group of faculty from many disciplines is working to identify ways in which the elderly can be helped to remain healthy, independent, and productive for as long as possible.

Many people experience multiple health problems as they grow older and a great deal of money is spent on health care for the elderly. It is estimated that a total of $76.4 billion will be spent in 1985 by the Federal Government alone for the provision of health care to the elderly. Faculty from a number of colleges at UIC have been developing a model of an integrated system of health and medical care for the aged which will serve as a laboratory for education and research and a demonstration center for clinical excellence provided in a cost effective way.

The developing model encompasses a complete range of health care alternatives integrated into a system of care. The alternatives include intensive, acute care in a tertiary hospital when necessary, but only when necessary. More often care will take place in an intermediate facility, an outpatient setting, or, to the maximum extent possible, in the patient's home. Movement from one level of the system to another will be coordinated by a health care team, and interdisciplinary consultation and continuity of care will be provided throughout. This flexible, cooperative model will enable the patient to preserve the greatest amount of personal freedom and dignity and should do much to keep costs of care at the lowest possible level.

The development of these components into an integrative whole will require several years of effort. The process is well along on several

levels where the resources are already available to faculty. As reported last year, the University of Illinois Hospital and Clinics now provide, through the Diagnostic Clinic, access to an Interdisciplinary Assessment Unit. An elderly person coming to the clinic will have his or her case evaluated by a team of health care workers. An individualized care program will be designed and the health care team will follow the patient's progress, with adjustments to the care plan being made as appropriate.

In FY 1985, the University concluded an affiliation agreement with the Westshire Retirement Center operated by the First Health Care Corporation in Cicero, a suburb of Chicago, to develop a model teaching nursing home. Several UIC faculty have been appointed to positions in the nursing home for the purpose of providing special health care services and consultation in the development of a model for nursing home care. The nursing home will also provide a working laboratory for student clinical experiences in the care of the elderly. It now is projected that many health care professionals may be required to spend up to 75% of their time treating elderly patients; thus, it is essential that didactic and clinical curricula be revised to include gerontological components. Many UIC colleges already have added gerontological components to their curricula and are in the process of developing other components. For example, under the leadership of a newly recruited person in the Department of Nutrition and Medical Dietetics in the College of Associated Health Professions, a new graduate course in gerontology has been developed and will be required of all nutrition masters students starting Fall 1985. Faculty in the Department of Physical Therapy have developed an interdisciplinary graduate course in teamwork in the care of elderly patients, and it will be offered to all students at UIC by the Graduate College starting in the Fall 1985. Another example of the curriculum developments occurring in the field of gerontology involves students and faculty from Medical Social Work, Nursing and Medicine. Under guidance and the leadership of the Department of Medicine, students and faculty from Nursing, Social Work and Medicine fields do joint rounds in the teaching nursing home.

The College of Dentistry now requires all senior students to see elderly patients at home or in nursing homes through the College's extramural geriatric dentistry program. During the past year, the College

created a joint position with the Westside Veteran's Administration (VA) Hospitial for a VA Dental Geriatrics Fellow. Under her leadership, the College developed plans to expand its geriatric dental program to include a special "in house" geriatric dental clinic. With $50 thousand from the funds received by the Campus in FY 1986 for gerontology, the College is beginning the clinic. When fully developed, the special clinic will provide all junior and senior dental students extensive clinical experience in providing dental care for elderly patients. The College also has been developing didactic courses with special focus on elderly patients; enrollment in some of the courses will be required for all undergraduate dental students. To complete these curriculum developments, additional faculty with commitments to the field of gerontology must be appointed.

Research activity will be very important in evaluating the various models being explored, and research results may lead to still other health care models. For example, faculty in the College of Health, Physical Education and Recreation (HPER) are engaged in research which identifies the effects nutrition and physical exercise have on the aging process. Through this research, it may be possible to identify life styles in which health problems normally associated with the elderly are reduced. Faculty of the Department of Nutrition and Medical Dietetics in the College of Associated Health Professions are engaged in research studies which involves the measurement of nutrient intake and food waste in nutritional programs for the elderly. The research activity seeks to identify nutrition programs which will support more healthy and active lives for the elderly. Faculty in the Department of Medical Social Work have a grant from the Illinois Department of Aging to study the feasibility of providing payments to families for the purchase of special community care services for elderly family members. The research is to be focused on the identification of incentives for the elderly to remain in their homes and lead independent lives for as long as possible.

Basic scientists in the College of Medicine are interested in expanding their understanding of the aging process, and are seeking new knowledge about diseases such as Alzheimer's and arthritis which are prevalent among the elderly. Basic research in the process of aging must be led by faculty who have a special interest in gerontological research.

To coordinate all of the activity in the field of gerontology, the campus has expanded the role of the Gerontology Center. Half of the $200 thousand in new gerontology program funds received by the campus in FY 1986 have been allocated to support the expanding role of the Center. The Center will coordinate gerontological instruction and training activities in which faculty from several disciplines must work together, coordinate multidisciplinary research activities, and provide a clearinghouse for faculty research activity, research publications, and research and training grant availability. Of the remaining $100 thousand received in FY 1986, $50 thousand was allocated each to the Colleges of Associated Health Professions and Dentistry. The College of Dentistry plans to use the funds to continue the development of the geriatric dental clinic described earlier. The College of Associated Health Professions is recruiting a Physical Therapist who has been on a year's leave from another University as a fellow with the Institute of Medicine, doing research in the field of gerontology. The focus of the year's research activity dealt with "Program for the Second 50." The College is recruiting the person to spend a year with its faculty to provide assistance in the continuing developing of its gerontological instruction and research program. The funds will be reallocated to recruit faculty having other types of expertise in the field of gerontology in FY 1987 and beyond.

A total of $500 thousand is requested in FY 1987 to meet the needs identified by the colleges in the development of instructional and research programs in the field of gerontology. The Colleges of Pharmacy; Health, Physical Education and Recreation; Nursing; Dentistry; and the Jane Addams College of Social Work each require funds to hire new faculty critical to the development of their gerontology programs.

The College of Pharmacy will use the new funds to recruit a faculty member with training and experience in gerontology, particularly geropharmacy and geropharmacotherapeutics. The position is essential if the College is to play an expanded role in serving elderly patients in ambulatory and acute care settings.

The College of Health, Physical Education and Recreation will recruit a faculty member with interest in the field of health maintenance and rehabilitation and the prevention of debilitating diseases associated with

aging. With the addition of such a faculty member with this type of experience and background, the College will continue to develop its research program on the effects of regular exercise and nutrition on the aging process.

The College of Nursing plans to add a faculty member with experience and training in gerontology to assist in the development of an advanced degree program in gerontological nursing. The College has already used its own reallocated funds to hire a nurse gerontologist to lead these developments.

Faculty of the Jane Addams College of Social Work have long been interested in the problems associated with the aging process, and they are revising their graduate program curriculum to include gerontologically related topics. An additional faculty position is required to assist the College in developing opportunities for graduate students to engage in gerontological research activities. The College plans to use the teaching nursing home in its instructional and research programs.

The College of Dentistry now requires senior dental students to provide care to institutionalized and homebound elderly. The College plans to expand this program to the first year of study by adding didactic and clinical program activities focusing on the unique oral disease problems often experienced by the elderly. Thus, students will begin to develop an understanding of the dental problems of the elderly early in their program of study. The College requires funding for new faculty positions in FY 1987 to continue development of this program.

The School of Public Health, Department of Community Health Sciences, seeks to add two new senior faculty members to develop a specialized gerontology track in the Master of Public Health program. The development will lead to a series of courses for students in the School's professional MPH degree program. Presently, the Department has two survey courses in aging. Another trial course was offered in the area of mental health and aging during the Spring 1985 quarter. The School would like to have the gerontology track fully in place in FY 1987. A social gerontologist and a gerontological social worker are needed to provide the teaching support in the new courses developed for this curriculum track, which will also be available to students enrolled in other UIC colleges. The School requires $70 thousand in new funds to add the two new faculty positions.

The College of Medicine requests new funds totaling $63 thousand to add a new faculty position that will strengthen the college-wide program in geriatric medicine already in place. With the new position, it will be possible to incorporate the study of geriatric medicine throughout the four years of undergraduate medical training including a clinical rotation in the teaching nursing home. The new faculty member will provide a focus for expanded research and public service activities in gerontology, too.

The College of Associated Health Professions has been actively engaged in the development of the teaching nursing home. The College has created a Gerontological Advisory Board to assist the faculty of the College in coordinating their instructional and research efforts in the field of gerontology. Funds totaling $69.5 thousand are requested to add two new faculty positions, one in Occupational Therapy and one in Nutrition and Medical Dietetics. These new positions will support the development of didactic courses with a focus on gerontology and assist the College in the development of a primary role in the teaching nursing home, a major resource in providing clinical experiences to students.

In FY 1988, a final increment of $500 thousand will be requested, completing UIC's multi-year plan for expanded activities in the area of gerontology. UIC will be in a position to take a national leadership position in many fields of gerontological research and training.

The FY 1987 budget request is itemized below:

Academic Staff	
10.50 FTE Faculty	$407,500
Nonacademic Staff	
2.00 FTE Clerical	30,000
Expenses	62,500
Total	$500,000

EXPANDED/IMPROVED PROGRAMS
E. STRENGTHENING BASIC INSTRUCTION AT ALL LEVELS OF ILLINOIS EDUCATION

STRENGTHENING BASIC INSTRUCTION AT ALL LEVELS OF ILLINOIS EDUCATION ($2,300,000)

Introduction

Many complaints have appeared in the press and elsewhere about the degree of literacy of high school and college-level graduates. It is widely asserted that they neither write well, nor communicate effectively orally; that they are competent in only one language (English), and vast improvement is needed even in that language; and that they do not understand social processes in their own culture, let alone the cultures of other nations. Many, especially those with technical orientations, are considered to have been insufficiently exposed to the arts and humanities. Receiving most prominent attention is the belief that these graduates are not well trained in the sciences, mathematics and computing.

These complaints are not without foundation. Over the last twenty years, Scholastic Aptitude Tests measuring comprehension in reading and mathematics have declined nationwide, with a fifty-point drop in verbal tests and a thirty-two point drop in mathematics. The scores reached their low point in 1980 and 1981, and for the last several years have stabilized at approximately those levels. According to a 1982 Gallup youth poll, 89% of all recent high school graduates felt that the most serious deficiency in their schooling was the lack of assistance for students struggling with reading and mathematics. In 1983, the National Commission on Excellence in Education reported that only one-fifth of the nation's students were able to write a persuasive essay. The Illinois State Board of Education released a report in June, 1985, which indicates that Illinois secondary students are not academically competitive with their peers in a number of countries, that their performance in math and advanced problem-solving is a "particular cause for concern," and that they have difficulty when asked to condense and apply information or organize a collection of facts into a coherent whole.[1]

A recent report on the condition of higher education in the nation sponsored by the National Institute of Education and prepared by the Study Group on the Conditions of Excellence in American Higher Education

[1] Student Achievement in Illinois: An Analysis of student Progress - 1984. Illinois State Board of Education, June, 1985.

discusses these concerns and several others, and suggests a number of recommendations for remedial actions to be taken by the higher education sector. Among these recommendations are the following:

- Faculty and other institutional resources should be reallocated toward increased service to first-and second-year undergraduate students. Opportunities should be provided for intense intellectual interaction between students and instructors, with as many of the finest instructors as possible assigned to first-year classes. Graduate teaching assistants should be assigned selectively and measures taken to ensure they are well-prepared for their responsibilities.
- Liberal education requirements should be expanded and reinvigorated to ensure that (1) curricular content is directly addressed not only to subject matter but also to the development of capacities of analysis, problem solving, communication, and synthesis, and (2) students and faculty integrate knowledge from various disciplines.
- Remedial courses and programs should be offered, but standards should be set that will enable students to perform well subsequently in college-level courses.

The University of Illinois shares the concern of the Study Group and other groups regarding the quality of undergraduate instruction. Although the University has an excellent reputation for undergraduate preparation, it is aware that in the past decade there has been an erosion in the quality of instruction in a number of areas and that room for improvement exists. The Strengthening Basic Instruction program presents several strategies to improve undergraduate education, many of which parallel the recommendations of the Study Group mentioned above. In addition to these strategies, the University proposes several outreach programs to influence the quality of elementary and secondary instruction in the State.

The single most important factor influencing the erosion of basic education at the University is the fact that budgetary allocations have rarely kept pace with inflation, while a number of "productivity improvements" have been absorbed at the same time that severe market pressures in such areas as engineering, computer science, commerce and business

administration, and the sciences have placed an insurmountable demand on the overall resources which were available. As a result, levels of service have been cut back in nearly all areas, and the academic units have suffered. Staffing levels have dropped, especially among teaching assistants; section sizes have increased; instructional laboratories have been eliminated; supplies and equipment for teaching are purchased less often and in smaller quantities. Unfortunately, larger classes have led to a reduction in the amount of writing students are required to do. Homework assignments in fields such as mathematics cannot be monitored with the same care they once were. Instructional laboratories, where they still exist, now tend to provide only written or oral descriptions of experiments, or computer simulations of them, because of a lack of adequate equipment and supplies. A recent upsurge of interest in foreign languages has resulted in class sizes so large that the amount of individual recitation must be curtailed. The list of such problems is nearly endless. To make matters worse, these erosions have occurred at the very time the basic teaching core is being called upon to help in overcoming a decline in the level of basic skills which high school graduates bring with them to college.

The University in FY 1986 requested that a program to strengthen basic instruction be established which would: a) restore undergraduate instructional quality through reducing class sizes to maximize direct faculty-student learning relationships, increasing writing assignments and increasing support for instructional laboratories; b) establish a series of innovative curricular offerings in the humanities, basic sciences, social sciences and mathematics; and c) provide support for the State's elementary and secondary teachers to improve their expertise in math, writing and foreign language instruction. As a result of funding received in FY 1986, the program has been established successfully and progress in several areas, described in detail in the following campus program sections, has been made. In order to maintain the momentum of this program, the University is requesting incremental funding for FY 1987 to continue the initiatives established in FY 1986 as well as to address several additional needs not included in the FY 1986 request.

The FY 1987 Strengthening Basic Instruction program consists of two main thrusts for each campus: improvement of undergraduate-level programs and improvement of elementary and secondary instruction in the State. This reflects the University's awareness of the interdependency of educational systems in the State: competency in undergraduate education is dependent on good elementary and secondary preparation, and the quality of that preparation is dependent upon the expertise of teachers and administrators trained in higher education.

TOTAL FY 1987 PROGRAM REQUIREMENTS
BACK TO BASICS
(Dollars in Thousands)

	UIC	UIUC	Total
I. Undergraduate-Level Initiatives	$700.0	$1,050.0	$1,750.0
II. Program Support for Elementary and Secondary Schools	100.0	450.0	550.0
Total	$800.0	$1,500.0	$2,300.0

Chicago Program
($800,000)

In FY 1986, the State supported the Strengthening Basic Instruction program at UIC with $1 million to help restore the quality of the undergraduate program in liberal arts and sciences. These funds will be used to restore teaching assistant lines in English and the Sciences. New faculty will be hired in Mathematics, Chemistry and English to provide additional instructional support for basic courses in those areas. Instructional equipment and supplies needed for undergraduate laboratories also will be provided with the new funds. Finally, the FY 1986 funds will help to address critical needs in the foreign language departments. Lecturers will be added in Spanish and French to help bring the class sizes to a more manageable level.

Undergraduate Level Initiatives ($700,000)

The FY 1987 proposal is specifically targeted toward improving lower division instruction in composition, mathematics, the natural sciences and languages. The program will address critical needs in each of these areas by providing additional faculty and teaching assistants in order to decrease class size and enhance student-instructor interaction. The faculty of the College plans to reconfigure some courses and develop new course sequences to serve all undergraduate students, whether they are science, business or humanities majors. These core courses will expand the students' understanding of the subject matter, and improve their ability to analyze and comprehend. The smaller courses will allow for more written assignments, as well as intensive instruction in computer and language laboratories.

As part of its educational initiatives, the College of Liberal Arts and Sciences is requesting $150 thousand in the FY 1987 budget for expenses and equipment. These funds will allow faculty to acquire much-needed equipment and materials that will enhance and improve teaching of basic skills to all undergraduate students. Specifically, new equipment is needed for the language laboratories in order to increase the number of student carrels for individual instruction, and to provide video and computer equipment for each of the laboratory classrooms. The Writing Center could increase substantially the number of students it serves if it were able to introduce individualized computer-assisted instruction. In addition, the Science departments want to introduce the use of micro-computers in their introductory-level courses in order to allow students to see the results of rapid data manipulation while analyzing and discussing experiments in the laboratory. During a time of rapidly changing technologies and approaches to undergraduate education, it is vital that the College keep abreast of these developments and provide the necessary resources to its Departments to provide up-to-date instruction in the classroom.

The undergraduate instructional initiatives at UIC also include support for the Honors College, which plans to expand its core sequence program. The Honors Cores are sequences of three quarter courses developed around a single theme by professors in a variety of departments. During the 1984-85 academic year, the Honors College offered three different cores: The Idea of the Classic, which explored the concept of

"classic" during different periods of history in art, music and drama; Making Sense of the Cities, which focused on the development of the city from the fourteenth to the eighteenth century, as well as the context of the city in literature and art; and The Science of Humanity, which examined the works of Darwin, Marx and Freud. Teaching in each of the cores is an interdisciplinary effort and reading assignments are largely from original sources. Students are expected to integrate works from a variety of disciplines in their writing assignments, and class discussions are expected to reflect sound analytic reasoning.

This type of integrated course work is an innovative approach to undergraduate education and to the provision of skills which all students must acquire. Students who have participated in the first two years of the program have benefited from excellent and varied teaching. Faculty have seen growth in the quality of the students' writing and communication skills. This interdisciplinary approach to instruction with a faculty team can also be transferred to other academic units to be used in required courses. The request for FY 1987 will support five Honors Cores to be developed and taught by fifteen faculty from a variety of academic disciplines.

The total request for Undergraduate-Level Initiatives in FY 1987 is summarized below.

Academic Staff	
3.00 FTE Honors College Faculty	$ 90,000
16.00 FTE LAS Faculty	384,000
Nonacademic Staff	
4.00 FTE	66,000
Expenses	60,000
Equipment	100,000
Total	$700,000

Additional funding of $900 thousand in FY 1988 will be required.

Support for Elementary and Secondary Education ($100,000)

The College of Education of the University of Illinois at Chicago proposes to implement an innovative program to improve the quality of education at the pre-collegiate level. The College has a unique opportunity to provide leadership in the quest for academic excellence at both the elementary and secondary level. The College plans to establish a Chicago Area School Effectiveness Council (CASEC), which will allow the University and local schools to share their experiences in teaching and learning.

CASEC will link schools in the metropolitan area with the research, methodological and policy expertise in teaching and learning that is available from the College faculty. There is a definite need for the University to be involved in the improvement of public and private elementary and secondary schools by coordinating knowledge produced by universities with actual knowledge utilized in the schools. CASEC's membership will include any school in the metropolitan area interested in participating. The Director of the Council (a member of the faculty in Education) will oversee the activities of the group which will include: special inservice seminars which deal with the implementation of special state or federal programs; curriculum improvement; assessing the instructional needs of special students; and developing special learning skills programs, particularly at the elementary level.

The Council also plans to designate and develop a limited number of schools as Professional Development Centers. These schools will serve as sites for the preparation of teachers and other education personnel who desire specific training in the fields where the school excels. The schools will also serve as testing and demonstration sites for innovative instructional activities, which then could be transferred to other schools if they prove successful. CASEC will also offer five faculty fellowships each year to UIC professors to do research and/or development in the schools represented in the Council.

This proposal represents a continuing commitment by UIC to work with schools and educators throughout the Chicago area to improve learning for pre-college students at all levels. The budget for program support for elementary and secondary education is summarized on the following page.

Academic Staff	
3.00 FTE Academic Professionals	$ 59,000
Nonacademic Staff	
1.00 FTE Clerical	16,000
Expenses	20,000
Equipment	5,000
Total	$100,000

Additional funding of $100 thousand in FY 1988 will be required.

UIC CAMPUS SUMMARY OF
FY 1987 STRENGTHENING BASIC INSTRUCTION
AT ALL LEVELS OF ILLINOIS EDUCATION
(Dollars in Thousands)

	Personnel Services	Expenses	Equipment	Total
I. Undergraduate-Level Initiatives	$540.0	$60.0	$100.0	$700.0
II. Support for Elementary and Secondary Education	75.0	20.0	5.0	100.0
Total UIC:	$615.0	$80.0	$105.0	$800.0

Urbana-Champaign Program
($1,500,000)

Considerable progress will be made in FY 1986 toward implementing the first phase of the Strengthening Basic Instruction program. Several high school articulation programs, especially those in rhetoric and foreign languages, will be strengthened by an allocation of $300

thousand. An allocation of $800 thousand for improvement in instructional quality will be used for the following: new faculty and staff will be added to undergraduate international programs in Asian Studies, Russian, East European Studies, Latin American Studies, African Studies, Spanish and Political Science; new staff and more operational expenses will be provided for the area of Science, Technology and Society which deals with the systematic study of how science and technology have transformed society; teaching assistant positions will be added in the social sciences and the humanities in order to reduce class sizes in basic curricular areas and enhance instructor-student interaction. Finally, part of the instructional quality funds will be used for operational expenses in Chemistry and Psychology.

Undergraduate-Level Initiatives

At the Undergraduate-level, a multifaceted approach is proposed for FY 1987 which will emphasize and strengthen the skills of all students in the basic disciplines, whether they are pursuing an artistic, literary, scientific or technical program of study. This approach includes restoring instructional quality by improving the training of graduate teaching assistants, reducing class sizes to maximize direct faculty-student learning relationships, increasing the frequency of writing assignments, and increasing support for undergraduate laboratory instruction. It also includes several new initiatives including the introduction of new curricular options, undergraduate honors seminars and a "summer bridge program" for students with special needs.

A. Undergraduate Laboratory Instruction ($400,000)

Incremental funds provided in FY 1986 will be allocated to help reduce class sizes in a number of departments in the College of Liberal Arts and Sciences. For FY 1987, UIUC will focus attention on improving the instructional laboratory experiences of undergraduate students in general biology courses, psychology courses, and chemistry courses and on introducing a laboratory experience in undergraduate genetics where none exists at the present time.

Sufficient funds ($110 thousand) have been unavailable to convert the existing genetics course from a lecture only format to a laboratory course. Students who enroll in this course come from many disciplines: life sciences, psychology, agriculture, biochemistry, chemistry, etc. Genetics, as it is presently taught in the lecture mode, is far inferior to genetics as it might be taught in the laboratory mode.

Other laboratory courses in biology, psychology and chemistry suffer from a lack of instructional personnel, laboratory materials, and up to date equipment. Section sizes in these laboratories have continued to creep upward until they have become unmanageable. Additional graduate assistants will make it possible to add new sections and to reduce existing section sizes. Additional expense funds will provide supplies necessary to be purchased which will improve existing experiments and to allow new ones to be added. In order for these laboratory experiments to be meaningful, appropriate equipment must be provided.

The budget required to rejuvenate the laboratory courses in general biology, psychology, and chemistry is as follows:

Academic Staff	
13.50 FTE Graduate Laboratory Assistants	$ 197,100
3.00 FTE Laboratory Staff	72,000
Expense	130,900
TOTAL	$ 400,000

B. Training Graduate Teaching Assistants ($100,000)

Approximately fifteen years ago, nearly all academic departments operated training programs to help their graduate teaching assistants do a better job in the classroom. Because of the general shortage of funds experienced by most campus units since that time, the majority of the academic departments have either abandoned such training programs or have reduced the scope of the programs drastically.

In the early 1980's, the campus administration, recognizing the need for a graduate teaching assistant training program, funded a small Campus

Teaching Program in the Course Development Division of the Office of Instructional Resources (OIR). The Program was very well received on the campus; however, the staff affiliated with this program is so small that it is unable to respond to all the requests from academic departments for its services.

OIR staff presently help the departments design curricular materials. They present new teaching methods and design their presentations to address problems that are specific to the particular departments involved. Teaching assistants in the classroom are videotaped, and their performances evaluated. Suggestions are made to improve the presentations. OIR staff work with personnel from the Department of English as a Second Language to help foreign teaching assistants with language problems and to introduce them to various cultural and pedogogical aspects of their teaching responsibilities.

In recent years, OIR has been attempting to hire graduate assistants or even to fund a small percent of a faculty member's time from the discipline in which they will be working that particular year. In this way OIR often is able to make a lasting impression on the teaching of the department, because in following years the instruction of future graduate assistants will be carried on by those who taught the program in the previous year.

The training presently provided by OIR is excellent, having been tested for a number of years. Now it needs to be expanded so that more departments can take advantage of it in any one year.

The following funds are requested to allow OIR to increase its impact on undergraduate instruction by the training of additional graduate teaching assistants.

Academic Staff		
3.50 FTE Academic Professionals	$	91,000
Expenses		
Commodities		9,000
TOTAL	$	100,000

C. Curricular Options in Liberal Arts and Sciences (LAS) ($150,000)

One of the common characteristics of a leading research university is that programs leading to concentrations, or majors, are very well developed. This is consistent with the research and scholarly mission of the institution, and much faculty time and effort are expended by curriculum development. However, it is clear from many reports sponsored by the National Endowment for the Humanities, the American Association of Colleges and the National Institute of Education that there are few coherent curricular options for undergraduates outside of their chosen areas of concentration. Most institutions have general education, or liberal education programs, but with the exception of several private institutions, these programs are best described as modified distribution requirements: courses are selected from areas (e.g., physical science, biological science, social science, humanities, or the arts) to meet credit requirements. However, these may not provide a distinctive educational pattern. The courses are typically lower division, typically departmental (thus frequently serving as introductory courses for majors), and typically not oriented toward meeting the unique undergraduate mission of broadly educating the undergraduate.

This proposal requests the creation of a recurring development fund for curricular options. One of the principal uses of the fund will be to secure faculty time from departments to create options which would be available to satisfy general education credit requirements. Rather than attempting to revamp an entire general education program at once (impractical because of the sudden massive resource shift implied), the fund would provide the basis for evolutionary change by supporting the creation of coherent options which gradually would replace some current courses in the LAS General Education program and would be available as elective options for interested students. One can envision, for example, proposals involving multiple faculty and several courses. This contrasts with the current practice which limits funding to a few proposals involving a single faculty member and a single course.

Curricular options would tend to have the following characteristics: thematic (ideas employed sequentially through two or three courses); analytic (requiring students to employ defined modes of inquiry and

analysis); question-asking (requiring research rather than absorption of information per se); and synthesis (organization of ideas and information from across disciplines to address questions). This approach will require extensive writing and assessment.

The purpose of the fund is to not to support a general education or elective program but, rather, to provide the resources necessary to develop programs which, over time, can replace some of the current offerings for the general student in LAS or other colleges. Although a separate unit with its own faculty will not be created, a somewhat larger portion of faculty instructional time will be devoted to courses which may not satisfy departmental requirements for majors.

To implement such a program will require a variety of incentive systems (e.g., salary adjustments and access to necessary instructional and technological resources). An anticipated minimum level of support would be as follows:

Academic Staff	
4.00 FTE Faculty	$ 140,000
Expense	
Commodities	10,000
TOTAL	$ 150,000

D. Undergraduate Honors Seminars ($250,000)

The LAS Honors Council has proposed the creation of a series of Honors Seminars for freshmen honors students. This program is designed not only to be excellent for qualified undergraduates but also to be attractive to those outstanding high school students who are trying to decide which of the leading institutions they will attend.

These seminars will be designed to replace the traditional general education requirements with intensive, interactive seminar-style instruction conducted by some of the College's finest teachers. The proposal is to identify eight faculty members to be designated "LAS Honors Professors" who will develop a total of four seminars, with two faculty

members involved in the creation of each seminar. The four seminars will be two semesters long, thus comprising a total of eight courses, and they will satisfy most of the general education requirements. Enrollment in each seminar will be limited to 25 students, and two faculty members will share in its instruction. The proposed seminars, each having four semester credits are listed below:

Freshman year--

Literature and the Arts in Western and Non-western Cultures, I
Perspectives in Psychology and Biology, I
Historical, Philosophical, and Social Perspectives, I
Physical Science, Science and Society, I

Sophomore year--

four more seminars with the same title which would build upon the first year's instruction (e.g., Perspectives in Psychology and Biology, II).

The cost of such a program depends upon the number of students admitted. Assuming 75 honors students per year, the total program cost would be as follows:

Academic Staff	
.50 FTE Director	$ 20,000
6.00 FTE Faculty	210,000
Wages	10,000
Expense	
Commodities	10,000
TOTAL	$ 250,000

E. Summer Bridge Program ($150,000)

Although the vast majority of the undergraduate students admitted to UIUC are among the very best in the State, there are also several hundred students who are admitted on a special basis. These students, because of their relatively marginal academic performance and other factors, will

very probably be "at risk" when placed in competition with the students at UIUC. The University is proposing a six-week "Summer Bridge Program", to be part of the regular summer session, that will strive to improve the academic status and potential of each participant by strengthening and sharpening cognitive skills in mathematics, writing, and reading and building confidence and self-esteem.

Generally, students selected to participate in this pre-college program will have scores of 15 or below on ACT mathematics and/or English subtests. Prior to acceptance into the Bridge Program, each prospective participant will be carefully screened and interviewed. The initial phase of the program will include forty students, and the budget presented here is based on serving that number of students.

The major thrust of the proposed Summer Bridge Program will be in the area of academic improvement. Small classes will be held in mathematics, rhetoric, and in the development of reading and cognitive skills. The academic program will be rigorous, and every effort will be made by the Bridge faculty to inspire students to develop the needed basic skills in these areas. The courses will be regular credit courses offered as part of the regular summer session. Each participant will take a series of placement tests to determine which particular courses will best suit his/her academic needs.

The students will have access to tutorial assistance for all the courses in which they are enrolled. Also, they will be taught how to study, how to read with the efficiency needed in college-level classes, and how to discriminate ideas, analyze thoughts, and draw logical conclusions.

