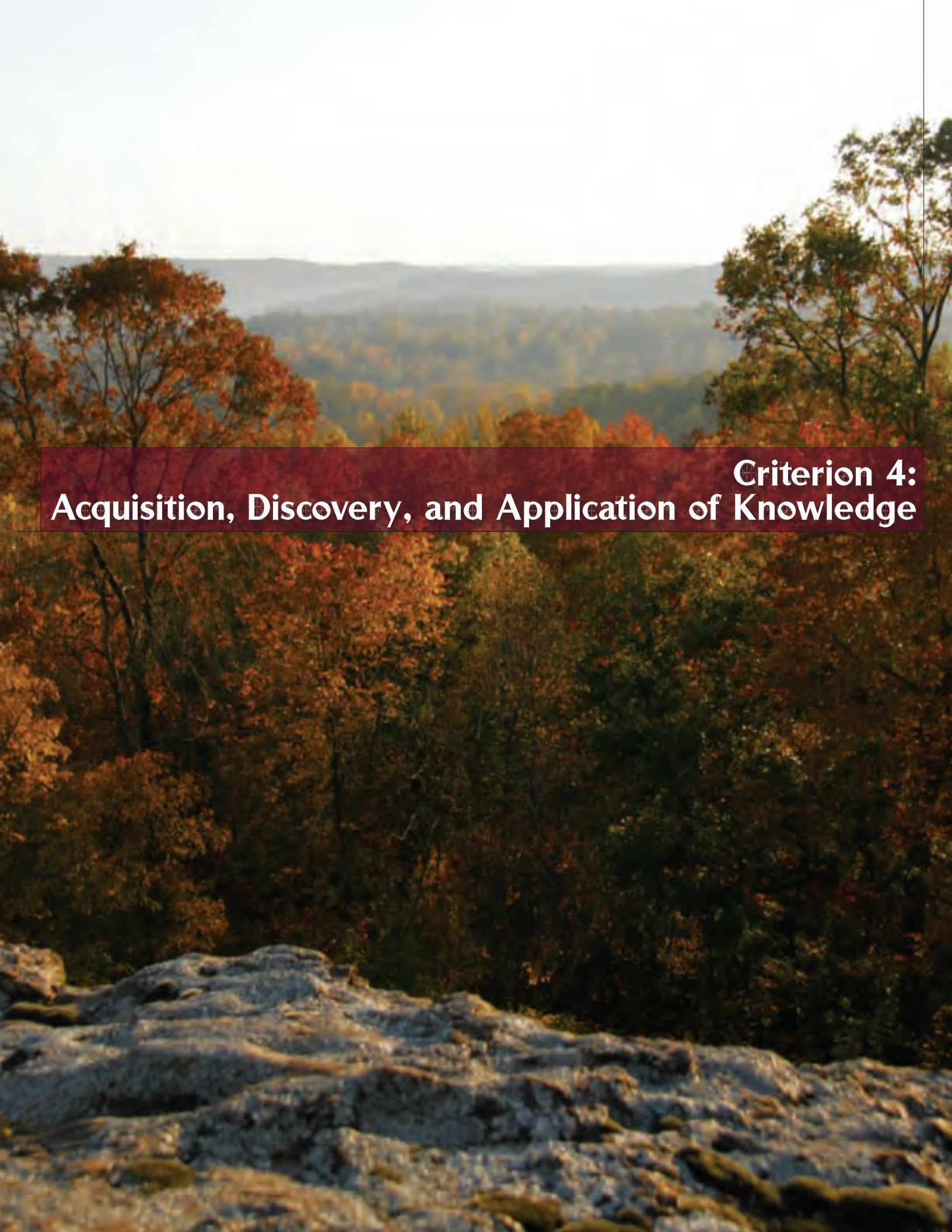


# Criterion 4: Acquisition, Discovery, and Application of Knowledge

# Criterion 4: Acquisition, Discovery, and Application of Knowledge

*The organization promotes a life of learning for its faculty, administration, staff, and students by fostering and supporting inquiry, creativity, practice, and social responsibility in ways consistent with its mission.*

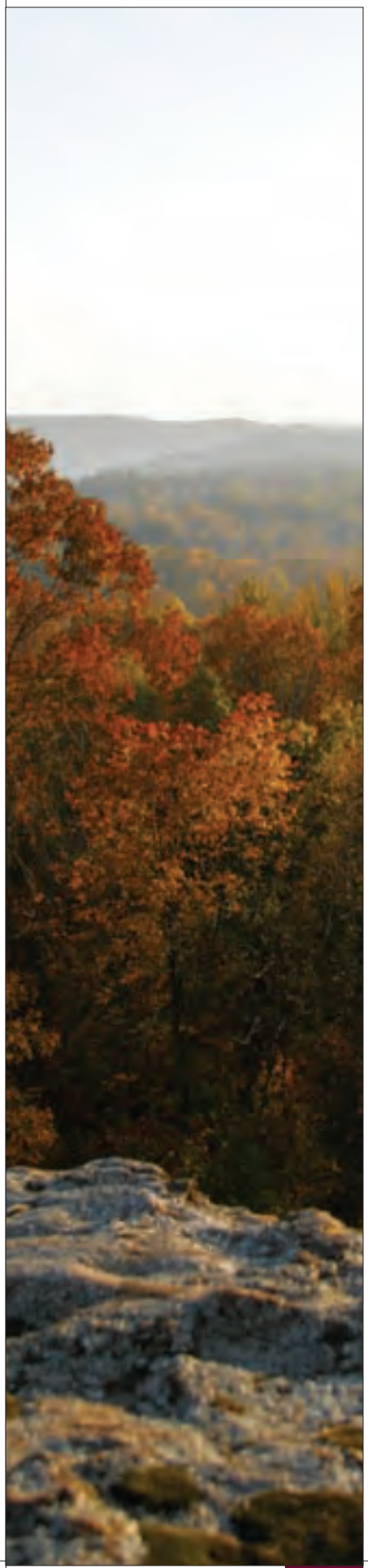
The Carnegie Foundation classifies Southern Illinois University Carbondale (SIUC), including the School of Medicine Springfield (SOMS) as a Research University (high research activity). As such, the university is committed to supporting "lives of learning" throughout the community through the basic and applied research, scholarly and creative activities, and regional service/outreach endeavors of its faculty, staff, and students. This commitment is clearly articulated in the university's foundational documents. For example, the mission statement of Southern Illinois University Carbondale, revised by the Board of Trustees on March 13, 2003, states:

> *Committed to the concept that research and creative activity are inherently valuable, SIUC supports intellectual exploration at advanced levels in traditional disciplines and in numerous specialized research undertakings, some of which are related directly to the southern Illinois region.*[290]

*Southern at 150: Building Excellence through Commitment* is the campus-wide, long-range planning document that seeks to chart SIUC's progress to the institution's sesquicentennial in 2019. This 2003 document specifies that because a university goal is to "enhance the culture of research and scholarship,"

> *Research and scholarship will be integrated into every decision made on campus. Improvement can be realized in the development of the research enterprise on campus. Building a culture where research becomes an integral part of all undergraduate and graduate programs is essential.*[291]

These statements establish an ambitious charter for campus action.



290 http://bot.siu.edu/leg/policies.html#1A.

291 *Southern at 150: Building Excellence Through Commitment*, p. 31.

At SIUC, "research" is a shorthand term for the diverse individual and collaborative activities of the life of the mind that are central to the mission of all universities. These activities include all manner of approaches to basic intellectual inquiry, discovery, acquisition, and applications of knowledge and understanding, including lab-, field-, and clinically-based research and research training, scholarly activities in libraries and archives, and creative activity in studios and on stages. The term research is so used here, as shorthand but in the most inclusive sense.

As a "high-research" institution, then, SIUC maintains a commitment to applying research activities in support of "lives of learning" among all members of the university community. Their actions, successes, and responses to new initiatives illustrate, on a daily basis, how a life of learning is valued and pursued. This chapter addresses the ways the Carbondale and Springfield campuses, separately and together, promote and support a life of learning throughout their internal and regional communities by encouraging and nurturing the acquisition, discovery, and application of knowledge.

## Core Component 4.a: The organization demonstrates, through the actions of its board, administrators, students, faculty, and staff, that it values a life of learning.

SIUC attaches great value to research and research training, scholarship, creative activity, intellectual inquiry (cumulatively "research") and lifetime learning among all members of the university community—faculty, students, staff, and the broader regional public. The material presented here illustrates not only the myriad ways in which resources are allocated by the institution to support these pursuits, but also how such support has led to singular scholarly and creative accomplishments. These, in turn, enhance and expand an environment in which such results have now become both the expectation and the norm.

### Reinvigorated Support for Research and a Life of Learning

Since the 1999 North Central accreditation visit, SIUC has thoroughly transformed its research enterprise through the creation of the Office of the Vice Chancellor for Research and Graduate Dean (OVCR/GD) in 2002, supported by *Southern at 150*. To understand the current role of research at SIUC in the early twenty-first century and the increased support of the institution's "board, administrators, students, faculty, and staff" for research-

related endeavors, it is useful to give brief consideration to its history.[292]

As described in the chapter on Criterion 1, Southern Illinois University began as a teacher's college, but granted its first Ph.D. degree in 1959 after being elevated to a university in 1947. SIUC subsequently developed into a major research institution. This evolution was stimulated in part by the new, post-World War II, U.S. national science policy that highlighted the role of university research in enhancing the economy and the federal government's role in funding basic science research. Another stimulus was SIUC President Delyte Morris, inaugurated in 1949, who launched an ambitious agenda that included expanding curricula, developing Ph.D. programs, adding a medical school, founding the SIU Press,[293] and stressing the critical integration of instruction and research for the regional economy:

> *It seems reasonable to encourage the future growth of the curriculum and the future development of research in the directions best adapted to the special assets and the special needs of the area. It is obvious that we need to develop thoroughgoing instructional and research programs in such fields as forestry, horticulture, . . . coal mining, recreation, geography, geology, sociology, labor relations, archaeology, ichthyology, ornithology, flood control, and wildlife studies . . . .*[294]

The growth of research programs was facilitated by creation of the Graduate School in 1951 along with the Graduate Council. From its very beginnings, the Graduate School's dual educational and research missions were viewed as "intrinsically related in the functioning of a programmatically comprehensive university."[295]

By 1989 SIUC was categorized as a Carnegie Research II university and Morris Library was among the nation's top sixty research libraries. Then-Chancellor Lawrence Pettit cited five "themes" in SIUC's mission and purpose in his strategic plan: "comprehensive undergraduate education, strengthened and targeted graduate and professional education, a cultivated diversity, professional and moral concern for the natural environment, and a general emphasis on public policy issues and public service."[296] He observed then that new

292 See Prudence M. Rice, "The Role of Research/Scholarly/Creative Activity at SIUC: A State-of-the-University and State-of-ORDA Report" (April 19, 2000; http://www.orda.siuc.edu/reports/siuc_research.pdf). Also John A. Koropehak et al., "Reinventing the Mid-Level Research University," *Journal for Higher Education Strategists*, vol. 1, no. 1 (2003), 11-31.

293 The SIU Press, founded in 1956, publishes in composition and rhetoric, aviation, American and Civil War history, Lincoln, theater, history, poetry, and other areas.

294 Betty Mitchell, *Delyte Morris of SIU* (Carbondale: Southern Illinois University Press, 1988), p. 16.

295 Graduate School 1997 Self-Study document, p. 1, in the Office of the Director, Graduate School.

296 Thomas Britton et al., "Strategic Planning for Southern Illinois University" (1989), p. 2, in the Office of the President, Southern Illinois University.

physical facilities, including a new library and engineering and life sciences buildings, were "absolutely essential" to sustain these emphases.

Unfortunately, during the 1990s—a decade of enormous increases in federal spending on university research—research productivity at SIUC grew slowly if at all, a point noted in the 1999 Self-Study Report. Not only did research fail to grow, it stagnated. The state funding environment was dominated by the belt-tightening policies of "P*Q*P." P*Q*P was a planning process of the Illinois Board of Higher Education (IBHE) to refocus Priorities, improve Quality, and enhance Productivity among all public post-secondary institutions in Illinois (see Core Component 2.a). Thus the campus stressed instruction and affordability rather than the generation of new resources. Several hundred graduate assistantship lines and more than one hundred tenure/tenure-track faculty lines were eliminated to trim the budget (Figures 4-1 and 4-2).

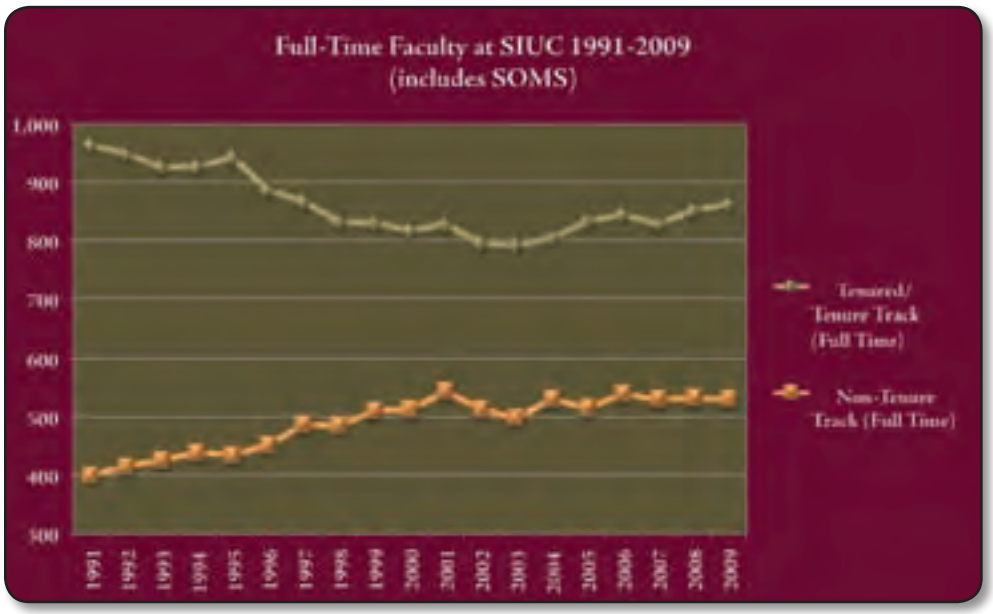



Figure 4-1. Full-time faculty, 1994-2009.[297]

297 IPEDS Fall Staff Survey [EE06] Fall semesters 1994-2008; also *Southern Illinois University Carbondale Factbooks 2000-2001* through *2009-2009*.


Figure 4-2. Graduate assistants, 1991-2009.[298]

The flat research profile was accompanied by a gradual demotion of administrative responsibilities for research oversight on campus. Research moved out of the hands of a vice president for academic affairs and research to the vice president for academic affairs and provost, and then, accompanying a reversal of president and chancellor titles, became a third-tier parenthetical function: associate vice chancellor for academic affairs (research)" (AVCAAR). Information about research productivity ceased to be requested in annual departmental and college-level achievement reports.

### *Increased Productivity*

Clearly, research had to be returned to priority status within the university. One step was taken in 1999 via the Graduate School's "Master Plan," which identified three goals: (1) increase the amount, quality, and visibility of sponsored and university research at SIUC; (2) increase the resources available to attract, retain, and graduate high-quality advanced students; and (3) build on existing faculty/staff strengths and research partnerships to benefit the citizens of the state of Illinois and the regional and state economies. At the time, however, amid widespread campus calls for SIUC to "go for" Carnegie Research I status, virtually no one was aware that the institution was barely maintaining its qualifications as a Carnegie II institution.