Bridge participants will be housed in a group in one of the University residence halls. The Bridge Program will provide housing and meals for all participants. The Program will also provide all course textbooks but will not be responsible for the costs of travel to and from the campus. Financial aid will be available to qualified participants.

The proposed budget for the Summer Bridge Program is outlined on the following page:

Academic Staff (summer only)	
1.00 FTE Director and 1.00 FTE Associate Director	$ 19,800
9.00 FTE Teaching Associates and Assistants	30,000
2.00 Counselors (non-cognitive skills)	9,000
Nonacademic Staff	
2.00 FTE Secretaries	3,700
Wages	1,300
Expense	86,200
TOTAL	$150,000

Program Support for Elementary and Secondary Schools

In FY 1987 UIUC also requests support to continue its commitment to improving the expertise of the State's teachers and to strengthening biology and foreign language instruction in Illinois. In addition, UIUC seeks to establish an Office for School Research and Improvement focusing on improving elementary and secondary education in Illinois.

A. Integration of Computer-Assisted Instruction (CAI) into the Foreign Languages Programs of Illinois High Schools ($100,000)

Although Illinois high schools are investing in microcomputers in increasing numbers, it has been difficult for foreign language programs to take advantage of the potential of CAI for two reasons: (1) high quality foreign language software is not readily available, and (2) foreign language teachers have received less training than mathematics and science teachers in CAI techniques. As a result, foreign language instructors have had less opportunity to integrate CAI into their instructional program.

The demand for training of this type is extensive and increasing. At foreign language teachers' conferences, CAI workshops given by the University of Illinois Language Learning Laboratory (LLL) staff are

oversubscribed. The LLL has received many requests from State and national teacher's associations to sponsor workshops in CAI, and the American Council on the Teaching of Foreign Languages has asked LLL staff to edit a regular feature in the Council's journal on the topic of CAI in foreign languages. These requests are a reflection of the extensive need in this area and of the unique and nationally recognized expertise of the Language Learning Laboratory.

LLL will provide developmental training and consulting to high schools through workshops and short courses in order to build instructional expertise throughout the State. Within this project, LLL will conduct the following activities:

1. work with the Illinois Foreign Language Teachers Association and other state organizations to identify key school personnel in districts who support language program improvement and to advise these individuals regarding hardware systems, authoring languages, and useful commercial lesson materials;
2. conduct in-service workshops to demonstrate materials and software, to train teachers in advanced computer lesson techniques, and to advise them on developing interactive computer/audio and computer/video lessons; and
3. consult with schools and foreign language teachers on curricular needs, and the integration of CAI into different teaching programs and pedagogical approaches.

The second LLL project will offer residential research and development internships to a small group of high school teachers who are experienced materials developers. These teachers will be designated as Research Associates in residence for either one semester or one year. They will be required to have appropriate foreign language and programming experience and will be expected to complete significant projects in materials development, working closely with LLL staff and with faculty in the foreign language departments at UIUC.

After completion of their projects, the high school teachers will continue their work on the computer facilities in their schools and will also continue to have access to the facilities and staff of the Language Learning Laboratory.

The proposed budget for the Language Learning Lab is outlined below:

Academic Staff	
1.00 FTE Assistant Professor	$ 25,000
2.00 FTE Graduate Assistants	28,000
Expenses	
Commodities	47,000
Total	$100,000

B. Science Instruction ($100,000)

The School of Life Sciences proposes the creation of an ongoing summer institute and articulated academic year workshops for science teachers of grades 7-12. The broad goal of the institutes/workshops is to provide an interactive environment which brings together the existing technological infrastructure on the UIUC campus with a social infrastructure comprised of active Illinois science teachers. The several objectives of these summer programs and coordinated inservice workshops are:

1. to provide a factual study of the new technologies and the science that underlies them,
2. to develop the skills needed to analyze and to arrive at decisions in controversial areas of science and technology,
3. to provide hands-on laboratory activities which aid teachers in developing learning experiences that they can use in their local schools and classrooms,
4. to familiarize teachers with teaching materials available in the various areas of science and technology,
5. to conduct articulated inservice workshops during the school year that will enrich the teachers' subject matter knowledge and provide opportunities for sharing experiences, and
6. to establish and coordinate a network of science teachers within the State to facilitate communication between them and UIUC faculty members.

The School of Life Sciences will bring a group of 30-35 science teachers to the campus for a summer institute lasting six weeks. The

institute will be divided into three or four blocks of one to two weeks each. Learning activities in each time block will center around a single technology, for example, human and medical genetics. A single summer session will be devoted to the study of three or four different technologies. Participants may attend the entire session, or they may elect to attend only certain blocks.

Following the summer institute participants will be invited back to the University for one and one-half day workshops to update subject content and to develop teaching materials further.

Examples of topics that could be offered include the following: social impact of human and medical genetics, computers in a technological age, the human environment, agricultural technologies, medical marvels, nuclear technology, fossil fuel technology, and microelectronics.

Participants will be selected by application. Selection criteria will emphasize the teacher's potential to serve as a resource person. They will also consider the willingness of the participant's school or district to support her/him in this enterprise. The goal of networking and resource sharing requires that successful candidates serve as resource persons to other teachers for periods longer than the duration of an institute or workshop.

From the start of the program and increasingly as the number of teachers trained in successive institutes/workshops grows, attention will be given to developing a state-wide network so that individual teachers can communicate with each other and UIUC faculty members. UIUC will function as the coordinating agency for this network.

The network concept will include a material resource center at UIUC and computer linkages for rapid sharing and dissemination of information. Information will also be distributed in hardcopy by means of a newsletter to network participants and to other science teachers.

Beyond the summer institutes and workshops, but as part of the program, selected teachers will be invited to the UIUC campus for extended periods of time--from several days to weeks-- to interact with faculty experts in various fields, to research topics of interest to themselves or to their students, to work in the research laboratories on the campus to gain first-hand experiences, and to pursue work that will

result in curriculum or teaching materials related to science/technology/society.

There is yet another important reason for making available to science teachers a program of the kind detailed in this proposal. During the last two decades, science educators in the U.S. have emphasized instruction focusing on content and process. Values education, which is concerned with the cultural implications of technology, has only recently attracted attention. Many emerging technologies pose serious and controversial issues to society, and decisions concerning their implementation will be demanded. Instruction that develops the ability to investigate and to evaluate controversial issues will thus be invaluable to students and teachers. Thus, the third feature of this proposal is to sponsor instruction in the area of values education.

The proposed FY 1987 budget for this project is shown below:

Academic Staff	
3.00 FTE Faculty Members (summer appointments)	$ 24,000
Expense	71,000
Equipment	5,000
TOTAL	$100,000

C. Office for School Research and Improvement ($250,000)

The College of Education and University High School propose to establish a campus-wide Office for School Research and Improvement (OSRI). The mission of this Office is to focus on improving elementary and secondary schooling in the State of Illinois through:

1. improving dissemination and use of educational research by practitioners,
2. initiating new curriculum development efforts and school-based research activities,
3. studying how to make secondary schools more effective, and
4. developing new teacher education and leadership development model programs for school personnel and the training of prospective teachers at UIUC.

The OSRI will involve UIUC and University High School faculty in collaborative endeavors with educators and policy makers in selected schools and school districts, in the Illinois State Board of Education, and in the newly-created North Central Regional Education Laboratory funded by the National Institute of Education.

The Office will sponsor two major programs: a Program for Educational Improvement and a Program for the Study of Effective Secondary Schools.

As part of the first program, several Educational Improvement (EI) Task Forces will be organized for a period of three to five years to examine critical education issues (e.g., improving early childhood and elementary education; implementing computer-based education and technology, improving basic education in language arts, mathematics, and science, etc). The EI Task Forces will involve the UIUC College of Education and University High School faculty, teachers and administrators from cooperating school districts, and scholars from other appropriate disciplines in a process of needs identification, problem definition, development of appropriate interventions (e.g., new curricula, new models for teacher updating, or innovative computer software systems for teaching languages), field testing the interventions in the cooperating schools, and developing long-term strategies for adoption of the interventions by schools. It is anticipated that the EI Task Forces will seek external funding from various sources to extend and to broaden their school-based research efforts.

The outreach and dissemination unit staff will coordinate the development of workshops, conferences, newsletters, and other services to schools throughout Illinois. This unit will also be responsible for coordinating activities with the North Central Regional Education Laboratory, the Illinois State Board of Education, and other groups providing direct services and support to schools.

The second major program, a Program for the Study of Effective Secondary Schools, will consist of a basic functional unit--Research Study Teams generally composed of five persons. One will be a research faculty member from UIUC who has expertise in the study of technology, learning processes, or social psychological processes of the classroom or

school, etc. One will be a UIUC faculty member who has expertise in a particular subject matter, e.g., mathematics. Another will be a Master Teacher who is an expert in the teaching of high school students (generally an executive teacher from University High School or occasionally a visiting master teacher who has subject matter expertise related to the particular curriculum area), and finally, a graduate assistant who will aid in the collection of research and evaluation data will be added. A typical team might focus on coursework development for the microcomputer and/or teacher training projects in the use of computers in foreign language instruction. Once model programs and curricula have been developed at the Laboratory High School, they will be field tested in other site schools and then widely disseminated through OSRI.

Since the computer will play a major role in the research, development, and outreach of the center, an investment will need to be made in computer hardware and technology in the laboratory schools.

It should be noted that the Research and Development Study Teams of this Program differ significantly in orientation and focus from the Task Forces of the Program for Educational Improvement. The Research Study Teams will engage in more basic research on the improvement of secondary education and will generate new knowledge about what makes secondary schools effective. The EI Task Forces, on the other hand, will begin by focusing on a central educational issue or problem in the field and will draw on existing knowledge to improve the school or particular educational program.

A broadly constituted Advisory Committee will provide extensive input in the annual planning and evaluation of the Office's work. This group will be composed of representatives from the UIUC campus, the ISBE, participating schools and school districts.

The OSRI will develop cooperative agreements with several Illinois school districts. In addition to being centrally involved in the secondary-level curriculum development and outreach efforts of the OSRI. University High School will serve as one of the field school sites. The additional school sites will represent a wide range of schools in Illinois, including schools in inner-city, urban, suburban, and rural locales.

The budget for FY 1987 is as follows:

Academic Staff	
1.50 Professors	$ 60,000
4.50 Academic Professionals	119,000
Nonacademic Staff	
1.50 FTE Secretaries	23,000
Expense	42,000
Equipment	6,000
TOTAL	$ 250,000

UIUC CAMPUS SUMMARY OF
FY 1987 STRENGTHENING BASIC INSTRUCTION REQUEST
(Dollars in Thousands)

	Personal Services	Expenses	Equip.	Total
I. Undergraduate-Level Initiatives	$ 792.6	$257.4		$1,050.0
II. Support for Elementary and Secondary education	279.0	160.0	$11.0	450.0
Total UIUC:	$1,071.6	$417.4	$11.0	$1,500.0

Another increment of $1.5 million in FY 1988 would then complete the funding of various Strengthening Basic Instruction efforts that have been planned.

EXPANDED/IMPROVED PROGRAMS
F. ADVANCING MINORITY EDUCATIONAL ACHIEVEMENT

ADVANCING MINORITY EDUCATIONAL ACHIEVEMENT
($1,775,000)

Developing all the human talent of Illinois is crucial to the economic, social, and political advancement of our State and country. A number of recent studies on minority participation in education, however, demonstrate that minorities are underrepresented at all levels of Illinois education. Whether it be high school or college, the graduation completion rates for minority students are unacceptably low, and the number of faculty and graduate students in Illinois colleges and universities is distressingly small. Minorities represent a growing portion of the State's overall workforce. It is urgent that efforts to advance minority educational achievement increase in both scope and in depth. To these ends, the Illinois Board of Higher Education has placed among its highest priorities initiatives that would: 1) increase high school completion rate for minorities; 2) prepare more minority high school students for baccalaureate degree programs; 3) increase baccalaureate degree completion rates for minorities; and 4) expand professional development opportunities for minorities in fields leading to graduate and professional degrees.

The University of Illinois can point to a number of excellent programs it has initiated in past years to increase the numbers of underrepresented minorities on its campuses and elsewhere in higher education. It is a national leader in directing more minority students into engineering and medicine. Both campuses have developed support programs to help educationally disadvantaged students and have established new minority student recruiting programs intended to increase minority access to the University. In spite of these successes and a long commitment to expand the educational opportunities to students not now served, overall progress has been disappointing. Thus, the University requests FY 1987 funding for a substantial, aggressive, and comprehensive program to improve minority participation in education. The proposed program will focus on: 1) expanding outreach activities to encourage minority youth toward post-secondary education, 2) attracting outstanding minority students and faculty to the University, and 3) providing support services to improve retention.

In FY 1986, the University received $607 thousand of incremental funds for a variety of minority recruitment and retention activities. These funds, together with the FY 1987 request, will support a comprehensive plan to improve high school and baccalaureate level retention rates, to encourage highly qualified minority students to remain in Illinois for their baccalaureate and graduate training, and to increase the number of minority faculty at the University.

SUMMARY OF FY 1987
ADVANCING MINORITY ACHIEVEMENT REQUEST
(Dollars in Thousands)

	UIC	UIUC	TOTAL
Outreach Activities			
Personal Services	$ 75.0	$ 54.0	$ 129.0
Expenses		46.0	46.0
Attracting Minorities to U of I			
Undergraduate Minority Scholarships	75.0	425.0	500.0
Graduate Minority Fellowships	125.0	200.0	325.0
Faculty Awards			
Personal Services		50.0	50.0
Expenses	200.0		200.0
Recruitment Coordination			
Personal Services	30.0		30.0
Expenses	35.0		35.0
College Based Retention			
Personal Services	265.0		265.0
Expenses and Equipment	50.0		50.0
Campus Coordination of Minority Programs			
Personnel Services	136.0		136.0
Expenses and Equipment	9.0		9.0
Total	$1,000.0	$775.0	$1,775.0

OUTREACH ACTIVITIES

The Chicago Program - Early Outreach ($75,000)

Early outreach programs on the UIC campus seek to identify educationally and economically disadvantaged minority students at the middle and high school levels. The programs are designed to provide these students with academic enrichment in the areas of science, mathematics, reading, and composition, as well as to introduce them to the culture of higher education. They can also provide preceptorship experience, which permits the students to learn by doing, while working under the guidance of professionals who serve as mentors and role models. Another important component of these programs is individual and group counseling for students.

The early outreach component of the Urban Health Program introduces minority youth to the health professions well before they enter college. Saturday College, the State funded program within Early Outreach, provides an innovative and successful model for activities in this area. This program, designed to meet the specific requirements of college-based programs in the Health Sciences, will receive additional State funding of $50 thousand in FY 1986. The FY 1987 request for $75 thousand will permit hiring of two academic/professionals and 1.5 additional nonacademic employees to expand early outreach activities to a more general audience of minority youth. These personnel will work with and through secondary schools and community agencies to encourage academic achievement and motivation and to support the idea of a college education and professional career for minority students. Programs for academic enrichment will take place on the UIC campus and use the library, student union, computer center, and other educational facilities.

Chicago is a fertile area for early outreach activities. It is expected that this program will continue to expand beyond FY 1987, depending upon the results of the FY 1986 and FY 1987 programs.

Urbana Early Outreach - Principal's Scholars Program ($100,000)

Historically, many minority students have been insufficiently prepared for college admission to programs that require an academic background in science and mathematics. As a result, the post-secondary

choices of these students have been limited. Seven years ago the Principal's Scholars Program (PSP) was initiated at UIUC, with the cooperation of the Ada S. McKinley Educational Services Agency, to address this problem. The Program is now operating in eighteen high schools in Chicago, three in Decatur, three in Urbana-Champaign, and two in East St. Louis. More than two thousand students and their families are actively participating in the Program.

The Principal's Scholars Program is a recognition program for minority students in college preparatory programs. To be successful in any school, the program must have the full endorsement of the principal, who is expected to take administrative control of the Program.

The principals and staff members of the various schools select students to participate in the Program. They attempt to identify these students as early as possible (eighth or ninth grade), so that their high school coursework can be focused upon college preparatory requirements. Students are selected on the basis of such factors as grades, aptitude tests and parental interest. Usually, the Program is limited to 200 students per high school, with 50 students coming from each class of freshmen, sophomores, juniors, and seniors. Other students who are not selected can elect to become candidates for the Program, and they participate in all of the special events sponsored by the Program.

University personnel coordinate monthly motivational programs for the students, conduct teacher and counselor enrichment workshops, and provide evaluation and course-improvement assistance. They also provide students with special extra-curricular experiences: science fairs, speech contests, writing contests, mathematics contests, industrial visits, career counseling, visits to the campus, and an academic summer program at UIUC.

The success of the Program is evidenced by the subsequent academic achievements of the students. When the Principal's Scholars Program was initiated, the average composite ACT score of the participants was 14. The average score has now increased to more than 22. A high percentage of PSP students have gone on to college, many of them pursuing curricula in engineering, science, business, and agriculture.

Personnel from the Chancellor's Office, the Office of the Vice Chancellor for Academic Affairs, the Office of Admissions and Records and

numerous colleges--Agriculture, Applied Life Studies, Commerce and Business Administration, Engineering, and Liberal Arts and Sciences--volunteer their time and effort in assisting with various aspects of the Program. They are joined by a number of representatives from businesses, firms, and organizations throughout the State that contribute funds to the Program.

In FY 1986, the State provided $137 thousand which made it possible for UIUC to establish a central PSP office, reporting to the Vice Chancellor for Academic Affairs, and to begin expansion of the Program. FY 1986 and FY 1987 funds will permit the addition of 12-14 new high schools in the State that have large or totally minority student enrollments.

The Principal's Scholars Program is the foundation for UIUC's future recruiting efforts. Although PSP is not a recruiting program, it does serve to expand significantly the pool of minority high school graduates who are well-prepared to attend the college or university of their choice. Past experience has shown that a large percentage do choose to attend UIUC and do well here. Perhaps the strongest endorsement for PSP is that the students who were involved in the Program in high school, and who then went on to UIUC and later graduated, are all very enthusiastic supporters of the Program. They have helped to raise funds to support its activities and have volunteered to help present many of its programs.

ATTRACTING MINORITIES TO THE UNIVERSITY OF ILLINOIS

Recruiting Outstanding Undergraduate Minority Students ($500,000)

For a number of years, many highly qualified minority high school graduates have chosen to leave Illinois for their baccalaureate experiences. Data from the ACT, SAT, and the Illinois State Scholars Survey confirm the seriousness of the out-migration of highly qualified minority students. From these data, it is estimated that over 225 Black students with ACT scores of 26 or above (or the SAT equivalent) enroll out-of-state each year. In addition, there are an estimated 575 Black students who score between 21 and 25 on the ACT, and who also enroll out-of-state. Thus, approximately 800 high scoring Black students annually enroll as

freshmen at out-of-state institutions; this represents well over 50% of the total number of high scoring Black students in Illinois.

Students receiving baccalaureate, graduate, and professional degrees from out-of-state institutions are less likely to seek employment in Illinois than students receiving their training within the State. If Illinois is to develop minority talent for leadership positions within the State, it is essential that highly qualified minority students remain within the State for postsecondary education. In an effort to reduce the migration of outstanding Black and Hispanic students of Illinois to out-of-state institutions, the University embarked on an ambitious program during the past year to attract these students to both campuses of the University of Illinois. The target group was composed of 375 semifinalists in the National Achievement Scholarship Program and the National Hispanic Scholarship Program. The University initiated a new, need-based scholarship program for the target group which is competitive with scholarship programs at other institutions in the nation. In order to achieve this competitive balance, the University had to commit approximately $2,500 per student over and above the normal sources of student financial aid.

Approximately 190 of the 375 students in the target group have accepted admission to either the Chicago or Urbana campus, and 100 students are expected to enroll. In past years only 30-35 of these students matriculated at the University of Illinois, and this year's special effort will triple the number of these highly qualified minority students attending the University.

The University seeks additional funds to establish an ongoing program which will be targeted <u>only</u> to those students who otherwise would leave Illinois for their training. From information gathered from the students who will likely enroll in the special UI program outlined above, it is clear that most of the students had intended to enroll at out-of-state institutions before the University initiated its aggressive recruiting effort. The University does <u>not</u> seek special scholarship funds to recruit students who otherwise would enroll in other Illinois colleges or universities.

As indicated earlier, approximately 100 students from the special target group are expected to enroll in Fall, 1985, with special scholarships averaging approximately $2,500/student, requiring a commitment of up to $250 thousand of university funds in FY 1986. For FY 1987, $500 thousand is being requested for undergraduate minority scholarship support to provide second-year funding to those students who began as freshmen in FY 1986 and to provide first year funding for a new freshmen group in FY 1987. The precise allocation of these funds between the two campuses will depend upon the final enrollment decisions of the scholarship winners.

This new scholarship program, combined with a strengthened minority recruiting program, will have a direct and positive impact on minority undergraduate enrollment at the University in FY 1987 and beyond and, more importantly, upon the overall enrollment level of minority students in the State of Illinois.

Minority Graduate Fellowships ($325,000)

To expand professional development opportunities for minorities and, in particular, to increase the minority applicant pool for faculty positions, it is imperative that the number of minority students in the University's graduate programs be increased. By attracting highly qualified minority students to baccalaureate programs and strengthening retention efforts to increase baccalaureate completion rates, the University hopes to increase significantly the number of Illinois minorities who pursue graduate training. To keep these students in Illinois and to attract other highly qualified minorities for graduate education at the University of Illinois, funds are requested to expand the University's graduate fellowship programs.

At UIUC the Graduate College operates a minority graduate student recruitment program in which staff members and minority faculty members travel to other institutions across the nation, informing minority students about UIUC's excellent academic programs and attempting to interest them in coming to UIUC. The College also provides funds for visits of prospective students and supports thirty fellowships for new minority students.

These efforts, however, are inadequate because UIUC cannot offer graduate fellowship support that is competitive with that offered at peer institutions. For example, among those schools represented in the Committee on Institutional Cooperation (CIC), The Ohio State University, the University of Wisconsin, and the University of Minnesota have state-appropriated funds for minority graduate student fellowships. This competition, together with sudden increases in the minority application rate, have made the number and size of the UIUC minority fellowship program inadequate. Therefore, the Graduate College is requesting $200 thousand for FY 1987 to increase both the amount and number of its minority fellowships.

At UIC, the need to increase the number of minority graduate students is a significant element in the long-term goals and commitments of the campus. In FY 1986, the campus has allocated $25,000 to begin a special minority graduate fellowship program. For FY 1987, UIC is requesting $125 thousand to expand this effort. This special fellowship program will be managed centrally in order to provide the campus with the flexibility to make awards to the most promising minority students in any discipline.

Programs To Attract Minority Faculty ($250,000)

The number of minority faculty members at the University of Illinois is low. Both campuses have, for a number of years, aggressively sought out minority faculty for appointments to the University, but their efforts have been severely hindered because of a small national pool of minority applicants. The programs outlined previously in this section will serve to increase that applicant pool over the long run. In the interim, the University must significantly increase efforts to recruit successfully from the existing applicant pool. The University has therefore initiated a special program in FY 1986 to provide inducements that will attract minority faculty to both campuses of the University. The University has set aside $100 thousand of institutional funds and $30 thousand of new State funds for this project. This program will provide new minority faculty members with up to $10,000/year for three years to be used in direct support of their scholarly activities. The program is intended not only to attract outstanding minority faculty to the

University but also to give them research support early in their careers which will help ensure their future success.

As an outgrowth of this effort, the UIC campus is requesting funds for FY 1987 for a new Minority Faculty Support Program. The goal of this Program is to recruit promising young minority scholars and to provide them with a supportive environment during the period critical to their professional developments. UIC is in a particularly strong position to accomplish this goal. Chicago has a vigorous intellectual and cultural environment for minorities, certainly an attractive feature for young minority scholars. The presence of several other strong universities in the area, other public and private libraries, historical and cultural institutions, and the many business, financial, governmental, and industrial entities offers easier access to scholars for research projects, as well as opportunities for funding support.

UIC has allocated $30 thousand in State funds in FY 1986 to initiate this Program. The FY 1987 request of $200 thousand will be used to recruit and support young minority faculty members in a variety of ways, depending on individual needs and progress. Awards of $10 thousand to $15 thousand for 2-4 years will be made for research assistants, travel, equipment, scholarly materials, computer time, or other costs associated with professional development. If fully funded, this Program would support approximately 20 minority faculty annually, with provisions for annual review and renewal up to four years. It is anticipated that this Program will assist UIC in adding 20 to 30 young minority faculty members to the campus over the next several years.

For a number of years, the Urbana-Champaign campus has maintained a central pool of funds to augment new positions for minority faculty members. In addition, UIUC will participate in the new FY 1986 University-wide program, mentioned earlier, which will provide research support for new minority faculty. These efforts, however, are only a small step in the right direction.

For FY 1987, UIUC is requesting funds to establish a special minority postdoctoral fellowship program. The campus plans to make special efforts to recruit new Ph.D.'s to postdoctoral fellowships for 1-2 years. Departments receiving the postdoctoral fellows will be expected to help

them develop and enrich their academic qualifications. If it appeared that there was a good match between the fellows and the department, the fellows would be considered for tenure-track faculty positions when their fellowships expired.

To initiate this special minority postdoctoral fellowship program in FY 1987, UIUC is requesting $50 thousand, enough to fund the first two postdoctoral fellowships (at $25 thousand each). If this pilot effort proves successful, an additional $200 thousand will be requested in FY 1988 for an additional eight fellowships.

Minority Recruitment Coordination - UIC ($65,000)

The Office of School and College Relations (OSCR) has central responsibility for undergraduate recruitment at UIC. In FY 1985, it began focusing some of its activities on inner-city Chicago public schools to develop long-term, stable relations with counselors and teachers in these schools. This establishes a two-way communication network for discussing admission requirements, for explaining programs, for answering academic, financial and social questions, and for identifying promising minority students who might be interested in UIC. It also provides an access channel to students and their parents.

Additional State support in FY 1986 of $60 thousand permitted an expansion of these activities, and the FY 1987 request of $65 thousand will complete funding of the focused program for minority recruitment in OSCR. It will provide resources to hire an additional Spanish-speaking support staff member and establish a peer group recruitment program in which students visit schools and community agencies for recruiting purposes. In addition, it will establish a funding base for annual publication of brochures designed to address the special needs and concerns of potential Hispanic and Black minority students at UIC.

MINORITY RETENTION PROGRAMS

For well over a decade, the University of Illinois has placed a high emphasis on the retention of minority students. Numerous programs, such as the Educational Opportunity Program in Urbana and the Educational

Assistance Program in Chicago, have provided support services to educationally disadvantaged students with generally successful results. In spite of this, it is clear that much more needs to be done. At Urbana, FY 1987 funds are requested to support a new initiative, the Summer Bridge Program, which aims to strengthen participants' skills in mathematics, writing, and reading, and to build their confidence and self-esteem in the non-cognitive areas of improvement. This Program is part of the Strengthening Basic Instruction request and is discussed in that section. Although the Summer Bridge Program will be available to all undergraduate students who are admitted with certain basic skill deficiencies, it is expected that the majority of participants will be minority students. The Summer Bridge Program can have a significant impact on the retention rates of minority students and could serve as a model for other institutions.

College Based Retention/Recruitment Programs ($315,000)

UIC is composed of 16 colleges offering programs designed for students from the beginning freshman to professional and doctoral degree candidates. Minority students enrolled in a particular college will have educational, motivational, occupational and social needs pertinent to its discipline or profession as well as to their level of study. Consequently, departments in each college often require academic counseling, support groups, educational and career assistance, and program coordination which reflect these distinctive needs.

Funds in this request will allow colleges to strengthen their links with early outreach activities, general recruitment activities, financial assistance programs, educational support programs, and career counseling and placement efforts. These funds will also allow colleges to build or enhance existing programs with the specific goal of retention, including tutoring programs as well as academic counseling and guidance specific to the disciplines in each college. A comprehensive review of current efforts and the completion of a strategic plan for minority recruitment and retention during the next five years will identify areas of progress and those in need of added strength. The goal is to recruit, train, and support minority students through the completion of all the academic requirements for a degree in any of the disciplines represented at UIC.

Increased funding in FY 1986 has enabled the campus to make progress toward this goal. An additional recruiter/counselor will be added in both the Educational Assistance Progam (EAP) and Latin American Recruitment and Educational Services (LARES) Program. The Colleges of Architecture, Art and Urban Planning, Dentistry, and Nursing will receive additional funding to support recruitment of qualified minority students into these professional programs.

Of the funds being requested for FY 1987, $80 thousand will be targeted to the Supplemental Instruction Program, modeled on successful programs at the University of Missouri at Kansas City and other schools. This program, which has been implemented by the Counseling Service at the Health Sciences Center, is designed to increase students' competence in reading, reasoning, and study skills at the same time they master course concepts which are crucial to academic success. The focus is on high-risk students, helping them to master specific learning skills needed to become successful students and professionals.

The Supplemental Instruction Program is presently operating as a pilot program, serving primarily students in the College of Medicine. The State supported budget for this program in FY 1986 will be $28.5 thousand. As more experience is gained, additional high-risk courses in other colleges and programs can be targeted for inclusion. FY 1987 funds will permit employment of additional learning skills specialists who will be trained in the methods of the Supplemental Instruction model. These professionals work as supervisors for advanced students who function as leaders in the program. These leaders attend all classes and do all assignments in the targeted courses, help to design appropriate study aids, and lead review sessions. Supervisors are responsible for training the leaders, for preparation of evaluation/research reports, and for the day-to-day activities of the program. A budget increment of $80 thousand will provide for two additional supervisors and ten additional leaders, with the necessary clerical and operating expenses to increase the number of targeted courses by ten each quarter.

The Colleges of Business Administration, Education, Liberal Arts and Sciences, Pharmacy, and Social Work are developing counseling, tutoring, and skills development programs designed to increase retention of minority

students at both undergraduate and graduate levels. These programs will build on the experiences of the Supplemental Instructional Program, EAP, LARES, and other programs at UIC, as well as successful efforts at other universities. Funds in this request will provide for hiring five academic/professional persons, four nonacademic/clerical persons, and for expense and equipment funds. Final distribution of the funds in this request will be determined after completion of the campus-wide review of present and proposed programs and activities in these and other colleges.

CAMPUS COORDINATION OF MINORITY PROGRAMS - UIC ($145,000)

The wide range of outreach, recruitment, counseling, tutorial, and social and financial support activities carried out by colleges, departments, special programs, and administrative offices across the Chicago campus requires coordinated planning, goal setting and administrative oversight to accomplish the goal of providing meaningful access to higher education at UIC for underrepresented minority students. These activities can best be implemented by decentralizing decision-making and responsibility to the academic and administrative officials best able to determine needs and educational requirements. This must be done, however, in a coordinated framework so that the many pieces contribute effectively to the overall objective. In addition, there must be a common data base available for tracking these efforts and evaluating their relative effectiveness.

An FY 1987 request for $145 thousand will enhance planning and administrative coordination of minority recruitment and retention activities at UIC. The campus will identify a principal campus-level officer charged with planning, assessing existing program needs and priorities, and recommending the allocation of resources to address these priorities. In addition, the campus will strengthen its affirmative action program and expand its work with minority employees and contractors. The additional resources required for these efforts are estimated at 4.0 FTE positions at a cost of $136 thousand and expense and equipment costs of $9 thousand.

ENGINEERING REVITALIZATION

ENGINEERING REVITALIZATION
($4,000,000)

The economic well-being of Illinois is dependent upon the State's ability to attract and to retain high-technology industry and to restore the competitive position of the State's extensive base of mature industry. A major focus to ensure achievement of this goal is to provide industry with an adequate source of highly qualified engineering graduates. The importance of engineering education extends even beyond the State - quality engineering programs are also essential to the security and economic vitality of the nation as a whole. A recent study by the Research Council Committee on the Education and Utilization of the Engineer asserts that, "Engineering is a central feature of the technology development process. It is a critical element in the economic fortunes of industrialized nations." (Engineering Education and Practice in the United States: Foundations of our Techno-Economic Future. 1985, ISBN 0-309-03539-2). President Reagan recently endorsed the Decade III program of the National Academy of Engineering, a broad-based effort to advance industrial competitiveness and economic growth, and called on the Academy to "marshal the nation's technical engineering-based expertise in a campaign that will ensure American scientific, technological and engineering leadership into the 21st century."

The period of the 1970's and early 1980's was one of crisis for engineering education, as difficulties were experienced in competing with industry to attract and retain qualified faculty and in providing adequate incentives to encourage baccalaureate graduates to pursue graduate-level studies. Enrollment increases pushed faculty workloads to the breaking point, and obsolete equipment and facilities threatened to undermine research and instructional efforts. In 1982, George A. Keyworth II, President Reagan's science advisor, met with more than 50 government, higher-education, and industry leaders in New York to develop a plan to deal with these problems. The recommendations of the participants called on universities to improve salaries for faculty members, to increase stipends for engineering graduate students, to develop programs in which graduate students could gain experience in industrial research, to

increase spending on instructional and research equipment, to increase the numbers of faculty, and to increase research and instructional quality. The meeting participants recommended that State and Federal governments increase their support of graduate students and research. States, especially, were seen as the key to providing the resources needed to create stimulating and competitive educational and research environments at the universities.

Many states, including Illinois, have responded, and within the last several years the situation has improved. Much, however, remains to be done. The Research Council committee reports that major deficiencies continue to require attention, especially in the areas of salary comparability with industry (particularly for junior faculty), teaching loads which are often excessive, obsolete equipment and facilities, and access to engineering programs by women and minorities. It is clear that the national impetus to restore and preserve the quality of its engineering programs must continue.

The University of Illinois FY 1987 request for Engineering Revitalization funds represents the fourth phase of a program designed to ensure the continuation of the quality of its nationally-recognized engineering programs. Funds allocated in the first three phases allowed progress to be made in attaining competitive levels of faculty salaries relative to peer institutions, decreasing excessive faculty workloads, obtaining up-to-date instructional equipment, and remodeling poor quality space. These funds have also allowed both campuses to move toward increasing access to engineering programs by moving enrollment targets to all-time highs.

Incremental funds are requested for FY 1987 to recruit additional qualified faculty and support staff, to maintain a competitive salary structure, to purchase technologically advanced equipment, and to remodel laboratories and offices. In addition, several new emphases in engineering research will be explored, including establishing multidisciplinary groups to concentrate on microelectronics and pharmaceutical engineering.

Chicago Program
($1,375,000)

State funding in FY 1984 and FY 1985 for engineering revitalization has allowed the College of Engineering at the University of Illinois at Chicago to make steady progress in its multi-year effort to provide the State of Illinois and the Chicago metropolitan area with a first-rate engineering school. The anticipated increment in State support in FY 1986 will move the College still closer to this goal. The College enjoys increasing national recognition and respect for the quality of its instruction and research programs. One important measure of this recognition is the capacity to recruit strong faculty in a generally very tight market. The College has demonstrated the ability to attract outstanding faculty capable of generating significant amounts of external funding and donor support for their research activities.

The budget request for FY 1987 represents another significant step toward the goals articulated in the earlier budget requests to support engineering revitalization at UIC. These new funds will allow recruitment of additional faculty, hiring of critical technical and support staff, increasing the number of graduate assistantships available in the College, and increments to the equipment and expense budgets of the various departments. The College will be in a much better position to respond to growing industrial and professional demands for its products and services, for well trained personnel, and for experimental as well as theoretical research in the key areas of computer science, robotics, computer-assisted design and computer-aided manufacturing (CAD/CAM). The College also has substantial strength in chemical and materials engineering, and in the increasingly important areas of bioengineering and engineering related biotechnology.

Specific enrollment goals have been established for both the undergraduate and graduate programs in the College. In 1983, the first year of the revitalization effort, 2,462 undergraduates and 562 graduate students were enrolled in the fall term. The College of Engineering is striving to increase the undergraduate enrollment to 3,000 students, an increase of 22%, by Fall 1989. The targeted increase for the graduate student body

during this period is 33% to a total of 750 students. Simultaneously, the student/faculty ratio must be reduced from the 18.3 to 1 in 1983 to approximately 13.0 to 1 by 1990, in order to bring it more nearly into line with the national norm of 12.0 to 1 for quality engineering programs with graduate components. To achieve this enrollment level, the faculty complement must be brought to approximately 134 FTE by 1990, an increase of 52 FTE beyond the 82 FTE in Fall 1983. With the funding allocated for FY 1986, almost half of the needed increase will have been realized as the anticipated faculty level in the college reaches 103 and the student/faculty ratio will be approximately 15 to 1. An additional 12 faculty FTE in the FY 1987 request would bring this ratio down to approximately 14.0 to 1 and would make the goal for 1990 a realistic target.

This budget proposal contains funds to support additional professional, technical, and clerical positions which are critical to several programs in the College of Engineering. Staff are needed to increase efforts in the critical areas of outreach and articulation with the community colleges. The College has also made a commitment to increase the numbers of minority students who enroll in Engineering and to provide these students with greater support in order that significantly more of them can succeed in a rigorous engineering curriculum.

The effort to increase the number of graduate teaching assistantships will be continued with this budget. For FY 1985 the College is able to budget 59 FTE assistantships, and this is expected to increase to approximately 65 FTE for FY 1986. Funds in this request will be used to enable the target of 77 FTE to be fully met by Fall 1986. Graduate assistantships provide much needed instructional support in the laboratories. These funds enable the College to recruit better graduate students and to provide them with an essential part of their training as professional engineers.

As the College of Engineering is able to augment a very strong existing faculty with additional scientists whose research and teaching interests meet the needs of the curriculum, the capacity of the College to continue as a strong contributor to the economic development of the State of Illinois is enhanced. This contribution is best made through the training of engineers, and through research efforts which will bring the

results of much of current high technology research to the applications stage in design and manufacturing.

By its very nature much of high technology involves several traditional disciplines. Work in biology, chemistry, computer science, medicine, pharmacy, and physics will have engineering requirements before it can be brought to the manufacturing environment and the marketplace. The new materials, processes, and products possess new characteristics which require changes in manufacturing methods, storage methods and delivery systems. As research in these other disciplines increases at UIC and in the Chicago area, opportunities and demands for participation by a strong College of Engineering are growing. Among the many problem areas which must be addressed by the engineer in cooperation with faculty from other disciplinary areas are drug delivery systems, including innovative devices and mechanisms for transdermal drug delivery and transport; manufacturing process design for pharmaceuticals; and drug effects/post-marketing surveillance, particularly creation of data structures and management systems. One example of the type of problem which requires cooperative work between engineers and scientists in other disciplines is the clinical use of human insulin produced in a fermentation vat. Applications in the marketplace require involvement of the engineer to solve the many production problems associated with this technology. The study of such fermentation processes is a necessary step toward commercialization and industrial application of many of the products of biotechnology research and pharmaceutical engineering.

Anticipating increases in enrollment and in numbers of faculty, the College will require additional funding support in expense and equipment categories. This budget reflects these needs with a request for $375 thousand, of which $250 thousand will be for equipment. Equipment requirements in a comprehensive instructional and research program in engineering are great, and they are changing constantly as technological advances are incorporated into the program. In this period of rapidly changing technology the College of Engineering has established a reasonable goal of $700 per student per year for equipment expenditures, with about half of these expenditures to come through gifts and grants. As the College reaches toward the enrollment targets of 3,750 students by the end of this

decade, the equipment budget funded through appropriated sources should increase to a total of $1.2 million. With the equipment funds in this request the State funded budget in this category will be approximately, $500 thousand.

Academic Staff	
12.00 FTE Faculty	$ 540,000
4.00 FTE Academic Professionals	100,000
12.00 FTE Graduate Assistants	168,000
Nonacademic Staff	
4.00 FTE Technical	120,000
4.00 FTE Clerical	72,000
Expenses	125,000
Equipment	250,000
Total	$1,375,000

Urbana-Champaign Program
($2,625,000)

A multi-year plan was initiated in FY 1984 to revitalize the Urbana-Champaign College of Engineering. Incremental funding provided each year since FY 1984 has sustained and strengthened the process of revitalization. Much progress has been made: faculty salaries have become more competitive, faculty workloads are becoming more reasonable, enrollment restrictions are being eased, new instructional equipment is being purchased and remodeling of aged and inadequate space is taking place. Incremental funding in FY 1987 for the areas discussed below will insure the continuation of this progress.

Salary Enhancement

Several conditions in the Engineering job market combined to jeopardize the College's ability to retain superior faculty members in the late 1970's and early 1980's. A shortage of Ph.D. graduates in engineering and science disciplines drove private sector salaries to new highs. A similar shortage of baccalaureates raised salary levels for four-year graduates to the point where fewer and fewer of these students were willing to pursue advanced degrees, thus aggravating the shortage of candidates for industrial as well as university positions. UIUC and other premier institutions were subjected to "raiding." Institutions of the sunbelt and the West, where population migration and growth provided support for the universities of those regions, competed favorably for the very best faculty who were attached to universities in states like Illinois which were suffering several years of financial difficulty. Although the College experienced a turnover of approximately 20 faculty positions per year and was able to replace these people in the mid-1970's, there was a net decrease of nearly 20 engineering faculty during the four years preceding the initiation of the Engineering Revitalization program.

The College's salary position was eroded significantly in FY 1983 relative to its peers, but three successive incremental increases of $1.2 million in FY 1984, $666,000 in FY 1985 and $404,000 in FY 1986 permitted the College to regain its position relative to its peers. The highly competitive market for the best engineering faculty will continue for the next five to ten years. Therefore, UIUC will have to continue to monitor salary and compensation practices at peer institutions to retain the benefits that the Revitalization Program has acquired thus far.

Engineering salary rate increases at those institutions with which the University competes for new faculty generally exceeded the rate increase in salaries of faculty in other disciplines. It is probable that the annual rate increases in engineering and science disciplines at peer institutions will continue to exceed the generally available rate increases provided to other disciplines. To meet the expected rate increases of peer institutions may require a portion of the FY 1987 budget request for Engineering Revitalization.

Staffing

During the decade of the 1970's, engineering undergraduate enrollment increased by 50%, and graduate enrollment increased by approximately 15%. Similarly, instructional workload increased by almost 50%. Although the number of teaching assistantships increased by 50%, the number of faculty increased by only 2%. Teaching as a proportion of total workload drifted upward but could not keep pace with the increases in enrollment. Therefore, undergraduate class sizes in lecture sessions increased from 83 to 120 at the 100 level, 23 to 94 at the 200 level, and 26 to 38 at the 300 level; lecture discussion sessions doubled in size at all course levels; and laboratory sections increased by about 25%. Concerns for the quality of instruction and the importance of scaling the instructional program to the quality of the students being admitted required that class sizes be reduced to meet accepted standards for outstanding colleges of engineering.

The first increment of revitalization funds dedicated to redress these concerns was invested largely in increasing the number of graduate teaching assistants and support staff while the departments prepared to recruit faculty. These preparations have paid off during the second year of revitalization, and during FY 1985, a net increment of 15 faculty members was hired so that in the fall of 1985, the engineering faculty will have begun a sustained pattern of growth for the first time in approximately two decades. Recruiting procedures have now moved beyond the start-up phase and the College expects to be able to recruit and to add an increment of 25-30 tenure-track faculty in FY 1986 and 20 faculty during each of the next few years. Since each new faculty member requires support in the form of graduate assistants, academic professional and nonacademic personnel, wages and expenses, a portion of the incremental funding has been and will be used to cover these costs.

When peak enrollments and teaching loads were reached in 1980 and 1981, the College was experiencing the first of the net losses in faculty to other institutions. A limitation was placed on freshman enrollment in an effort to reduce instructional workload over a period of time. There have been three freshman classes of reduced size admitted through FY 1985 academic year, but the admissions cycle for fall of 1985 has been modified to increase freshman enrollment to its record high level. As

successive classes are similarly constituted and as future increments of new revitalization positions become available, the College will be able to continue to move toward all-time high enrollments and to reduce large class sizes. For FY 1987, the increment of funds to provide for 25 new faculty and the attendant staff and support funds is $1.7 million.

Instructional Equipment Funds

The College continues to assign high priority to its goal of obtaining a level of instructional equipment funding equivalent to $1,250 per baccalaureate degree awarded (FY 1984 dollars). The IBHE Engineering Grant funds provided in recent years for equipment purchases plus engineering revitalization funds have helped the College move toward its total goal of an annual budget of $1.75 million for equipment.

The driving force for additional equipment funding is two-fold. First, the pace of technological advancement--as evidenced by the advent of the microcomputer, for example--has led to technological obsolescence of instructional equipment in far shorter time periods than was true even a decade ago. Second, burgeoning student populations have resulted in larger classes. While lecture size is limited by the number of available seats, laboratory courses are limited by the number of laboratory stations. As a result, the College must teach many more lab sections, leading to more intensive use of the equipment.

The College has used its FY 1984, FY 1985 and FY 1986 equipment allocation to expand instructional equipment opportunities in every department. The FY 1987 request includes an increment of $188,900 of instructional equipment funding.

CAD/CAM Equipment Acquisition

It is now an accepted fact that the computer is pervasive in engineering education. Nowhere is this more evident than in the area of CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing). In recognition of this need, the College of Engineering has made major strides in the last two years to acquire significant CAD/CAM capability with non-state funding. Within the last 24 months, the College and the departments have acquired $4.5 million in CAD/CAM systems without the expenditure of state funds. These include an HP 9000 system in Mechanical

Engineering, an IBM 4331 system used by four departments, and an IBM 4381 system used by Electrical and Computer Engineering and Computer Science. In total, these systems provide less than 60 student stations to serve an undergraduate student body of 5,000.

In addition to the acquisition of these machines, the College requires annual maintenance and operating funds equivalent to roughly 10% of the machine's cost. Engineering Revitalization funds ($175,000 per year) have already been dedicated to the service contracts and operations costs of the IBM 4331 system. The IBM 4381 system was obtained from IBM with three years of free maintenance. Service contracts on the HP system exceed $40,000 per year.

To obtain a minimum level of capability to serve all engineering students, the College will require at least two additional CAD/CAM systems of the 4331/4381 class. These systems have an estimated purchase cost of $2 million each, and this amount has been requested on a nonrecurring basis over a four-year period beginning with $1 million in FY 1988. In addition to this, the maintenance and operation funds are requested at the recurring level of $400 thousand, also phased in over a four-year period. An amount of $200 thousand is being requested for FY 1988. Although these items are not part of the FY 1987 request, they are mentioned here, for they represent major deficiencies that must be met in the near future.

Remodeling

For two years the College has used its Engineering Revitalization funds to consolidate the space assigned to the Department of Civil Engineering and other units. It has then remodeled the vacated space for new and growing programs. In FY 1984, provision was made for the Very Large Systems Integration Program, for the instructional laboratory programs of the Computer Science Department, for the initiation of the Center for Supercomputing Research and Development, and for growth in the Continuing Education Program of the College. In FY 1985 departmental consolidation continued, permitting additional remodeling to accommodate both the Supercomputer Centers and programs in Materials Processing. An increment of $250 thousand is requested for FY 1987 to increase the

annual level for remodeling to $900 thousand. The funds will be used to remodel poor quality space, much of which was built near the turn of the century, so that it can be used to accommodate new program activities.

Expanded Program Activities

The College of Engineering has taken great care to maximize the benefits generated through Engineering Revitalization funds. Many of the new faculty members, graduate assistants, and nonacademic staff members that have been hired during the past two years have been employed in programs that will be of direct economic benefit to the State of Illinois. They are doing research in microelectronics, computer systems design, software engineering, very large systems integration, supercomputer design, robotics, etc. The College plans to use the majority of its FY 1987 funds to develop a multidisciplinary group that will concentrate on various aspects of manufacturing systems, to strengthen the multidisciplinary group doing research in microelectronics, and to establish a central computerized instructional facility of 200 workstations that will be available to engineering students from all departments within the College.

Conclusion

Morale within the College of Engineering is very high at the present time. The faculty members and administration are planning actively for the future and the improvements that they believe are soon to be realized. Momentum is building. Outside funding has already increased to the point where the College now ranks second in the nation in terms of outside dollars earned each year. Revitalization is taking place. If additional incremental dollars are provided in FY 1987 and beyond to go with those the College expects to generate from grants, contracts, and a new fund drive for capital improvements, it is expected that initial work that has gone into Engineering Revitalization will prove to be tremendously worthwhile and will stimulate industry and business within the State and will be responsible for many new links between the University and industry.

The FY 1987 budget request is outlined on the following page:

Engineering Revitalization - UIUC

Academic Staff	
25.00 to 36.00 FTE Assistant Professors*	$ 1,466,300
8.25 FTE Graduate Assistants	139,100
*precise number will depend on amount of salary enhancement required	
Nonacademic Staff	
8.50 Secretaries	$ 117,700
4.00 Technical Staff	78,200
Wages	30,500
Expense	354,300
Equipment	188,900
Remodeling	250,000
TOTAL	$ 2,625,000

SUMMARY OF FY 1987 ENGINEERING
REVITALIZATION BUDGET REQUEST
(Dollars in Thousands)

	UIC	UIUC	TOTAL
Personal Services	$1,000.0	$1,801.3	$2,801.3
Equipment/Expenses/Other	375.0	823.7	1,198.7
Total	$1,375.0	$2,625.0	$4,000.0

Additional funds will be requested in FY 1988 to continue the Revitalization effort.

SPECIAL SERVICES/FUNDING COMPONENTS

SPECIAL SERVICES/FUNDING COMPONENTS

Budget requests for essential services provided by the University of Illinois are summarized in this section. These services are outside the University's core function of instruction. As such, the resource requirements of these services should not compete for educational funding. The FY 1987 request for funds to support these activities totals $397 thousand. The specific programs requested in this section are outlined in Table 16.

Included in the special services request are funds for the Cooperative Extension Service and Fire Service Institute. The Cooperative Extension Service request consists of three programs: Soil and Water Conservation, Financial Management for Illinois Farms, and Economic Development for Illinois. These programs share the same commitment to improving the State's economy and quality of life.

TABLE 16
FY 1987 SPECIAL SERVICES/FUNDING REQUESTS
(Dollars in Thousands)

A.	Cooperative Extension Programs		350.0
	1. Soil and Water Conservation	(100.0)	
	2. Financial Management for Illinois Farms	(150.0)	
	3. Economic Development for Illinois	(100.0)	
B.	Fire Service Institute		47.0
	Total		$ 397.0

SOIL AND WATER CONSERVATION
($100,000)

This request is the third part of a major proposal to address crucial issues in the area of soil conservation and water quality. The program was initiated in response to needs identified in the Illinois Water Quality Management Plan submitted by the Governor in 1979. A request for $150,000 to support the first phase of this work was funded by the State for FY 1985. Second phase funding in the amount of $150,000 is expected for FY 1986. All three phases are consistent with the plan originally approved in 1979.

The objective of the program is to conduct research and to provide educational programs that will ensure the efficient production of food to meet present and future needs, while enhancing the quality of surface water flowing from agricultural lands. The Agricultural Experiment Station and the Cooperative Extension Service plan to take the following actions:

1. to determine cultural management practices for optimum sustained crop production/crop protection systems for land where excessive erosion now occurs,
2. to quantify erosion and sediment transport processes, and
3. to conduct educational programs throughout the State of Illinois on subjects related to improving water quality.

The importance of the education and research program to the people of Illinois is illustrated by Illinois Department of Agriculture estimates that an average of 188 million tons of soil is eroded from Illinois farms by water each year. Of this amount, 158 million tons are lost from agricultural land because of sheet or rill erosion. This erosion causes the loss of 8,000 acre-feet of reservoir storage each year which would cost the citizens of the State $17.7 million annually in terms of dredging, or $3.1 million annually for the construction of new reservoirs.

There is an urgent need for more research on erosion control systems and their impact on water quality processes. Extensive laboratory and field measurements of soil behavior under various tillage and management systems are required to obtain parameters for development of systems models. Current soil erosion educational programs offered by the Cooperative Extension Service will be continued and expanded for the transfer of

research findings on these matters to agricultural producers and to governmental and regulatory agencies.

The proposed budget for FY 1987 is shown below:

Academic Staff	
1.00 FTE Assistant Professor	$ 38,000
1.00 FTE Academic Professional	25,000
Nonacademic Staff	
1.00 FTE Technican--field worker	20,000
Expense	
Commodities	2,000
Contractual Services	2,000
Travel	13,000
Total	$100,000

FINANCIAL MANAGEMENT FOR ILLINOIS FARMS
($150,000)

Agriculture is entering a new era. Many observers describe the present as a time of "fundamental structural change in agriculture." Evidence of this change is greatest in the financial situation. In one sense, farmers have over-borrowed and are caught in their mistake. In another sense, agriculture's pains were brought about by a drastic change in national economic policy, primarily a shift to tighter money. The current financial situation arises from high interest rates and asset deflation, leaving highly-leveraged farmers doubly exposed.

In the years immediately ahead, farmers will liquidate assets in order to reduce debt. For many, survival as farmers will depend upon effective cost containment. The recent emphasis on expansion is being dramatically replaced by emphasis on efficiency. Lenders will require much more detailed financial analyses in support of credit applications. They will also require greater evidence of superior management.

The Illinois Cooperative Extension Service (CES) is making major commitments to bring the advantages of computer-assisted instruction, recordkeeping, analysis, and management to Illinois farmers. Through real-locations, approximately 100 microcomputers have been purchased to date. Additional units will be purchased in FY 1986. The intended goal is to place microcomputers in all extension offices. The effort to obtain the necessary computer hardware has been accomplished to date without benefit of any special State or Federal appropriations.

The College of Agriculture and the Illinois Cooperative Extension Service participate as a member of the North Central Computer Institute (NCCI)--a unit financed by Kellogg funds and matching support from twelve North Central State Land Grant Colleges of Agriculture. NCCI helps to facilitate the use of computers in extension and agricultural research in the twelve North Central States. In Illinois, CES also is the recipient of a Kellogg Foundation grant of $500,000 which is being used to develop automated farm record systems. That project is well underway.

Faculty in the College of Agriculture and elsewhere on campus are being asked either to develop the necessary software or to adapt existing software to Illinois conditions. They have begun this task. However, most departments affiliated with the Cooperative Extension Service do not have computer programmers in their employ. Departments do not have allocations of wage funds sufficient to reallocate to this purpose. The effort to bring the benefits of computer technology through University programs is stymied by the lack of technical assistance to faculty members.

An allocation of new State funds in the amount of $150,000 would permit the hiring of approximately seven professionals in the computer area. It is anticipated that while all seven positions would be budgeted within a single central unit, the majority of them would be rotated on a project basis among various departments on campus that have extension specialists. All related costs will be met by reallocation of existing funds and from outside resources. For planning purposes, the intended assignments are as follows:

2.00 FTE Computer Programmers
1.00 FTE Trainer (User Services)
1.00 FTE Systems Analyst/Software Engineer
1.00 FTE Information Services Specialist

The University of Illinois Cooperative Extension Service is charged to provide problem-solving educational assistance in agriculture and home economics to the people of Illinois. The University of Illinois at Urbana-Champaign is the only institution in the State that has the expertise to do this work and to serve the agricultural community statewide. The results of this program will be many and varied:

1. Improved efficiency in the internal management of the roughly 120 different planning units that comprise the Cooperative Extension Service (department on campus, regional, and county offices).
2. Capability to expand the delivery of relevant and needed educational services to clientele served by the Cooperative Extension Service. (CES reaches approximately 700,000 different people each year with direct instructional contact. As computer software becomes distributed and available throughout the system, many clients will receive direct benefit from the public investment in automation.)

3. Capability to use the results from automated decision-making models in new releases and other mass media outlets to produce widespread benefit to the population generally.
4. Specific capability to provide needed problem-solving assistance to the agricultural community.

The proposed budget for this program is outlined as follows:

Academic Staff	
5.00 FTE Academic Professionals	$ 150,000
Total	$ 150,000

ECONOMIC DEVELOPMENT FOR ILLINOIS
($100,000)

A majority of the counties in Illinois face critical problems in economic development and associated resource allocation. Many are confronted with declining employment opportunities, low-farm incomes, loss of retail trade, inability of local government to provide needed public services and the consequent deterioration of public works and facilities. Some counties are experiencing uncertainty and conflicts over the use of land and water resources especially in areas of urban expansion into agricultural areas. The challenge for all these counties is to find ways to strengthen their economic position, to provide employment opportunities through business growth, and to improve community service and facilities while at the same time protecting and developing their natural resources.

As part of its educational mission to the people of Illinois, it is the intention of the College of Agriculture at UIUC to expand upon and to improve its economic resource development services to all counties of the State. Experience has shown that the most effective way to do this is to increase the number of area advisers in resource development so that these services and programs can be made more uniformly available. A competent professional staff of area advisers strategically located and assigned by the University to focus full attention on economic development can bring about significant results as well as multiply the efforts of private and public development groups and other institutions of higher education.

The staff conducts educational work statewide through 103 county offices (98 county or multi-county offices plus five programming offices in Cook County) in four program areas: Community Resource Development (CRD), Agriculture and Natural Resources, Home Economics and Family Development, and 4-H and Youth Development.

The CES campus-based staff prepares educational material for county and area staff use, engages in direct teaching of clientele groups through county programs, and collaborates with researchers on campus in addressing major problems. The county-based staff works with clientele groups to identify problems, to develop educational approaches to the solution of problems, and to deliver and to evaluate educational programs. Some of the work of county staff is one-on-one, but a significant amount consists of

group teaching or demonstration. County-based staff by necessity must be generalists, for they deal with a wide range of problems in their program areas.

The area adviser component of CES's delivery system brings a level of specialization to the organization that is needed to meet today's complex problems. Area advisers are officed in the region they serve. They provide CES with the increased capability to deal effectively with problems that are specific to the various regions of the State.

The Illinois Cooperative Extension service is prepared to expand substantially its problem-solving educational programs in Community Resource Development. It has both the expertise and the legislative mandate for this work. No other public agency is staffed or organized to meet this educational need throughout the State.

Through an allocation of $100,000 in new funds in FY 1984, three new area economic development positions were established in Southern Illinois. Experienced and well-trained staff, all with masters degrees, were hired and located in regional extension offices in Effingham, Benton, and Edwardsville. Other regions of the State are now asking for similar program staff support from CES.

The expanded educational program of CES would address the problems relating to general economic development, small business management, improvements in services of local governments, and the use of public land water. Area advisers, as listed in the proposed budget, will be employed to work with county and State extension staff, State and Federal agencies, other educational institutions, and directly with clientele to develop and to deliver educational problem-solving activities and programs. There will be continuing efforts to cooperate with other agencies and educational institutions in order to avoid duplication of programs and to provide maximum benefit from cooperative ventures.

A total of $100,000 is requested to continue the development of this expanded program and to hire highly qualified persons for these area positions. Costs of secretarial assistance, office rent, travel, etc, will be covered through reallocations from resources within the Illinois Cooperative Extension Service. The proposed staff additions would be housed in regional

offices located in Dixon, Macomb, Springfield, and Peoria. The details of the proposed budget for this program are outlined as follows:

Academic Staff

Area Advisers

1.00 FTE Business and Economic Development	$ 30,000
1.00 FTE Resource Development/Local Government	35,000
1.00 FTE Business Management	35,000
Total	$100,000

FIRE SERVICE INSTITUTE
($47,000)

Since the passage of the Illinois Fire Service Institute (Public Act 81-1147, effective July 1, 1980), the University of Illinois has received a direct appropriation from the Fire Prevention Fund for the operation of the Institute. Previously, funds had been received through a contract with the Office of the Illinois State Fire Marshal. The funds received from the Fire Prevention Fund are used for three major purposes:

1. To continue conducting programs of training and education for paid volunteer fire fighters and officers on campus and at regional and local sites throughout Illinois.
2. To provide adequate teaching and training facilities for the Institute.
3. To permit program growth and improvement.

As detailed in past budget requests, the need for adequate instructional and training facilities is acute. Current facilities are inadequate, office and classroom space is scattered across the Urbana-Champaign campus, and only one training structure, the Fire Tower, exists on the primary training site. Thus, after the operating needs of the current instructional programs have been met, the majority of new funds must be used to construct an adequate training facility. A modest amount of new funds has been used for program growth and improvement, with major program development activities to follow once sufficient facilities exist.