Another important step was to reverse the long decline of internal research-support dollars and return to investment in the research mission. First, a new plan was adopted for redistributing the Facilities and Administrative (F&A) or "indirect" cost returns (IDC),

298 IPEDS Fall Staff Survey [EEO6] Fall Semesters 1994-2008; also *Southern Illinois University Carbondale Factbooks 2000-2001* through *2008-2009*.

the reimbursed "overhead" dollars charged to grants. The existing plan was an 80:20 distribution, in which 80 percent of the returned dollars went to the chancellor (including 19-26 percent to what was then the AVCAAR) and 20 percent to the generating units (colleges, centers, departments), which had their own internal plans for reallocation. This was changed to 70:30, with 40 percent returned to the AVCAAR and 30 percent returned to the generating units. This plan was implemented in FY01.

In addition, SIUC negotiated new F&A cost rates. Partly because of the general administrative neglect of the research mission in the 1990s, the university was out of compliance with the federal requirement to negotiate new rates every three years with the Department of Health and Human Services (DHHS), SIUC's cognizant federal agency. The campus' last proposal had been in FY90, after which the university requested and was granted two extensions of the FY91 rate. In response to the last request in FY97, however, those rates were adjusted downward one percentage point (to 41 percent) as a penalty for failing to prepare and negotiate complete rate proposals. Although individual researchers understandably enjoyed these low rates, the failure to capture the true costs of doing research and secure adequate reimbursement for them meant a substantial loss of income to the university—doubly painful because of the simultaneous declines in state appropriations to the institution. As discussed below, since FY01 SIUC has negotiated three tri-annual F&A rate proposals with DHHS, each time receiving increases.

The most visible and effective way to return research to priority status was to (re)create a high-level administrative position charged with leading the research mission, a suggestion made rather obliquely in the 1999 NCA evaluation report (pp. 19-20). Initially this was not a popular idea, given an aversion to increasing the administrative ranks on campus, but by 2001 the proposal to create a vice chancellor for research position had garnered wide support among various constituencies, including the Graduate Council, the deans, the Graduate and Professional Student Council, and the *Daily Egyptian* student newspaper, as well as then-Chancellor Walter V. Wendler, the SIU system president, and the Board of Trustees. The BOT approved the OVCR/GD in 2002, and the associate vice chancellor for research position was created the following year.

Figure 4-3 provides one indicator of research productivity on the Carbondale campus: data on various kinds of publications between calendar years 1999 and 2008. Clearly the rate of productivity increased over this period, as the number of faculty (indicated by a line) did not increase commensurately with the increase in publications.

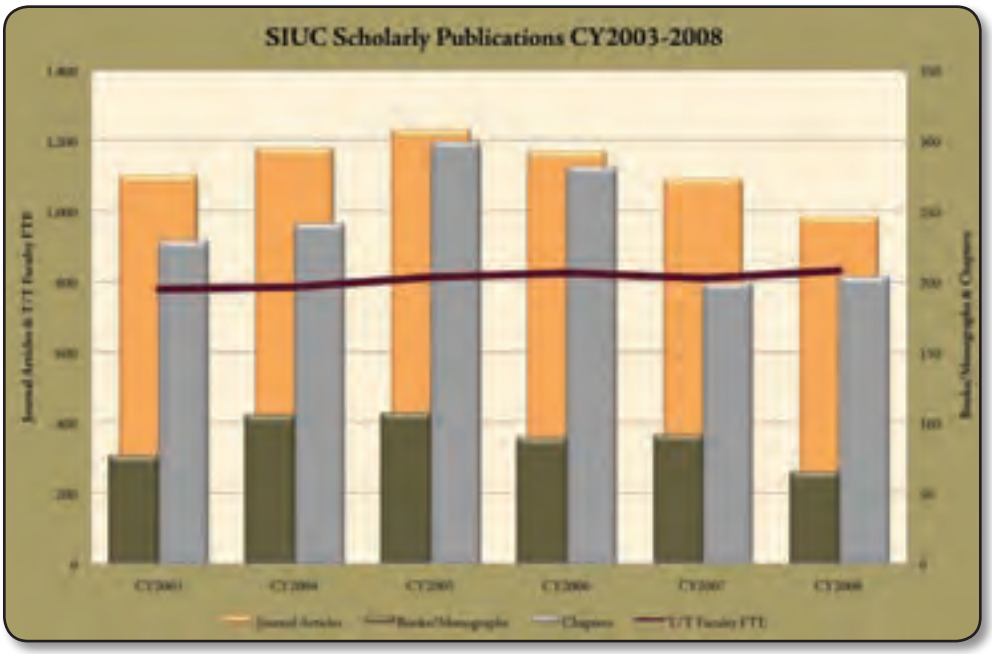



Figure 4-3. Faculty publications (CY1999-2002 does not include SOMS; 2003-2008 includes SOMS. *Source:* Annual Deans' Reports to the Office of the Vice Chancellor for Research.

Figure 4-3 appears to show a decline in publications after CY05, but this is explained by a change in protocols for reporting data on creative activities, such as exhibitions, performances, and other non-published presentations. The College of Liberal Arts (CoLA) had been using a formula to convert productions and exhibitions into the equivalent of publications. Since CY06, however, these have been tabulated separately.

Figure 4-4 is a compilation of data on creative and artistic activities for the last five years in CoLA (2004-2008).

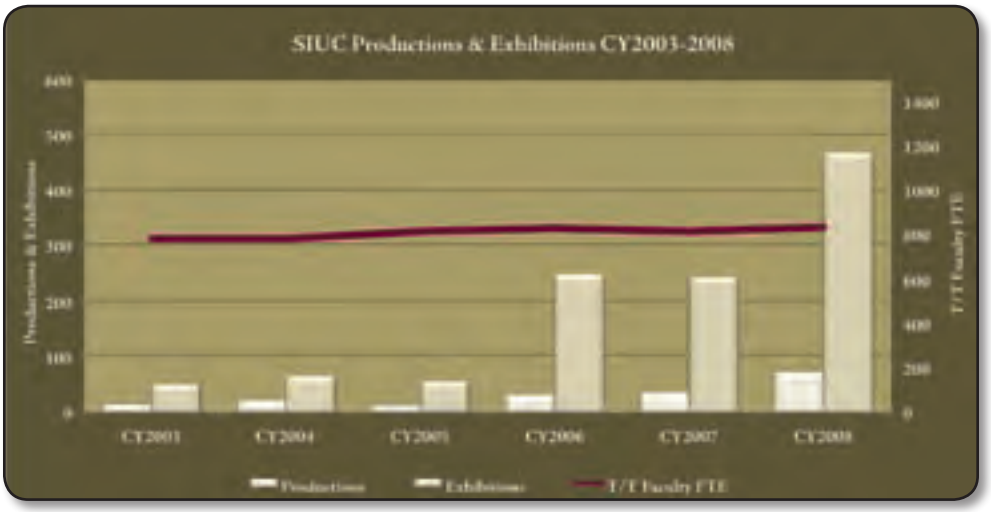



Figure 4-4. SIUC Productions & Exhibitions, CY2003-2008. *Source:* Annual Deans' Reports to the Office of the Vice Chancellor for Research

### *External Proposal, Award, and Expenditure Data*

External funding is an important source of income for research universities to support the intellectual life and learning in the institution at all levels: faculty, staff, students, and the community. Such funding also increases its national visibility and prestige. All proposals to external sponsors, and all awards and contracts from such external sources, must pass through review in the sponsored-programs offices of the two campuses, the Office of Research Development and Administration (ORDA) at Carbondale and the Office of the Associate Dean for Research and Faculty Affairs (ADRFA) at Springfield.

ORDA maintains databases to track these activities at both SIUC and SOMS. In virtually all reports of proposal, award, and expenditure data by ORDA and the Office of Accounting Services, whether in our own publications or as IPEDS data to the National Science Foundation (NSF), data for the two campuses are combined. This is also true in the discussions and illustrative material below, unless indicated otherwise.

Success in externally sponsored research, scholarly, and creative activities may be expressed by various quantitative measures: numbers of external proposals submitted; numbers and dollar amounts of incoming awards; numbers and dollars of federal (versus other) awards; numbers and dollars of research and development (R&D) compared to other kinds of awards; total R&D expenditure dollars; federal R&D expenditure dollars; institutional rankings on these indicators (published by the NSF); and so on. SIUC, through the OVCR/GD, ORDA, and Office of Accounting Services, carefully monitors all measures and uses the data in different ways to assess the progress of our research enterprise.

Proposal submissions tend to fluctuate from year to year, in part because the most research-active faculty may be submitting proposals for multi-year projects. The overall data, shown in Figure 4-5, reflect a sharp decline in proposal submissions from both SIUC and SOMS in the last half of the 1990s, and a marked increase with the renewal of the research mission of the university at the turn of the millennium. Proposal submissions have declined again since 2006, for reasons that are unclear.

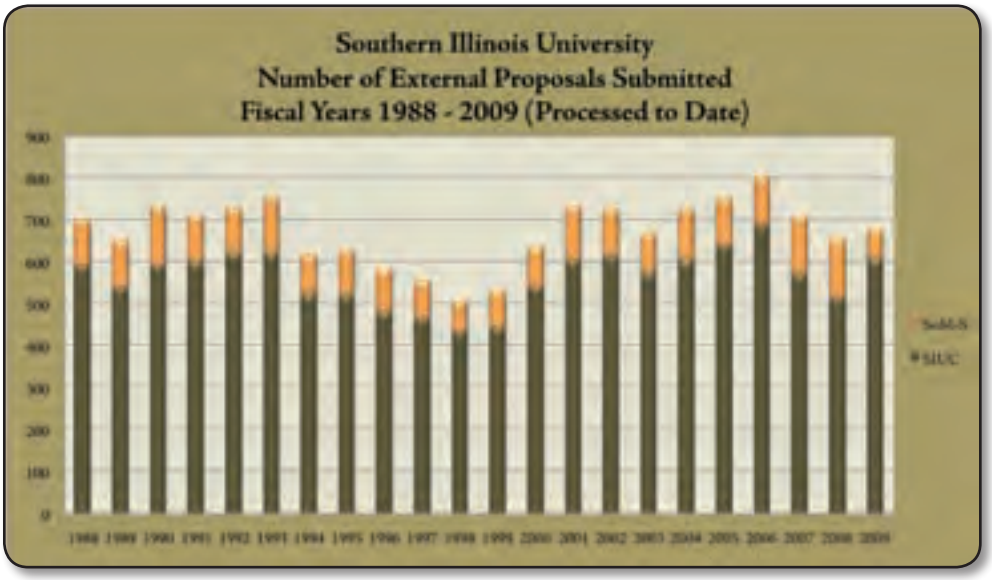
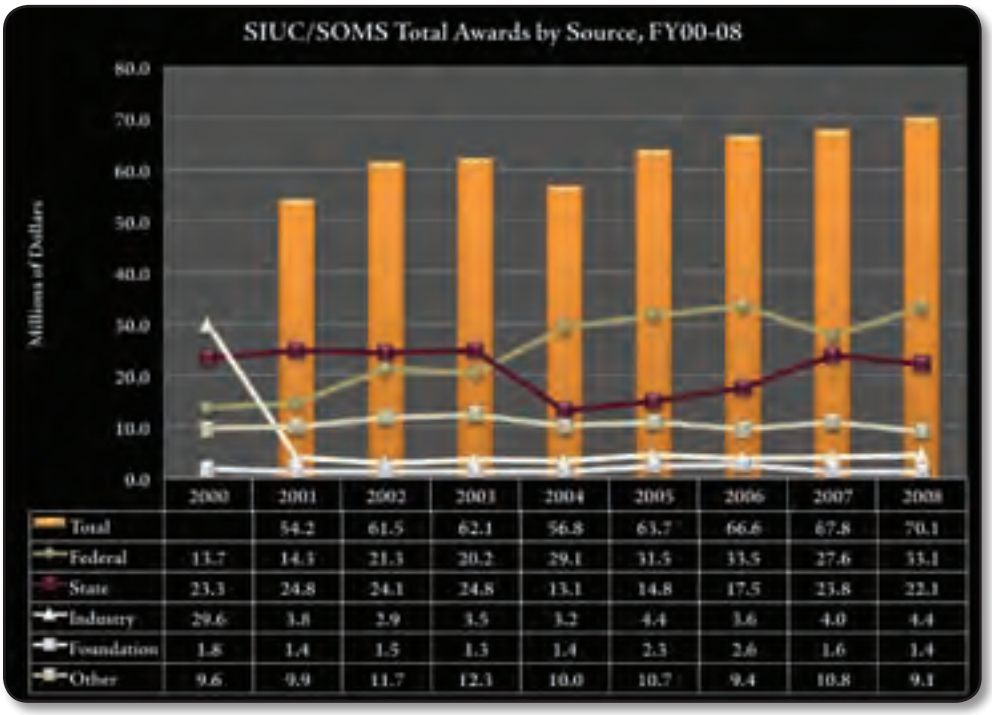



Figure 4-5. External proposals, 1988-2009. *Source:* Office of Research Development and Administration.

The sources of external awards (excluding financial aid) to the Carbondale and Springfield campuses are presented in Figure 4-6. The primary sources of funding for the university are federal and state dollars, with federal dollars increasing over this period and state dollars decreasing. Funding from industry, foundations, and "other" sources do not show clear trends.




| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|
| Total | | 54.2 | 61.5 | 62.1 | 56.8 | 63.7 | 66.6 | 67.8 | 70.1 |
| Federal | 13.7 | 14.5 | 21.3 | 20.2 | 29.1 | 31.5 | 33.5 | 27.6 | 33.1 |
| State | 23.3 | 24.8 | 24.1 | 24.8 | 13.1 | 14.8 | 17.5 | 23.8 | 22.1 |
| Industry | 29.6 | 3.8 | 2.9 | 3.5 | 3.2 | 4.4 | 3.6 | 4.0 | 4.4 |
| Foundation | 1.8 | 1.4 | 1.5 | 1.3 | 1.4 | 2.3 | 2.6 | 1.6 | 1.4 |
| Other | 9.6 | 9.9 | 11.7 | 12.3 | 10.0 | 10.7 | 9.4 | 10.8 | 9.1 |

Figure 4-6. SIUC-SOMS combined total awards by source (excludes financial aid). The $29.6 million in industry funding in 2000 includes a one-time award of $24.75 million from Ilinois ComEd to the SIUC Clean Coal program. *Source:* Office of Research Development and Administration.

Federal funding declined in FY07, as it did for all universities, because of the overall cuts in federal spending on research in the national budget.[299] A recovery in FY08 may presage a resumption of the decade's upward trend. As of this writing (October 2009), only three months into the fiscal year, SIUC has been awarded more than $3 million in federal funding through the American Recovery and Reinvestment Act of 2009.

A comparison of Figure 4-5 and Figure 4-7 shows data that appear contradictory: the number of external awards received is declining at SIUC, while oscillating at SOMS, whereas the total dollars of the awards are increasing steadily at Carbondale (and oscillating at SOMS). This clearly indicates that researchers are setting and achieving ambitious goals: to bring in the larger and more prestigious grants, especially from federal sponsors.

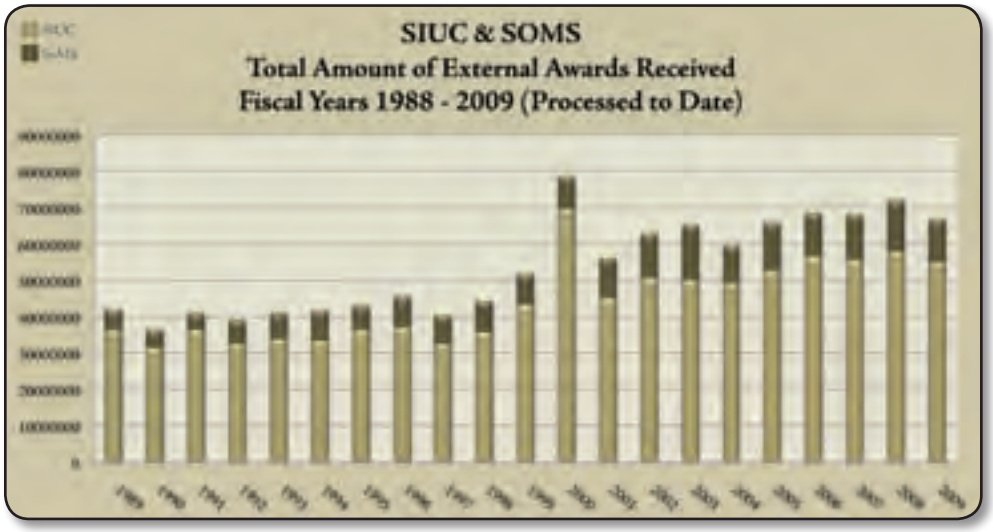



Figure 4-7. Amount of external awards, 1988-2009 (excluding financial aid). The spike in 2000 includes a one-time award of $24.75 million from Ilinois ComEd to the SIUC Clean Coal program. *Source:* Office of Research Development and Administration.

The primary sources of federal funds to SIUC/SOMS over the years are the National Institutes of Health (NIH), non-NIH funds from the DHHS, the NSF, and the U.S. Department of Education; the primary sources of state of Illinois funding are the Department of Commerce and Economic Opportunity (DCEO), Department of Child and Family Services, and Department of Education.[300]

Another way of measuring research productivity is through the money expended on such activities. Expenditure data reflect the amount of money spent on research activities primarily from the external awards brought to campus (and the associated F&A returns), as the principal investigator spends those funds in the course of carrying out the project. At SIUC, these research expenditures are not tracked by ORDA but rather by Accounting

299 http://www.nsf.gov/statistics/infbrief/nsf08320/.

300 Grant reports available in the Office of Research Development and Administration.

Services and are reported annually to the NSF. NSF tracks them as R&D expenditures for the sciences, engineering, agriculture, social sciences, and psychology, but excludes education, humanities, the arts, law, and library science.[301]

Expenditure data are typically presented as "total R&D" and "federal R&D." Figure 4-8 shows SIUC's total R&D expenditures since 1989 compared with the national total R&D expenditures.[302] Since 1998, total R&D expenditures at SIUC/SOMS have increased by a mean of 12 percent per year, exceeding not only the national rate (~5 percent) but also the goal of 11 percent in *Southern at 150* (p. 30).

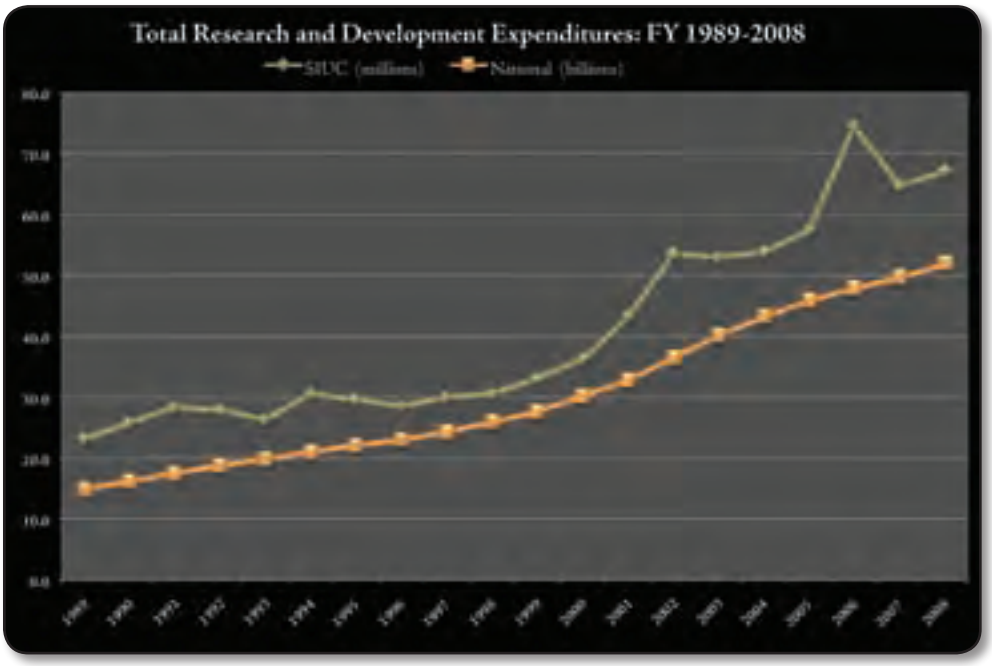



Figure 4-8. Total R&D Expenditures for SIUC/SOMS compared with national trends, FY89-08.
*Source:* National Science Foundation, Academic Research and Development Expenditures.

Another commonly cited measure of research productivity is the expenditure of federally granted funds. SIUC's expenditure of federal R&D funds in 1989 was approximately $7.8 million whereas the mean national expenditure was about $15.2 billion. By 2007, mean national expenditures had risen to $30.4 billion—twice the 1998 figure—and SIUC's expenditures of federal R&D funds in 2008 were $17.5 million, or just over 2.2 times the 1998 amount. These increases are shown graphically in Figure 4-9,[303] which presents a parallel to the increase in total R&D expenditures in Figure 4-8. Both figures underscore

301 http://www.siu.edu/~ovcr/profile.html; http://www.siu.edu/~ovcr/profile.pdf.

302 SIUC data: NSF Division of Science Resources Statistics, Survey of Research and Development Expenditures at Universities and Colleges, FY 2006, Table 27 (1999-2006), FY2007: SIUC Accounting Services. National data: NSF Division of Science Resources Statistics, Survey of Research and Development Expenditures at Universities and Colleges, FY2007, Table 1; InfoBrief, NSF 08-320, Table 1.

303 Ibid.

the degree to which SIUC researchers have excelled, over and above national levels, in committing themselves to the research enterprise and to bringing in external funding.

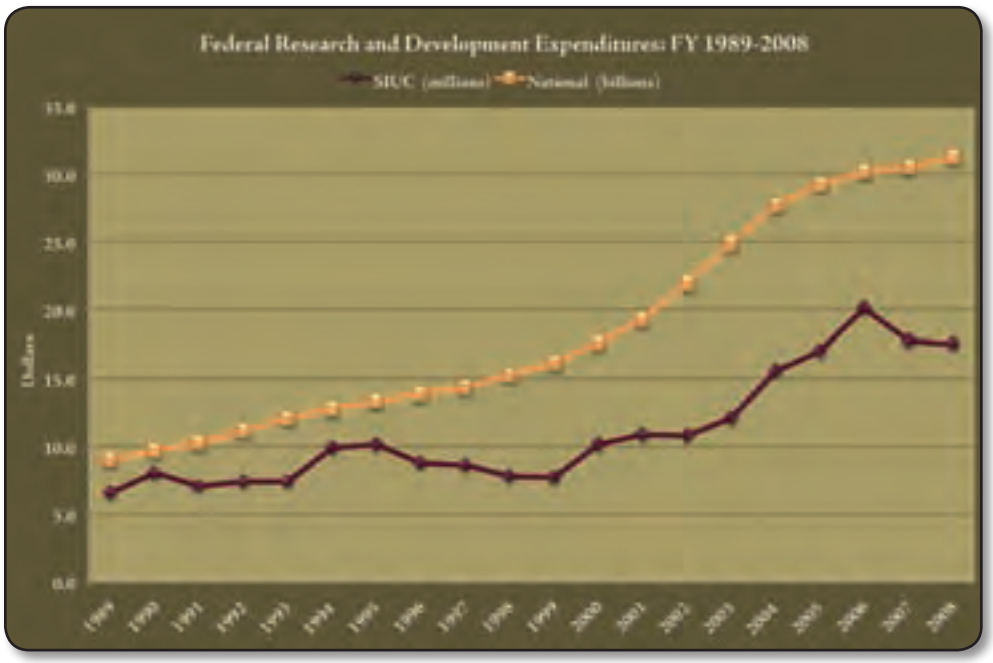



Figure 4-9. Federal R&D Expenditures for SIUC/SOMS compared with national trends, FY89-08. *Source:* National Science Foundation, Academic Research and Development Expenditures.

NSF accumulates the total and federal R&D expenditure data and ranks universities on these figures. One of the primary goals of *Southern at 150* is for SIUC to be ranked among the top 75 public research universities in the country according to NSF rankings by total R&D expenditures. Figure 4-10 shows SIUC's ranking in total R&D among public institutions, between 1975 and 2008 (based on NSF data). SIUC's ranking peaked at 84 in 1985, then declined for the next thirteen years.


Figure 4-10. SIUC's ranking among public universities, 1975-2007, and growth in total R&D expenditures (includes SOMS). *Source:* NSF.

Among public universities, in 1999 SIUC ranked 108th nationally with $33.17 million in total R&D and 161st in federal R&D with $7.66 million. In 2006, SIUC ranked 101 nationally in total R&D ($74.52 million) in total research and development expenditures[304] and 133 in federal, which nearly tripled to $20.11 million. Unfortunately, even though our emphasis on obtaining external funding and hiring faculty in critical areas has been demonstrably successful and improved our rank relative to 1999, in 2007 we dropped back to 108 in total expenditures as other universities slipped ahead of SIUC once again.

Figure 4-10 also indicates that, whereas sponsored research activity at SIUC was essentially flat-lined during the 1990s, a time of administrative neglect, it grew dramatically after 2000 with the creation of a high administrative position charged with leading the campus research enterprise and the *Southern at 150* planning process. These data on proposals, awards, and expenditures demonstrate that, indeed, "scientific discovery, scholarly inquiry, and creative achievement are central to the mission of Southern Illinois University Carbondale" and to its faculty.[305]

SIUC and SOMS should and do take pride in this overall growth, but the situation is not completely rosy. There are year-to-year fluctuations in the success registered by these indicators, and sometimes it appears that progress has slowed. SIUC suffered, as have all institutions, from the economic downturn after September 11, 2001, but in Midwestern states such as Illinois, the economies have been particularly slow to recover. In addition, the Illinois budget has not been kind to higher education or research. SIUC has always depended heavily—perhaps too heavily—on state funding for some of its research programs; and sponsorship by many of these, especially the Illinois Council on Food and Agricultural Research (C-FAR), Department of Community and Economic Opportunity, and the state matching-grant program, has been crippled or disappeared entirely. Moreover, as noted above, federal funding for research declined in 2007 and 2008, and these declines may be reflected in the SIUC data. Federal support is clearly on an upswing with ARRA funding in 2009, however. In any case, setting ambitious goals and high expectations is important; and while a top-75 ranking is a laudable goal to strive for, it may be unrealistic in these difficult budgetary times.

## The Office of the Vice Chancellor for Research and Graduate Dean

The Office of the Vice Chancellor for Research and Graduate Dean (OVCR/GD) was established at SIUC in 2002. As the central administrative unit responsible for leadership

304 See http://www.nsf.gov/statistics/nsf08300/content.cfm?pub_id=3797&id=2, Table 32.

305 http://vcresearch.siuc.edu/profile.html.

and oversight of the university's research and graduate education missions, the OVCR/GD is also charged with fostering a culture of "life of learning" on campus and in the community. The OVCR/GD is home to two administrative units, the Graduate School and the Office of Research Development and Administration (ORDA), as well as several research centers: Center for Delta Studies, Center for Ecology, Center for Integrated Research in Cognitive and Neural Sciences, Coal Research Center, Cooperative Wildlife Research Laboratory, Fisheries and Illinois Aquaculture Center, Materials Technology Center, and Middle Mississippi Wetland Research Field Station.

### *Planning*

Strategic planning is a key element for fostering and sustaining a climate that successfully engages a university community in inquiry, creativity, practice, and responsibility. In 2004, in response to *Southern at 150*, the OVCR/GD developed an internal "Strategic Plan: Building Excellence in Research, Graduate Programs, and Economic Development at SIUC."[306] As articulated in this plan, the mission of the office and its constituent units is "to lead the organization and administration of all graduate programming, research and creative activities, and economic development efforts (including technology transfer) of the University." The primary responsibilities of the OVCR/GD are to:

- *Support and integrate the research (including that done by undergraduate students), graduate education, and service missions of the university to promote academic excellence;*
- *Facilitate the sharing of knowledge and expertise in order to enhance economic development—including that derived from university-based research—in the southern Illinois region and beyond;*[307] *and*
- *Promote responsibility in the conduct and administration of these activities.*[308]

This strategic plan was informed by the reports of two groups of consultants who had been brought to campus by the VCR to assess the research and scholarly programs at SIUC and provide guidance about the overall campus research enterprise. One of these was the Washington Advisory Group (WAG), who evaluated science and engineering programs. Their recommendations included: (1) strategic planning; (2) hiring additional research faculty; (3) focusing "efforts on a limited number of interdisciplinary research areas or thrusts";

306 http://vcresearch.siuc.edu/2004strategicplan.pdf.

307 At the time of development of this plan, the Office of Economic and Regional Development (OERD) reported to the OVCR/GD.OERD has since been moved to the office of the SIU system president (see the chapter on Criterion 5).

308 OVCR/GD Strategic Plan, p. cit. (in note 18).

(4) addressing research space and infrastructure needs; and (5) conducting a successful development campaign "to build faculty quality and research infrastructure."[309] On the basis of recommendation (3), areas of research emphasis were identified as biotechnology, energy and the environment, nanotechnology and materials, and neuroscience. A parallel study of the humanities, arts, and social sciences (HASS) complemented the WAG report. The recommendations of this group included: (1) have units engage in strategic planning; (2) provide dedicated research support at the college level; (3) hire internationally-renowned, research-active faculty at the full professor level; and (4) improve communication with the colleges regarding the goals of *Southern at 150*.[310]

The OVCR/GD internal strategic plan is a living document, with all reporting units annually required to set objectives within its framework and evaluate success in achieving them. But planning cannot effectively guide administrative action to establish and maintain a vigorous intellectual culture unless it incorporates the means of acquiring and investing resources—money, human talent, and space—into the enterprise, along with generous acknowledgment of the hard-won successes throughout the campus community by means of recognition, awards, and rewards.

### *Resources: Money and Human Capital*

With respect to acquiring financial support for "research" writ large, the 2001 (pre-OVCR/GD) campus plan for distributing F&A cost returns has already been mentioned. This plan increased the amount of returned dollars that was allocated to research administration, as well as to the generating units. Of the 30 percent returned to the units, the plan specified that one-third must be returned to the department, thereby encouraging (in principle) departments and individual faculty to seek external funds and reap the benefits of associated cost returns to cover various research-related expenses.