Based upon current revenue projections, growth of approximately 5% is projected for the Fire Prevention Fund for FY 1987, raising the total in the Fund to $7,914,000. The University of Illinois' share of this amount (1/8) would be approximately $989,360. The FY 1986 appropriation is expected to be $942,250, resulting in a total increment of $47,110 available for FY 1987. Of this amount, approximately $4,500 would be required to fund growth in retirement funding, leaving about $42,500 available for salary and price increases. In view of the continuing top-priority need to secure adequate instructional and training facilities, it is expected that any funds not required for base salary and price increases will be added to the $315,000 currently available for facilities acquisition.

RESOURCE MATCHING

RESOURCE MATCHING
($2,210,000)

One of the most important and productive methods for universities to acquire costly high technology equipment is to secure grants from outside sources. In many cases, equipment can be procured for only a fraction of its market value. The benefits of such grants are shared by the donor and the recipient. The corporate donor is rewarded by enhanced recognition of its products, as well as by the exposure to and the training of future users of its products. Federal or State agency donors are rewarded by supporting instruction and research that can facilitate favorable social, economic and educational changes. The University benefits from the increased accessibility to sophisticated research and teaching equipment for a broader base of faculty, staff and students.

UIUC has been extremely successful in obtaining large gifts and grants of technical equipment to be used by a wide variety of disciplines. In FY 1985 UIUC was awarded a National Science Foundation grant of $44 million to establish a National Center for Supercomputing Applications. The Center will be one of four NSF sponsored centers in the nation (Cornell, Princeton and the University of California at San Diego) devoted to advanced research in supercomputing technology. A recent microcomputer and software gift from IBM amounting to $12 million is among the largest given by that corporation to any college or university in the country. Recently, over 200 institutions with graduate programs in business entered a national competition sponsored by IBM seeking the best proposals for establishing research and curricular programs dealing with the management of information systems. The UIUC proposal "Project MICA", described in detail later, was one of thirteen winners in the competition; and the College of Commerce and Business Administration is now eligible to receive equipment and software amounting to approximately $2.7 million over a period of five years.

Although the equipment donor does not charge the University for its product, the equipment does not come to the University without costs. The University is required to obtain funds to cover the costs of operating equipment, including installation, maintenance and training expenses. For

equipment grants these costs are generally equivalent to about 10% of the cost of the equipment. With other gifts, the matching amount is often specified in the grant proposal.

Three programs requiring University matching funds are included in the FY 1987 budget. The National Center for Supercomputing Applications grant requires a matching component of $1 million in FY 1987; large gifts of computer equipment from IBM and AT&T require matching funds of $920 thousand to cover the costs of using and maintaining the equipment; and Project MICA requires a commitment of $290 thousand.

National Center for Supercomputing Applications ($1,000,000)

In many disciplines, faculty are discovering that large-scale computer simulations are an indispensable tool. These disciplines include astrophysics, high energy and many-body physics, materials and biomolecular research, atmospheric sciences, computer-aided design, structural analysis, computer science, and fluid dynamics. Many of the problems studied in these disciplines have been and still are beyond the reach of computers currently available. The technology and the theory that are required to create a network of cooperating computers are now being developed. This activity is giving birth to the multi-processors or supercomputers that will make it possible to handle the large-scale research problems of heretofore intractable complexity.

The University of Illinois at Urbana-Champaign has long been a leader in computer design and construction. The famous ILLIAC series of computers was designed and built at Urbana-Champaign during the 1950's and 1960's, and in recent years, the campus has become the focal point for the most exciting and innovative research in the area of supercomputer architecture, software, and algorithm development. For example, the Cray X-MP, one of the most advanced supercomputers currently being designed and produced in the United States was designed by a former Ph.D. student of the Laboratory for Advanced Supercomputers in the Department of Computer Science. Department faculty have enjoyed close working relationships with all of the supercomputer manufacturers in the United States, including Cray, ETA (the supercomputer subsidiary of Control Data Corporation), Control Data Corporation itself, and Denelcor. Computer Science faculty

have worked closely as consultants on important new development efforts in the field of array processors and parallel processor computers, e.g., the new Star Technologies advanced array processor.

The University was recently awarded a major grant by the National Science Foundation to set up a major national Center for Supercomputing Applications, with funding from the NSF totaling $44 million over a five-year period. This proposal calls for cost-sharing from UIUC, and there is a strong commitment from Cray Research to furnish state-of-the-art supercomputer hardware at very attractive prices over the period of the grant.

The University is prepared to make a dramatic and decisive move toward realizing a major breakthrough in computing in American universities. the University's Center for Supercomputing Research and Development, which has already received more than $10 million in Federal grant support, will team with the Center for Supercomputing Applications to provide the UI with supercomputing leadership unmatched at any university in the nation. The centers will bring together, in a university setting, many of the world's best scientists, engineers, computer designers and computational algorithm developers. They will have at their disposal the best computational facility that current technology permits. They will interact in seminars and in their work, sharing expertise and insights. As a result of the academic environment this center will produce, the University fully expects major breakthroughs in scientific and engineering problems, new computer algorithms, software, designs, and theory, and the preparation of an entire new generation of researchers and graduate students skilled in the use of supercomputers.

The NSF grant for supercomputer applications will bring to UIUC the most advanced supercomputer that can be made readily accessible to scientific and engineering researchers. This supercomputer will possess extremely high-speed processing capabilities over a wide range of applications, yet will remain compatible with a mature and widely-used software base. The supercomputer will be part of a fully-integrated system including adequate mass storage, graphics, and hard-copy facilities and a high-speed work station network.

Currently, only national laboratories possess such integrated supercomputer facilities. The national center at the University of Illinois is

modeled on the best elements present in these national laboratories and is being developed with close cooperation with the staffs of those facilities. The Center will be a dedicated basic research facility used intensively to solve scientific and engineering research problems which require large-scale computer simulations.

The supercomputer will be used continuously by approximately 25 to 50 research groups at the Urbana-Champaign campus. For each Illinois professor in these research groups, there are an average of two off-campus collaborators and three graduate students who will also be active users. The facility will be available to outside users through a Visitor's Program that is an integral part of the proposal submitted to the National Science Foundation. The Visitor's Program will bring to the Center world leaders in applying supercomputers to frontier fields and will allow them to use a portion of the Center's supercomputer time.

As mentioned earlier, the grant from the National Science Foundation requires cost-sharing by UIUC. To match the $44 million in support from NSF, UIUC will allocate a total of $800 thousand from campus resources for each year of the five-year funding period. In addition, the NSF commitment calls on UIUC and the State of Illinois to provide additional resources, amounting to $1 million in the first year of the grant, $2 million in the second year, $3 million in the third year, and $4 million in the fourth year and each year thereafter. The University's FY 1986 budget contains the first $1 million in support of this commitment.

The funds contributed by UIUC and the State will go toward site development and toward basic research which is essential to the further development of the national supercomputer facility. Heavy emphasis will be placed upon basic research relating to the design of supercomputer architectures, to software associated with the so-called parallel processor machines, and to the design and construction of the Cedar multiprocessor system. The proposed budget, when combined with existing UIUC resources and with Federal and industrial resources, will provide the University with a Center for Supercomputing Applications that will gain international recognition and attention.

In FY 1986 the supercomputer will be installed and the building readied for equipment and staff. The networking and workstations in the user center will be set up. The first scientific users should be using the facility in the fall of 1985. A series of national workshops will take place which will give high visibility to the Center.

The FY 1987 cost-sharing commitment related to the NSF proposal is outlined below:

Academic Staff	
2.00 FTE Professors	$ 120,000
3.00 FTE Assistant Professors	120,000
Nonacademic Staff	
3.00 FTE Secretaries	50,000
Expense	
Commodities	105,000
Networking	300,000
Travel	5,000
Equipment	300,000
Total	$1,000,000

Campus Computer Support ($920,000)

During the past two years, the University of Illinois at Urbana-Champaign has given considerable attention to ways of addressing the substantial need for computers, especially microcomputers, in its academic programs. One successful strategy has been to solicit equipment gifts from computer manufacturers. Equipment gifts provide a cost-effective way for the University to incorporate current computing technologies on a scale which would be impossible to achieve within the constraints of the University's annual appropriation of equipment replacement funds. It is important for graduates to be trained in the use of state-of-the-art computer hardware and software. As a major research university, it is equally important for the Urbana-Champaign campus to devise strategies for meeting faculty needs for research computers.

Fortunately, most major computer manufacturers have responded to this interest by creating special discount and grant programs. The University has been quite successful in competing for these gifts. In the fall of 1984, the Urbana-Champaign campus was awarded a three-year equipment grant of $12 million from IBM. The purpose of this grant is to facilitate innovative instructional applications of microcomputers. Later in the fall, AT&T Information Systems awarded the Department of Computer Science $3.2 million in equipment to support research and training programs. The campus recently received notice from another major computer company that a gift worth $1 million will be announced before the end of the year, and two additional gifts are being negotiated with other companies.

A problem inherent in the receipt of these gifts, however, is the funding of costs associated with using the equipment, e.g., providing training for the faculty, maintaining the equipment, installing necessary cables, purchasing software, and providing security. Such support requirements typically total approximately 10% of these types of grant.

When the University received the IBM equipment grant in FY 1985, the State agreed to provide $500 thousand for support activities associated with the first $5 million of the grant. A second installment of $200 thousand was provided in FY 1986 toward the $700 thousand balance needed to support the IBM gift adequately. In addition to the $500 thousand still needed to support the original IBM grant $420 thousand is needed for support costs associated with the remaining $4.2 million in gifts of equipment which will be received in FY 1985.

The proposed budget for the use of the $920 thousand is shown below:

Academic Staff	
6.00 FTE Technical Assistants	$120,000
Expense	
Commodities	700,000
Contractual Services	100,000
Total	$920,000

In FY 1988 and beyond, it is expected that UIUC will continue to receive more computer gifts which will require support at the rate of approximately 10% of the grants.

Managing Information Systems to Achieve Competitive Advantage--Project MICA ($290,000)

International Business Machines (IBM) recently sponsored a nationwide competition for major equipment and software grants based on proposals for the Program of Support for Education in the Management of Information Systems (MIS). MIS is a very rapidly growing area in which the business community currently is leading the academic community. The University of Illinois is one of 13 winners in this competition.

As one of the foremost business schools in the nation, the UIUC College of Commerce and Business Administration has long recognized the importance of the computer as a tool in all aspects of the business curriculum and the need for a strong, broad-based program in the management of information systems. The IBM Program fits perfectly into the College's long-range plans to apply the computer to its instructional programs and to provide more computer support to the faculty for research purposes. Project MICA, developed by the College, requests approximately $2.7 million from IBM over a period of five years. Included in the MICA proposal is the promise of a UIUC campus contribution of $290 thousand. It is that amount that is being requested in this proposal. The campus has already provided $350 thousand for remodeling the space required to accommodate the new equipment that will be acquired. The College will contribute approximately $340 thousand in direct support from its resources.

The MICA proposal states that the College will develop the research and curriculum necessary for managing information systems. Four critical issues will be addressed:

1. designing and redesigning information systems capable of creating competitive advantages by adding value to products and services, by anticipating and designing appropriate responses to threats and opportunities, and by creating a productive, humanly satisfying work environment;

2. managing organizational and individual user impacts of information systems by studying the ways technology changes job functions and employee motivation and interrelationships;
3. improving the power of work stations through advances in modeling, simulation, and artificial intelligence; and
4. assuring privacy, security and data integrity.

The faculty will work in partnership with leading corporations to conduct research and to develop curricula in all four critical areas of information systems management. The initial Corporate Partners are listed below:

1. Arthur Andersen & Company
2. American Hospital Supply Corporation
3. Natural Gas Pipeline Corporation of America
4. Northern Trust Bank
5. Motorola
6. State Farm Insurance

Each of these companies is a leader in some aspect of managing information systems. The College also is collaborating with several University departments that have advanced programs of research and teaching--programs related to managing information systems: the Department of Computer Science, the Department of Psychology, the Aviation Research Laboratory, and the Supercomputing Center.

One innovative plan linking the Departments of Business Administration, Accountancy, and Computer Science is already underway. The plan will allow business students to interact with computer science students through a network, using graphics design and communications tools to describe business problems in terms of information systems requirements. Over several semesters students will interactively create and test prototype systems. This plan exemplifies the kind of innovation and leadership the College intends to pursue through Project MICA. By providing future managers with the experience of a comprehensive development system, the College expects to produce managers and specialists capable of bridging major communication gaps between line managers, functional specialists, and application designers.

Changes in information technology will involve virtually every manager in the management of information systems. The College is redesigning its graduate curricula so that modules addressing critical issues in information systems management are incorporated in all core courses and in most elective courses.

Five new courses that focus exclusively on the management of information will be developed:

1. Advances in Information Technology
2. Information Systems Management
3. Information Technology and Organizational Innovation
4. Decision Support Practicum
5. Applications of Knowledge-based Decision Support Systems

During Project MICA's first five years, 120 of the 150 faculty in the College will participate in an intensive Summer Curriculum Institute. The aim of the Summer Institute is to involve faculty in state-of-the-art information systems being utilized by the Corporate Partners, to alert faculty to new developments envisioned by members of the computer industry and the Computer Science faculty, and to integrate new curriculum and research efforts throughout the College. A newly established Office of Information Management will coordinate the research and curriculum development activities of Project MICA.

To bolster the research and teaching base of the College, Project MICA will require five new faculty members with skills in database development, telecommunications, system audit and security, decision support, and systems design.

Project MICA is designed to involve students with the problems and possibilities of multilevel processing and storage systems. IBM funding would provide a computing environment that links enhanced graphics workstations to two System/36's and a System/38. This will allow the College to simulate advanced office systems at the departmental and division level and use state-of-the-art relational database technology.

Additional enhanced graphics AT workstations will be networked for use as a developmental lab. The computing system will also be linked to an existing 4341 computer and to the mass storage system being developed by the University's Computing Services Office.

The budget for the funds required as UIUC's contribution to the MICA Project is provided below:

Nonacademic Staff	
1.00 FTE Computer Operator	23,000
2.00 FTE Computer Programmers	63,000
Wages	
	4,000
Expense	
Commodities (software, supplies, etc.)	125,000
Contractual Services (maintenance)	75,000
TOTAL	$290,000

SUMMARY OF FY 1987 RESOURCE
MATCHING REQUEST
(Dollars in Thousands)

National Center for Supercomputing	
Personal Services	290.0
Equipment and Expenses	710.0
Campus Computer Support	
Personal Services	$ 120.0
Expenses	800.0
Project MICA	
Personal Services	86.0
Expenses	204.0
Total Request	$2,210.0

APPENDICES

RETIREMENT

The level of funding of the State Universities Retirement System has been a source of significant concern during the past several years. As a result of legislation passed in 1967, annual appropriations for the system are required to cover the projected costs of future benefits plus interest on the existing unfunded liability. This statutory level of funding has never been reached and, in effect, part of the retirement costs of current employees has been shifted to future years.

There was, however, some movement towards an improved level of retirement funding from FY 1979 through FY 1981. In each of those years the State's contribution was at or above the gross payout level of funding. At that level, the State's contribution covers all of that year's benefits and administrative expenses. The system is then able to add the employee contributions and interest and dividend income to the system's assets to provide future benefits.

The improved funding was, unfortunately, shortlived. As the State's economy worsened, so did the funding for the Retirement System. From FY 1982 through FY 1985 funding dropped significantly below the gross payout level. While these reductions are seen as necessary to prevent disastrous cuts in operating funds, it must be remembered that the State is borrowing against the future. Eventually the State will have to make up for those cuts; the longer it waits to meet these obligations, the more it will cost and the greater the impact will be on the operating budget of the University.

The University will continue to analyze the State's funding of the State Universities Retirement System. The fiscal soundness of the system is an issue of considerable importance to the institution and its staff.

It is a matter of long-standing policy of the Board of Trustees of the University of Illinois that the request for incremental funds for Retirement be set at the amount needed to achieve the statutory funding level. The University's FY 1986 Retirement appropriation is $37,627,600. Based on data from SURS, the estimated statutory level for FY 1987 is $112,217,300. Therefore, an increment of $74,589,700 is requested for FY 1987.

APPENDIX II

Bases and Calculations for
FY 1987 Continuing Components Increases
(Dollars in Thousands)

I. Salary Improvement

A. FY 1985 Personal Services Base: $354,351.2

B. FY 1985 Annualization : 3,180.4

C. FY 1986 Personal Services Base: 388,982.6

D. Calculation for FY 1987 Increment

1. Annualization of FY 1986 Increases (8%)

(FY 1985 Base + Annualization) x .95 x .08 x 2/12 =
($354,351.2 + $3,180.4) x .95 x .08 x 2/12 = $4,529.1

2. FY 1987 Increase (7.5%)

(FY 1986 Base + Annualization) x .95 x .075 x 10/12 =
($388,982.6 + $4,528.7) x .95 x .075 x 10/12 = $23,364.8

3. Total Request (1 + 2) = $27,893.9

II. General Price Increase

A. FY 1986 Base: $66,996.9

B. FY 1987 Percentage Increase: 6%

C. Calculation: $66,996.9 x .06 = $4,019.8

D. Note: The General Price Increase Base includes the following objects of expenditure: Contractual Services; Travel; Commodities; Operation of Auto Equipment; Awards and Grants; Equipment; Hospital and Medical Services and Appliances; CES Expense. Funds for utilities and for library acquisitions are excluded.

III. Utilities Price Increases

A. FY 1986 Base: $38,416.5

B. FY 1987 Percentage Increase: 6.4%

C. Calculation: $38,416.5 x .064 = $2,468.8

IV. Library Price Increases

A. FY 1986 Base: $6,857.5

B. FY 1987 Percentage Increase: 7%

C. Calculation: $6,214.4 x .07 = $480.0

FISCAL YEAR 1987 CAPITAL BUDGET REQUEST

FY 1987 CAPITAL BUDGET REQUEST

Introduction

The University's FY 1987 Capital Budget Request is comprised of two major sections: (1) Regular Capital and (2) Food for Century III. In a variation from past budget requests, Space Realignment, Renewal and Replacement (SR^3) projects will not appear in the Regular Capital section, and the separate section normally devoted to energy conservation projects has been deleted this year. Minor remodeling continues to be a high priority for FY 1987, and provisions to fund a substantial portion of those needs are included in the Build Illinois program which was approved by the Illinois General Assembly. Funding will continue to be sought for energy conservation projects on a matching fund basis from the U. S. Department of Energy (USDOE) energy conservation grant program and from the State of Illinois. Since the USDOE grant cycle corresponds to the Federal fiscal year, it is virtually impossible to advise the State of a matching fund need until after the normal appropriation process has been completed. Therefore, such requests will be submitted in the early fall for consideration by the Governor and General Assembly during the "override session".

Appropriations from the Build Illinois Repair and Renovation Program will provide the University with approximately $7.8 million annually for five years to fund minor repair and renovation projects. The creation of a continuing revenue source for minor remodeling projects has eliminated the need to include SR^3 project proposals in the capital budget request. The types of projects which will be financed from the repair and renovation program include: realignment of space to meet changing programmatic needs, remodeling to restore old and heavily utilized facilities, and replacement and retrofitting of building and campus utilities systems.

In addition to the Repair and Renovation Program that was funded through the FY 1986 Build Illinois program, Build Illinois Bonds were also appropriated for the planning of the Engineering Research Facility

at Chicago. The approximately 65,000 assignable square feet structure is needed to address the rapid expansion of enrollment and staff in the engineering disciplines. The facility will contain instructional and research laboratories, support space, and offices. A description of the Chicago Engineering Research Facility construction project as well as the FY 1987 Repair and Renovation project description, are contained in the Build Illinois section of this capital request. Given the extraordinary funding source which finances these projects, both the Chicago Engineering Research Facility and the Repair and Renovation program have been excluded from the Regular Capital Request.

The Regular Capital segment of the request includes remodeling, renovation, and new construction projects necessary to support the University's ongoing programmatic activities. The segment dealing with the Food for Century III Program is somewhat unique this year in that a synopsis of the entire program is included in addition to highlighting the single project being requested in the FY 1987 budget. This approach has been taken to provide a historical perspective at a time when the final project of the formal program is being proposed.

Each project in the request has been reviewed by the campus and University administrations and integrated into a set of University capital budget priorities. The priority list is an assessment of the relative need for each project as compared to other capital projects. In addition, the priority list reflects a level of funding which meets the University's highest priority needs and is realistic and defensible when compared to other pressing State needs. Now more than ever in the past, the emphasis of many projects in the capital list are oriented toward the areas of high technology and biotechnology leading toward the enhancement of the economy of Illinois. To this end the University's needs are more pressing than any of the past few budget cycles--the thrust of high technology cannot wait--advances and breakthroughs occur at outstanding institutions with well equipped laboratories and research centers. The University must support its finest faculty with state-of-the-art facilities and equipment if it is to continue its leadership role in scientific and technological research.

Emphasis of the FY 1987 Regular Capital Budget Request

The FY 1987 Capital Request is comprised of 26 projects at a total cost of $58.7 million. Table 1 presents a summary of the proposed projects for FY 1987 in priority order. The first priority project is extremely significant in that it involves upgrading the electrical infrastructure which is essential to supply the electrical power to the new high tech research centers to be located on the north Urbana-Champaign campus--the supercomputer and microelectronics centers--and the south campus with the Plant Sciences Greenhouse Complex and the Animal and Dairy Sciences Laboratory Addition.

In the new building category, clearly the most significant project is the construction of the Computer Laboratory Addition. With the proliferation of computer assisted instruction and the rapidly expanding fields of computer hardware, software, and communications research, construction of an addition will relieve the intolerable crowding experienced by the Department of Computer Science at this time. The Department of Computer Science does not have sufficient space to meet the current demands which they must address to accommodate growth in research and instruction.

Remodeling the Clinical Sciences Building has assumed a prominent position in the FY 1987 Capital Request now that funds to upgrade the utilities system have been released and construction is ready to proceed. The College of Medicine has been constrained in developing its full potential for service and scientific research primarily because of lack of appropriate research space. The remodeling of the vacated hospital space in the Clinical Sciences Building will pay direct dividends through increased direct grants and indirect costs received by the University. Similar benefits are to be gained from the construction of a clean room environment for the Department of Physics in the Science and Engineering South Building. This area will be used for promising research projects in the fields of advanced laser, microphysics, and device physics.

The FY 1987 request also includes a proposal for planning the construction of a 50,000 assignable square feet addition to the Architecture and Art

Building. The addition will allow the consolidation of highly productive programs that are now spread throughout several buildings and require additional space.

A planning request for the construction of a Life Sciences Research Laboratory is included in the FY 1987 request for the Urbana-Champaign campus. The Laboratory will contain approximately 60,000 assignable square feet of sophisticated biotechnological research and support space. The facility will be the campus locus for genetics and advanced biological research. Construction of this building will permit the location of research efforts in sophisticated laboratory space while enabling life sciences instructional space to be consolidated in a single facility.

The former Veterinary Medicine Building is now vacant with the exception of several temporary occupants. Plans have been developed for remodeling the facility for the Department of Geology and the Institute of Environmental Studies. An FY 1986 appropriation of $3.5 million will fund the installation of 25 additional fume hoods in the facility and upgrade the building's mechanical systems. The FY 1987 request of $3.75 million will support the construction a four-story connecting structure between the main building and the annex and minor space realignment required to house the Geology Library.

Planning funds for the construction of a new Engineering-Science Library addition at the Chicago campus will provide a facility designed to contain 360,000 volumes in a 30,000 assignable square foot area. This will be accomplished by utilizing high density compact shelving. The facility will be designed to permit 24 hour operation and will improve access to collections which are used extensively after normal operating hours. The design will be open, easily suited to rearrangement, and will be accessed by a single controlled entrance.

Remodeling of the English Building is the third phase of a four phase program that will renovate the complete interior of the building and the mechanical systems. The remodeling will focus on the northwest and west center section of the building. A new elevator will be installed and three new classrooms will be created.

The building at 1919 West Taylor Street is designated as the future central facility for the College of Associated Health Professions. Funds are requested to upgrade the building mechanical systems and remodel the sixth floor. In future years additional funds will be requested for remodeling on other floors.

Two chemistry remodeling projects are the next priority projects in the FY 1987 request. The Urbana-Champaign project requests funds for planning the renovation of Noyes Laboratory which is one of the major campus chemical sciences facilities. At Chicago funds are requested to upgrade laboratories in the Science and Engineering Laboratory for graduate research in organic chemistry.

More complete descriptions of these projects and the remainder of the FY 1987 capital projects are presented later in this section of the budget request.

The FY 1987 capital request list is displayed by campus and capital budget category appears on Table 2. Table 3 presents the costs per square foot of each building and major remodeling project requested for 1987. Future cost implications of the FY 1987 projects are shown in Table 4.

Status of Ongoing Projects

Table 5 provides a summary of actions on capital budget requests from FY 1982 through FY 1986. At the time this document was prepared, the Governor had signed the Build Illinois Bond Fund legislation, but he had not signed the regular capital appropriations bill. Assuming that no projects appropriated by the General Assembly are vetoed, the following list describes FY 1986 capital project receiving State appropriations.

Regular Capital

Chicago

Pharmacy Bldg. Remodeling and Air Conditioning	$5,218,000
Library Renovation, including Equipment	5,345,000
Office of Admissions and Records Relocation	1,149,800

Urbana-Champaign	
Computer Laboratory Addition, Planning	1,100,000
Microelectronics Research Center	3,700,000
Swine Research Center	1,745,300
Veterinary Medicine Remd. for Environmental Sciences	3,500,000
Fire Service Institute	2,600,000
Food for Century III	
Equipment	600,000
Build Illinois	
Microelectronics Research Center	10,000,000
Animal and Dairy Science Lab. Planning	1,000,000
Chicago Engineering Research Bldg.	2,400,000
Orr Farm Purchase	700,000
Repair and Renovation Program	7,834,000
University Total	$46,892,100

Table 6 shows the construction or funding status of each University capital appropriation from FY 1983 to FY 1985. For FY 1983 through FY 1985 projects all appropriated funds have been released and each project is progressing toward completion. Although Table 6 does not include FY 1982 capital appropriations, as was noted before, funds have been released recently for the installation of vertical utilities systems in the Clinical Sciences Building.

TABLE 1
UNIVERSITY OF ILLINOIS
FY 1987 CAPITAL REQUEST
PRIORITY LIST
(Dollars in Thousands)

Priority	Campus	Project	Budget Category	FY 1987 Request	Cumulative Cost University	Cumulative Cost Chicago	Cumulative Cost Urbana
1	U	Electrical Infrastructure	UTIL	$ 3,478.0	$ 3,478.0		$ 3,478.0
2	U	Computer Lab Addition	BLDG/UTIL	18,517.4	21,995.4		21,995.4
3	C	Clinical Sci. Bldg. Remd.	REMD	7,232.2	29,227.6	$ 7,232.2	
4	C	Physics Clean Room	REMD	1,025.0	30,252.6	8,257.2	
5	C	Architecture & Art Bldg. Addition	PLAN	611.9	30,864.5	8,869.1	
6	U	Life Sciences Research Lab	PLAN	1,200.0	32,064.5		23,195.4
7	U	Environmental Sciences Bldg. Remd.	REMD	3,750.0	35,814.5		26,945.4
8	C	Engineering Library Bldg. Addition	PLAN	389.7	36,204.2	9,258.8	
9	U	English Bldg. Remd.	REMD	3,200.0	39,404.2		30,145.4
10	C	Associated Health Sci. Bldg. Remd.	REMD	2,186.0	41,590.2	11,444.8	
11	U	Chemistry Lab Renovation	PLAN	200.0	41,790.2		30,345.4
12	C	Chemistry Lab Remd.	REMD	1,075.0	42,865.2	12,519.8	
13	U	Steam Distribution System	UTIL	730.0	43,595.2		31,075.4
14	C	College of Med - West Tower Utilities System Upgrade	PLAN	380.0	43,975.2	12,899.8	
15	U	Painting and Pottery Lab	BLDG	672.8	44,648.0		31,748.2
16	U	Core Campus Land Acquisition	LAND	685.0	45,333.0		32,433.2
17	C	Pharmacy Bldg. Remd.	REMD	1,493.8	46,826.8	14,393.6	
18	U	Pilot Training Facility	BLDG/UTIL	965.7	47,792.5		33,398.9
19	U	WILL Radio-TV Bldg.	PLAN	450.0	48,242.5		33,848.9
20	C	Alumni Hall Remd. for Student Services	REMD	1,150.0	49,392.5	15,543.6	
21	U	Mechanical Engr. Bldg. Remodeling	REMD	2,800.0	52,192.5		36,648.9
22	U	Vet. Med. Lab Remd.	PLAN	280.0	52,472.5		36,928.9
23	C	Campus Emergency Electrical Dist. System	UTIL	1,513.5	53,986.0	17,057.1	
24	C	Campus Fire Alarm Upgrade	REMD	1,007.3	54,993.3	18,064.4	
25	C	Computer Center Elect. System Upgrade	UTIL	1,500.0	56,493.3	19,564.4	
26	U	Federal Research Facility Site Dev.	BLDG/SITE	2,220.0	58,713.3		39,148.9
Build Illinois Projects							
*	C	Engineering Research Facility	BLDG	22,499.9			
*	C/U	Renovation/Rehabilitation	REMD	7,834.0			

TABLE 2
SUMMARY OF THE FY 1987 CAPITAL BUDGET REQUEST*
BY CAMPUS AND CATEGORY
(Dollars in Thousands)

Category	Chicago	Urbana-Champaign	Total
1. Buildings, Additions, and/or Structures		$21,716.9	$21,716.9
2. Land		685.0	685.0
3. Equipment			
4. Utilities	$ 3,013.5	4,767.0	7,780.5
5. Remodeling	15,169.3	9,750.0	24,919.3
6. Site Improvements		100.0	100.0
7. Planning	1,381.6	2,130.0	3,511.6
Total	$19,564.4	$39,148.9	$58,713.3

*Excludes projects to be supported by Build Illinois Bond Funds.

TABLE 3
COST PER SQUARE FOOT OF NEW BUILDING AND MAJOR REMODELING PROJECTS BY CAMPUS

	Project Cost	Gross Square Feet	Assignable Square Feet	Efficiency ASF/GSF	$/GSF	$/ASF
Chicago						
New Buildings						
Engr. Facility[1]	$24,899,900	108,000	65,000	.60	$230.55	$383.08
Architecture & Art Addition	11,166,400	69,120	41,200	.60	161.55	271.03
Engineering Library Bldg. Addition	6,723,800	42,600	30,000	.70	157.84	224.13
Major Remodeling[2]						
Clinical Sciences Building	7,232,200		83,956			86.14
Physics Clean Room	1,025,000		7,000			146.43
Chemistry Lab. Remd.	1,075,000		5,551			193.66
Pharmacy Building Remd.	1,493,800		13,200			113.17
Alumni Hall Remd.	1,150,000		20,346			56.52
Urbana-Champaign						
New Buildings						
Computer Lab Addition	18,517,400	99,000	59,600	.60	187.04	310.69
Life Science Research Lab	19,200,000	100,000	60,000	.60	192.00	320.00
Pilot Training Facility Building	965,700	10,200	8,500	.83	94.68	113.61
WILL Radio-TV Building	5,085,000	40,500	34,500	.60	125.56	207.55
Painting and Pottery Lab Addition	672,800	10,000	8,500	.85	67.00	79.15
Major Remodeling						
Environmental Science Bldg.	6,000,000		49,445			121.35
English Building Remd.	3,200,000		22,500			142.22
Mechanical Engineering Bldg. Remd.	2,800,000		15,450			181.23

[1]Planning funds ($2,400,000) for this project were appropriated from Build Illinois Bond Funds. Construction funds are anticipated from the same source of funds.

[2]The Associated Health Sciences Building Remodeling is excluded from this table beacause the primary function of this project is to upgrade utilities service throughout the entire facility, rather than renovating specific assignable space.

TABLE 4
UNIVERSITY OF ILLINOIS
FUTURE FUNDING IMPLICATIONS OF THE FY 1987 CAPITAL BUDGET REQUEST
(Dollars in Thousands)

Priority	Campus	Project	Budget Category	1987 Project Cost	FY 1988 Costs	Cost for FY 1989 and Beyond
1	U	Electrical Infrastructure	UTIL	$ 3,478.0	$ 1,628.0	$ 403.9
2	U	Computer Lab Addition	BLDG/UTIL	18,517.4	945.0	1,000.0
3	C	Clinical Sci. Bldg. Remd.	REMD	7,232.2		
4	C	Physics Clean Room	REMD	1,025.0	1,500.0	1,500.0
5	C	Architecture & Art Bldg. Addition	PLAN	611.9	10,241.0	
6	U	Life Sciences Research Lab	PLAN	1,200.0	18,000.0	1,500.0
7	U	Environmental Sciences Bldg. Remd.	REMD	3,750.0		
8	C	Engineering Library Bldg. Addition	PLAN	389.7	6,116.3	1,000.0
9	U	English Bldg. Remd.	REMD	3,200.0		4,000.0
10	C	Associated Health Sci. Bldg. Remd.	REMD	2,186.0	1,500.0	1,500.0
11	U	Chemistry Lab Renovation	PLAN	200.0	2,000.0	3,700.0
12	C	Chemistry Lab Remd.	REMD	1,075.0		
13	U	Steam Distribution System	UTIL	730.0	1,135.0	173.0
14	C	College of Med - West Tower Utilities System Upgrade	PLAN	380.0	3,420.0	
15	U	Painting and Pottery Lab	BLDG	672.8		
16	U	Core Campus Land Acquisition	LAND	685.0		
17	C	Pharmacy Bldg. Remd.	REMD	1,493.8		
18	U	Pilot Training Facility	BLDG/UTIL	965.7	155.0	
19	U	WILL Radio-TV Bldg.	PLAN	450.0	4,300.0	1,245.0
20	C	Alumni Hall Remd. for Student Services	REMD	1,150.0		
21	U	Mechanical Engr. Bldg. Remodeling	REMD	2,800.0		
22	U	Vet. Med. Lab Remd.	PLAN	280.0	2,800.0	
23	C	Campus Emergency Electrical Dist. System	UTIL	1,513.5	1,500.0	3,000.0
24	C	Campus Fire Alarm Upgrade	REMD	1,007.3	1,000.0	1,000.0
25	C	Computer Center Elect. System Upgrade	UTIL	1,500.0		
26	C	Federal Research Facility Site Dev.	BLDG/SITE	2,220.0		
				$58,713.3	$56,240.3	$20,021.9

TABLE 5
HISTORY OF RECENT CAPITAL BUDGET REQUESTS

	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986
Campus Requests					
Chicago	$ 9,939,200	$ 7,330,000	$11,146,900	$17,775,400	$26,253,500
Urbana-Champaign	19,236,400	7,821,100	9,884,600	23,032,100	18,556,500
TOTAL	($29,175,600)	($15,151,100)	($21,031,500)	($40,807,500)	($44,810,000)
IBHE Recommendations					
Chicago	$ 4,286,400	$ 3,244,900	$ 4,289,300	$ 4,255,400	$11,712,800
Urbana-Champaign	12,776,900	5,715,200	5,635,500	10,447,500	9,140,000
TOTAL	($17,063,300)	($ 8,960,100)	($ 9,923,800)	($14,702,900)	($20,852,800)
Appropriation[1]					
Chicago	$ 2,072,800		$ 660,000	$ 757,700	$11,712,800
Urbana-Champaign	7,500,000[2]		350,000	4,378,000	10,045,300
TOTAL	($9,572,800)		($ 1,010,000)	($ 5,136,500)	($21,758,100)[3]
Appropriations for Special Projects					
Food Production Research	$ 1,000,000	$ 750,000	$ 2,254,500	$11,116,100	$ 600,000
Energy Conservation	2,085,700	15,000,000	4,549,200		
Build Illinois - R & R					7,834,000
Build Illinois - Major Projects					14,100,000[4]
Fire Service Institute					2,600,000[5]
TOTAL	($ 3,085,700)	($15,750,000)	($ 6,803,700)	($11,116,100)	($25,134,000)
Total University of Illinois					
Appropriation	$12,658,500	$15,750,000	$ 7,813,700	$16,252,600	$46,892,100

[1]Excludes Food Production Research and Energy Conservation.
[2]Excludes funds which were lapsed because the substitution of moveable book stacks for fixed stacks reduced construction costs.
[3]Governor's Recommendation.
[4]Includes $1,000,000 planning for the Animal and Dairy Science Laboratory.
[5]The Fire Service Institute will make an annual payment of $218,400 for a period of 24 years to the State of Illinois for debt service associated with this appropriation.

TABLE 6
STATUS OF CAPITAL PROJECTS
FY 1983 - 1985
AS OF JUNE 1985
(Dollars in Thousands)

	PROJECT COST	ESTIMATED COMPLETION	STATUS
FY 1983 Appropriations			
Urbana			
Agricultural Engineering Sciences Building Equipment	$ 750.0	4/84	Complete
FY 1983 TOTAL	$ 750.0		
FY 1984 Appropriations			
Chicago			
Roof Replacement - Peoria School of Medicine	$ 202.9	8/84	Complete.
Hazardous Waste Incinerator	457.1	N/A	Program review.
Energy Conservation - Health Sciences Center	981.4	9/85	Design. Bidding 12/84 - 4/85.
Energy Conservation - University Center	552.5	9/85	Design. Bidding 12/84 - 4/85.
Subtotal	$ 2,193.9		
Urbana			
Microelectronics Center Planning	$ 350.0	N/A	Program statement completed 3/85.
Agricultural Engineering Research Lab Remodeling	404.5	8/85	Construction commenced 3/85.
Veterinary Medicine Animal Room Facilities	2,700.0	8/86	$1.2 million of funds released. Design phase. Bids anticipated 7/85.
Energy Conservation	3,015.3	9/85	Design. Bidding 9/84 - 4/85.
Subtotal	$ 6,469.8		
FY 1984 TOTAL	$ 8,663.7		
FY 1985 Appropriations			
Chicago			
Pharmacy A/C Planning	$ 443.2	N/A	Funds Released 2/85.
Library Renovation Planning (includes Relocate OAR)	324.5	N/A	Funds Released 2/85.
Subtotal	$ 757.7		
Urbana			
Plant Sciences Greenhouse Complex	$10,116.1	3/87	Bids 6/85.
Utility A/C System Animal Science Lab	354.6	3/86	Design.
Roofs various buildings	524.2	10/85	Bids anticipated 7/85.
Subtotal	$10,994.9		
FY 1985 TOTAL	$11,752.6		

FY 1987 CAPITAL PROJECTS
CHICAGO CAMPUS

Clinical Sciences Building Remodeling - ($7,232,200)

A major key to progress in modern health care is good, carefully-directed, and well-conceived medical research. While new medical developments and advances have today become almost commonplace, the practice of medicine still is a very inexact science. Medical professionals and leaders in fields related to curative as well as preventive medicine will quickly acknowledge that many unanswered questions remain; in point of fact, medical research to date has only begun to make an impression upon the vast number of unresolved medical problems that are faced daily by patients and health-care providers. Because scientific/medical research has not yet found answers to their difficulties, many people--citizens of Illinois and the United States--are destined to live with serious physical handicaps; some are certainly consigned to early death.

The University of Illinois College of Medicine, in the past five years, has begun a major effort to improve both the quality and quantity of its medical research. The College has recruited and continues to recruit a core group of faculty and department heads who, together with some excellent people from earlier years, not only provides excellence in teaching medical students, but also has and will significantly improve its research position--and its stature with agencies making research grant awards. But the recruitment process has just begun. As scientific knowledge expands, new fields of research endeavor are continually being developed which must be explored if the College is to keep abreast of the "cutting edge" of research and development.

Modern facilities are essential to the achievement of excellence in medical education and research today for several reasons. First, good researchers can be attracted to an institution only if it can be demonstrated to them that by coming to that institution they will improve their circumstances and the conditions under which they are to conduct their research. Second, recent advances in scientific research, experimentation, and techniques have been made with the aid of very sophisticated equipment and instruments which require special electrical, laboratory, and environmental conditions in order to function properly. College of Medicine

facilities must be able to support such equipment and instrumentation. Third, in order to attract leading researchers and develop young faculty in an increasing competitive health-related research enterprise, the College must be able to provide the latest in modern research technology, and house it in modern and attractive facilities.

Whether or not the substantial progress already achieved can be maintained and expanded depends to a great extent upon whether or not plans for remodeling and upgrading facilities will be funded. If funding can be provided for major remodeling and upgrading of some College of Medicine facilities, the present initiative can be maintained, and significant results achieved. The $13 million-plus in direct research and training grants awarded to College of Medicine personnel in 1983 will certainly be increased in subsequent years with remodeled facilities as a drawing point.

The College of Medicine at Chicago occupies parts of ten buildings at the Health Sciences Center. Only one-third of this space was actually designed and built for academic and research purposes; the remaining two-thirds was designed for other activities. While some remodeling has occurred (the Genetics Center suite in the College of Medicine - East Tower, for example), a great deal of the space remains unsuited for medical research activities. This is the case with space in the Clinical Sciences Building, which was formerly a hospital-patient care facility. Consequently, major remodeling is needed if this space is to be useful in developing the College's medical research programs.

As the mode of teaching has changed from that of utilizing the talents, knowledge, and expertise of practicing physicians and surgeons to that of full-time teaching faculty with research interests, the need for increasing amounts of varying types of facilities has increased. Yet, the College's acquisition of space at the Health Sciences Center have come as a result of new buildings being built for other administrative units--the College of Dentistry, the Library of the Health Sciences, and the University of Illinois Hospital. Consequently, the need for remodeling and upgrading of space for College faculty and researchers has been a continuing matter. The remodeled space available to the College of Medicine has been well-utilized

by College personnel, both new employees and faculty/researchers of long-standing. The College's sponsored research program expenditures over the past four years, FY 1981 - FY 1984, indicates a 26% growth has occurred--from $10.3 million to $13.0 million.

Research and Training Grants
College of Medicine at Chicago

Fiscal Year	(Dollars in Millions)
1981	$10.3
1982	11.4
1983	11.6
1984	13.0
	$46.3

What can be accomplished in terms of research findings, medical advances, as well as support funding for academic/research endeavors if a continuing program of facilities remodeling, upgrading, and modernization is funded can only be imagined at this time, but a straight line projection indicates at least a $700 thousand increase per year.

The Clinical Sciences Building (CSB) is a 15-story 207,000 GSF structure which housed the University Hospital prior to construction of the Replacement Hospital in 1981. Floors 1 through 4 and 14 are at present utilized for various hospital functions--ambulatory clinics, service laboratories, Medical Records and Hospital Patient Accounts. Floors 5 through 13 have been assigned to the College of Medicine; floors 4 and 14 will be subsequently assigned to the College as other space becomes available for various hospital functions.

The College of Medicine has assigned this space to three major clinical departments and intends to create therein a modern, up-to-date academic and scientific research facility.

It was early ascertained by a consulting A & E firm that the building's electrical and mechanical systems, first installed in the 1950's, would be inadequte to support the kinds of equipment and research activities for the 1990's. Therefore, funds were requested and appropriated to renovate or replace major plumbing, piping, and electrical risers in the core areas of the building. This project will be completed during 1985-86, and the new

installations will be ready to serve new laboratories and research service facilities.

However, as space is remodeled and upgraded, lateral distribution systems for each floor must be planned and installed to connect the new risers to various points-of-use. New mechanical rooms must be created on each floor to serve remodeled space with central heating, ventilation, air conditioning, and electrical power. New central public restroom facilities must be created, and this work must be accomplished concomitant with corridor and space remodeling.

Floors 4 through 14 have been assigned to the College of Medicine Departments of Surgery (floors 4, 5 and 6), Medicine (floors 7 through 11), and Pediatrics (floors 12, 13 and 14), to serve as primary academic and research space. These departments are themselves subdivided into sections or divisions, and insofar as possible, these sections or divisions have been assigned contiguous space on the various floors. This project will not only upgrade mechanical and electrical systems throughout the floors, but will create new and in some cases refurbish existing facilities for these units (i.e., create modern research laboratories and support facilities, develop faculty and administrative offices, and upgrade corridors). As new restroom facilities are developed, many old facilities that served the former inpatient facilities will be remodeled and the space converted to academic and research ues. While each floor (4 - 14) contains approximately 10,000 square feet--including corridors, mechanical rooms, and stairwells--the assignable space that will result as the remodeling project is completed will total about 75,000 squre feet, or about 6,800 assignable square feet per floor.

Physics Clean Room - ($1,025,000)

The initial phase of this program, funded as the top priority project in the FY 1984 Renovation for Excellence Program, provided a second floor to the Physics High Bay area in the Sciences and Engineering South (SES) building, increasing the available area to approximately 7,000 square feet. Also included in Phase I was the construction of a new penthouse; installation of

a new main HVAC unit; humidification and de-humidification of the area; and new exit and penthouse access stairs and enclosures.

Phase II of this project will complete the upgrade of the existing facility only (existing high bay physics area - 7,000 square feet) including a new 1,500 square foot clean room, all required fume hoods, a related exhaust and make-up air system, all laboratory furniture including services, sinks, etc.; and other work as required to complete this facility.

Future phase(s) of this project will expand this facility by an additional 9,000 square feet (NASF) to house all of the research programs proposed by the Department of Physics. These programs are as follows:

1. A new Microphysics Laboratory (8,000 square feet)
2. A new Center for Advanced Laser Concepts (7,000 square feet)
3. A new Device Physics Facility (1,500 square feet)

Any combination of the above in whole or part within the presently available 7,000 square feet will be included in Phase II of this project. The remaining programs will be provided for in future phase(s) of this project.

The additional space generated by this program will provide for the establishment or expansion of continued research in such vital areas as Advanced Laser, Microphysics and Device Physics.

The Physics Department's success in attracting outside funding, its quality research, and demonstrated commitment to quality teaching have earned the backing of a number of noteworthy supporters. Indeed, support from diverse sectors such as private industry, the Federal government, and academic research agencies reveals widespread recognition of the value of physics research at the University of Illinois at Chicago.

The Physics Department's success results from an apparent recognition of its applied research potential. For example, laser microchips, semiconductors, and data-based computer applications provide enormous opportunities for collaborative scientific projects between the University and numerous government and private sector agencies. The Department of Physics, along with other University departments, has actively pursed several of these major joint-ventures. While high-tech developments stimulate a demand

for applied physics research nationally, the Chicago area concentration of major private industries creates numerous opportunities for University private sector collaboration locally.

The Department's continued success will depend upon its ability to attract funding support. Faculty must be provided with the necessary equipment and facilities if it is expected to perform. Funding of this project will be an important contribution to maintaining the quality of research and institutional efforts of the Department.

Architecture and Art Building Additions - ($611,900)

Additions to the Architecture and Art Building will provide offices, classrooms, laboratories and special use spaces. The additions will be added to the north and south of the existing Architecture and Art Building at locations which are adjacent to existing horizontal and vertical circulation and where provisions were made for additions in the original building planning and construction. The north section will consist of four floors plus a basement and will contain faculty and administrative office space for Architecture, Art and Design, and the College. The south section will consist of five floors plus a basement, and will contain faculty and administrative offices for the History of Architecture and Art, and Urban Planning, seminar and classroom space, instructional laboratories, and special use spaces, including a slide library and computer facilities.

The gross area is projected to be approximately 69,000 square feet, which includes new circulation and linkages to existing facilities in the Architecture and Art Building. It will be possible to realize savings in the construction costs by utilizing existing facilities in the Art and Architecture Building, which was designed to accomodate additions in these locations.

In addition to providing critically needed space for the College, this addition will considerably improve the efficiency of the existing building by improving the circulation system and access both vertically and horizontally. It will also provide handicapped access to the entire building, which at present is limited to approximately 40%.

These additions can be implemented with virtually no disruption of the current program and activities in the Architecture and Art Building or to adjacent activities on campus.

The Architecture and Art Building was programmed and designed to be constructed in two phases. The second phase, approximately 60% of the total required space, which would have included faculty offices, seminar and classrooms, a resource center and gallery, and additional instructional laboratory space, was never built. Since the completion of the first phase of the building, the programs in Architecture, Art and Design, and History have doubled in size, both in terms of students and faculty. In addition, there are now major graduate programs in Architecture and Art and Design which were not part of the original curricula. (There will also be a new graduate program in the history of architecture and art in FY 1987). In 1977 the College of Architecture and Art and the College of Urban Science merged to form the current College of Architecture, Art, and Urban Planning, which also includes the Center for Urban Economic Development, and the Nathalie Voorhees Center for Neighborhood and Community Improvement. There was no additional space acquired to provide for this merger or for the Centers.

At present there are 62 full time and 50 adjunct faculty in Architecture and Art, and a total of 20 faculty offices. (Separate seminar and teaching assistant spaces are non-existant.) A similar situation exists in Urban Planning and the Centers, where it may be impossible to accept any new research grants because of the lack of space.

Since 1978, our graduate programs in Architecture and Art have grown to over 200 students with no increase in physical facilities. The graduate program has been accommodated by giving up faculty offices and locating students in unheated stairwells and other inadequate spaces. These physical facility problems were pointed out as major discrepancies in three separate accreditation visits to Architecture, Art and Urban Planning during the last two years.

The College is in a considerably stronger qualitative position than it was five years ago in all areas except equipment and physical facility

resources. During the last five years, it has recruited both outstanding full time and adjunct faculty to take advantage of the rich human resources of the Chicago metropolitan area. Both permanent and adjunct faculty continue to gain national and international acclaim through awards and publication of their work. Chicago dominates the national scene in architecture, and the School of Architecture dominates the Chicago scene in awards, exhibits and competitions. This year faculty and alumni received eight of the ten local American Institute of Architects Honor Awards, and for the last five years they have received thirty-six of the fifty-two awards. The Art and Design faculty continue the strong visual arts tradition of Chicago, and have won three Guggenheim scholarships and eight NEA individual artist grants. This faculty recognition is also growing in History and Planning, where members of the faculty have been appointed as curators in major museums, and as commissioners in the Chicago City government.

The School of Urban Planning and Policy has received official recognition from the American Planning Association. The School has been able to recruit an outstanding and diverse young faculty who are actively engaged in research. Outside support for research has grown from $344 thousand in 1980 to $707 thousand in 1984.

In addition to the academic programs, the two Centers have added to the College and University service and research base. the Center for Urban Economic Development has become a respected technical assistance resource in the Chicago area. (The Director, currently on leave, is serving as Commissioner for Economic Development for the City of Chicago.) The Nathalie P. Voorhees Center for Neighborhood and Community Improvement is involved with research and technical assistance to neighborhood and community organizations, and with integrating and coordinating activities of other College and University units toward this end.

This addition to the Architecture and Art Building will not only provide the space necessary to properly accommodate the program in the College, but it will also bring the faculty, students, and administration (now in six different locations) into one building, which will increase both efficiency

and collegiality. The current lack of proximity between units makes it virtually impossible to stimulate joint programs and faculty and student interaction. This is becoming even more critical as the programs in Architecture, Urban Planning, and the centers increase their interdisciplinary activity related to public and private entities in the City of Chicago.

The existing space in the Architecture and Art Building does not provide the kind of flexible spaces that are needed for the College programs either now or in the future. This addition will provide both the quantity and quality of space to match the growth of the program.

In addition to providing for the needs of the College of Architecture, Art, and Urban Planning, this project will make available to the rest of the campus approximately 27,000 square feet of space in the Behavioral Sciences Building, Henry Hall, Jefferson Hall, and University Hall, where there are also critical space shortages.

Engineering-Science Library Addition Planning - ($389,700)

At the present time the Science Library, a collection of 87,000 volumes, is housed in a 9,700 square foot facility in the Sciences and Engineering South (SES) building. Twenty-one thousand volumes of its collection are shelved in a separate 1,400 square foot basement storeroom which requires paging of over 300 items submitted by over 200 users each month. Thirty-nine thousand volumes of science periodicals are shelved on the fourth floor of the Main Library. The Library's entire engineering collection of 44,000 volumes is shelved on the fourth floor of the Main Library. A 22,000 volume collection containing most of the Library's holdings in pure mathematics is housed in the Science and Engineering Offices (SEO) building. Space for growth of these collections at their present sites is nonexistent. Only 22 seats are available for library users in the Mathematics Library, and the Science Library has approximately 100.

Stopgap measures designed to provide temporary alleviation to the lack of shelving space have created significant obstacles to the identification and retrieval of materials. The forced disposal of collections; the lack of easy access to some materials; the placement of science and engineering-related materials in multiple locations; the sacrifice of seating for the

installation of new shelving; and the continual need to identify new space to accommodate current additions to the collections argue persuasively for the creation of a single engineering-science library facility. Such a facility should provide extensive hours of access to the large numbers of laboratory-based students and faculty at the UIC campus. No possibility exists for creating a space within SES which meets the needs for a centralized, easily managed science- engineering library facility. Other alternatives which have been identified, such as moving into space now occupied by the cafeteria, would exacerbate the problems identified above.

The growing emphasis on research and graduate education components of UIC's science and engineering programs brings increased needs for access to the Library's researh level science collection. In addition, the decision to build a dormitory on the campus will increase needs for library facilities able to provide services on weekends and later evenings.

Considerable progress has been made in the application of data processing techniques in the internal operations of the UIC Library. The application of computer technology has radically changed many of the methods of ordering, processing, and disseminating library materials. This trend is well established in many libraries in the U.S. and it is clear that this expansion will continue. An Engineering-Science Library would contain the tangible results of these developments, containing conduits and communications lines linking it to local and national databases. The present card catalog will be replaced with an on-line machine readable card catalog accessible by means of terminal devices from remote locations. Within the next year, electronic access to bibliographic records for the Library's holdings in engineering and science will be possible from terminals located anywhere on campus via the Academic Data Network. The net effect of these developments will be to reduce onsite space requirements for technical processing and other library staff operations, thereby freeing space for seating and shelving of collections.

Utilization of high density storage will permit the Library's entire engineering and science collections to be housed in a single location within

a 30,000 ASF area. A mix of immediately accessible open stacks for current and heavily used materials and on-demand retrieval of lesser used and older materials will permit efficient and rapid retrieval of library materials.

The Engineering-Science Library Addition at the Science and Engineering Laboratory should have a single entrance which will permit effective control, and should be structured in such a way that the library can be accessed at times when the main building is closed. The possibility of extending hours of service to reflect the long hours spent by faculty and graduate students in laboratories should remain a primary consideration, even to the extent of providing 24-hour access to primary clienteles. The opportunity to the campus community resulting from extended hours of service would more than offset the inconvenience to those whose offices and laboratories are not located in SEL.

Recent data show that the University Library of the University of Illinois at Chicago ranks second in size at public institutions of higher education in Illinois. It ranks forty-eighth in a ranking of the largest research libraries in the United States. Construction funds have been appropriated to remodel the Main Library in order to utilize existing space in the most efficient manner and to reclaim space dedicated to other functions.

Basic Planning Assumptions

1. The Engineering-Science Library should be designed to serve the faculty, undergraduate, graduate and post-doctoral students of the departments of Biology, Chemistry, Geology, Mathematics, Physics and the College of Engineering.

2. The Engineering-Science collection will contain 360,000 volumes (80,000 volumes as a research collection in the Science-Engineering Library; 280,000 volumes as a retrospective collection in accessible high density compact shelving) and seating will be provided for 240 readers.

3. The facility will be designed to permit 24 hour operation and will be able to function independently of other building hours and functions.

4. Microforms will be used wherever possible as a substitute for full-sized hard copy and the facility will be designed to permit the maximum utilization of communication and computer technology.

5. The interior space in the Engineering-Science Library will be fluid, open, expansible, amenable to rearrangement, limited to a singular control exit, and all weather access from SEL will be provided.

Associated Health Sciences Building Remodeling - ($2,186,000)

The 1919 West Taylor Street Building, formerly the Public Health Hospital and Clinics, was transferred to the University in June 1975. This "H" shaped, eight story building, constructed in the early 1950's, has approximately 183,000 gross square feet and 109,000 assignable square feet.

The need for upgrading this facility was apparent before the University assumed operational responsibility. The facility houses the Sickle Cell Program, the Division of Services for Crippled Children, the Family Practice Program, a new Child Care Center and three curricula of the College of Associated Health Professions: Occupational Therapy, Physical Therapy, and Biocommunication Arts.

This project provides three component parts of a major renovation designed to bring together the departments of the College of Associated Health Professions into an academic facility appropriate to its diverse instructional, research and service-related plans and activities. The components parts of the project are:

- Install a central air conditioning system
- Distribute electric power, floors 2, 3, 4, 5, and 6
- Remodel 6th floor

Subsequent phases will disbribute air conditioning to academic areas and remodel additional building areas to complete the consolidation of the College.

This program provides the necessary components for the purchase and installation of a central air conditioning system in the 1919 West Taylor Street unit and will provide chilled water to floors 1, 2, 3 and 4. No lateral distribution is provided however. The components included are:

- 300 ton chiller
- Cooling tower
- Condensate pumps and piping
- Chilled water pumps
- Chilled water risers
- Chilled water valves

- Electrical connections
- Controls

Future phases will complete the system, providing lateral distribution on the floors.

This portion of the project has major implications for the educational and research activities of the departments housed in the building. The absence of air conditioning drastically affects the teaching laboratory activities. In Physical Therapy and Occupational Therapy, teaching laboratories are an active and strenuous undertaking. In Biocommunication Arts heat problems in the photo lab result in chemical disturbances which render the chemicals unusuable and create noxious fumes. Poor temperature control has also had a negative effect on research. In addition, ventilation is extremely poor throughout the building creating an objectionable environment even for normal classroom and faculty office activities which must be maintained over a 12 month period.

Upgrading and modernization of electrical services in the 1919 W. Taylor Street Unit was begun with the allocation of funds in FY 1979 and FY 1980. Completion of this funded work has provided adequate electrical service to the building for future needs and distributes power vertically to all floors. This project provides for the lateral distribution of electrical power on floors 2, 3, 4, 5 and 6 to accommodate the needs of the Biocommunications Arts, Occupational Therapy, Physical Therapy, two additional departments and graduate programs of the College of Associated Health Professions.

The current electrical capability of the building is inadequate to effectively implement the activities of those departments currently located at 1919 W. Taylor Street and those departments planned for relocation there. All of the programs by their very nature require equipment which is electrical in nature and for teaching and research. Some academic projects have had to be postponed because of inadequate electrical power and others have been conducted only after innovative logistical maneuverings.

This project will also prepare space to accommodate educational and administrative units of the College. It is part of an overall design to

consolidate the College into one facility. Currently three of the College's eight departments are in the 1919 W. Taylor Street building. This project remodels space to relocate two additional departments. A final phase is planned to then physically merge the remaining three departments into the building.

Presently the eight departments of the College are in locations spanning a three city block area. Serious communication barriers exist among faculty, students, and administrators at both the interdepartmental and intradepartmental levels. The College believes space consolidation into one location will permit important enhancements toward interdisciplinary models in research and service. In addition, economies will occur through more efficient use of space in scheduling of classes and conferences, more efficient use of research and teaching equipment, and a substantial reduction in faculty and staff time now being employed in travel between locations.

Chemistry Laboratory Remodeling - ($1,075,000)

The Department of Chemistry maintains an outstanding research faculty with expertise encompassing four major subfields in the field of Chemistry. The Department has just completed a review of its programs, which among other things, has led to the present capital request. However, the strongest finding emerging from this review is the fact that the Department suffers from an acute shortage of research space.

Numerous examples illustrate the Chemistry Department's acute research space shortage. For example, all space in Science and Engineering South (SES) is in such high demand that one professor has been forced to house his research work in a former departmental work room.

The past few years have witnessed an expansion of research activity by the Department's faculty. In fact, the number of research grants and graduate students has increased steadily during the same period. However, one consequence of these expansions has been an ever increasing demand for scarce departmental research space. Although efforts have been made over the past two years to address this problem, additional assistance is required.

To assist in eliminating this problem the Chemistry Department has undertaken steps to convert undergraduate lab space to research space. Several remodeling projects under the University's Renovation for Excellence (RFE) Program have been implemented to mitigate the shortage of research space. In fact, several projects in the University's FY 1986 and FY 1987 Repair and Renovation Program have been developed to complete these valuable research space remodeling initiatives begun two years ago.