In addition, indirect cost returns to the campus have increased because, as noted, since 2001 the university has negotiated its F&A rate proposal with DHHS three times. Each brought a higher rate, which means more income to the university, the VCR, and the generating units. The last negotiation raised our full, off-campus rate to 45.5 percent from July 1, 2008 through June 31, 2012.[311] This, plus the overall increase in external funding for research-related activities, has meant that the F&A returns to SIUC and SOMS climbed from $4.5 million in FY99 (with a 41 percent rate) to nearly $8 million in FY09.

309 See http://vcresearch.suc.edu/WAGDiscBckgd.doc.

310 See http://vcresearch.siuc.edu/arts_humanities_social.doc.

311 http://orda.siuc.edu/rates/indirect.html.

The OVCR/GD's share of the F&A cost returns assist research, scholarly, and creative activity for faculty, students, and staff throughout the campus, for example:

- Providing travel funds (administered through ORDA);
- Assisting with facilities renovations (including those in the School of Art and Design, Agricultural Sciences, Science, Engineering, and the Vivarium);
- Assisting with start-up costs for new faculty;
- Supporting Morris Library;
- Supporting undergraduate research;
- Maintaining graduate fellowships (to compensate for state budget cuts);
- Miscellaneous needs (e.g., grad student recruiting, external performance reviewers [Kleinau], machine shop upgrade, transferring equipment from the former glassblowing shop to the School of Art and Design, subscribing to research databases such as Community of Science, etc.); and
- Providing matching funds for grants.[312]

In FY01 and FY02, the OVCR/GD began several initiatives to increase the number of high-quality, tenure/tenure-track, research-productive faculty. In FY01, $1.2 million was acquired through the campus RAMP process to provide a central pool of resources to enhance SIUC's competitiveness in hiring such faculty by supporting start-up costs. In FY02, with the support of the Graduate Council, the "Strategic Faculty Hiring Initiative." later renamed the "Faculty Hiring Initiative" (FHI) was begun to make good programs better, leverage existing strengths, position success in disciplinary/interdisciplinary areas showing great potential for growth, enhance core doctoral programs lacking critical mass, and address concerns about core programs that have been raised in on-going program reviews.[313] The FHI invested $2 million in new tuition funds to create twenty-eight new positions beginning in FY04. Subsequent studies by external advisors (WAG, HASS) lauded the FHI, but indicated that significant additional growth in faculty positions was required to achieve the university's goals. In response, a ten-year, $1 million/year plan was developed and implemented in FY05-07. The following year, however, this program was put on hiatus owing to budget challenges.

Overall, seventy-four positions were approved and sixty-four (S)FHI hires are currently at SIUC. Since coming to SIUC, these energetic new faculty members have garnered internal and external awards and they account for:[314]

312 See http://www.orda.siuc.edu/internal/matching.html.

313 See Core Component 4.c.

314 OVCR/GD, "Long Range Planning for Faculty Hiring at SIUC in the 2000s: A Synopsis and Preliminary Assessment, 5/21/08."

- $8.1M in external grant funding on campus;
- 250 peer-reviewed journal articles, 8 books, 45 book chapters, 67 productions, and 35 exhibitions;
- 570 international/national and 80 regional/state presentations;
- 10+ patents and 6 patent applications; and
- 4 NSF CAREER Awards.

In addition, although two-thirds of these faculty have only been on campus for the past year:

- 7 (11 percent) have won national or campus teaching awards, enhancing the teaching mission of the university;
- 11 (17 percent) have won national or campus research awards, enhancing the scholarly reputation of the campus; and
- 2 have been recognized for their service activities.

Recognizing the important role of advocacy and leadership for research at all levels, the OVCR/GD has urged the colleges, especially those most research-active, to create associate deanships with leadership and oversight responsibilities for both research and graduate affairs (e.g., an "associate dean for research and graduate education"). This suggestion was also made less specifically by the WAG and HASS reports, both urging more dedicated infrastructural support for research in the colleges, but it has not been greeted enthusiastically by the college deans. Only the College of Science has created such a new position; the College of Agricultural Sciences has long had an associate dean for research. In other colleges, "research" may be included with other functional identifiers such as "personnel" or "budget" in associate deans' titles.

### *Space and Facilities Devoted to Research and Creative Activity*

Space is a scarce but critical resource on all university campuses and SIUC is no exception. Although the rural Carbondale campus is large, covering 1,136 acres, many of its 262 buildings comprising 6,878,223 square feet of interior space are 35-50 years old.[315] The challenges on the Carbondale campus with respect to physical facilities for research are (1) quantity: there is not enough of it; and (2) quality: labs in the old buildings are inadequate in terms of heating, ventilating, and air conditioning (HVAC) systems, power sources, and other systems supporting the needs of modern, high-tech research.

In the 1999 self-study, SIUC reported that, "[i]n general, the University has adequate

315 *Southern Illinois University Carbondale Factbook 2007–08*, p.16; http://www.irs.siu.edu/quickfacts/pdf_factbooks/factbook08.pdf.

physical facilities for its . . . research [mission]. With a stable enrollment, the physical facilities should continue to be adequate for the foreseeable future."[316] The conclusions in 2009, however, are much less sanguine than those of 1999. The lack of adequate space for research and creative activity is emerging as a significant issue as SIUC strives to enhance its research profile.

The 1999 self-study also noted that the university had no inventory of space and the ability to use the facilities was hampered by the lack of such an inventory.[317] This deficiency has been rectified, as Physical Plant Engineering Services (PPES) in the Department of Plant and Service Operations (PSO) has been charged with maintaining such an inventory of space and space use. This information is critical for developing the F&A rate proposals the university is required to submit every three years. Table 4-1 shows the net assignable square feet (nasf) available for each functional use on both the Carbondale and Springfield campuses.

Table 4-1. SIUC functional space use in net assignable square feet (nasf), FY08.

| Functional Use | Carbondale nasf | Springfield nasf | Total nasf |
|---|---|---|---|
| Instruction | 1,367,844 | 55,999 | 1,423,843 |
| Organized Research | 186,737 | 38,229 | 224,966 |
| Agriculture Research | 91,873 | 0 | 91,873 |
| Other Sponsored Activities | 77,833 | 4,661 | 82,494 |
| Operations and Maintenance | 208,560 | 18,172 | 226,732 |
| Other Institutional Activities | 1,873,760 | 27,763 | 1,901,523 |
| Department Administration | 197,928 | 75,270 | 273,198 |
| General Administration | 135,712 | 24,416 | 160,128 |
| Sponsored Project Admin. | 5,256 | 1,227 | 6,483 |
| Recharge Center | 0 | 11,309 | 11,309 |
| Library | 247,405 | 21,301 | 268,706 |
| Student Services | 427,106 | 1,888 | 428,994 |
| Vacant | 65,534 | 5,014 | 70,548 |
| Specialized Services Facil | 10,657 | 364 | 11,021 |
| Patient Care | 33,540 | 121,145 | 121,145 |
| **TOTAL** | **4,929,745** | **406,758** | **5,050,890** |

*Source:* Plant and Service Operations' Physical Plant Engineering Services (PPES), data compiled by Jeff Tally, Manager, Grant and Contract Accounting & Fixed Asset Accounting.

PPES staff, student employees, and interns conduct facility surveys by physically inspecting and measuring the areas and compiling individual building floor plans. In

316 SIUC "Self-Study Report" submitted to the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools, vol. I, 1999, p. 62, in the Office of the Associate Provost for Academic Affairs.

317 Ibid.

assessing use, PPES space assessment follows the room use standards set by the National Center for Education Statistics (NCES) in the *Postsecondary Education Facilities Inventory and Classification Manual*, and through informal discussions with the occupants and departmental representatives.

An internal assessment prompted by the OVCR/GD in 2006 determined that SIUC "has a significantly lower level of net assignable square feet (nasf) of space than comparable institutions" and that "SIUC has less research space than comparable institutions.[318] This report, using data from the NSF's semi-annual Survey of Scientific and Engineering Research Facilities,[319] concluded that SIUC has the second lowest percentage of nasf from among SIUC peer and aspirational peer institutions,[320] and the second lowest level of nasf research space among the same group. It also concluded that "SIUC's percentage of laboratory space (9.9%) is 25% lower than that of either research category (Carnegie Research/Doctorate Intensive and Carnegie Research/Doctorate Extensive), and comparable to that of a master's level institution."[321] According to NSF data from 2001, the 188 public doctoral-granting institutions averaged 580,000 nasf for research in science and engineering. SIUC, in comparison, has only 342,000 nasf; thus, "SIUC has 41% less nasf for research in science and engineering than the average of [public] doctorate-granting institutions."[322]

Although a lack of research space is a significant impediment to SIUC's growth as a research institution—and also impacts the educational mission—another issue concerns the quality of the existing space for research in science fields (including agricultural) and also in the studios for the arts. The core buildings on the Carbondale campus were built between 1955 and 1970. The major systems installed during this era have exceeded their useful lives and are in dire need of replacement. State-appropriated Capital Renewal funding was been "on hold" since 2004 (recently reinstated in 2009) and at the same time, the university has faced compulsory state budget reductions. The backlog for deferred maintenance is projected at $450 million for FY10. The BOT approved the 2008 Facilities Maintenance Plan that outlines a ten-year effort to meet our immediate deferred maintenance needs, such as general campus roof systems, power plant repairs, HVAC renovations and replacements,

318 Phil Gatton, Cathy Hagler, John Koropchak, Pru Rice, Jeff Tally, and Scott Weber, "Academic Space Issues for SIUC: A Preliminary Assessment," July 17, 2006, available in Office of Physical Plant Engineering Services, Department of Plant and Service Operations.

319 NSF Survey of Scientific and Engineering Research Facilities, 2001: www.nsf.gov/statistics/nsf02307

320 As part of the development of the *Southern at 150* plan, the campus identified a set of eight institutions regarded as peers and four as aspirational peers (see *Southern at 150*, p. 10).

321 Gatton et al., op. cit., note 30. These figures rely on comparisons from the Association of Physical Plant Administrators, "Facilities Performance Indicators, Facilities Core Data Survey 2003-04."

322 Ibid.

electrical upgrades, and classroom and laboratory renovations.[323] This plan identifies $100 million of immediate deferred maintenance needs, of which an estimated $75 million can be addressed with the Facilities Maintenance Fee revenue stream and a planned bond sale in FY12 for $25 million. In late 2009 the state passed legislation renewing capital funding for campus projects, which will assist with some of the deferred maintenance as well as other construction.

Further indications of the inadequacy of research space at SIUC are found in the responses of various departments and colleges to the Faculty Hiring Initiative. This initiative, announced in FY04, was intended to add additional tenured and tenure-track faculty, with the expenditure of one million dollars a year for ten years to be committed to the initiative.[324] Several departments and colleges could not accommodate additional hires because of the lack of laboratory space for new faculty.[325] For example, the Department of Physics could not hire faculty because of a lack of laboratory space even though it had a newly approved Ph.D. in Applied Physics. The College of Agricultural Sciences sought only one new position because of space limitations and the Departments of Psychology and Anthropology in CoLA were reluctant to seek new hires who would require laboratory space. In addition, the College of Science spent "inordinate amounts of resources to create new research space from a storage area in the basement of [Neckers] building in order to locate two new hires in the Department of Chemistry and Biochemistry."[326]

The 1999 NCA Report (p. 79) noted the deteriorated state of the physical facilities of the SIUC campus, a consequence of a lack of state funds for deferred maintenance, and identified this as a challenge that "impair[s] the ability of the university to carry out its mission." The university is painfully aware of these problems, which are not only aesthetic but also represent health and structural concerns. SIUC's Facilities Advisory Committee reviews and provides input on priorities for use of state funds, should they become available again. The committee, working with the director of PSO, identified two buildings housing research labs, Neckers and Life Science II, as having the greatest deferred maintenance problems on campus,[327] and these top the priority list for renovation.

323 "Approval of the 2008 Facilities Maintenance Plan, Carbondale Campus, SIUC," board matter approved by the BOT on April 10, 2008.

324 Koropchak, J., and P. M. Rice, "A Current Perspective on Research at SIUC" ( June 27, 2006). Owing to budget constraints, this initiative was put on hold beginning in FY07. SIUC Faculty Senate Minutes, Remarks of Chancellor Dunn, 02/13/07.

325 Office of the Vice Chancellor of Research and Graduate Dean, Discussion Paper, Campus Research Space Evaluation and Recommendations (9/14/05), at 1-2.

326 Koropchak and Rice, op. cit. (in note 324).

327 Ibid. at 2.

An important step toward future resolution of campus research and other space issues was the development of a comprehensive Campus Land Use Plan. This plan was created in 2001 with the Campus Land Use Committee, composed of a large and widely representative group of administrators, faculty, staff, and students, with Civitas, Inc. as external consultants. The process involved considerable surveying and innovative polling throughout campus for constituency input. The final plan formed the basis for several other planning documents.

In March of 2006, the SIU Board of Trustees approved the creation of the 2006 SIUC Campus Master Plan[328] which included the integration of the 2001 Land Use Plan with the 2004 University Housing Facility Master Plan, the Athletics Facility Master Plan, and "Saluki Way." The 2006 Campus Master Plan is a working document crafted to provide guidance to the future development of the SIUC campus. Also, the SIU president has articulated a set of specific objectives relating to improving physical facilities on campus, drawn from the goals of *Southern at 150*.[329]

The OVCR has worked with several deans, center directors, and others to develop plans for a new Advanced Energy and Interdisciplinary Research Laboratory. This building is intended as a state-of-the-art laboratory facility to house campus energy researchers and those in complementary areas such as materials and biotechnologies, as well as the policymakers from various program areas. Current energy activities on campus include federally funded research on biofuels, fuel cells, hydrogen generation and storage, solid-state refrigeration, and carbon sequestration and capture, along with programs having state-wide and national leadership in clean coal technology. Such a structure will provide energy researchers on the Carbondale campus with optimum facilities, stimulate the most effective collaborations, and provide a think-tank for development of the most innovative, interdisciplinary, and high impact solutions that will further accelerate our progress toward achievement of these national goals. Funding for this building was requested in the university's RAMP plan, but it was not included for funding in the state's capital bill.

In addition, recent discussions have focused on construction of a Carbondale Combined Laboratory Facility (CCLF) on the SIUC campus that will also house offices and labs of the Illinois Department of Public Health and the Division of Forensic Services of the Illinois State Police. Envisioned as 35,000 square feet of laboratory space, the CCLF will allow the university to attract additional faculty, attract new grant and contract resources, and increase collaborative training programs for students that will be important in workforce

328 http://www.pso.siu.edu/pdfs/200610_LandUseMstrPlanMk08Mod06.pdf.

329 Objective 2, Goal 3, "Goals of the President, 2007-2008" at www.siu.edu/pres/goals.html.

development. This too has been unsuccessful in requests for state funding. Nonetheless, these kinds of planning initiatives represent a step in the right direction and contrast with the institutional complacency that existed at the time of the last self-study. But the lack of research space will continue to impede aspirations of significantly enhancing SIUC's research profile.

Three proposals have been submitted to NIH for remodeling the animal care facility in the Life Science II building, but none were successful. The university is seeking ways to upgrade laboratories in Parkinson, Engineering, and at the Illinois Coal Development Park to accommodate expanded gasification/liquefaction research. With respect to the latter, external funds have been obtained for a Coal-to-Liquids I-Laboratory and gasification-research facilities. The Coal Research Center is developing plans for these expanded research spaces in conjunction with PSO.