To date, efforts to eliminate the Department's space shortage have produced impressive results. For example, some research initiatives have benefited in part from generous outside grants providing funds for essential research space. Hence, there is reason to believe that recent efforts to eliminate the Chemistry Department's space shortage problems have produced quite tangible results. However, if these modest efforts are to have any lasting impact, then funding results outlined in this proposal must receive ongoing full support.

This project provides for the upgrade and remodeling of various areas on the second floor west of the Science and Engineering Laboratories (SEL) building. The work will include remodeling Rooms 2009, 2013, 2202, 2210, 2214, and 3232. The remodeling of these areas is a continuation of work begun in FY 1984 and FY 1985 and will provide additional and upgraded laboratory space for the Department of Chemistry.

The work to be completed under this project is as follows:

A. Room 2009 and 2013

1. Install overhead 208 VAC, 3 phase, 60 amp; 120 VAC, 30 amp; cold water, gas, and high pressure air at one location in Room 2009.

2. Install overhead 208 VAC, 1 phase, 30 amp; 120 VAC, 1 phase, 30 amp; cold water, gas and low pressure air at four locations in Rooms 2009 and 2013.

3. Install floor drains beneath the five overhead utility racks in 2009 and 2103.

4. Install 120 VAC, 15 amp duplex receptacles on wall six feet apart in both rooms.

5. Install cold water cup drains at nine locations along walls in both rooms.

6. Install benches along walls with knee openings, drawer space and storage shelves with doors in both rooms.

7. Modify hall space outside Room 2009 to a small annex to Room 2009. Install blackboard along one wall. Install six duplex outlets. Install adequate lighting and ventilation.

8. Install wall in Room 2013 in order to create a wet chemistry space at end of room with the hood. Provide benches, one full sink with hot and cold water, distilled water, gas, air; one cup sink.

B. Room 2202

Remove existing lockers and enclose area adjacent to Room 2210 and provide an office instrument room. New office and instrument room to be similiar to office and instrument room adjacent to Room 3223 (presently in planning for FY 1986).

C. Room 2210

1. Remove all existing lab benches.

2. Install a full-height partition dividing Room 2210 into a lab and an instrument room with a passage door between.

3. Install a 6-man bench arrangement in the north room.

4. Install wood lab benches along the north and south walls of the south room. At two locations along each bench, install the following: Cup sink, gas, air, water and 110V power.

5. Install Dex-o-tex resilient flooring.

6. Install 208V 3-phase power in one location in instrument room.

D. Room 2214

Divide Room 2214 with an east-west wall, creating two separate laboratories. Revise and/or remove built-in benches as required to accommodate wall installation.

E. Room 3232

Remove existing lockers and enclose an area adjacent to and connected to Room 3228. This new room will be "L" shaped providing a balanced room for the laboratories in the 3224-28 quadrant. Provide twelve duplex outlets.

The project budget does <u>not</u> include supplemental HVAC to meet the Department's requirement of 24 hrs/7day ventilation. It is assumed the house system will remain on during weekends and after normal working hours.

The remodeling program is intended to generate more badly needed research space. This is consistent with the long-range development plan of the campus and the increasing emphasis on research, particularly in high technology areas. The program will create laboratory research space as well

as adjacent research faculty and student office space. At the same time, the program will provide improved facilities for undergraduate instruction, particularly in the important area of analytical chemistry and instrumental analysis.

College of Medicine - West Tower - Utilities Systems Upgrade - ($380,000)

Basic Medical Sciences are the "heart" of a College of Medicine. In the laboratories and lecture halls of Basic Medical Sciences departments the foundations for medical practice and for teaching future generations of doctors are established. Advances made in basic research are almost immediately transferrable to clinical departments engaged in patient care, as well as becoming part of the "body" of knowledge imparted to medical students and fledgling doctors. Therefore, the quality and scope of research and teaching conducted by basic medical scientists and researchers can have a major and continuing impact upon the future of health care.

The College of Medicine West Building is a primary academic facility of the College of Medicine at Chicago, providing both academic and research space to five basic medical sciences and one clinical department (Anatomy, Biological Chemistry, Pharmacology, Physiology and Biophysics, and Pathology). The buildings for the most part remain as they were built in the mid and late 1920's; they lack central air conditioning, are underpowered (electrical), and fitted with single-pane, steel casement windows that leak dirt and air. The buildings are beset with leaking and crumbling roofs and exterior walls. Mechanical systems are inadequate, and existing laboratories tend to be antiquated and dilapidated. These buildings are in urgent need of major renovation and upgrading if they are to support modern teaching and research.

The building systems now in place include radiant (steam) heat and constant-volume air circulation. The buildings are not air conditioned, except for small specific areas (lecture rooms, classrooms) which are served by fan-coil chiller units with chilled water from a central source. A large number of window air conditioning units are in place--units that are noisy, dirty, inefficient, and costly to operate.

The building systems must be converted to a variable air volume central heating and cooling operation. New electrical circuitry must be provided, as well as a new plastic pipe treated water system. The existing manual elevators should be automated. The initial phase of the program is to provide a mechanical service tower housing support utilities for each floor in the building. Included will be heating and air conditioning equipment, medical gas systems, water systems, and electrical power. Local floor distribution of these systems shall be accomplished as the individual floors are upgraded.

The Basic Medical Sciences Departments which occupy the space in the College of Medicine West (excepting the 1st floor) have for many years been "landlocked", with no possibility for expansion. The only chance for acquisition of better, more up-to-date facilities, if a new building is not constructed, is internal remodeling of assigned space. The Basic Medical Sciences researchers are well-funded and highly motivated; their principle lack is modern, appropriate facilities.

The heads of the Basic Medical Science Departments have a number of important research goals which they hope to achieve within the next five years. Some of these goals involve development of research programs for which presently antiquated and obsolete laboratories are completely inadequate. For example, the Department of Biological Chemistry desires to develop more detailed information on the structure of DNA so that it can interpret how the primary nucleotide sequence can signal the intricate phases of differentiation seen with embryonic organogenesis. Special facilities not now in existence are necessary for conducting this type of research.

Also, as new, young, and vigorous faculty/researchers are recruited to fill the faculty ranks, the best people will ignore the College of Medicine if the University cannot offer modern, efficient, clean, well regulated and controlled academic facilities.

Therefore, it is important that this major facility of the College of Medicine be put into first class condition. Existing antiquated laboratories must be reconstructed almost from the walls outward; laboratory service facilities must be recreated, with capabilities for serving modern research; new built-in instrumentation must be devised and installed; and

the total environment must be greatly upgraded, including the provision of central air conditioning. With such facilities, the College of Medicine will be able to keep its existing complement of excellent faculty/ researchers, and will be able to bring to the campus new, enterprising people with research vision and with a compulsion to teach what they know to new generations of Illinois citizens.

Pharmacy Building Remodeling - ($1,493,800)

The pharmaceutical industry in the State of Illinois is a multi-billion dollar enterprise. There are approximately 12,000 registered pharmacists and over three thousand community, hospital, and nursing home pharmacies. In addition, Illinois is the central headquarters for several major pharmaceutical corporations (e.g., Searle, Baxter Travenol, Abbott), drug chains (e.g., Walgreens and Osco Drugs), and drug wholesalers. Each of these institutions (pharmacies, hospitals, corporations, chains, wholesalers) are highly dependent upon the College of Pharmacy as a source of pharmacists and pharmaecutical scientists. The College of Pharmacy, being the only school of pharmacy in the State of Illinois, is expected by these groups to not only provide well trained graduates, but also to be at the forefront in both practice and pharmaecutical research.

The College of Pharmacy has entered the high technology era. The ability of the faculty to attract external research funds, to provide a top rate education, and the ability to attract the brightest students is highly dependent upon the completion of this capital improvement project. The State of Illinois economy, the pharmaecutical industry, the University, and the College will derive many benefits upon its completion.

Since the Pharmacy Building was constructed, there have been major changes in the programs of the College of Pharmacy. A new pharmacy curriculum, the Doctor of Pharmacy Degree Program, was approved for implementation in Fall 1984. The new Pharm.D curriculum is a six year program composed of 2 years pre-pharmacy and 4 years of professional education. Previously, the faculty of the College taught several basic science courses (e.g., physics, organic chemistry, histology, anatomy, etc.). In the new curriculum, these courses are a component of the pharmacy requirements and can be acquired at most undergraduate campuses (e.g., Chicago and Urbana-Champaign). The

undergraduate curriculum has undergone significant changes with much less emphasis on wet laboratory instruction and greater emphasis on the social, behavorial, administrative and biological sciences and the professional practice of pharmacy. As a result of this major curricular change and the corresponding reduction in class size, there is no longer a need for the large laboratories designed in the early 1950's. Some of these laboratories should be modernized into small, more flexible laboratories and offices for computer applications and faculty research.

On the other hand, the enrollments in the graduate programs of the College have increased, and there is very little space for research. With the increased emphasis on high technology research among faculty, there is a serious need to convert unneeded undergraduate laboratory space into areas where high technology research can be conducted by students and faculty. Since the original construction, the number of research faculty in the College has nearly doubled. In addition, approximately 25 clinical faculty have been added. This project would reduce the current overcrowding of faculty and graduate students and provide desperately needed office and research space.

Another high priority goal of the College is to increase the level of research funding from external sources such as pharmaceutical corporations and international organizations such as World Health Organization. Completion of this capital improvement project will also make us more competitive in attracting research project money sponsored by the National Institutes of Health, National Cancer Institute, and the National Science Foundation. In FY 1984, faculty of the College of Pharmacy attracted approximately $20,000 per FTE. Upon completion of these projects a goal of $40,000 per FTE would seem entirely possible. As indicated previously, lack of research space greatly limits the ability of our faculty to expand beyond current funding levels.

The College of Pharmacy faculty and administration have recently prepared a space use plan for all space occupied by the College of Pharmacy. The projects described below are a direct result of this study and have the highest priority. Three of the areas (Room 237, 304, and 346) are large undergraduate laboratories which need to be gutted and remodeled as faculty

office and research space. The last area (Rooms 501-510) are graduate research laboratories which need to be modernized for conducting advanced research.

The southwest quadrant on the second floor is currently used as an undergraduate dispensing laboratory. The construction of a new dispensing laboratory (Pharmacy Practice Simulation Laboratory) in another location (Room 200) is anticipated in FY 1986. Consequently, Room 237 can at that time be gutted and remodeled to accommodate the faculty office space needs of the Department of Pharmacy Practice. This is the largest department of the College and the proposed remodeling will consolidate this group of faculty on one floor of the building. Currently, these faculty are spread through various floors and locations. Room 237 will be partitioned and furnished with modular furniture to provide the greatest flexibility and to meet future space needs of the Department.

The north end of the third floor of the Pharmacy Building is a large undergraduate laboratory. This facility has previously been used to teach histology and anatomy courses in the pharmacy curriculum. Since both courses have now become prerequisites to admission to the College, this area needs to be gutted and remodeled into faculty and graduate research space for faculty and staff associated with the Program for Collaborative Research in the Pharmauceutical Sciences (PCRPS).

The southeast quadrant on the third floor of the Pharmacy Building is used to a very limited extent as an undergraduate pharmacology laboratory in the pharmacy curriculm. This activity can easily be conducted in another location (e.g. Room 440). At the present time, approximately one half of Room 346 is used as a research laboratory for graduate students in Pharmacodynamics. The entire room needs to be gutted and remodeled into several modular research laboratories and offices for faculty and graduate students. The current physical facilities are entirely inadequate for biological-type research. The Department of Pharmacodynamics has inadequate office and research space. The College is currently searching for a permanent departmental head and several additional faculty in the Department of Pharmacodynamics and anticipates expanding its graduate program.

The north end on the fifth floor of the Pharmacy Building consists of 10 relatively small (approximately 400 ASF) research laboratories used primarily by students in the Medicinal Chemistry Graduate Program. These laboratories were part of the original building construction and are greatly in need of upgrading to accommodate modern research techniques. These rooms need to be gutted and remodeled with appropriate furniture and services for conducting sophisticated pharmaceutical research.

Alumni Hall Remodeling for Student Services - ($1,150,000)

The consolidation of Student Affairs units in Alumni Hall represents an opportunity to reorganize student services along the changing character of the Chicago campus. Although the Chicago campus was designed as a commuter campus; it could not have been conceived when the campus was designed that more than three-fourths of the students would be employed while attending school. Many UIC students are on campus only long enough to attend classes prior to their scheduled work hours and the addition of Program PM in 1977 created a shift of the campus population whereby nearly one-fourth of the students attend classes in the evening. As the percentage of part-time students has grown, it has become increasingly necessary to create opportunities for students to register for classes, pay tuition, apply for financial aid, and obtain information in a concise and easy manner. The consolidation of such units as Admissions and Records, Student Financial Aid, a cashier, and other such offices that interact with each other on a daily basis, will provide students, particularly part-time and evening students, with an opportunity to utilize student services located in one building without having to move from one end of the campus to the other during busy periods and evening hours. Additionally, the academic units that interact with Student Affairs, particularly the college advising staffs, will have an opportunity to meet with student services staff located in one building to assist students regarding admissions, student records, financial aid policies, and student developmental programs.

The FY 1986 Capital Budget Request for UIC included an initial phase of the Alumni Hall Program, since the Library Improvements Project required the relocation of the Office of Admissions and Records (OAR) to that facility.

Since the relocation of OAR will move a key student service unit from the center of the campus to an area for students across the Eisenhower Expressway, it has become necessary to create a complete student services facility whereby OAR does not end up isolated from the rest of the campus by itself. The addition of other student services units to Alumni Hall will create a new student traffic "center" for the campus, thereby enhancing UIC's image in the community. The Alumni Hall Renovation Project will complete the program necessitated by the OAR Relocation Program. It is important that OAR and School and College Relations not remain isolated from the other units they routinely interact with for a long period of time. The speedy relocation of student services units will provide an enhanced opportunity for academic units to expand their operations into the space vacated by Student Affairs.

The third, fifth, and sixth floors of the south portion of Alumni Hall located at 400 South Peoria will be remodeled to provide space for the move and consolidation of Student Affairs units. Currently, the third floor is partially occupied by the Energy Resources Center; the fifth and sixth floors are used for storage space. The FY 1986 Library Improvements Remodeling Project and Admissions and Records Relocation Project (to Alumni Hall) are key events that precipitated the relocation of other Student Affairs units and related units.

As the campus continues to increase its research efforts, more space is needed by academic departments for faculty. A long-term space reorganization plan for the campus assumes increased library space and the relocation of faculty to University Hall. The consolidation of the Chicago campus has created a need to consolidate Student Affairs units. The Alumni Hall Building provides an opportunity to utilize existing, unused space to consolidate those activities.

Campus Emergency Electrical Distribution System - ($1,513,500)

This project represents the second phase of a multi-phased program to ultimately provide autonomous electrical power to health care and research laboratory facilities. Upon completion of this campus master plan, the University will be in compliance with State, local, and national requirements relating to emergency electrical power for health care and research facilities. The distribution of emergency power will provide the standby electrical power necessary to prevent loss of life and loss of valuable research data that would occur in the event of prolonged power outage of the utility company's electrical service to the buildings.

The initial phase of this Program, a project included in the campus FY 1986 Facilities Renovation Program, will furnish and install a 3rd 1100 KVA emergency generator at the Central Refrigeration Plant of the Health Sciences Center. Subsequent phases will include the extension to the building distribution system and the addition of a 4th 1100 KVA emergency generator dedicated for academic research activity.

This project provides for the installation of a new multi-cell hi-voltage cable duct between the existing generator facility located at the Central Refrigeration Building of the Health Sciences Center to the Clinical Sciences Building. The project also includes the installation of a new double ended switchgear, sized for expansion, in the Clinical Sciences Building. This new switchgear is to be interconnected via new cabling to the existing emergency generator bus work located in the Central Refrigeration Building.

This project will also provide for the cable interconnects to the existing standby emergency facilities located in the Clinical Sciences Building, Clinical Sciences North, Illinois Surgical Institute, Campus Health Services, and the Neuropsychiatric Institute.

As campus emphasis increases in patient care and research, it becomes increasingly important that standby electrical power be provided to prevent loss of life and research data.

This project must proceed in conjunction with the development plan of the campus to insure that all critical activities are protected in the event that primary electrical service from the utility company is either interrupted or lost.

Campus Fire Alarm Upgrade - ($1,007,300)

The existing fire alarm system in the Health Sciences Center and University Center buildings consists of various types of manufactured alarm systems. Many of these systems within the buildings are not in compliance with the rules and regulations of various applicable codes and ordinances. Fire reporting devices are so old that it is difficult and almost impossible to maintain the integrity of each system within each building.

There is a central station at the Police and Watch unit located in the Clinical Sciences Building which receives fire reports from each building. The reports are transmitted by hard wired equipment and by automatic dialers via telephone lines. The calls are then forwarded to the City of Chicago Fire Department.

At the University Center, the conditions are similar to the Health Sciences Center; however, calls are reported to a different Police and Watch Station located in the Services Building. Again, calls are then forwarded to the City of Chicago Fire Department.

There are several buildings that report directly to the Chicago Fire Department. These include the new hospital facilities, Roosevelt Road Building, Eye and Ear Infirmary, 1919 W. Taylor Street Building, College of Dentistry and the new Lion's Building.

This project is the initial phase of a multi-phase program to ultimately upgrade the campus fire reporting systems to current City fire codes.

Subsequent phases of the program will continue the revisions to the Internal Fire Alarm Reporting Systems in the buildings until all buildings are in total compliance.

This project represents the initial phase of a multi-phase program which will consolidate and upgrade the entire campus system to a "state-of-the-art" status.

The work included in this phase is as follows:

1. The installation of a "state-of-the-art" central monitoring station sized to accommodate the fire reporting from all University of Illinois at Chicago buildings. The monitoring unit will be located at the main Police and Watch Station located in the Services Building at the east campus.

2. The Internal Fire Alarm Reporting System in four (4) buildings, are to be upgraded to meet all codes and local fire ordinances. The four (4) buildings are: University Hall and Main Library, the Clinical Sciences Building and College of Medicine East Tower.

3. New interconnecting cable to all buildings located at both the east and west campuses is to be provided and interconnected to the new monitoring station.

Computer Center Electrical System Upgrade ($1,500,000)

The Administrative Computer Center located on the Chicago campus provides computing services for administrative functions of the University of Illinois. Computer support is also provided to the academic community of the City Colleges of Chicago, the Illinois Community College Board receives both academic and administrative computer services, and the Library Computer System, which serves 22 separate colleges and universities throughout Illinois, is based at the Administrative Computer Center. The Computer Center is served by a single source of electrical power--a 12,000 volt underground system. During the past six years there have been six separate interruptions lasting six hours. These interruptions crippled the academic support and administrative operations of over 20 universities and colleges. The potential exists that the service interruptions could endure for periods of several days to a week.

Two steps are required to secure the Administrative Computer Center from the effects of a loss of external electrical power. First, a series of batteries should be installed which would provide an approximately 15 minute period of power during which computer equipment could be shut down gradually. This "soft crash" would reduce the loss of machine-stored transactions and serious damage to sensitive equipment. Second, it is necessary to install diesel fuel generators which would provide a source of power for the most crucial Administrative Computer Center activities during a loss of electrical power. The cost of implementing both emergency power systems is $1,500,000.

FY 1987 CAPITAL PROJECTS
URBANA-CHAMPAIGN CAMPUS

Electrical Infrastructure Upgrade - ($3,478,000)

The completion of numerous remodeling projects, the recent addition of new major buildings on the campus, and the addition of new equipment with increased power requirements have combined to strain the limits of the existing electrical and steam distribution systems of the University. To support the proposed facility and program growth, it is essential that the Urbana-Champaign campus infrastructure (electrical capacity and steam distribution systems) be upgraded substantially. Consultants employed by the University have developed a two-year $5 million plan to improve the electrical distribution systems on the Engineering and Agriculture portions of the campus.

The majority of the FY 1987 request involves the extension of Illinois Power Company feeders from an Illinois Power Company substation on North Goodwin Avenue to a new distribution/load center for the Engineering campus. The timing of this request is so critical that the Urbana-Champaign campus will provide planning funds in FY 1986 in order to assure meeting construction schedules.

The second portion of the request involves the extension of an Illinois Power Company feeder from Windsor Road to the Agriculture campus for the new Plant Sciences Greenhouse complex located at the corner of Peabody Drive and Dorner Drive. This represents the first phase of a two-phase project to increase the electrical capacity in the southeast portion of the campus, and includes $104,000 of planning funds to develop plans and specifications for the second phase. The second phase of the project includes a distribution/load center to provide electrical power for the Animal and Dairy Sciences Laboratory Addition.

The completion of the first and second phases of this electrical upgrading project will allow the Urbana-Champaign campus to redistribute loads throughout the electrical infrastructure of the campus, permitting the University to accommodate increasing electrical loads created by increased computer-oriented instructional usage, the remodeling of older campus facilities, and the addition of major pieces of equipment. There

will be $1,628,000 requested in FY 1988 to provide the electrical power for the long-term needs of the Urbana-Champaign campus, especially the College of Agriculture and the College of Engineering.

A project breakdown summary of the FY 1987 request is as follows:

North (Engineering) Campus	
Construct New Electrical Service Line and New Electrical Control Center	$2,749,000
South (Agriculture) Campus	
Construct New Electrical Service Line	$ 625,000
Plan New Electrical Control Center	104,000
Subtotal (South Campus)	$ 729,000
Total FY 1987 Electrical Infrastructure Request	$3,478,000

Computer Laboratory Addition - ($18,517,400)

The University of Illinois at Urbana-Champaign, home of the world's first sorted-program, bit-parallel digital computer has the largest and one of the most prestigious computer science departments in the history of computing. Ranked number one in computer science in the "overall influence" of its publications by the National Research Council Assessment of Research-Doctorate Programs in the United States and number five nationwide for program effectiveness in the same survey, the Department has had a major impact in education and research over the full range of computer science and engineering.

In research, UIUC is known for its design and construction of computers, its major developments in computer problem solving, and its new involvement in supercomputing and artificial intelligence. It now has 1,457 undergraduate students and 337 graduate students, and it is graduating 299 bachelors, 103 masters, and 15 PhDs a year. The latter represents about 6% of the PhDs produced in computer science nationally. Nationwide, the graduation of PhDs in computer science has dropped from a high of about 300 per year five years ago to less than 250 per year today. UIUC has maintained its PhD graduation rate and, from the increase in the students passing the PhD qualifying exam in recent years, appears to be

moving towards a production of 25 PhDs per year. These graduates are an important source of technical manpower for Illinois and the Midwest. For example, the University's new Center for Supercomputer Research and Development employs at least five PhDs from the Department of Computer Science. Undergraduate and Master's degree enrollment pressures continue to climb. Enrollment is severely restricted in the Department in order to keep the enrollment and the existing operating resources in balance.

The breadth of knowledge of the faculty enables cooperation between the Department of Computer Science and many other units and activities on campus. The Department is an important resource for both the micro-electronics and the two supercomputing centers, as well as for the College of Engineering and the campus as a whole.

A major factor in the success of the Department of Computer Science has been the span of and the close cooperation between the diverse groups within it. This has been possible in the past because all faculty and a modest number of their research students have been housed within the same building, enabling the sharing of ideas through personal interaction and the development of these ideas through the ability to share research and educational equipment. As the range of available computer equipment expands, the importance of a shared facility increases. Sharing expensive, state-of-the-art equipment enables a more effective use of special purpose equipment. The use of the experimental very high bandwidth links possible in the case of physical proximity enhances the research and educational environment for all concerned. Unfortunately, the members of the Department no longer fit within a single building.

Increased enrollments have required an increase in faculty to bring class sizes to a tolerable level and to meet the needs of an expanding research program. This past growth has been fostered by the College of Engineering and the University, and additional growth of the Department is planned for the future. All offices in the current building have been converted to faculty and staff use by moving instructional laboratories, teaching, and most graduate assistants to temporary housing in various locations around the campus. Additional contiguous space for the department is essential to the continued success of the program at its present size; if it is to grow to meet the needs of the new high-technology thrust

of the campus, the need for additional space is even greater. At the present time the Department has a space deficiency of 44,000 ASF.

The excellent reputation of the Department of Computer Science has been instrumental in attracting millions of dollars of support in gifts and grants from industry and Federal agencies. The State should make every effort to foster this unit, for it will serve as one of the major attractions in Illinois for high-technology firms considering relocating to this State. The expertise concentrated within this distinguished Department should prove to be a valuable asset to any firms of this sort.

The answer to these problems is a new Computer Laboratory Addition which will be planned and designed in FY 1986. The Addition has already been programmed to contain the following types of space:

Room Type	ASF in Proposed Addition
Classroom	3,000
Class Laboratory	17,500
Non-Class Laboratory	17,600
Office	18,000
Lounge	1,500
Storage	2,000
Total	59,600

The various costs associated with the construction of the facility are listed below:

	Estimated Total Project Cost	Estimated Planning Approved in FY 1986	Estimated Bond-Eligible Funded Requested in FY 1987	Request FY 1988 and Beyond
Basic Building Cost (Including Fixed Equipment and Professional Fees)	$19,313,400	$ 1,100,000	$ 18,213,400	
Equipment	945,000			$ 945,000
Utilities	304,000		304,000	
Total	$20,562,400	$ 1,100,000	$ 18,517,400	$ 945,000

Life Sciences Research Laboratory Planning, Phase I - ($1,200,000)

Scientists are now able to isolate, to study and to move genetic information. The very first industrial application of these activities involved the isolation of the genetic information or gene for human insulin. This breakthrough came at a critical time, because trends show that the number of diabetics in the population is increasing faster than the consumption of and supply of porcine and bovine pancreas from which insulin is isolated. Therefore, the need for a new source of insulin was essential.

It once took 500,000 sheep to provide less than 1 mg (1/32 of an ounce) of the growth hormone somatostatin. Now it is possible to produce twice that amount in under 24 hours, in less than the space occupied by a half-gallon container of milk.

Likewise, the clotting factor required by hemophiliacs and bovine growth hormone to stimulate weight gain in cattle are presently under genetic development. Overall, there are presently over two dozen products in clinical trials which are the product of recombinant DNA technology.

Other major developments are also underway. One of the most notable of these, and one which has major implications for global food production, involves the ability to genetically engineer important cash crops or to use the products of crop production in new and imaginative ways.

Right now the very first experiments involving the introduction of foreign genetic information into humans is being planned. Retroviruses are a class of viruses which cause cancer in humans and other animals. These viruses have been disarmed and will not cause cancer. However, their infectious properties remain intact. The object will be to correct specific genetic defects not in the germ cell line and, therefore, not in an inheritable fashion, but in the somatic line. Examples of diseases that respond to such techniques are Lesch-Nyhan disease, in which afflicted individuals literally destroy themselves; adenosine deaminase (bubble baby syndrome), affecting the immune system; Tay-Sachs, hyper-cholesterolanemia; etc. Such procedures will be implemented with human subjects within a year to two, perhaps even before 1985 is out. Other well-publicized examples of the use of this technology involve the release of genetically engineered organisms into the environment in order to

detoxify chemical wastes, to digest oil spills and to prevent ice-crystal formation when crops are exposed to temperatures slightly below the freezing point.

Aside from the direct health related implications of genetics research, recent scientific discoveries are extremely important to the economics of the State of Illinois. Estimates currently available suggest that by the turn of the century direct industrial sales emanating from such work will be in the neighborhood of $64 billion. There are currently over 300 new companies engaged in biotechnological research. Established companies have invested heavily in this new area, e.g., DuPont has just dedicated its new $85 million biological research laboratories and, of its several hundred million dollar per year research budget, biological research is the fastest growing area. Monsanto dedicated its new $150 million biological research facility and is spending over $400 million a year on research, over half of which is in life sciences. Add to this list: Upjohn, Searle, Eli Lilly, Abbott, Pittsburgh Plate Glass, Kodak, W. R. Grace & Company, Corning Glass, and the list goes on and on. At Princeton, Michigan, Michigan State, Indiana, Maryland, Rutgers, Berkeley, only to mention a few, new basic life sciences research facilities are currently underway. It would appear that $64 billion in industrial sales related to new biotechnological discoveries by the year 2000 may be an underestimate.

The companies mentioned previously are coming to UIUC and the other best schools in the country to hire young scientists and support staff personnel to work in these new areas of research. The University cannot compete head-to-head with industry for these people on a purely monetary base, e.g., industry will start a new Ph.D. at $38,000-40,000; UIUC starts a new assistant professor for nine months at $28,000. Further, it takes from $100,000 to $150,000 of set-up funds to get a new laboratory operating. In addition, special and, often times, newly designed facilities are required for these research efforts. Industry has no difficulty in meeting these needs, nor is industry concerned about providing the ongoing research support for this new investigator. The University struggles in each instance to establish a new faculty member. Its facilities are outmoded and shop-worn and do not readily adapt to new research activities. The requisite space is lacking.

Buildings which were planned and constructed just 30 years ago were designed at a time just preceding the dawning of the biological revolution. The use of radioactivity for biological experiments, the growth of animal and plant viruses, tissue culture facilities, large scale fermentation facilities, sterile rooms, transfer rooms, etc., were virtually unknown 30 years ago and represent an ongoing need in today's research environment. Life sciences research, particularly in the areas of molecular and cell biology, genetics, virology, biophysics, microbiology are highly technique-oriented, relying on the use of the most sophisticated equipment.

For the next several decades it is anticipated that basic life science research will profoundly effect numerous other disciplines important to the campus. To be competitive, proper facilities must be available in order to attract and to keep the best faculty and students such that the full impact of this research will be resident on this campus and within the State of Illinois.

The School of Life Sciences has been experiencing a severe space shortage for the past decade. It has a space shortage of approximately 60,000 assignable square feet (ASF). This deficit will be decreased to 55,000 ASF in FY 1986 with the completion of the Burrill Hall Addition Annex. However, the space problems of the School of Life Sciences extend far beyond the existing and projected space deficiency. Much of the space currently assigned to the School is outdated and is totally inappropriate for modern research and teaching.