Research space and facilities at the Springfield campus of the School of Medicine are considerably better than at Carbondale. SOMS continuously updates and periodically expands research space through renovations of existing facilities and construction of new ones, and thus space has been greatly expanded and enhanced since 1999. With regard to equipment, the medical school is expanding core research facilities with high-cost, state-of-the-art research equipment. Given the school's relatively small faculty, core facilities are the most efficient means of assuring that all faculty members have access to these resources. The following information is from the SOMS response to the Criterion 4 Committee questionnaire:

Funds were provided in the FY00 state budget to construct the 109,300 gross square foot biomedical facility—the Springfield Combined Laboratory Facility (SCLF) addition—shared by SIU School of Medicine, the Illinois Department of Public Health (IDPH), and the Illinois State Police for their forensics laboratories. Construction began in January 2002 and occupancy was delayed by state funding issues, but the facility was finally opened in summer 2006. The SCLF addition provides the medical school with eleven new Biological Safety Level (BSL) -2 laboratories and one suite built to BSL-3 specifications. This facility enhances ongoing collaboration between the school's microbiologists and laboratory personnel in the IDPH.

Reallocations and renovations of existing space have expanded and improved areas used for research by SOMS faculty. An existing office building on the Springfield campus was reassigned and renovated to become a research facility initially used by cancer institute

faculty. This facility has eleven assigned laboratories and two support/shared areas, adding 8,110 net square feet (nsf) of dedicated research space. The new building for the SimmonsCooper Cancer Institute at SIU, begun in July 2005, was completed in 2008 and houses nearly 4000 nasf of assigned laboratories.

Additional reallocated space for research in Springfield includes 4,681 nsf in another building. The animal care facility is currently undergoing a $1.5 million renovation, funded partly through a federal grant, and scheduled for completion in July 2009. Reallocated space for research in Carbondale's Life Science II and Lindegren buildings provided an additional 1,700 net square feet for medical research since 1999.

## The Role of the Graduate School in Supporting Inquiry

The SIUC Graduate School administers programs in the Colleges of Agricultural Sciences, Applied Sciences and Arts, Business, Education and Human Services, Engineering, Liberal Arts, Mass Communication and Media Arts, and Science, plus the School of Law and School of Medicine. The OVCR/GD is responsible for graduate education and the associate dean and director of the Graduate School reports to the VCR/GD. The school has one other associate dean (who is director of the Coal Research Center), an associate director, and an assistant dean among a staff of seventeen persons, plus student workers and graduate assistants.

The primary concerns of the SIUC Graduate School are instruction and research at the graduate level.[330] The Graduate School therefore plays an essential role in developing instructional and research programs, overseeing assistantships and managing fellowship funds, and procuring facilities necessary to encourage and support research by members of SIUC's scholarly community. It confers master's degrees in seventy programs and the doctoral degree in thirty, as well as offering eight certificate programs. Figure 4-11 graphs the number of degrees granted by fiscal year, FY00 through FY09.

330 See http://gradschool.siuc.edu/mission.htm

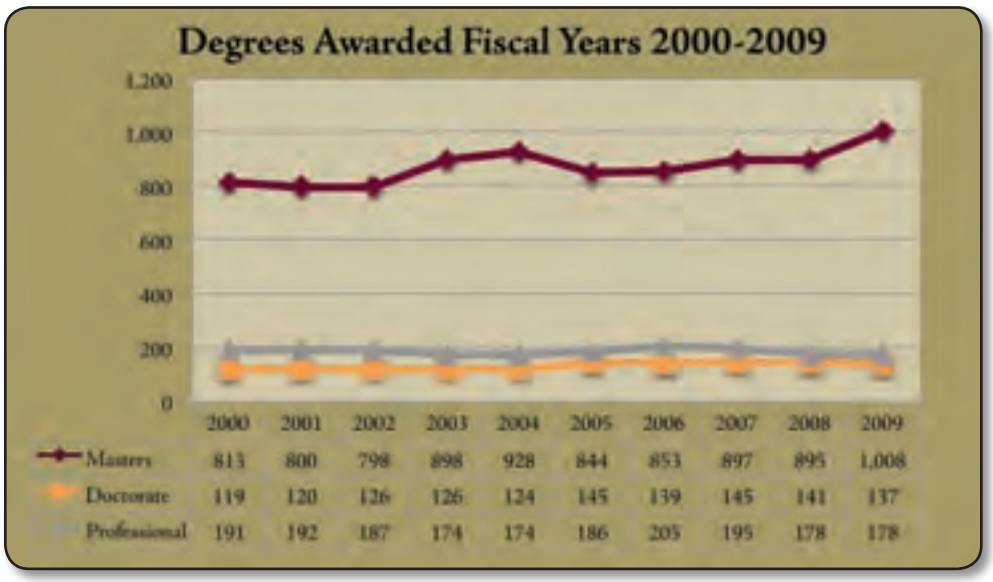



Figure 4-11. Graduate/professional degrees awarded, FY00 – FY09.[331]

As part of the overall effort to increase graduate enrollments, the Graduate School undertook a "capacity analysis" to investigate the ability of existing programs to absorb greater numbers of graduate students. In 2006, departments were requested to complete a capacity analysis instrument developed at the University of Iowa to determine if programs were over- or under-capacity using registration data for Fall 2005. The capacity analysis instrument incorporates data on four dimensions: (1) program goals, including time-to-degree, completion rate, and diversity; (2) mentoring, placement, and mission; (3) resources, fellowships, and grants; and (4) department-specific creations of weighted averages of these factors. Although, as expected, results varied from department to department, and not all departments participated in the exercise, it appears that SIUC's graduate programs have the capacity to grow by 600+ students (i.e., ~14 percent), although such growth is unreasonable without significant budgetary enhancement.[332]

### *Graduate Faculty and Graduate Council*

Graduate students pursue advanced study and research under the leadership of a graduate faculty of 888 members. All tenure-track and tenured faculty in departments that deliver graduate programs are eligible for membership in the graduate faculty of SIUC. Tenure-track faculty normally hold regular graduate faculty membership which allows them to direct master's theses and serve on doctoral committees; tenured faculty members have the authority to direct doctoral dissertations.

The graduate faculty elect twenty-two representatives to the Graduate Council, which is

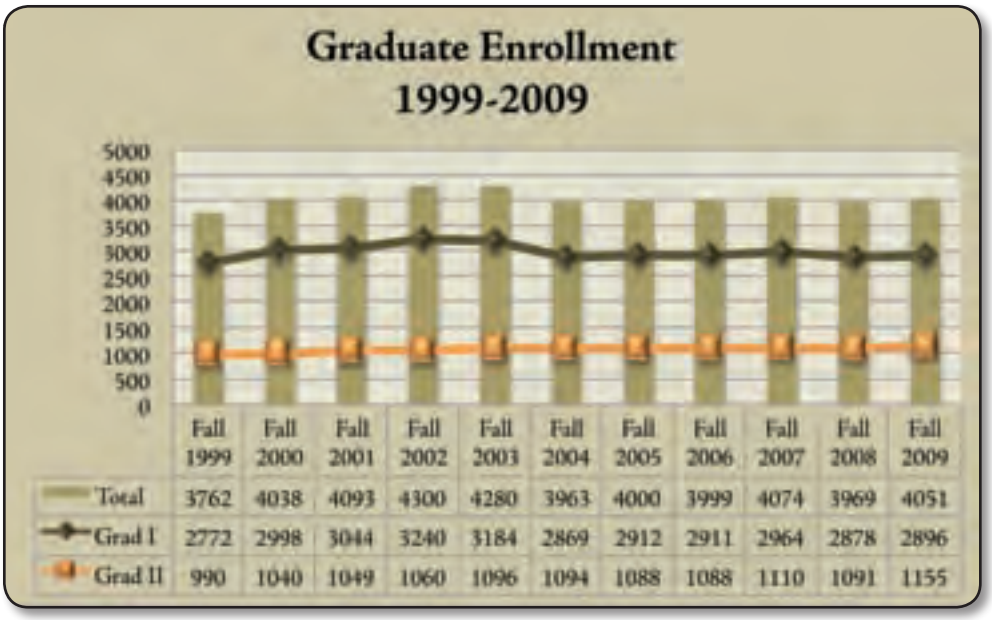
331 *Southern Illinois University Carbondale Factbook 2008-2009*, Table 24.

332 Wilson, D.W., "Capacity Analysis," report prepared for the OVCR/GD, July 5, 2007.

responsible for establishing the policies administered by the Graduate School. Each college has at least one representative, with the total number apportioned on the basis of the number of graduate faculty in each college and school. In addition, five graduate students elected by the Graduate and Professional Student Council serve on the Graduate Council with full voting privileges. The chancellor, provost, VCR/GD, associate vice chancellor for research, associate dean and director of the Graduate School, and the associate dean all hold ex officio status on the council. The Graduate Council annually elects a chair and vice chair who oversee monthly meetings of the council during the academic year. There are four standing committees: Program Review, Educational Policy, New Programs, and Research. More detailed information can be found in the Graduate School Operating Paper.[333]

### *Graduate Student Admissions, Enrollment, and Financial Aid*

The Admissions Office participates actively in recruiting students, with Graduate School staff regularly attending regional, national, and international graduate student fairs; departmental representatives are also invited to attend these events. Staff are especially active in working with faculty to recruit high-quality international students and frequently attend graduate school fairs in Asia, Europe, Latin America, and the Middle East. The Graduate School also works closely with the Office of International Programs and Services to ensure that international graduate students have a productive experience at SIUC. The Graduate School soon will be implementing a new online graduate enrollment system called "Apply Yourself."




| | Fall 1999 | Fall 2000 | Fall 2001 | Fall 2002 | Fall 2003 | Fall 2004 | Fall 2005 | Fall 2006 | Fall 2007 | Fall 2008 | Fall 2009 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | 3762 | 4038 | 4093 | 4300 | 4280 | 3963 | 4000 | 3999 | 4074 | 3969 | 4051 |
| Grad I | 2772 | 2998 | 3044 | 3240 | 3184 | 2869 | 2912 | 2911 | 2964 | 2878 | 2896 |
| Grad II | 990 | 1040 | 1049 | 1060 | 1096 | 1094 | 1088 | 1088 | 1110 | 1091 | 1155 |

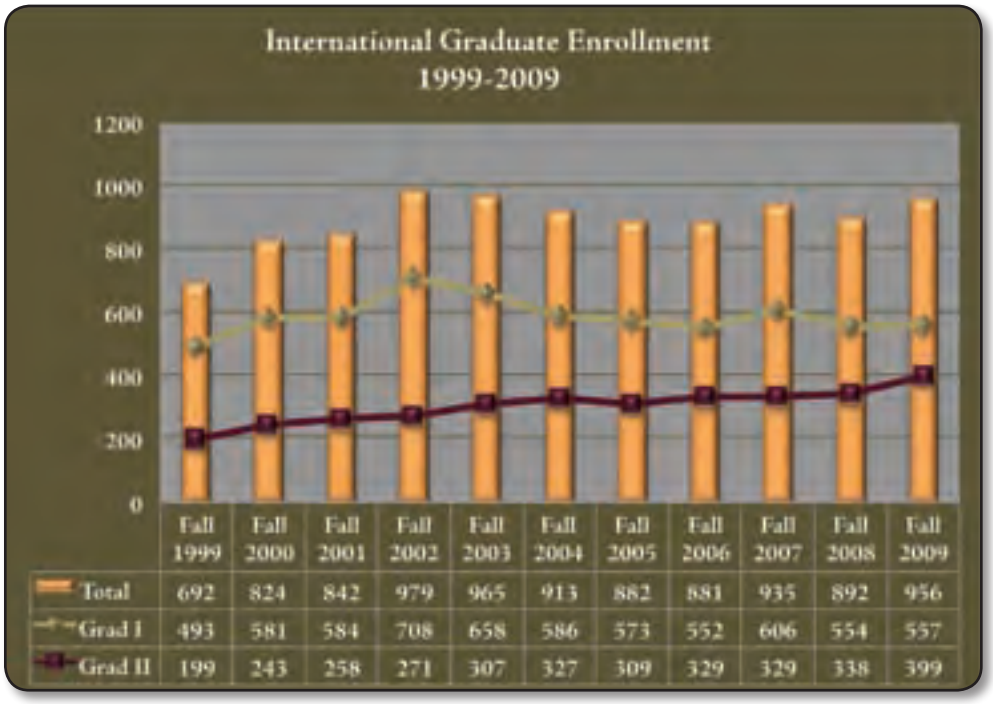
Figure 4-12. Graduate enrollment, fall 1999 – fall 2009.[334]

333 See http://www.gradschool.siuc.edu/council/gspaper.htm.

334 Source: Institutional Research and Studies.

Graduate enrollments are essentially holding steady, oscillating around a mean of 4000 students, with an approximate 10 percent increase in Grad II (doctoral) students. The apparent dip in enrollment of Grad I or master's-level students (and hence overall enrollment) beginning in 2004 is a consequence of an administrative decision made outside the Graduate School, by which students were not allowed to register for the required 601 Continuing Enrollment course if they had any balance on their bursar's account. This policy has subsequently been rescinded.

As did many other U.S. universities, SIUC experienced a slight dip in international student enrollment in the middle of the decade, with increased scrutiny of foreign visitors after September 11, 2001, but this is recovering, particularly at the Ph.D. level (Figure 4-13). International students currently account for approximately 29 percent of all graduate students.




| | Fall 1999 | Fall 2000 | Fall 2001 | Fall 2002 | Fall 2003 | Fall 2004 | Fall 2005 | Fall 2006 | Fall 2007 | Fall 2008 | Fall 2009 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | 692 | 824 | 842 | 979 | 965 | 913 | 882 | 881 | 935 | 892 | 956 |
| Grad I | 493 | 581 | 584 | 708 | 658 | 586 | 573 | 552 | 606 | 554 | 557 |
| Grad II | 199 | 243 | 258 | 271 | 307 | 327 | 309 | 329 | 329 | 338 | 399 |

Figure 4-13. International graduate student enrollment, 1999-2009.[335]

The Underserved Fellowship Office, headed by an assistant dean, focuses on recruiting students from first-generation college families, students of color, and students from non-traditional backgrounds. The office also handles fellowship and assistantship programs for such students. The PROMPT (Proactive Recruitment of Multicultural Professionals for Tomorrow) program, for example, provides opportunities for individuals from non-traditional backgrounds to pursue advanced degrees. In 1996 SIUC was awarded the prestigious Council of Graduate Schools/Peterson's Award for Innovation in the



335 Source: Institutional Research and Studies.

Recruitment and Retention of Minority Graduate Students on the basis of PROMPT.

The Financial Aid Office processes graduate assistant contracts and manages several fellowship and tuition scholarship programs. The Master's and Doctoral Research Fellowship programs support approximately forty-five students for one year, the awardees selected in a university-wide competition among outstanding students nominated by the departments. The Morris Fellowship is intended to bring outstanding doctoral students to campus and is not open to students who have received a degree from SIUC. The Morris provides a five-year support package to each participating student with three years paid by the Graduate School and up to two additional years by the student's department. The Graduate School also awards fifty tuition scholarships per academic term, based strictly on undergraduate GPA, and the student cannot receive other forms of institutional support such as an assistantship. Graduate Dean's Fellowships and PROMPT Fellowships are two-year financial assistance packages providing a stipend and tuition scholarship.

The OVCR/GD and associate dean and director of the Graduate School sponsored four proposals between FY03 and FY08 for state funds to increase the number of graduate teaching assistantships and to recruit, retain, and reward high-quality graduate students. These were unsuccessful in the state's budget climate.