The proposed solution to the space problem includes constructing a new Life Sciences Research Laboratory of 120,000 ASF. Planning funds ($1.2 million) are being requested for FY 1987 to prepare for the construction of the first phase of the building in FY 1988. This initial phase would include 60,000 ASF, would cost approximately $23.1 million. The second phase of the facility is tentatively scheduled for construction in FY 1995 at 60,000 ASF and an estimated cost (in current dollars) of $18 million.

The Life Sciences Research Laboratory, Phase I will include the following types of space:

Room Type	ASF in Proposed Building
Office	12,000
Non-Class Laboratory	40,000
Animal Quarters	5,000
Lounge	1,000
Storage	2,000
Total	60,000

Environmental Sciences Building Remodeling - ($3,750,000)

Since the completion of the new Veterinary Medicine Basic Sciences Building, the former veterinary education facility has remained unoccupied. After careful study, it has been determined that with appropriate remodeling this building will make an excellent home for the Department of Geology and the Institute for Environmental Studies. Both of these units are currently accommodated in substandard space, much of which is not suitable for modern research or instruction.

The old Veterinary Medicine Building (49,445 ASF) was constructed in 1952, and although it is sound structurally, the building has no central air conditioning or ventilation systems. The building is equipped with only five fume hoods and they do not meet current code requirements. The proposed occupants require approximately twenty-five fume hoods which will require a major heating, ventilation and air conditioning improvement for the building.

An architectural firm has developed schematic plans for the remodeled building. The architect's plan includes joining the Veterinary Medicine Annex to the main structure, adding approximately 2,500 ASF to the building and making the Annex a functionally usable part of the main structure. The Institute for Environmental Studies will occupy the third floor of the building (15,460 ASF), and the remainder of the facility (36,730 ASF) will be devoted to the Department of Geology and the Geology Library.

This proposed FY 1987 remodeling project has been estimated to cost $3,750,000 for the remodeling and realignment of the existing structure. For FY 1986, $3,500,000 has been approved for mechanical systems upgrade. The movable equipment for this project has been estimated to cost $600,000 and that amount will be requested in FY 1988.

English Building Remodeling - ($3,200,000)

In 1975 an architect was hired and a masterplan was developed to convert the English Building to its new and permanent use. The plan that was developed calls for the remodeling of the English Building in four phases at a total cost of $9.1 million. When the job is completed, the English Department will have all new facilities within the original exterior walls at a cost of 40-50% less than the cost of a new facility of the same size.

In total, 61,940 ASF (118,140 GSF) will undergo remodeling. The entire program involves the addition of a new heating and air conditioning system for the building, construction of a new fire-rated stair, enclosing two existing stairs, installation of an elevator, additional rest rooms and new plumbing installations, new structural flooring in the west half of the building as well as the typical partitioning, lighting, and ceiling improvements associated with office and classroom space. To date, only the first two phases of the remodeling have been completed in the English Building.

The third phase of the work, which is currently being proposed, involves the renovation of the northwest section of the building as well as the west center portion of the building on the first, second, and third floors. The remodeling will involve the installation of an elevator and the construction of new floors in the areas to be remodeled. A total of 22,500 ASF of space will be converted into office space and classrooms.

There will be an equipment request in FY 1988 to support this remodeling request. Because of the period of time necessary to complete a project of this size, it is better to request equipment funds the year after the remodeling funds are approved.

Chemical Laboratory Renovation Planning - ($200,000)

Noyes Laboratory was built in two major sections which date back to 1902 and 1917 respectively. Since the beginning of the century, when the building was constructed, chemistry and the nature of the facilities required have changed markedly leaving Noyes Laboratory out-of-date. There are major deficiencies in the utilities and ventilation systems in the building. Temperature and humidity control is virtually non-existent. The sizes and shapes of rooms and the furnishings in them do

not relate to their functions. There are too few adequate hoods. In sum, the building is a dismal place in which to work. These deficiencies not only make it very difficult to conduct a modern program of teaching and research in chemistry, but the environment is unattractive and the safety of the space is questionable. Although every program in Noyes Laboratory is affected in some way or another, several specific examples follow to illustrate some of the limitations that are faced.

One of the current research programs in inorganic chemistry is heavily involved in fossil fuel desulfurization. (This program is relevant to issues such as coal beneficiation and, in the longer term, acid rain.) By necessity, much of this research involves work with the malodorous organosulfur compounds found in fossil fuels. Unfortunately, the hood, ventilation, and plumbing systems in Noyes Lab severely limit this work because sulfurous fumes vented in their hoods reenter rooms located above, and dilute wastes flushed down the drain produce strong odors in neighboring laboratories. Progress is severely restricted because this work must be carried out at night when the area is largely unoccupied. Wholesale improvements in the hood, ventilation, and plumbing systems would be required in order to make this research routine.

Lasers are fast becoming an important tool in the study of molecular structure and dynamics. Several research groups in physical chemistry use lasers, and the Department has established a central laser facility for general use. For lack of any other location, the central lab was set up in Noyes Laboratory. Unfortunately, deficiencies in the building greatly impair its usefulness. Proper lay-out of experiments is hampered by the size and shape of the laboratory; building vibrations interfere with the alignment of the laser beams; poor temperature control causes changes in calibrations; and dust in the air scatters the laser light, making it necessary to work with reduced laser power, lowering the sensitivities of the experiments. Individuals working with lasers in their own research labs in Noyes Laboratory have similar difficulties. Work goes on in these laboratories, but it is clearly very inefficient and relatively crude compared to what could be done in modern facilities.

The above two examples illustrate a broad range of problems that the conditions in Noyes Laboratory present. In these cases the faculty and

students involved try to work around these difficulties so that at least some research progress can be made. Unfortunately, this is the norm in Noyes Laboratory rather than an isolated situation. Similar problems plague the teaching laboratories in the building. There, it has been necessary to "water down" the experiments being conducted and to eliminate some experiments. This, of course, affects negatively the educational experience of the students.

There are a number of important activities that cannot be conducted at all in Noyes Laboratory at this time. The inadequate hood and ventilation systems clearly make it risky to do any work involving highly toxic gases, especially if they have no smell. The severe dust and general cleanliness problem makes it impossible to do certain work in the areas of tract analysis, surface studies, and radiopharmaceuticals. The absence of isolation facilities imposes significant restrictions on genetic engineering experiments that the biophysical chemists would like to pursue.

The School of Chemical Sciences at UIUC has long been one of the world's major sources of well-trained, highly-qualified chemistry graduates. That role is now jeopardized by the negative impact that Noyes Laboratory has on the Department's ability to attract the best faculty and students. Future developments in the chemical sciences will depend primarily on the continued availability of a pool of talented people. Anything that works to reduce that pool will clearly have a major technological and economic impact on the State and Nation.

Because the School of Chemical Sciences currently has a space deficiency of 109,000 ASF, it is impossible to remodel large sections of its space at any one time, for the School has no surge space for those scientists whose space is being remodeled. This means that remodeling in Noyes Laboratory must be phased over a number of years.

Planning funds ($200,000) are being requested for FY 1987 to solve one of the major problems in the building--getting the fume hoods to operate properly--and to plan the remodeling of Room 10 (5,500 ASF) into a chemical instrumentation laboratory. Planning will also be done for the development of a modern chemistry laboratory (500 ASF) in Rooms 461 and 462. Funds for the construction of these projects will be included in UIUC's FY 1988 capital request.

Steam Distribution System Upgrade - ($730,000)

The anticipated steam and condensate demands of the proposed Microelectronics Center on the north part of the Urbana campus for the College of Engineering and the Animal and Dairy Sciences Laboratory Addition on the south part of the campus for the College of Agriculture will exceed the capacity of the existing steam distribution systems. Since the steam distribution is all interconnected, a decrease in steam pressure would affect all buildings, but particularly those located at the end of the system. The Microelectronics Center and the Animal and Dairy Sciences Laboratory Addition will be two buildings most adversely affected by erratic steam pressure and poor temperature control as they will be located in areas of the campus near the ends of the steam distribution system. The only viable solution to overcome this problem is to increase the capacity of the steam infrastructure.

The Urbana-Champaign campus employed an engineering consulting firm to analyze current and future steam and condensate needs and to develop a comprehensive plan to correct the problems identified. The consultant has proposed a plan estimated to cost approximately $2 million which should be accomplished in FY 1987 and FY 1988 in order to avoid the operational deficiencies mentioned above.

The components of the FY 1987 request are as follows:

1. Install a short 12" low pressure steam line interconnection in the center of the campus near the Auditorium to eliminate a restriction within the system and provide more potential capacity to the north part of the campus where the College of Engineering facilities are located. The cost of this improvement is estimated to be $200,000.
2. Install an 8" utility pressure steam line from Harker Hall to the Engineering Research Laboratory to provide additional steam capacity for the north campus. This improvement will ensure that the Digital Computer Laboratory Addition and the proposed Microelectronics Center can be properly served. Estimated cost of this work is $370,000.
3. Develop plans for the installation (in FY 1988) of a new 16" low pressure steam line and 4" condensate return line on the south

part of campus using the existing Peabody Drive tunnel from the Intramural-Physical Education Building to the Stock Pavilion. When constructed, this project will provide the necessary steam and condensate capacity for all anticipated improvements and expansion to the Agriculture campus, including the proposed Animal Sciences Laboratory Addition and the Federally funded Biotechnology facility. The cost of developing these plans is estimated to be $160,000. Funds for the actual construction of this work would be requested in FY 1988 and is currently estimated to be $1,135,000.

In summary, this request is a critical part of the needed upgrading of the utility infrastructure of the Urbana-Champaign campus. If the University of Illinois at Urbana-Champaign is to retain and to expand its national leadership role in high technology and biotechnology research, this investment in utility service is necessary. The proposed improvements will clearly have a long-term beneficial effect upon the expansion of the technical programs of the Colleges of Engineering and Agriculture which will benefit the economy of the area and State of Illinois.

Painting and Pottery Laboratory - ($672,800)

The School of Art and Design at UIUC is in the unenviable position of having its programs spread across eighteen separate buildings on the campus. The need for consolidation is evident. A site has been identified on Griffith Drive in Champaign, where a small cluster of Art and Design buildings (Sculpture Laboratory and Glassblowing Laboratory) currently exist, for another related facility--a Painting and Pottery Laboratory.

The proposed facility will accommodate 15 graduate painting students, 100 pottery students, and related faculty, and its location will permit easy access to other students and faculty in the School--a situation that unfortunately does not exist under current conditions.

An inexpensive metal building of 10,000 ASF with natural and artificial light, plus good ventilation, will serve the needs of the students and faculty. Planning funds will not be required; moreover, both programs that will be accommodated in the new facility will not need new equipment but will be able to transfer existing equipment to the building.

The Painting and Pottery Laboratory will contain the following space:

Type of Space		ASF
Office		600
Shop	1,000	
Classroom		800
Student Laboratories		7,600
TOTAL		10,000

The importance of this project extends well beyond the School of Art and Design. Once the new Laboratory has been completed, the Graduate Painting Program will release 4,100 ASF in Davenport Hall to the School of Chemical Sciences, which has a current space deficiency of 109,000 ASF and is forced to do much of its research and teaching in outmoded quarters in Noyes Laboratory (112,090 ASF) and in the Chemistry Annex (29,527 ASF). The released space in Davenport Hall, when combined with other reallocated space within the building will provide a welcome relief package of 10,000 ASF to the School of Chemical Sciences--a distinguished unit presently laboring in adverse conditions.

The School of Art and Design will also release 3,800 ASF in the Ceramic Engineering Kiln Lab to the College of Engineering which plans to use the space to accommodate new faculty and staff in its consolidated and expanding Metallurgy, Ceramics, and Polymers Program. Although the space is not ideal, it does adjoin facilities in which similar work is presently supported. Educational and research programming planned for the future in this area includes research projects sponsored jointly by governmental and industrial affiliates. The rapidly growing areas of materials processing, electronic materials, polymer/metal/ceramic composites are receiving national attention and the rate of increase in the funding of the research in these areas has exceeded the ability of the College to provide laboratory space to accommodate the growth.

Core Campus Land Acquisition - ($685,000)

Greatly increased attention has recently been focuses on the potential expansion of research and development activities at the Urbana-Champaign

campus. The areas of microelectronics, robotics, and other engineering-related fields, supercomputing, biotechnology, agriculture, and environmental sciences have all been emphasized. Each is an area in which new University facilities have recently been funded or planned. Each is an area in which there is growing private sector interest in expanded cooperative activities with University of Illinois scientists and engineers, and in which there is the potential for the future expansion of corporate research facilities located near University buildings. These developments have in turn raised concerns about the long range development of the campus, modifying existing campus land use patterns, and the need for expanding the campus boundaries.

The campus has begun an update of its long range land use and needs plan. That plan was last revised in the early 1970's, and work already completed on the current update has confirmed that many of the premises of the 1970's plan remain accurate and important for the campus to pursue. Certain issues, such as research parks, athletic facilities, and agricultural needs have changed somewhat, but the general overall acquisition boundaries of the earlier plan are still meaningful. It is apparent, however, that few actual land acquisitions for satisfying that plan have been accomplished. As a result, a large number of privately owned properties which ultimately will be needed by the Urbana-Champaign campus have not yet been acquired.

It is extremely important that a multi-year Land Acquisition Plan be immediately implemented for the Urbana-Champaign campus. Building sites need to be acquired for projects now proposed for the College of Engineering, School of Life Sciences, College of Communications, College of Liberal Arts and Sciences, and others. In planning for such needs, retaining a compact, cohesive campus is important for an overall economic campus operation. A compact campus reduces wasted effort of faculty, staff, and students, as well as the physical plant operation.

A second reason for immediate action involves availability and acquisition costs of many locations. Of the properties included on the University's long-range need list, few have been materially improved in the past fifteen years. This "status quo" condition is about to change, however, since the existing buildings on most of the locations in question

have outlived their usefulness. Therefore, replacing those existing old structures with new student apartment complexes is becoming quite attractive to the current owners and private investors. Upgrading a given location immediately increases the value of that location approximately tenfold and can make acquisition and clearing the site for an academic building impractical. The conversion of a single lot can also virtually destroy the value of adjacent University-owned land as far as accommodating existing building needs.

The FY 1987 land acquisition request involves the acquisition of nine critical locations for $685,000 that appear to be prime targets for commercial apartment-type development. If these properties are not acquired by the University and commercial improvements are allowed to proceed, the acquisition cost of these nine properties will increase dramatically, and the use of adjacent University-owned land will become quite limited. Most of the properties are located in areas of the existing campus where College of Engineering or School of Life Science improvements are planned.

Pilot Training Facility - ($965,700)

This project has been developed because of the badly deteriorated condition of the present facility. The current facility was constructed in 1945. While the building has been upgraded, at least temporarily, and remodeled to furnish minimum facilities, it is rapidly deteriorating and requires replacement. The facility is poorly insulated, has inadequate climate control capacity, and until a recent temporary coating was applied to the roof, it leaked.

Deterioration due to aging and weather damage has occurred to the point where current educational functions have been jeopardized. Instructors and students were not being protected from leaking structures, and expensive electronic flight simulators were being damaged from moisture and furnace residues. There has existed the potential for severe electrical shock resulting from the operating of equipment in areas where water has collected. While the resurfacing of the roof has corrected the situation for the short term, these leakage problems are expected to recur in two to three years from now. The current space is also extremely energy inefficient and this must be corrected to conserve energy and utilities funds.

The replacement facility will be of low-cost construction (concrete block or pre-engineered metal structure with concrete foundation and concrete floor).

WILL Radio and Television Building Planning - ($450,000)

The University television and radio stations provide a valuable public service to the people of the State of Illinois, reaching more people each week than all of the rest of the University's units combined, at a cost of less than a half-cent per listener-hour. For many people in Illinois their only connection to the University is through these stations and their excellent educational programming.

The existing space occupied by the television station, a former bakery and a former rooming house, is badly deteriorated and requires continuing maintenance. One exterior wall of the bakery building was recently rebuilt to prevent water leakage on expensive equipment. The roof is under constant repair but has deteriorated to the point that the repairs will last only temporarily. The dust level in the bakery building is unacceptably high but cannot be reduced because the dust consists of crumbling plaster, paint dust, and insulation fibers. This dust penetrates expensive videotape machines and causes enormous damage and expense on a continuing basis. Videotape operation costs are approximately five times the industry average despite extensive air filtration and dust containment measures undertaken by the Division. Even existing office space at the Television Building is inadequate.

To address the problem of deteriorated space and to consolidate radio and television services in a single location, construction of a new building is proposed. The building will be programmed to contain the following types and amounts of space:

Room Type	ASF in Proposed Building
Instructional Lab	600
Office	10,000
Audiovisual, Radio TV	13,500
Storage	400
Total	24,500

The total planning cost of the proposed building is estimated to be $450,000. It is anticipated that a request for funds for constructing this project will be included in the FY 1988 Capital Budget Request.

Mechanical Engineering Building Remodeling - ($2,800,000)

In recent years the College of Engineering has been strengthening and expanding its new Manufacturing Program--a program of great importance to Illinois industry. The Manufacturing Program has a high priority on the agenda of a number of departments within the College: Mechanical and Industrial Engineering, Computer Science, Civil Engineering, Electrical and Computer Engineering, and General Engineering. Faculty members from these units are combining their efforts to work on research projects in the areas of robotics, manufacturing equipment design, materials processing, polymers and metal composites, production control, and computer-controlled manufacturing. The relevance of this work in today's manufacturing realm is evident.

Fortunately, the College of Engineering has been able to identify an area in the Mechanical Engineering Building, which in past years was used for a machine shop, a laboratory, and student shower and locker space, that can now be converted into 6,000 ASF of research laboratory space, 5,800 ASF of office space, and 3,650 ASF of instructional laboratory space for the Manufacturing Program. The scope of the remodeling will be extensive because the areas are basically large spaces which need to be segmented into smaller office and laboratory space.

In essence, the College is leaving behind the past heavy emphasis on the use of the machine shop in teaching machine-tool design and application, and it is moving into a new era. In the future, students will be working with computers on design problems, and all aspects of manufacturing will be integrated in a new systems approach.

The graduates will be prepared to help convert outmoded assembly lines into computerized flexible systems that can be changed rapidly and adapted to new functions and products in a period of hours rather than weeks and months. Their exposure to robotics and artificial intelligence offerings will stand them in good stead as they convert the plants and factories of the past twenty years into modern production facilities for the future.

Students who have completed the Manufacturing Program will also be invaluable in helping to establish new high-technology industry in Illinois. They will have the expertise required to establish and to maintain facilities that will be competitive with the best in the nation and the world.

Veterinary Medicine Laboratory Remodeling Planning - ($280,000)

This request is the final phase for planning funds needed to complete unfinished space in the Veterinary Medicine Basic Sciences Building. The animal rooms located on the first floor will be completed as part of funds received in FY 1984 and FY 1985. This request involves completing approximately 15,800 square feet on the second and third floors of the building to provide the required office and research space for the College of Veterinary Medicine.

The space on the second floor will be occupied by the Department of Veterinary Pathobiology. The Division of Pathology and the Division of Epidemiology must be provided additional offices and laboratories to accommodate existing faculty.

Additionally, the Department has recruited eight new faculty during the past four years. Their programs are expanding, thus placing additional pressure for expansion of the laboratory and office space they are utilizing. The Department has recently recruited a new parasitologist and two faculty members in the areas of molecular virology and bacteriology. These faculty are forced to share laboratories that are currently occupied by existing programs. One of these existing programs in hematropic diseases of cattle and malaria in man has been awarded a $2 million grant from the U.S. Agency for International Development, thus placing significant pressure on expansion into the unfinished areas of the building. The Department is also expanding its programs in biotechnology and wishes to recruit additional faculty in this area but must complete the unfinished space to do so.

In summary, approximately one-half of the additional laboratory and office space will be used to support expansion of the biotechnology and molecular biology programs with new faculty. One-fourth will be used to effectively house pathology and epidemiology programs that are being

added, and one-fourth for molecular parasitology and the expansion of existing programs as the result of significant additions in extramural funds.

The third floor space will be occupied by the Department of Veterinary Biosciences. The Department has made a commitment to being the number one program in pharmacology/toxicology among veterinary colleges in North America. Although we are now arguably in first place, it is imperative that we continue to build on our present success if we are to maintain this recognition. The Animal Poison Control Center has become a national resource and is recognized as such by the USDA. The anticipated favorable consideration of a new program proposal for Environmental Toxicology will result in two additional joint appointments between this Department and the Institute of Environmental Studies. Therefore, we expect that approximately one-third of the space will be devoted to laboratories and offices to accommodate the increase in toxicology research and graduate training. There will also be a need for work space for staff involved in development and maintenance of the data base for the Animal Toxicology Hotline within the Animal Poison Control Center.

A second major consumer of space in this area will be faculty working in biotechnology, especially in research on culture and genetic manipulation of embryos. Because of these needs and increasing usage of various cell culture systems in other departmental programs, a modern facility for tissue and embryo culture will be included. Other laboratories will be designed to accommodate faculty working in molecular biology as it relates to cellular or subcellular actions and mechanisms of hormones, drugs and toxins. In this manner, strong basic research support will be provided to three program areas already nationally recognized--reproductive biology, pharmacology, and toxicology.

The third area for expansion is in the bioengineering/morphology research activities. Interdisciplinary efforts are already in place for studies on bone growth, biomaterials, and biomechanics. These programs are now attracting graduate students as well as visiting scientists and postdoctoral trainees. If we are to maintain this momentum, we must provide additional space for laboratory work as well as office space for staff and trainees.

The total planning cost, including construction document development, is estimated to be $280,000. It is anticipated that funds for completing the second and third floors will be requested in FY 1988.

Federal Research Facility Site Development ($2,220,000)

Planning funds for a biotechnology research center are expected to be appropriated to the U.S. Department of Agriculture for Federal FY 1986. Faculty from the Departments of Animal Science, Agronomy, Plant Pathology, Horticulture, and Food Science, as well as the College of Veterinary Medicine and the School of Life Sciences, will comprise the research staff in the proposed biotechnology facility. The site location of the facility is extremely important because the staff must maintain a strong working relationship with their home departments as they pursue research initiatives in the biotechnology center.

The site of the current University Motor Pool and old Agriculture Engineering Building would provide the ideal location for the new facility. This site is adjacent to Turner Hall (Plant Sciences), the Animal Sciences Laboratory, and the site for the new Greenhouse Complex. The site is also within close proximity to the Agricultural Engineering Science Building, the Meat Sciences Laboratory, and the Dairy Manufacturers Building (Plant Sciences). Thus this location would provide immediate access for the research faculty and staff to related laboratories as interlocking research projects are undertaken.

The location of the facility at the motor pool site, requires its relocation to another site on the south campus. The proposed site for the relocation of the Car Pool Facility is north of St. Mary's Road, west of the Assembly Hall parking areas, and east of the trash compactors. The proposed Motor Pool Facility will be adequate to service and store the 500 plus Urbana-Champaign campus vehicle fleet. Parking will be provided for faculty and staff that need to park their cars temporarily while using a fleet vehicle.

Also included in this project is the redirection of traffic patterns on the south campus. The proposed location of the biotechnology center at the site of the existing Motor Pool, along with the construction of an addition to the Animal Sciences Laboratory, requires ending the use of

Goodwin Avenue as a thoroughfare. Traffic will be redirected to Dohner Drive, an existing one way, two lane paved street, which borders the east side of the site for the Greenhouse Complex. Dohner Drive will be expanded to four lanes and accommodate two way traffic. In addition to improving vehicular traffic flow through the southeast section of the central campus, the project will enhance pedestrian safety for students walking from the Florida-Pennsylvania Avenue dormitory complex to classrooms in the quadrangle. For FY 1987 $100,000 is requested to conduct a south campus traffic study and plan the road construction project. Additional construction funds of $1,200,000 will be requested for FY 1988.

FY 1987 CAPITAL PROJECTS
BUILD ILLINOIS

In February, 1985, Governor Thompson, through the creation of a program entitled Build Illinois, set forth a program designed to revitalize and expand the State's capital investment in an effort to promote economic expansion. As a part of the Build Illinois program for FY 1987, the University of Illinois expects to receive $22,499,900 for the construction of a new Engineering Research Facility at Chicago and $7,834,000 for both the Chicago and the Urbana-Champaign campuses to enhance the ongoing repair and renovation of its facilities. The repair and renovation funds began in FY 1986 and will continue for a period of five years. Below are detailed descriptions of the projects specified under the Build Illinois Bond Program for FY 1987. An additional Build Illinois project, the Animal Sciences Laborotory Remodeling and Addition, is described in the FY 1987 Food for Century III Request.

Engineering Facility - ($22,499,900)

As the only publicly-supported school of engineering in the Chicago metropolitan area, the College of Engineering at the University of Illinois at Chicago has assumed a significant role in improving the economic health, industrial productivity and competitiveness of Chicago and the northern region of the state. Its graduates are found in many of the leading business and industrial firms in the area. A growing number of its faculty members are receiving national and international recognition for the quality and industrial importance of their research in areas such as robotics, biotechnology, microelectronics, and mineral processing. If these exciting developments are to grow over the next decade, however, to meet the educational, research, and technological requirements of the Chicago area, there must be a solution to the College's overwhelming need for additional research and teaching space. This need was created by the rapid expansion of enrollment and staff in the engineering disciplines, creating a critical shortage of laboratory and other space. The only realistic solution is the construction of a new Engineering Facility.

The importance of the College of Engineering as a source of highly skilled manpower may be seen in the following:

- The College of Engineering has over 2,600 undergraduate students, nearly two-thirds of whom are residents of Chicago and Cook County.

- About 600 additional students are currently pursuing graduate work in engineering.

- With the help of the General Assembly and Governor, new operating resources are being provided to increase this enrollment capacity to 3,000 undergraduates and 750 graduate students.

- Twelve percent of the enrolled undergraduates are members of minority groups, the highest percentage among all Big Ten university schools of engineering.

- In 1984, over 400 baccalaureate and 100 graduate degrees were awarded by the College, double the number awarded only eight years earlier. Recent surveys of UIC Engineering graduates show that among those who seek employment, more than 75% take positions within the State of Illinois.

In addition to their primary role as teachers, the faculty of the College in Chicago have become increasingly active and productive in research of critical significance to the Chicago economy. A growing portion of their work is being supported directly by companies like Westinghouse, Union Oil, American Iron and Steel, Borg-Warner, American Telephone and Telegraph and McDonnell-Douglas, as well as by State and Federal agencies such as the Illinois Coal Research Board, the National Science Foundation and the National Aeronautics and Space Administration. In addition, the exceutive officers of area corporations included International Harvester, Amoco Oil, Commonwealth Edison, Sunstrand, General Electric, Inland Steel and Gould Incorporated serve on the Industrial Advisory Board of the College. The size of the research program is larger than any other public engineering school in Illinois other than that at the University's Urbana-Champaign campus.

As its undergraduate and graduate enrollments have grown in response to area needs and its faculty has expanded, both in terms of size and active involvement in key industrial research, the College has simply outgrown the physical space available to it. It needs more space to house the most sophisticated instructional equipment for educating today's engineers and it

needs higher quality space for the controlled environments required by advanced faculty research and the training of graduate engineers. Based on accepted standards for determining University space requirements, the UIC College of Engineering requires approximately 260,000 assignable square feet of space to adequately serve a stucdent body of 3,750. Even with recent remodeling efforts, the College today has only 150,000 square feet of space. By far the largest deficiency (nearly 90,000 feet) is in laboratory space--precisely the area most critical to producing up-to-date instructional programs and competitive research opportunities.

The following examples illustrate the limitations which present facilities place on the ability of UIC faculty to do research in fields of critical importance for the economic development of the State and nation, and the education of both undergraduate and graduate engineers.

Research on fermentation processes is important to the production of microbes for industrial, commercial and medical uses, such as the production of human insulin for clinical use. This work requires an environment free of dust and other foreign substances, often cleaner than the environment in a hospital surgery. The entire biotechnology/bioengineering effort at UIC is handicapped because of the absence of such "clean room" space.

Similarly, modeling of industrially important chemical reactions is not possible in existing laboratories. Fume hoods, powerful exhaust systems, and chemical waste incineration systems are needed since much of ths work involves toxic materials. Lack of such space and equipment excludes UIC from competition for funding in this area.

Borg-Warner recently awarded the UIC microelectronics group a seed grant of $120,000 for the design and development of gas diodes used to measure quantities and types of air pollutants. Although the project was successful, the larger grant which would have followed was beyond the reach of the UIC group because appropriate facilities were not available. This work requires space equipped with sufficient electrical power and furnaces for drying materials. The environment must be very clean, requiring space built to allow the filtering of even very fine particles from the air.

Space is needed for building and testing robots and walking machines. Such work requires large open areas of 2,000 square feet or more. Reseasrch competition in this area is very intense, with applications in many industrial, commercial and military uses. Contractors spend many millions of dollars each year for such research. Although the College has several strong faculty in this field, their work is inhibited due to lack of appropriate space.

Engineers at UIC have developed a unique computer program for modeling structures, such as cars and trucks. This permits them to study the dynamics of these structures and improve their design in a highly cost effective way. To pursue the results of such research requires larger-scale testing of prototypes to gather experimental data and verify these models. Specialized facilities such as wind tunnels and combustion chambers are required for this work. Without them the necessary follow-up work cannot be done at UIC, further limiting the effectiveness of UIC faculty.

Construction of an Engineering facility with approximately 65,000 assignable square feet in instructional, laboratory, and office space will enable the college to continue its enrollment expansion and enable it to accept corporate and federal research monies important to Chicago and the State. The facility will provide classrooms constructed to utilize the latest instructional techniques including interactive computers, electronic blackboards and video presentations. Specialized environments for microelectronics and biotechnology research and properly-designed support facilities for work in robotics will be available for faculty research and the training of graduate students in up-to-date industrial technologies and processes. UIC engineering graduates will provide a resource for Chicago area employers, while UIC scientists and engineers will become more productive in attracting private and federal research support.

Planning funds ($2,400,000) were received in FY 1986. Construction funding of $22,499,900 is requested for FY 1987 with equipment funding needed in the following year.

The construction of this facility will permit the College of Engineering to take a significant step toward realizing its full potential in meeting the educational, industrial and technological needs of the Chicago area in the late 1980's and beyond. It must be part of the future that underpins the Chicago economy.