The Registration and Records Office, headed by an associate director, handles graduate registration matters, maintains appropriate graduate records, verifies graduation clearances, posts degrees, reviews thesis and dissertations for conformance to standards, and oversees electronic submission of theses and dissertations. Electronic thesis and dissertation submission began in 2005.

### *New Graduate Degree Programs*

Requests for new graduate degree programs are initiated at the department or college level; and after review in the Office of the Provost and Vice Chancellor, they are transmitted to the OVCR/GD for review by the New Programs Committee of the Graduate Council before being voted upon by that body. As indicated in Table 4-2, fourteen new master's programs and five new doctoral programs have been approved since 1999.

| Master's | Approved |
|---|---|
| M.A. in Geology | Fall 2002 |
| M.P.H. in Community Health Education | Fall 2004 |
| M.L.S. in Legal Studies | Fall 2005 |
| M.S. in Professional & Media Management | Summer 2006 |
| M.A.T.-Master of Arts in Teaching | Summer 2004 |
| M.ARCH-Master in Architecture | Summer 2007 |
| M.S.P.A.-Master of Science in Physician Assistant Studies | Summer 2007 |
| M.S. in Biomedical Engineering | Summer 2008 |
| Master of Engineering in Civil & Environmental Engineering | Spring 2010 |
| M.S.M.S.Ed. in Math & Science Education | Spring 2009 |
| P.S.M.-Professional Science Masters in Advanced Energy & Fuels Management | Spring 2010 |
| M.S. in Medical Dosimetry | Spring 2009 |
| M.S. in Medical Dosimetry-Track | Fall 2009 |
| M.S. in Business Administration (online) | Fall 2009 |
| **Ph.D.** | **Approved** |
| Environmental Research and Policy | Fall 2000 |
| Applied Physics | Fall 2005 |
| Electrical & Computer Engineering | Summer 2007 |
| Computer Science | Fall 2007 |
| Agricultural Sciences | Fall 2008 |

Table 4-2. New graduate degree programs since 1999.

SIUC has also developed a novel Professional Science Master's program in advanced energy and fuels management with industrial partners and the SIUE corn-to-ethanol research facility.

In addition, the university has just (fall 2009) been awarded a $3 million Integrative Graduate Education and Research Training (IGERT) grant for watershed science and policy from NSF. This program will support graduate coursework and international travel to research sites for each of three cohorts of five supported fellows per year, plus other students. SIUC is one of about seventy universities nation-wide with IGERT programs.

## Center for Graduate Teaching Excellence

The Center for Graduate Teaching Excellence (CGTE), established in 2002, supports faculty, teaching assistants, departments, curricular units, and various colleges in the improvement of instruction through the enhancement of existing, and development of new, teaching assistant instructional development programs through various activities:

- Individual consultation: meeting one-on-one with departmental chairpersons, directors of graduate studies, faculty, and teaching assistants to explore opportunities for the improvement of instruction.
- Campus workshops: developing, coordinating, offering, and evaluating various workshops on topics important to the training and orientation of teaching assistants.
- Coordination of campus resource units of expertise: bringing together faculty, staff, and teaching assistants to share expertise critical to the enhancement of instruction.
- Specialized funding for faculty/departmental improvement of instruction: encouraging and supporting innovative programs with the potential of meeting university goals such as increased undergraduate student learning and retention.

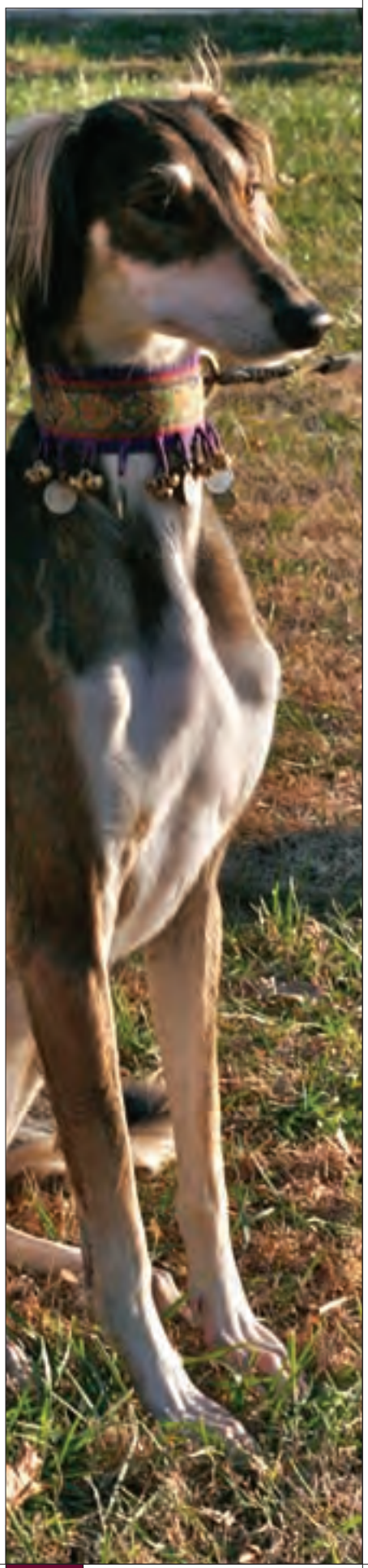
In 2007, the CGTE and OVCR/GD initiated a pilot program with the Department of Chemistry and Biochemistry to provide special training to graduate teaching assistants to work on retention issues in key gatekeeper courses. As discussed in Core Component 3.b, this program resulted in a 15 percent increase in the student success rate in CHEM 200, and the program has been expanded to include another chemistry course as well as a key course in mathematics.

## The Roles of the Sponsored Research Offices: ORDA and ADRFA

The Carbondale and Springfield campuses have separate offices for handling sponsored research: on the Carbondale campus it is the Office of Research Development and Administration (ORDA)[336] and on the Springfield campus of the School of Medicine (SOMS) it is the Associate Dean for Research and Faculty Affairs (ADRFA).[337] Both offices have the responsibility of facilitating and promoting faculty, student, and staff research and sponsored project activities, while at the same time "protecting" the institution and its researchers by creating and upholding policies and procedures to assure ethical conduct of research and compliance with a host of federal, state, and institutional regulations, assurances, and certifications. ORDA and ADRFA are the central offices through which faculty and staff members on the respective campuses submit proposals for external funding and receive external grant and contract awards. Thus their primary duties are to foster the kinds of "inquiry, creativity, practice, and social responsibility" that constitute the core of Criterion 4.

336 See http://www.orda.siuc.edu.

337 http://www.siumed.edu/adrfa/.



Unlike the SIUC OVCR/GD, which did not exist at the time of the 1999 accreditation review, the SOMS has been previously reviewed with regard to its robust research program that complements its educational and patient care missions. Since the last NCA review, SOMS has initiated new programs for research and recruited a director of clinical research development in July 2007, whose role is to develop and implement a plan to increase patient-oriented research by clinical faculty. In FY08, SOMS faculty conducted 216 active research projects with external research funding of $22.2 million; the estimate for FY09 is similar: 230 projects and $23 million.

The OVCR/GD at SIUC has worked diligently to increase collaborations between the Carbondale and Springfield campuses through monthly visits to Springfield (begun in 2004); duplication of the Carbondale campus' Research Town Meeting (see below); and travel support for a speaker exchange. Instructional collaborations include a Biomedical Engineering initiative; a Molecular Biology, Microbiology, and Biochemistry (MBMB) program, which brings together basic science faculty from three departments (two in the medical school and the other from the SIUC College of Science); and M.D./J.D. dual degree programs for teaching and research, which is a combined program of the Schools of Law and Medicine. These efforts are part of an increasing priority placed on interdisciplinary research at SOMS (including geriatrics and healthy aging, neurosciences, hearing and hearing loss, and reproductive biology) and on translational research—all examples of interdisciplinary research among basic and clinical biomedical scientists to speed the application of new knowledge and developments to patient care.

At SIUC, given the ambitious goals for research expansion in the *Southern at 150* planning document, ORDA was externally reviewed to assess the scalability of its operations for the anticipated growth of grants activity. Huron Consulting Services LLC was engaged to carry out this study, and its August 2005 report concluded that ORDA's support structure was not ready to meet the future challenges. It proposed a lengthy set of recommendations that can be loosely grouped as: structural changes in ORDA (define roles and responsibilities; some title changes); business processes (simplify the grants budget process); technology (acquire grants management software); and people (develop educational programs for faculty). Significantly, the Huron Report echoed the earlier WAG and HASS reports (see above) in noting the need to "improve the level and consistency of local staffing for research administration support by having dedicated research administrators within each college/school."[338] Some of these changes have been made, but those requiring significant financial investment, such as the purchase of grants management software and creation of associate

338 See http://www.orda.siuc.edu/reports/huron_report.pdf, pp. 4-5.

deanships, have not. The Research Committee of the Graduate Council was given the charge of monitoring ORDA's activities regarding the Huron Report recommendations.

### *Proposal and Grant Support Services*

At SIUC, ORDA has a director and a staff of fourteen. Staff includes five "Research Project Specialists" whose responsibilities are to work with faculty, staff, and students submitting proposals and receiving awards and contracts. They are available for consultation in their ORDA offices as well as by telephone and electronic mail. These ORDA staff members help researchers identify appropriate funding sources for their projects, provide consultation for proposal development and budget preparation, and help them establish accounts after awards are received. They and other ORDA staff also handle IRB and IACUC compliances, undergraduate research, publication of various materials about university research, and technology transfer.

At SOMS, the ADRFA provides similar services, including training sessions on grant preparation. ADRFA also supports the Springfield Committee for Research Involving Human Subjects (SCRIHS), the Laboratory Animal Care and Use Committee, the Office of Technology Transfer, and the Division of Statistics and Research Consulting. A number of other departments and programs also retain personnel to assist faculty in grant preparation.

Given the current dominance of electronic communication and web-based information sharing, ORDA has devoted considerable effort to creating a website that is comprehensive and easy to navigate.[339] The homepage provides quick links to major areas of concern for investigators, as well as regularly updated announcements of workshops, changes in sponsor requirements, deadline dates, and ORDA/OVCR/GD announcements to keep faculty and staff abreast of changes in the always fluid research environment. There are quick links to external funding sources; online fillable-forms and budget templates; data about DUNS numbers, F&A rates, student worker wages, etc.; compliance information; and so on. In addition, the *Sponsored Project Guide*, once printed and circulated as hard copy, is readily available online.[340] Both the Springfield and Carbondale campuses maintain membership in the Community of Science[341] online database of worldwide funding opportunities, and all faculty members and students have the opportunity to join at no cost.

339 See www.orda.siuc.edu.

340 http://www.orda.siuc.edu/guide/.

341 www.cos.com.

### *Internal Programs Supporting Faculty Research*

The Carbondale and Springfield campuses provide internal support for faculty research in several ways, including funding programs to promote successful competition for external funding, incentive programs encouraging research productivity, and central support programs and resources aiding applications for and performance of research. Internal support for research and creative activities is provided through programs administered centrally (some through the OVCR and ORDA), but also at the collegiate and departmental/center levels (below). These internal programs, based largely on F&A recovery and, for SOMS, total National Institutes of Health (NIH) funding, have been gradually increasing in parallel with the success of faculty in generating external funding.

"Your research keeps instruction fresh, helping you to teach our students not only what is in the textbooks of today, but also what will be in the textbooks of tomorrow"

Remarks of Chancellor Samuel Goldman, Research Town Meeting & Fair. April 14, 2009

At SIUC, ORDA manages three internal programs that support faculty research and creativity, as both annual competitive programs and case-by-case awards. Information, guidelines, and forms are available on the ORDA website.[342] The programs are Faculty Seed Grants, Interdisciplinary Research Seed Grants, and Travel Support.

The Faculty Seed Grant program has existed for several decades, but has been continuously modified to make the proposal and review process more rigorous and similar to that of federal agencies. Seed grants are competitive, peer-reviewed, one-year awards of up to $25,000 that fund a variety of research, scholarly, and creative activities. Available to full-time, tenure-track faculty members on continuing appointment, they enable faculty to run a pilot study, analyze preliminary data, do background research on an issue, complete a key stage in a larger scientific, scholarly, or artistic project, or otherwise lay the groundwork for an externally funded project. The goal is to make faculty more competitive for external funding and initiate a program of research, scholarly, or creative activity in the arts that will build toward a positive tenure decision. Approximately twenty-five projects are funded annually through the Faculty Seed Grant Program.

Interdisciplinary Research Seed Grants are awarded through a competitive, peer-reviewed process established in 2006 to encourage interdisciplinary research on campus. Grants provide initial support of up to two years and $30,000 per year for new, long-term programs of collaborative, interdisciplinary research with strong potential to attract external funding. Five priority areas are targeted: materials research, biotechnology, neuroscience/cognitive



342 See http://www.orda.siu.edu/internal/.

science, energy/environment, and Delta Region studies.[343] Four projects have been funded through this program.

The Travel Support program is based on the principle that dissemination of scholarly and artistic achievement provides professional development opportunities to faculty and students, brings distinction and visibility to SIUC and its programs, and is central to the university's research mission. During the budget challenges of the 1990s, central travel funds were distributed to the colleges, where they largely disappeared through consecutive rescissions. In FY01, the provost and vice chancellor and the vice chancellor for institutional advancement joined the OVCR/GD in providing a total of $60,000, primarily from F&A returns, for ORDA to distribute to aid faculty traveling to meetings. This amount was subsequently increased and in FY08 the total was $150,000 contributed by the OVCR/GD, provost and vice chancellor, and chancellor. Travel funds are awarded in conjunction with departmental and college contributions to support travel to present research findings, performances, or exhibit creative works, or act in other capacities in professional/scholarly gatherings; to pursue unusual one-time research opportunities or collaborations; and to visit program officers at funding agencies. Through this program, ORDA funds hundreds of faculty and student trips per year, more than 50 percent of the disbursed funds supporting faculty travel in arts and humanities disciplines (e.g., in CoLA and MCMA).

The School of Medicine, with a presence on both the Carbondale and Springfield campuses, has developed strong programs to support and encourage faculty research efforts, and these are administered by ADRFA. The Central Research Committee (CRC) program provides seed funding for the development of preliminary data and documentation of feasibility to strengthen faculty research applications to external funding agencies. The committee meets annually to review CRC proposals for scientific merit. SOM faculty on both the Springfield and Carbondale campuses are eligible to apply for CRC funding. Approximately six to eight awards of up to $15,000 each are funded annually through this mechanism. Projects must be completed in one year.[344] Typically, about 50 percent of the internal applications are considered meritorious and are funded internally from one of the two award programs discussed below.

The state of Illinois established the Excellence in Academic Medicine (EAM) program

343 The "Delta" refers to the broad alluvial plain of the lower Mississippi River, from just above the confluence of the Mississippi and Ohio rivers to the Gulf of Mexico. This floodplain and its surrounding uplands have a shared cultural and economic history. The Delta Regional Authority is a federal designation for the 240 counties and parishes in the seven states bordering the lower Mississippi plus portions of Alabama. The sixteen southernmost counties of Illinois, all in SIUC's "backyard," represent the northern portion of the Delta region. See http://www.siuc.edu/~delta/.

344 This information was provided in a response from school to the Criterion 4 Committee survey.

in 1996 to provide funding for medical research and post-tertiary clinical program development at the state's academic medical centers. With the state's support, a variety of programs are initiated by participating medical institutions. SOMS has leveraged its EAM support into greater external research funding by instituting an internal mechanism that allows faculty to gain preliminary data to strengthen planned research applications to the National Institutes of Health. Faculty members are invited annually to submit a grant application to request one year of EAM support. Approximately six awards of up to $50,000 each are funded each year. As with the CRC internal funding program, proposals for EAM funding are also reviewed for scientific merit by the CRC.[345]

Both the CRC and EAM include a "Near-Miss Award" program. Faculty can apply for one of these awards if they have submitted an application for external funding, but were not funded. Near-Miss funding is used to collect crucial data necessary to increase the ranking of the application when resubmitted externally. Two awards are made annually in the CRC and EAM programs.

Several new competitive faculty support programs were developed and implemented in the SOM in FY08 to promote the ability of medical school faculty members to compete successfully for external research funding. These include the Faculty Achievement Award in Research, the Clinician-Scientist Program, and the Concept Development Award.

The Faculty Achievement Award in Research (FAAR) program provides financial awards (in either research support funding or salary increments) as an incentive to increase external research funding, thus generating additional F&A cost recovery and salary return dollars. Awards are based on generation of salary or F&A dollars by the principal investigator of an externally funded grant. The implementation and impact of this program are now being assessed; and depending on the outcome, a similar program may be developed at SIUC.

The Clinician-Scientist Program at SOMS provides partial support for salary and research costs of clinical faculty, thereby allowing them to devote a greater portion of their effort to developing research careers. This program provides $80,000 per year, with eligibility for competitive renewal for up to three years. Activities include mentored research, with the eventual goal of obtaining K- or R-type funding from NIH.

The Concept Development Award provides funds for faculty and staff to develop intellectual property so that it becomes viable for patenting and licensure. These annual awards are intended to stimulate involvement with the technology transfer process, assist in



345 Ibid.

moving technologies into the market, and promote the economic welfare of the university and community.

### *Workshops*

ORDA and ADRFA staff also provide workshops on particular areas of expertise or responsibility related to their other duties. For example, ORDA staff assist Carbondale researchers—faculty, staff, and students—with their research efforts through a number of workshops offered during the year. These include:

- New Faculty Orientation – an orientation to ORDA and its services, offered three times in early fall;
- Faculty Seed Grant Workshop – an overview of the proposal-writing and review process;
- Community of Science Workshop – how to use this research funding database;
- REACH Application Seminar – advice on writing applications to the REACH undergraduate research program;
- Research Compliances Workshop – an overview of research compliance committees and regulations;
- Proposal Writing for Graduate Students – advice on finding funding and writing dissertation proposals;
- NSF Graduate Fellowship Awards – advice on creating successful applications for these prestigious fellowships;
- CAREER Award Workshop – advice on preparing proposals for the NSF Faculty Early Career Development Program, featuring faculty who currently hold these prestigious awards;
- NEH Summer Stipend Program Workshops – advice on preparing proposals for these summer humanities projects; and
- Tech Transfer/Intellectual Property Workshops – several gatherings held throughout the year on various aspects of patenting, starting new businesses, and related matters, often conducted by visiting experts in IP law and co-sponsored by the Southern Illinois Research Park.

ADRFA conducts grant-writing workshops annually for researchers at SOMS. Although applicable and appropriate for all faculty, residents, post-doctoral fellows, and graduate students, the content of these workshops is focused on providing new or junior faculty members with basic information and coaching essential to obtaining external funding,

particularly as applied to NIH awards. At least four senior faculty members participate in the program through both large-group and small-group discussion formats. A related program is the monthly Grants Outreach Brown Bag Lunch (GOBBL), informal discussions led by either the ADRFA or other senior research faculty that focus on topics of interest to faculty, students, and others who want to improve their proposal-writing abilities.

In addition, the Academy for Scholarship in Education (ASE), Department of Medical Education, offers educational workshops for all interested faculty members regarding medical education scholarship, getting grants in this area, and publishing findings. The Academy hosts "Brainstorming Research and Development" meetings for faculty members with interests in medical education research and promotes the school's work in educational development and research activities at the national and international levels by assisting the faculty in the dissemination of their teaching and educational research efforts. ASE offers monthly workshops on medical education topics such as writing better multiple-choice examinations, giving clinical feedback, and evaluating and improving professional behavior. These workshops are offered to all medical school faculty to enhance their skills as effective teachers.

### *Centralized Research Support Facilities*

The Carbondale campus has a number of central facilities that provide technical and analytical support for research and teaching, five of which report through ORDA: Central Research Shop, IMAGE, Laboratory Animal Program, Mass Spectrometry Facility, and Nuclear Magnetic Resonance (NMR) Facility. Many of these facilities have been enhanced through successful equipment grants from the NSF.

The Central Research Shop helps researchers solve specialized technical problems of research apparatus and equipment. With facilities for woodworking, welding, machining, sheet-metal fabrication, electrical and electronics operations, as well as short-run manufacturing, the director of the shop can design, produce, test, modify, and repair custom equipment used to fulfill special research requirements as well as standard laboratory equipment. The director also consults with researchers above the availability, feasibility, methodology, quality control, and techniques of all types of equipment, materials, or problem-solving modes to expedite research.[346]

346 http://shops.siuc.edu/cenrsrch/.

IMAGE (Integrated Microscopy and Graphics Expertise) provides faculty, staff, and students with training, technical service, and research in scanning electron, transmission electron, atomic-force, and light microscopy. Advanced capabilities include X-ray analysis, image analysis, and viewing of specimens under near-atmospheric conditions. IMAGE also administers a computer graphics and photography facility that offers assistance with posters and photographs and illustrations for publication.[347]

The Mass Spectrometry Facility in the Department of Chemistry and Biochemistry operates several high-performance mass spectrometers to support basic research efforts throughout SIUC. It offers training for independent operation of instruments as well as sample analysis by facility personnel. The facility's services are also open to external academic institutions and industry.[348]

The Nuclear Magnetic Resonance (NMR) Spectrometry Facility is a centralized laboratory for research and teaching that houses three Varian spectrometer systems plus a network of Sun computers and PCs to enable supplemental data processing, molecular modeling, and remote instructional NMR computing to X-windows clients.[349]

The DNA Sequencing and Allele Analysis Facility (College of Agricultural Sciences) provides next-day DNA sequencing services and same-day user center support. Short courses to teach the sequencing techniques are held regularly. The facility provides fragment size analysis with fluorescent labeled probes for microsatellites and other genetic markers.[350]

The Genomics and Robotics Services Facility provides robotic services attuned to high-throughput marker assisted selection, BAC and cDNA library construction and arraying, physical map generation, micro-array analysis, GMO content testing, genotyping, and genetic identity testing.[351]

The Elemental Analysis Services Facility (Department of Plant Biology) provides sample preparation and elemental analysis services for tissue, soil, and water samples via atomic absorption spectrometry, by flame or graphite furnace.[352]

Both the Carbondale and Springfield campuses operate central animal care facilities

347 http://www.image.siuc.edu/.
348 http://www.mass-spec.siu.edu/.
349 http://opie.nmr.siu.edu/.
350 http://www.siuc.edu/~pbgc/Services/automated.htm.
351 http://www.siuc.edu/~pbgc/Services/robotic.htm.
352 http://www.plantbiology.siu.edu/faculty/ebbs/eas.html.

(vivaria) that house animals used in research and teaching activities. The Springfield facility contains approximately 30,000 gross square feet of space that includes a surgery suite, cage-wash facility, diagnostic laboratory, necropsy room, quarantine area, infectious disease containment suite, and rodent barrier. The facility in Carbondale[353] is old and in need of renovation, but hundreds of thousands of dollars have been invested by the OVCR/GD and the Office of the Provost and Vice Chancellor in the last decade for improvements, most recently a new cage washer. Both facilities are accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care (AAALAC) and are maintained by veterinarians with specialization in laboratory animal medicine (the Springfield veterinarian is a diplomate in the American College of Laboratory Animal Medicine), in order to ensure proper and humane care and management of animals and compliance with federal regulations and guidelines. All research and teaching activities involving vertebrate animals must be reviewed and approved in advance by the Institutional Animal Care and Use Committees (IACUCs). Vertebrate animal research at Carbondale is primarily carried out with mice and rats, occasionally some rabbits and guinea pigs; researchers also utilize various fish and some frogs, and agriculture researchers work with large mammals (horses and swine).

Other research facilities at SOMS[354] include the Research Imaging Facility, which occupies approximately 1,500 square feet and offers support for transmission electron microscopy, confocal laser scanning microscope, laser capture microdissection, in vivo bioluminescence, and computerized image analysis. Support personnel are available to assist researchers, design protocols, provide training, and offer technical services on a fee-for-service basis and to oversee the daily operation of the facility.

The Flow Cytometry Facility occupies approximately 300 square feet and is a fully equipped high speed cell-sorting and cell-analyzing research laboratory. The lab, which also has a luminex analyzer, is staffed by a full-time experienced operator who assists researchers in the development of protocols, operates equipment, and manages daily operations.

SOMS maintains an irradiator with a 137-Cesium radioactive source (220 Curie activity) in the primary research facility at 801 North Rutledge Street. The Division of Statistics and Research Consulting assists faculty with study design and statistical analysis of research data.

353 http://www.iacuc.siuc.edu/.

354 http://www.siumed.edu/adrfa/researchsupport.html.

### *Technology Transfer*

Inventions and other intellectual property created by SIUC faculty, staff, and students are handled in two technology transfer offices:[355] the one on the Carbondale campus reports to the OVCR/GD through ORDA; and the office at SOMS, with a full-time director and researcher, is housed in ADRFA. Activities include invention evaluation, patent protection, invention marketing, and negotiation of licensing terms. Collaborating closely with the inventor, the tech transfer specialists assess the commercial feasibility of inventions, work with legal counsel to file patent applications as appropriate, and develop strategies to transfer the technology to industry for the benefit of the public. The offices also handle nondisclosure agreements, materials transfer agreements, and other activities involving intellectual property.

Technology transfer is a growing enterprise on both campuses, particularly in the areas of biotechnology, genomics, nanotechnology, and materials. In 2006 SIUC (including SOMS) ranked in the top ten in "Innovation Pipeline" rankings, that is, the number of patents issued per $1 million of research expenditures.[356] Over the past decade (FY99-FY08), 202 inventions have been disclosed, 53 licenses/options issued, 97 patent applications filed, and $2,853,271 million in royalties received (see Table 4-3).

At SOMS, the tech transfer office processed seven intellectual property matters to completion in FY07, including patents and trademarks issued, copyrights filed and registered, and licenses/options executed. Five such matters were completed in FY08, and nine new patent applications were filed and eleven invention disclosures were processed in FY09.

355 http://www.techtransfer.siuc.edu/.

356 Association of University Technology Managers, "Mind to Market..." September 2006.

| Fiscal Year | Number of Inventions Disclosed | Royalties Licenses / Options | | U.S. Patent Applications Filed | U.S. Patents Issued |
|---|---|---|---|---|---|
| 08 | 35 | $776,102 | 10 | 14 | 3 |
| 07 | 21 | $524,584 | 5 | 18 | 4 |
| 06 | 20 | $354,045 | 4 | 13 | 2 |
| 05 | 19 | $466,300 | 5 | 9 | 4 |
| 04 | 15 | $224,535 | 3 | 11 | 6 |
| 03 | 17 | $157,726 | 6 | 6 | 5 |
| 02 | 20 | $132,804 | 4 | 7 | 6 |
| 01 | 18 | $108,630 | 4 | 6 | 4 |
| 00 | 18 | $60,300 | 6 | 7 | 4 |
| 99 | 19 | $48,245 | 6 | 6 | 0 |
| 98 | 14 | $250,624 | 4 | 7 | 0 |
| 97 | 14 | $235,047 | 5 | 5 | 0 |
| 96 | 8 | $9,592 | 2 | 2 | 0 |

Table 4-3. SIUC technology transfer activities, FY96-08. *Source:* http://techtransfer.siuc.edu/current.html#techstats. Includes latest SOMS data.

Major recent successes include licensing of patents involving the treatment of various neurological disorders to the Cyberonics Corporation, and patents involving a bacterial gene-based transformant for crops to the Monsanto Corporation.

SIUC inventions have been the basis of seven start-up companies established in Carbondale since 2000:

- Genetics and Agriculture Biotechnology Inc. (2000) to use patented genetic markers to analyze soybean germplasm, develop high-speed genetic screening technologies, and provide genetic "libraries" to researchers;
- BioInsite LLC (2004) to provide microbial solutions for in-situ bioremediation of hazardous materials such as perchlorate and benzene;
- Midwest Energy Group Inc. (2007) to optimize and commercialize novel biodiesel production technology with pilot plant ground-breaking expected in 2009;
- Minerals Development Company, Inc. (2008) to commercialize mining-related technologies with the first product being introduced later this year, a novel engineered mine-roof support;
- Minestone Partners, LLC (2008) to commercialize a resin-based anchoring invention for mining applications;

- Atlas Cribs (2009) to produce a cost-effective engineered alternative for "cribs" traditional wood roof-supports in coal mines—which have been successfully installed in a number of area mines; and
- Enki Technology, Inc. (2009) to commercialize sol-gel glass coatings, with anti-soiling, hydrophobic, and enhanced light-absorption properties, for solar panels and other applications.

In addition, several non-local successes are based on SIUC researchers' patent-protected inventions:

- A new molecular analytical instrument was introduced in 2007 by Quant Technologies of Minneapolis, Minnesota; to date the instrument has been well accepted and is selling at a high rate for a new product of its type.
- At the beginning of 2008, a pilot project began for the conversion of $CO_2$ to methanol, and is being scaled up by Biodyne, Inc. of Houston, Texas. That project is nearly complete.
- In August 2008, the university licensed its transgenic GDH technology to a major agriculture company. Field trials are being prepared to develop crops with higher drought resistance and nitrogen retention.
- Nanoaqeonics, Inc. was formed in fall of 2008 to commercialize proprietary sol-gel materials for fabric water repellency, anti-wrinkling, and other home-care applications. The company is located in San Jose, California with a portion of the company's R&D and production activities planned for Carbondale.
- In July 2009 the university licensed its nanowire explosives detection technology to Icx Nomadics, Inc. of Stillwater, OK. The technology uses naturally occurring fluorescent characteristics to indicate the presence of extremely small quantities of molecules emitted by explosives.
- During the summer of 2009, the locally based Midwest Energy Group partnered with a Florida company to build a demonstration-scale biodiesel production facility. The process efficiently converts brown grease to diesel fuel. A 10-million gallon capacity production plant is being designed for the next phase.

SIUC has often been called the "economic engine of southern Illinois" by state economic development officials, and Jackson County (where SIUC is located) is actively interested in working with the university in the creation of new companies and job opportunities in the area. Much of this economic development activity has been housed in the Southern Illinois Research Park (SIRP), established by the SIU Board of Trustees in 2000 to facilitate

the establishment and expansion of regional businesses through SIUC technologies and expertise[357] (see Criterion 5).

In 2006, the Jackson County Business Development Corporation contracted with TIP Strategies of Austin, Texas to carry out an "opportunity analysis" that focused on "leveraging SIUC—Jackson County's strongest asset" (but also fostering over-reliance)—to create new economic opportunities in the area.[358] In response to the recommendations of this and other consultants' reports, the "Commercialization of University Technology Committee" (CUTC) was created. This committee, which includes entrepreneurial alumni, community leaders, venture capital representatives, and the SIUC OVCR/GD, tech transfer office, and SIRP, is working to transfer university research and knowledge into private sector jobs.