Repair and Renovation - ($7,834,000)

Included in the Build Illinois program is a commitment to provide an annual sum of $20 million for five years, initiated in FY 1986, to Illinois public universities and colleges for the ongoing repair and renovation of its facilities. Under an allocation process prescribed by the Illinois Board of Higher education, the University can expect to receive approximately $7.8 million annually.

In the past, repair and renovation funding has been used for a variety of projects on both campuses. At Chicago, these have included: a mechanical systems upgrade for an advanced laser research lab, new fume hoods to correct air exhaust inadequacies, provision for the generation of emergency power generation, and clean rooms for tissue culturing (nephrology). The following Urbana-Champaign repair and renovation projects have commenced: an upgrade of laboratories (wet lab facilities), a mechanical upgrade in Talbot Lab to accomodate a tension-torsion machine and remodeling a visual arts laboratory to support cinematography and photography instruction. Roof repairs and life, health, and safety code improvement projects have also been completed on both campuses.

While the University intends to maximize the effectiveness of the Build Illinois repair and renovation funds in remodeling efforts, it is clear that these funds will not be adequate to recover completely from building deficiencies accumulated through decades of insufficient facility maintenance support. In addition to the burden of coping with more than $400 million of deficiency-related renovation, the University must respond to rapidly changing curricular and research needs. For example, the cost of revising building electrical systems that are needed to continue to facilitate the University's efforts in computer assisted education and research will be substantial.

One indicator of the level of funding needed annually for handling one portion of the facilities renewal dilemma can be gleaned from the facilities management practices employed in the University's auxiliary services system. Within that system, an amount equal to one half of one percent of the replacement cost of all auxiliary facilities is expended annually for minor repair and renovation requirements of the auxiliary units. If the same maintenance funding standard of one half of one percent of the total replacement cost were applied to the academic and academic support facilities (2.4 billion in total), the University would need $11.9 million to support repair and renovation in FY 1987 alone. This figure would not account for the need to reconfigure or renovate space due to changes in academic program requirements.

Another formula method for determining annual repair and renovation costs for an academic campus is the Space Realignment, Renewal and Replacement (SR^3) calculation utilized by the Illinois Board of Higher Education. The formula assumes that the foundation and structure of institutional buildings (approxiately one-third of the building's construction cost) have a virtually infinite useful life, however, the interior space alignment and the mechanical systems of these buildings must be altered to suit changing programmatic and support requirements. It is believed that the entire interior of a building will be renewed twice during a 100 year period. One of these renewal projects will be a major remodeling effort, while the other renewal program will be the sum of all the minor repair and renovation projects conducted within the facility. Given these assumptions the following formula applies to minor repair and renovation projects:

Replacement Cost/GSF X

.667 (building cost minus foundation and structure costs) X

.01 (one time/100 years) =

Average Annual Repair and Renovation Cost/GSF

When the annual repair and renovation cost/GSF is calculated, it is multiplied by the square footage of all State supported University facilities to determine the annual funds required for repair and renovation projects. For FY 1987 the SR^3 calculation generates an annual funding

requirement in excess of $16.1 million for minor repair and renovation projects, as well as minor remodeling projects designed to address academic program requirements.

Given the extreme nature of the University building deficiency crisis and the inadequate resources available to meet this challenge, the University must reaffirm its support of the five year Build Illinois Repair and Renovation program. The initiation and continuance of the repair and renovation program is vital to the University's effort to restore its facilities to meet present and future programmatic demands. If funding for the repair and renovation program is reduced or curtailed, it will be necessary for the University to seek other methods of financing the backlog of essential remodeling and renovation projects.

The minor remodeling projects included in the FY 1987 Repair and Renovation program will address needs associated with the negative effects of deferred maintenance practices and space realignment required to meet changing curriculums and programs. In accordance with IBHE guidelines, no such repair and renovation project will exceed $500,000. A preliminary list of FY 1987 Repair and Renovation projects will be presented to the Board of Trustees for their review and approval in an upcoming meeting.

FY 1987
FOOD FOR CENTURY III
REQUEST

FOOD FOR CENTURY III
FOOD PRODUCTION RESEARCH FOR A DYNAMIC ILLINOIS AGRICULTURE

Illinois agriculture is critically important to the continued growth and development of the State's economy. This major industry has both a direct and indirect effect on food producers, consumers, processors, allied industries, and Illinois citizens as a whole. In addition, Illinois agriculture production has a very real impact on domestic and foreign trade. Together with the strong support of land-grant agricultural research and related extension education programs, Illinois agricultural producers marketed a broad range of agricultural commodities valued at more than $8 billion during 1983. Total cash receipts for the calendar year included an impressive $5.85 billion for various field, horticultural, and nursery crops and nearly $2.3 billion for livestock and livestock-related products.

In the foreign trade arena, Illinois agriculture exports continue to represent a vital component in the State's economy. In 1983, Illinois continued to hold its position as the national leader in the number of exports for all agricultural commodities. At a total value of almost $3 billion, those exports represented more than 36% of the State's gross cash receipts from crops and livestock.

In a very tangible way, the myriad of agricultural commodities produced and marketed by Illinois agriculture exert a profound impact on the State's economy and also serve the social and humanitarian goal of meeting increased world food needs. The recent food shortage and widespread famine in Ethiopia is but one example of the long-term need for expanded world food production. In addition to improved production the world food problem must also be addressed through better food distribution and marketing systems, improved human nutrition, and more effective population control methods. Illinois agriculture, with its great abundance of human and natural resources, can provide strong leadership in many of these crucial areas.

Today, there is a growing realization that many of these pressing socioeconomic problems can be solved through increased investments in agricultural research and education. During the past eight years, the

State of Illinois has advocated this approach by making a considerable investment in the Food for Century III capital initiative. As a result of this investment in modernizing University of Illinois facilities through major building renovation and construction, researchers are able to accelerate research activities which are already yielding major dividends in the form of state-of-the-art research and extension programs which benefit agricultural producers and consumers throughout the State, the nation, and the world.

Today's Illinois agriculture is truly a dynamic entity, representing many things to many people. It constitutes a major component in the nation's economy, a positive force in the world marketplace, a respected member of the international agricultural community, a useful model for national agriculture in developing countries, and above all, a valued State asset. As Illinois' broad-ranging agricultural enterprise moves rapidly into the era of high technology, even more dramatic achievements may be realized as a result of the Food for Century III program.

The FY 1987 budget request for Food for Century III will conclude this special University of Illinois capital initiative for food production research facilities. Funding is requested in FY 1987 to remodel and construct an addition to the Animal Sciences Laboratory. The University's FY 1986 capital appropriation includes $1.0 million for project planning. With completion of this project, the "critical" mass of agricultural and veterinary medicine research facilities will have been developed at the University. Facility needs which remain unmet or which may emerge as technology progresses may be integrated with other vital campus capital projects as part of the regular capital request in future years.

The following section provides a brief overview of the projects which have been completed through the Food for Century III initiative. The final section presents a more detailed description of the FY 1987 request.

FOOD FOR CENTURY III
ACHIEVEMENTS TO DATE

In FY 1978, the University of Illinois in recognizing that research conducted in its own Colleges of Agriculture and Veterinary Medicine could benefit agriculture producers and expand world food production, developed a special capital funding initiative, the Food for Century III program. This program was formulated with the specific intention of expanding and enhancing physical facilities for research and extension activities in the area of food production research. The following section provides an overview of each project funded through Food for Century III since the program's inception together with a description of the research programs related to each project which will potentially benefit agriculture producers and consumers. Table 1 provides a summary of these projects and the total cost associated with each project.

Dairy Research Facility

This project, which first received funding support in FY 1978, involved major renovation of four dairy barns and construction of a new milk cow housing unit and a heifer facility. Modernization of these facilities has provided the proper environment for researchers to utilize computers for monitoring and controlling feeding and conducting milking and management studies. Also, researchers in dairy science, agricultural engineering and veterinary medicine are involved in research to identify mastitis in milking cows. These researchers have designed and built computer monitoring equipment which is used to record changes in the electrical conductivity of milk and will provide early detection of the disease. University of Illinois veterinarians and dairy scientists are also conducting interdisciplinary research on the hormonal relationships that exist in cows with mastitis and those with resistance to this disease. Today there are an estimated 10.5 million milking cows in the U.S. and annual losses to this disease alone amount to approximately $1.7 billion. The combined effects of these studies will benefit the dairy industry significantly.

TABLE 1
FOOD FOR CENTURY III

Project	Initial Year of Funding Appropriation	Total Project Cost (Thousands)
Dairy Research Facility	1978	$ 450.0
Orr Agricultural Research and Demonstration Center	1978	313.4
Northwestern Illinois Agricultural Research & Dev. Center	1980	503.1
Veterinary Medicine Basic Sciences Building	1978	23,487.8
Veterinary Medicine Research Buildings	1978	2,317.7
College of Agriculture & Veterinary Med. Land Acquisition	1978	400.0
Swine Research Center	1980	1,927.4
Meat Science Laboratory	1980	1,026.0
Agricultural Engineering Sciences Building	1978	12,002.9
Veterinary Medicine Animal Room Facilities	1984	3,000.0
Agricultural Engineering Research Laboratory	1984	404.5
Plant Sciences Greenhouses and Headhouse	1984	10,566.1
Animal Sciences Laboratory (Construction Funding Requested in FY 1987)	1986	17,385.9
Total		$73,784.8

Orr Agricultural Research and Demonstration Center

In FY 1978, the University received $313,425 to purchase 257 acres of land in western Illinois. Established in FY 1979, the Orr Agricultural Research and Demonstration Center was designed to investigate problems that occur in agriculture production typical to that region, and to demonstrate potential improvements in the areas of soil management and crop production. In 1984, 61 projects were being conducted in a variety of areas including fertilizer production and comparisons, tillage studies, erosion control, seed variety screening, and efforts to increase the yield of corn and soybeans. Research is also focused on weed science and herbicide screening, insect control, and timber management. In addition, the Orr Agricultural Research Center and the University's Northwestern Illinois Agricultural Research and Development Center are used as observation points for the National Weather Service Agricultural Weather Network.

Northwestern Illinois Agricultural Research and Development Center

In FY 1980, the University received funding amounting to $503,100 to purchase 80 acres of land in northwestern Illinois. In contrast to the rolling, timbered, deep-loess soils located at the Orr Center site, the Northwestern Center site consists of Muscatine, Tama, and Sable soil types. These represent soils located in the "corn belt" and are some of the best crop-producing soils in the world. In addition to the land purchase, the funding provided for construction of a 10,000 ASF building on the site. The building consists of laboratory, office, and shop space and contains an efficient solar energy collection system for heating the building and for drying grain.

In FY 1984, 54 projects were being conducted in a variety of areas which include studies in tillage methods, conservation effects of tillage utilizing a rainfall simulator, and ridge planting. In addition, experiments are conducted in the areas of fertilizer composition, interactions between tillage and fertilizers, inter-seeding, plant densities, growth regulators, and disease control in seed corn production.

In the future, it is expected that research will be expanded in the studies of growth regulators, tillage, soil conservation, and fertilizer management, and it is probable that results of various University genetic engineering projects in the plant sciences will be field-tested at this site.

Veterinary Medicine Basic Sciences Building

Occupancy of the Veterinary Medicine Basic Sciences Building has allowed the College of Veterinary Medicine to increase its teaching, research and public service programs. The building, totaling 267,921 GSF, was completed in FY 1983 at a total cost of $23,487.8 thousand. The structure provides modern classroom and laboratory space and also contains a 25,000 GSF state-of-the-art Diagnostic Laboratory. This laboratory is used in conjunction with the Animal Poison Control Center and Toxicology Hotline which is operated under contract with the State of Illinois and provides service to more than 50 cases per day to people located across the country and Canada.

Research projects have increased dramatically since completion of this new facility. During the period FY 1978 through FY 1984, the number of research projects, funded primarily through the Federal government and industrial firms, have almost doubled. In FY 1984, this funding amounted to almost $4.3 million. Faculty in the Department of Veterinary Biosciences have been successful in gaining research funds through the U.S. Department of Agriculture (USDA), the Department of Defense, the Agency for International Development (AID), the Food and Drug Administration (FDA) and the Environmental Protection Agency. The range of research encompasses a broad spectrum, from examination of basic, cellular functions to investigation of problems affecting the whole animal. In the study of bacterial and viral diseases, research was conducted on the shipping fever complex in cattle, brucellosis, enteric and respiratory diseases, and leptospirosis. One new strain of leptospirosis, isolated from cattle in University laboratories, is known worldwide as the Illini Strain. More recently, researchers have developed a diagnostic test for eperythrozoonosis, bacterins or vaccines for leptospirosis and TGE, and an effective test that is being used in the State Diagnostic Laboratories for the diagnosis of PRV. The parasitology section has been recognized worldwide for years for isolating and identifying many parasitic agents. University of Illinois researchers have contributed enormously to the nomenclature of parasitology and the College is recognized as a center of studies on coccidia, a causative or contributing agent in many diarrheas of livestock.

Several members of the College are involved with research on livestock blood diseases occurring in the tropical regions of the world. Supported by funds from the Rockefeller Foundation, AID and industry, they have developed a vaccine for one tropical blood disease, babesiosis, and also for anaplasmosis, a tick-borne disease that occurs in cattle in Illinois. Researchers believe the same methodology used to develop vaccines for these animal blood diseases will work against malaria in humans. While continuing their work on livestock, the same research group in Veterinary Pathobiology received a $2.4 million grant in FY 1984 to develop protective agents against malaria in cooperation with the National Institute of Health, the Department of Defense and industrial and educational institutions.

Faculty in the departments of Pathobiology and Clinical Medicine are also researching solutions for mastitis, equine parasitic diseases, equine joint disease, canine neurological disease, diseases of the eye and lung, and equine hepatic disease. Work by veterinary researchers on drug effectiveness, drug pharmacokinetics, and sulfa residues in swine enabled the USDA, FDA, and the swine industry to minimize sources of drug residues in the U.S. meat supply.

Outstanding new facilities have enabled the College of Veterinary Medicine to attract new faculty members and begin exciting new programs in computer modeling of disease interactions, bioengineering, monoclonal antibody production, and the genetics of disease resistance. Monoclonal antibodies produced at the College have already improved laboratory tests for the diagnosis of heartworm and anaplasmosis. Services offered by the animal toxicology hotline as well as research by toxicologists are helping producers in Illinois and across the nation avoid losses in their livestock. These basic research efforts, coupled with essential animal experiments and applied field trials, will provide important new information for application by industrial firms and livestock producers.

Veterinary Medicine Research Buildings

In FY 1978 and FY 1980, funding totaling $2,317.7 thousand was appropriated for construction of five buildings to support the research needs of the College of Veterinary Medicine. One facility is used for holding

and conditioning small ruminants, primates, dogs and rabbits and a related service building contains office and laboratory space including a necropsy laboratory. The remaining buildings include a gestation unit, farrowing-nursery, and finishing units which are maintained in a specific pathogen-free (SPF) environment. These facilities allow researchers to study swine through all stages of growth which benefits greatly the teaching and research program in swine management.

Colleges of Agriculture and Veterinary Medicine Land Acquisition

The appropriation of $400 thousand in FY 1978 permitted the University to acquire approximately 130 acres of valuable farm land adjacent to the previously purchased lands of the College of Agriculture. The acquisition permitted the Agricultural Experiment Station to reallocate land needed to establish an equine research facility for the College of Veterinary Medicine and to meet some of its own land needs. All of the land is currently being used to support the research efforts of the two Colleges.

The Swine Research Center

The University received appropriations in FY 1980 to support construction of a modern confinement swine production unit (34,000 GSF) at a total cost of $1,927.4 thousand.

Research projects conducted at the new facility have already had a significant impact on the Illinois and U.S. swine industries. Studies by animal scientists and collaborating researchers have provided new knowledge on swine growth, feed consumption and utilization, rate-of-gain, amino acid nutrition, and the effects of various dietary and nutritional factors on animal performance and body composition. Related research has focused on the complex environmental and physiological factors involved in swine production. Also, modified designs for farrowing crates are being examined in efforts to increase total numbers of live pigs produced per year.

Interdisciplinary studies are ongoing in several major areas. In a recent grant-funded study, pigs were utilized as a model to analyze riboflavin deficiencies in human nutrition and to better understand infant

physiology. Collaborative research involving animal nutritionists and staff members of the International Soybean Program (INTSOY) has focused on the dietary uses of soybean-based food products generated through extrusion processes.

This ongoing research will potentially benefit both livestock producers and consumers by increasing production efficiency and ultimately, provide consumers with leaner, more nutritious pork products.

Meat Science Laboratory Remodeling

The Meat Science Laboratory remodeling, approved in FY 1980 at a cost of $1,026.0 thousand, provides high-quality laboratory and office facilities for research, teaching, and extension programs in the meat science area. Major research programs are currently ongoing in three broad areas: 1) meat quality and carcass composition of production animals; 2) meat science studies, emphasizing such areas as nutritional characteristics, palatability, and processing/packaging techniques for meats and meat products; and 3) growth biology, including uses of chemical compounds and hormones to produce leaner, higher quality meats and to stimulate rapid growth in meat animals.

Several major research studies already have been conducted in cooperation with State and national livestock associations, meat processors, pharmaceutical firms, and other University departments. Efforts to improve meat quality have focused on assisting the livestock and meats industries in creating an improved or "value-added" meat product which is lean, nutritious, and healthful.

Large amounts of bacterially synthesized animal and human growth hormones will soon be commercially available, and University meat scientists are currently exploring potential agricultural and clinical applications. Faculty researchers have developed a model to examine the effects of elevated levels of growth hormone in animals, using a cultured pituitary cell line. Growth in the model has been dramatic, with animals reaching twice normal weight in two months. The model has shown that growth hormone not only stimulates animal growth, but also has a large potential to repartition nutrient intake away from fat deposition and toward building increased muscle mass and leanness.

University meat scientists have researched the positive effects of other chemical compounds, called beta agonists, on muscle growth and development in swine, utilizing the controlled environment of the Swine Research Center. They also have successfully investigated growth-promoting chemical implants in beef cattle. Results of these and further studies may be translated into lower cost, more efficient livestock production, and improved meat products for consumers.

The remodeling of the Meat Science Laboratory also has contributed to growth in the teaching component in meat science, with greater numbers of graduates pursuing careers in the meats industry. Extension meat science programs have been greatly expanded, providing research-based educational programs and assistance to small meat processors, livestock producers, and consumers.

The Meat Science Laboratory remodeling has also helped to attract increased numbers of faculty research grants. The remodeled facility has enhanced the national stature of the University's meat science program and, as a result, the University is currently competing for a $3 million Meat Irradiation Center to be funded by the U.S. Department of Energy. The proposed center would be located adjacent to the present Meat Science Laboratory and would be utilized to study the effects of low-level radiation in destroying trichinae in pork.

Agricultural Engineering Sciences Building

The Agricultural Engineering Sciences Building, one of the first major construction projects included in the Food for Century III program, was completed in FY 1984 at a total project cost of $12,002.9 thousand. The 66,000 ASF structure contains 36 specialized laboratories, including an hydraulic flume and rainfall simulator, a fluid power laboratory, and an ultra-modern food processing pilot plant. The building also provides modern classroom and office space for the Department of Agricultural Engineering and a portion of the research and teaching programs in the Departments of Food Science and Forestry.

Agricultural engineers have conducted extensive research in the area of post-harvest technology, and currently power and processing specialists are investigating new means of utilizing agricultural crops, crop

residues, and food industry by-products in the production of various fuels, chemical derivatives, and feedstocks. Alternative fuels such as vegetable oils and ethanol are being adapted for use in tractors and other prime movers. Environmental engineers also are expanding research studies in fermentation technology which includes the uses of livestock waste in producing biogas fuels, animal feeds, and fertilizers. The construction of a large-scale anaerobic digester which utilizes livestock wastes from the Swine Research Center has facilitated applied research in methane gas production from organic wastes.

Systems automation, microprocessors, lasers, and other sophisticated technologies are assuming increased importance as agricultural producers and food processors strive for greater production efficiency and improved quality control. University agricultural engineers are assuming key roles in developing and testing electronically-controlled livestock production systems and devising improved storage, handling, and drying procedures for grain and other agricultural commodities. Currently, interdisciplinary research efforts are underway to improve grain quality and minimize breakage susceptibility of feed grains during harvest, storage, and transport. This research may have far-reaching implications as U.S. grain producers seek to expand grain exports and to compete more actively in the international marketplace.

In addition, researchers are employing laser technology to analyze the efficiency of agricultural chemicals application equipment and to detect kernel defects in food and feed grains. Wood scientists are investigating new procedures for producing valuable wood chemicals and chemical feedstocks from woody biomass, including oil, glucose, acetate, and aromatic compounds. University soil and water engineers are utilizing the unique research capability of the Agricultural Engineering Sciences Building to pursue basic and applied studies in land drainage, irrigation techniques, water management, sediment transport, and soil erosion control. Expanded work in these areas will aid Illinois agricultural producers in maximizing agricultural production while preserving the State's precious soil and water resources.

The ultra-modern food processing pilot plant facilitates close cooperation among food scientists, food technologists, and processing engineers,

plus numerous linkages with the Illinois and U.S. food industries. Current research emphasizes new or improved techniques for food processing and packaging, including major studies in extrusion, fermentation, and thermal transfer. Food scientists are exploring new uses for texturized vegetable protein and protein analogs in prepared foods, as well as applications of microwave technology to optimize product quality and energy utilization in food dehydration processes. Other researchers are studying the natural water content in foods, with the ultimate goal of designing intermediate moisture (semi-moist) foods which are palatable and shelf-stable. Also, researchers are continuing the study of membrane separation which will enhance the manufacture of purified and functional protein from oilseeds, cereals, and legumes.

University of Illinois food scientists are currently investigating new ways to utilize food industry by-products, including means of optimizing microbial production of several major feedstock chemicals from cheese whey, soy blanch water, and other large-quantity food wastes. Fermentation and enzyme treatment procedures are being studied, with the goal of developing a continuous fermentation system for 2,3-butanediol (glycol) which will increase production for use in synthetic rubber, plastics, cosmetics, and pharmaceuticals. Researchers also hope to increase production of glycol through research with recombinant DNA and protoplast fusion techniques.

Veterinary Medicine Animal Room Facilities

Occupancy of the Veterinary Medicine Basic Sciences Building has permitted the College to expand its programs directed toward basic veterinary research. The building provides modern laboratory space for researchers in the departments of Pathobiology and Biosciences; however, as these research programs expanded, the College did not have sufficient space for housing small research animals. Construction of animal room facilities in an unfinished area (11,400 ASF) on the first floor of the building has provided a sophisticated animal disease research laboratory area which also meets the federally mandated requirements for research animals. Funding totaling $2,850.0 thousand was appropriated in FY 1984 and FY 1985 to complete the remodeling and provide a portion of the funding needed to

purchase equipment. The FY 1986 appropriation of $150 thousand will be used to purchase the remaining equipment required for the laboratory.

Agricultural Engineering Research Laboratory

The Agricultural Engineering Research Laboratory is currently being remodeled to provide facilities for both the Department of Forestry and the Department of Agricultural Engineering. The FY 1984 appropriation of $404.5 thousand will provide this facility with an air-conditioned structural testing floor, a new kiln and wood-preserving laboratory, a wood-properties laboratory with climate chambers and testing facilities, a hot-press laboratory, and a wood-working shop. These remodeled facilities will provide development of new types of research capabilities using wood products and other structural materials.

Plant Sciences Greenhouses and Headhouse

The Plant Sciences Greenhouse Complex, funded in FY 1984 at a cost of $10,566.1 thousand, will provide environmentally-controlled greenhouses, specialized laboratories, and essential support areas for a broad range of research programs in the plant sciences. Construction of the complex, which includes a multi-purpose headhouse (approximately 19,000 ASF) and modern, aluminum-framed greenhouses (41,000 ASF) is scheduled to begin in the fall of 1985 and will require approximately two years to complete.

Basic and applied research to be conducted at the complex will have significant economic impact on the production and use of field, forest, and horticultural crops in Illinois and the U.S. For example, forestry researchers are striving for improved productivity of marginal agricultural lands, bottomlands, and mine spoils through biotechnological manipulation of nitrogen-fixing woody plants and their microbial symbiants. Studies in tree physiology and genetics conducted at the complex will focus on the biochemical adaptation of nitrogen-fixing soil bacteria to increase silvicultural production. Tissue culture techniques also are being utilized to complement and accelerate traditional breeding selection procedures with poplars and other fast-growing tree species.

University forestry researchers are pursuing related soil fertility and herbicide studies to enhance intensive culture of short-rotation woody

plants for biomass. Work in this area will ultimately produce increased quantities of chemical extractives, feedstocks, and other valuable wood-derived products.

Horticulturalists are currently investigating new approaches to the efficient production and use of horticultural food crops, ornamentals, and turfgrasses -- studies which may directly or indirectly benefit the growing Illinois horticulture industry. The greenhouse complex will provide modern facilities for research in new growth technologies, including hydroponics, the design of energy-efficient greenhouses and improved cultural strategies for use in controlled-environment plant production. Researchers are also exploring methods of increasing plant photosynthetic efficiency, and controlling plant growth to optimize yield, quality, and nutrition.

Plant diseases continue to represent a serious economic problem in the production of field, forest, and horticultural crops. Ongoing studies in the transmission of plant diseases by insects and other pests will be enhanced greatly by the new facility's controlled environment conditions, isolation areas, and capability of growing plants in the off-cropping season. Soil temperature tanks will facilitate the study of soilborne plant diseases at a variety of soil moistures and temperatures, while controlling ambient conditions.

Recent development of a revolutionary new "laser herbicide" by a University photobiologist and a vegetable crops specialist underlines the continuing importance of cooperative or interdisciplinary research in the plant sciences. The environmentally-controlled greenhouses and isolation facilities in the new complex will permit expanded studies in such interdisciplinary areas as the effects of soil chemistry on food and ornamental crops; the nontarget effects of herbicides on soilborne diseases; and the interaction between various plant pathogens, insects, and nematodes.

Plant researchers at the University of Illinois are currently employing plant tissue and cell culture, protoplast fusion, and other sophisticated biotechnology techniques to engineer such desirable genetic traits as increased disease resistance, tolerance to environmental stress, and capability for biological nitrogen fixation in economic plants. Wild relatives of current high-yielding crop species also are being exploited as

potential sources of genetic materials. Although considerable research and testing remains, the goal of engineering improved crop species is advancing steadily.

FOOD FOR CENTURY III
FY 1987 REQUEST

Animal Sciences Laboratory - ($16,385,900)

Planning	$ 1,000,000	(FY 1986)
Remodeling	2,700,000	(FY 1987)
Building	12,485,900	(FY 1987)
Utilities	300,000	(FY 1987)
Equipment	900,000	(FY 1987)
Total	$17,385,900	

Recently, the Illinois Board of Higher Education approved consolidation of the University of Illinois Departments of Animal Science and Dairy Science into a single Department of Animal Sciences. A national search has been completed for a Department Chair who will assist in integrating the efforts of the merged faculties to provide a more efficient unit for research, teaching and public service. The long-range plan has been to consolidate animal sciences research facilities, located in five separate buildings, to the Animal Sciences Laboratory on the south campus. This location is easily accessible to related facilities on the research farm. Consolidation will facilitate interdisciplinary and multidisciplinary research efforts. Planning funds for this project, amounting to $1 million, were appropriated from the Build Illinois Bond Fund in FY 1986.

The existing laboratory (46,000 ASF) was originally constructed in 1952 and in order to meet current and anticipated research needs the building requires considerable upgrading. Also, current estimates of required research laboratory space show that the Department is deficient by more than 20,000 ASF. Construction of an addition will meet this need with modern research laboratories as well as office and support facilities. The design of the addition will be compatible with that of the existing remodeled building, consisting of a basement level and four stories above grade that are connected to the main building at all levels. Classrooms and administrative offices for the newly organized Department of Animal Sciences will be centrally located on the ground level of the five-level building complex, facilitating easy access by students and the general

public. Specialized support facilities in the building will include coldrooms, coldrooms with freezers, a tissue culture room, and various environmental chambers. Animal holding facilities will be located in the basement level of the addition, adjacent to recently remodeled animal quarters in the existing Animal Sciences Laboratory. Additional space is planned for animal preparation and holding, storage space, small and large animal surgery, and quarters for animal care-takers. Instructional laboratories will also be available for teaching in the areas of animal physiology, biochemistry, and special problems.

The addition will contain the most sophisticated research space in the complex, including laboratory animal space that will enable researchers to implement or expand numerous research programs. In the area of biotechnology, a cadre of faculty in animal sciences is involved in studies utilizing recombinant DNA techniques ("gene-splicing"), production of monoclonal antibodies, tissue culture, and work in the molecular biology of domestic animals, microorganisms, and viruses. To facilitate collaboration in the proposed structure, these scientists will be housed near biochemists, microbiologists, and physiologists working in embryo transfer and manipulation. In the development of automation, robotics, and expert systems, faculty in the animal sciences are involved in programs of electronic identification of animals; automated feeding and handling; collection into a research computer of physiological and environmental data; and development of computer systems for analysis of data, projection of likely events, and decision-making for farm management (artificial intelligence).

Animal scientists specializing in genetics at UIUC are involved in studies to improve existing U.S. livestock through genetic evaluation, to add to the animal gene pool through importation of animals or embryos, and to devise new methods using new technologies such as the supercomputer, to accelerate the rate of genetic improvement. Research animal scientists specialized in the area of nutrition are involved in improving the bioavailability of vitamins, utilizing by-products for animal feedstuffs, establishing the mechanism of action for growth hormone in improvement of milk production, and enhancing the ability of the animal to utilize cellulose-containing materials for production of meat and milk.

Finally, interdisciplinary research in animal behavior, biochemistry, immunology, physiology, and microbiology will provide basic answers to practical problems, leading to the more efficient production of high-quality animal products.

The total cost of the Animal Sciences Laboratory addition and remodeling has been estimated to be $17,385.9 thousand; construction of the new addition will require $12,485.9 thousand. Planning funds for the project were appropriated in FY 1986 and the remaining funds required for completion of the project, $16,385.9 thousand, are requested in FY 1987 for remodeling, new construction, building utilities, and equipment.