### *Publications*

The scholarly and creative achievements of SIUC faculty, students, and staff are publicized in a variety of print media, as well as on OVCR/GD and ORDA websites. A particularly important venue for such publicity is *Perspectives: Research and Creative Activities at SIUC*, a biannual magazine published since 1990 that highlights the research, scholarship, and creative activity across the university community.[359] Widely praised for its clear explanations of complex issues, *Perspectives* added color in 2000; in 2007 it won a silver Addy Award from our regional chapter of the American Advertising Federation, and in 2008 a Silver "Award of Distinction" in the 14th Annual Communicator Awards international competition with more than 8,000 entries. The magazine's circulation extends beyond the campus to other VCRs in Illinois and other states, Illinois community colleges, selected funding agencies, legislators, donors, alumni, advisory boards, and local high schools.

Similarly, SOMS publishes *Aspects* magazine four times a year to highlight its research and other activities. Schedules of upcoming research workshops and presentations are distributed to all faculty and staff via weekly emails. Research updates are published monthly by the ADRFA office in the *Research Communiqué* and by ORDA in *Research Matters*, now published only online.

*Graduate Highlights* is an annual newsletter focusing on the achievements of graduate students and faculty, and since 2007 undergraduate accomplishments have been highlighted in the tabloid style *SIUC Undergraduate Research* publication. Since 2001 ORDA has

357 http://www.sirpark.com/.

358 "An Opportunity Analysis for Jackson Co., Illinois," prepared for Jackson County Business Development Corporation by TIP Strategies, May 2006, pp. 3, 5.

359 http:// www.perspect.siuc.edu.

published an annual *Research Profile* that summarizes award and expenditure statistics and briefly highlights outstanding faculty and student achievements. Finally, the office widely circulates a variety of up-to-date brochures and posters summarizing information about ORDA pre-award services, graduate funding opportunities, undergraduate research programs, and technology transfer services.

## Libraries, Centers, and Consortia

### *Libraries*

It is often said that the heart of a university is its library; and Morris Library, SIUC's main facility, serves that function. Morris Library provides resources for teaching and research in all disciplines on campus, as well as the physical home of the University Honors Program, and is the foundation for a life of learning among all members of the university community. The 50,000-square foot addition/renovation project on the north side of the existing structure holds a coffee shop, an auditorium, and extensive computer facilities. This addition, with its rotunda and tiered ornamental pool, was completed in 2008 and helps define outdoor space without disrupting the natural beauty of the area.

With more than 2.6 million volumes, 3.6 million microform units, and more than 36,000 current periodicals and serials, Morris Library was ranked 55 among U.S. public research university libraries by the Association of Research Libraries (ARL) in 2008. Morris Library is a member of the Consortium of Academic and Research Libraries in Illinois (CARLI), the Association of Research Libraries (ARL), and the Greater Western Library Alliance (GWLA).[360] Library users have access to I-Share (the statewide automated interlibrary-loan system) and an array of databases and other electronic data files.

Morris Library's Special Collections Research Center, begun with a small collection of Walt Whitman first editions in 1956, is organized into several curatorial units: the Manuscripts unit curates American philosophy, theatre, American and British expatriate authors (especially between World Wars I and II), and southern Illinois history and culture; University Archives documents the growth and development of the university and provides records management services to administrative offices. Rare Books collects materials related to First Amendment freedoms, as well as expatriate and modernist literature, Irish literature and history, American philosophy, American and British expatriate authors, James Joyce, John Dewey, fine printing, and southern Illinois history and culture. In 2006, Political Papers was separated from Manuscripts to focus on the collections of

360 http://www.lib.siu.edu/abt/about.


twentieth and twenty-first century Illinois politicians, elected officials, political appointees, and political parties and groups.[361]

Specialized law and medical libraries, although administratively autonomous units designed primarily to serve their schools' faculty and students, provide access to a wide range of law- and medical/health-related materials, in both print and electronic formats, as well as myriad services to the entire university community. The Law Library, housing a collection of more than 400,000 volumes and volume-equivalents, including nearly a million microform units as well as numerous law-related databases, offers a rich array of resources and research assistance to SIUC students, faculty, and staff needing access to legal information. Similarly, the Medical Library at SOMS holds a collection of nearly 170,000 volumes that supports the educational, patient care, research, and administrative information needs of SIUC faculty, staff, students, and residents.

### *Research Centers and Institutes*

Another indication of SIUC's commitment to a life of learning is the number and variety of campus research centers and institutes and memberships in regional consortia, all of which play important roles in the scholarly and creative endeavors of the university community. Research centers play significant roles in bringing in new resources, one of the targets of *Southern at 150* to "enhance and develop existing and new centers of research, scholarship, and creative activity excellence."[362] Since 1999, four new centers have been created on the Carbondale campus: Middle Mississippi Wetland Research Field Station (2003), Center for Ecology (2005), Center for Integrated Research in Cognitive and Neural Sciences (2005), and Center for Delta Studies (2008). The SimmonsCooper Cancer Institute at SIU (2001) is a new center at SOMS. On the Carbondale campus, as a rule, discipline-specific centers are housed in individual colleges and inter-disciplinary centers in the OVCR. In addition, several national and international research organizations are headquartered on campus.[363]

The Center for Advanced Friction Studies (CAFS) in the College of Engineering focuses its teaching, research, and testing services on areas of fundamental interest to the friction industry in the United States, including automotive, aviation, and railroad braking systems. Research may be initiated by faculty, students, or industrial sponsors on factors influencing friction and wear (including thermal effects) on performance of braking materials, especially

361 See http://www.lib.siu.edu/departments/speccoll/scrcintro.

362 *Southern at 150*, p. 31.

363 http://www.vcresearch.siuc.edu/centers.html.

carbon fiber-reinforced-carbon matrix (carbon-carbon) composite brake materials. CAFS is governed by an industrial board composed of one industry representative from each company that supports the center. Technology transfer between the center and industry is facilitated by personnel exchange and remote interactive learning networks. Co-op programs utilizing industry-sponsored students are being developed at both the undergraduate and graduate levels.[364]

The Center for Alzheimer Disease and Related Disorders (CADRD) was established in 1987 at SOMS by the state of Illinois. CADRD provides clinical care to patients with Alzheimer's disease, Parkinson's disease, and/or other neurological disorders; educational programs for medical professionals and lay care givers; and research into these diseases.

The Center for Archaeological Investigations (CAI), created in the College of Liberal Arts in 1978, conducts regional archaeological research at SIUC, retaining close ties to the Department of Anthropology. CAI projects provide research opportunities and employment for both graduate and undergraduate students. The center's four major activities include sponsored research; curation, such as the care and use of archaeological collections for research, student training, and public education; an annual visiting scholar program supporting a postdoctoral fellow; and publications (e.g., reports on excavations and a book of the papers presented at the Visiting Scholar Conference).[365]

The Center for Delta Studies, reporting to the OVCR/GD, was established in 2008 to build linkages among SIU scholars and those at universities in the region—centering on the lower Mississippi River valley—encompassed by the federal Delta Regional Authority (see note 343). The center's mission is to promote collaborative networks and research that will contribute innovative solutions to the problems of poverty and associated human and environmental issues endemic to the Delta region. The center is part of SIUC's commitment to lead in research, scholarly, and creative activities that serve others in our region and the larger world.

The Center for Dewey Studies, affiliated with the Department of Philosophy, is the home of projects and resources that focus on the American philosopher and educator John Dewey. Established in 1961 as the "Dewey Project" to collect and edit Dewey's works, the center amassed a wealth of source materials. Through its publications with the SIU Press, the center has become the international focus for research on Dewey's life and work.

The Center for Ecology is an interdisciplinary center that includes faculty from the

364 http://frictioncenter.engr.siu.edu/.

365 http://www.cai.siuc.edu/.

Departments of Anthropology, Geography, and Environmental Resources (CoLA), Plant Biology and Zoology (CoS), Forestry (CoAS), and Civil and Environmental Engineering (College of Engineering). Supported by and reporting to the OVCR/GD, the center has an active seminar program and will begin searching for a director in FY10. Much of the center's research is carried out in the southern Illinois region.

The Center for Integrated Research in Cognitive and Neural Sciences is a new interdisciplinary research center that reports to the OVCR/GD. The center involves faculty and students from the Department of Psychology (CoLA), the Rehabilitation Institute (COEHS), the Departments of Anatomy and Physiology in Carbondale (CoS), and Springfield (SOMS).

The Center for Innovation (C4I) in the College of Business was established in 2006 with the goal of bringing together faculty, students, and business organizations to foster innovation and interdisciplinarity. The center offers grants and scholarships to students and works with researchers, business development organizations, and the campus technology transfer office.[366]

The Coal Research Center (CRC) provides state and national leadership in energy research at universities and institutions, as exemplified by a $2 million grant from the state of Illinois to develop enhanced coal-to-liquid fuels research capability. It also provides administrative and technical support to the Illinois Clean Coal Review Board, which manages a $25 million trust; and participating in the Illinois Trade Missions on Energy to China (2006) and Europe (2008). CRC assists the state of Illinois in the promotion of new coal technologies, for example, in the effort to build the federal FutureGen project in Illinois and to organize a multi-institutional association to support university research as part of the project. CRC operates the Illinois Coal Development Park, a specialized coal and energy R&D facility which underwrites pilot-scale engineering research in advanced coal cleaning, mining, gasification, and carbon dioxide capture.[367]

Related to the above, SIUC is the administrative home of the Illinois Clean Coal Institute (ICCI), which was established in 1982 to coordinate a comprehensive coal research and development program that addresses environmental, safety, productivity, and marketing issues related to mining and using Illinois coal. ICCI is funded by the Illinois Department of Commerce and Economic Opportunity's Office of Coal Development. Through a competitive proposal process, ICCI distributes R&D funds to universities, industry, and

366 http://www.innovation.siu.edu/Strategy_statement.htm.

367 OVCR Selected Examples of Excellence (1/31/08; rev 5/12/08).

research institutions in Illinois and selected other states.[368]

The Global Media Research Center in the College of Mass Communication and Media Arts,fosters interdisciplinary communication among researchers, nationally and internationally, about global media operations, strategies, and trends. The center's mission is to foster a core group of faculty and students engaged in substantive research initiatives in global media; establish national and international partnerships for research and creative exchange; provide an active visiting scholars and artists program; serve as an impetus for the development of new courses addressing global media issues in the college; develop international exchange programs for faculty and students; and work with both the campus and the local community on fostering the discussion of global media topics.

For more than fifty years, the Cooperative Wildlife Research Laboratory, reporting to the OVCR/GD, has carried out basic and applied research emphasizing the welfare of people, wildlife resources, and their environments. Faculty hold tenure lines in the Department of Zoology.

The Fisheries and Illinois Aquaculture Center (FIAC) serves the university, region, and nation as a facility for research and teaching in the area of management and conservation of fisheries and aquatic resources. Reporting to the OVCR/GD, FIAC faculty are specialists in fish ecology, genetics, toxicology, and physiology in the Department of Zoology. Research facilities include more than ninety ponds, 900 square meters of wet lab space, a large research vessel, and toxicology and physiology laboratories.[369]

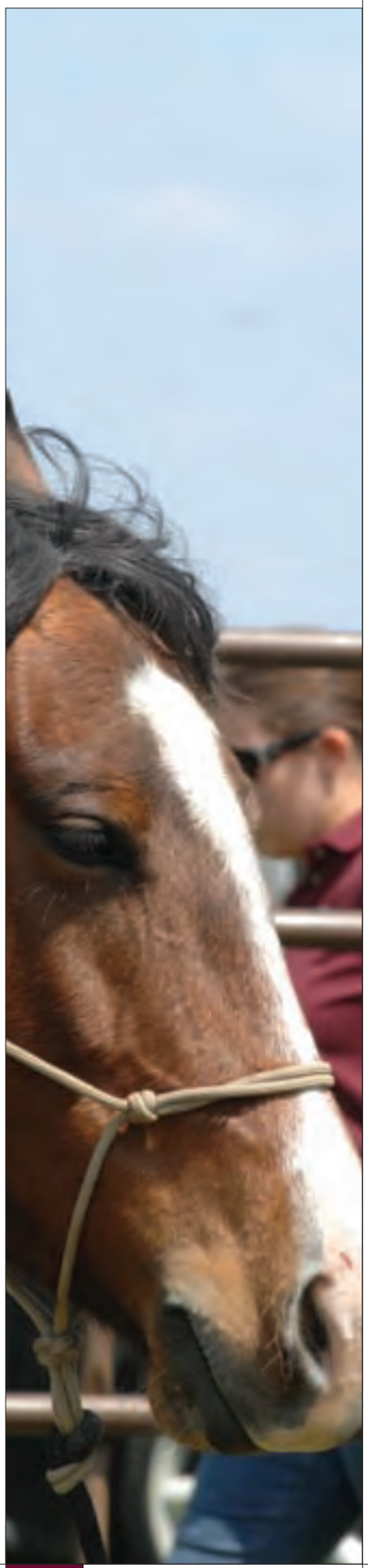
The Materials Technology Center (MTC), established in 1983 in the College of Engineering and now reporting to the OVCR/GD, undertakes interdisciplinary research in engineering and science in the areas of biomedical and "smart" materials, strategic materials fuel cells, sensors, civil infrastructures, and many other materials-related issues pertinent to the practical needs of society. The center provides internal research grants and sponsors conferences and seminars. MTC works with an Industrial Advisory Board and with federal and state agencies.[370]

The Center for Autism Spectrum Disorders in the College of Education and Human Services provides "teaching and interdisciplinary training of graduate students who will be the future professionals in their disciplines of behavior analysis, speech language pathology,

368 http://www.icci.org.

369 http://fisheries.siuc.edu.

370 See goals listed at http://mtc.engr.siu.edu.



and other related professions."[371] The center is also a regional resource for serving children with autism, their families and service providers, with clinical services, consultation, and training manuals and DVDs.

The Middle Mississippi River Wetland Field Station (MMRWFS) is a 1,380-acre research area owned by the state of Illinois and managed by SIUC. Established in 2003 through agreements with the American Land Conservancy and the Illinois Department of Natural Resources, the station is located on the banks of the Mississippi River in Alexander County, Illinois. The purpose of the MMRWFS is to serve as a research, education, and demonstration area on large river floodplain and wetland ecology, management, and restoration. It is used by faculty and students in the Fisheries Center, the Wildlife Lab, the Center for Ecology, and the Department of Zoology. The MMRWFS is a member of the Organization of Biological Field Stations.[372]

The Meyers Institute for Interdisciplinary Research in Organic and Medicinal Chemistry carries out basic research in organic chemistry and biochemistry. The Institute provides graduate fellowships, stipends for postdoctoral and visiting researchers, and summer stipends for undergraduate researchers. The Meyers Institute sponsors an annual symposium at SIUC on a topic of current interest to researchers in the institute or related interdisciplinary areas.[373]

The Paul Simon Public Policy Institute was founded in 1997 by Paul Simon, a former two-term U.S. Senator from Illinois and one-time candidate for the Democratic party nomination for president of the United States. The Public Policy Institute at SIUC differentiates itself from similar organizations by working directly with elected officials and others to fashion and implement changes in public policy. Many such organizations are considered "think tanks," which is not an apt descriptor for the Simon Institute. The center sponsors numerous conferences and lectures open to the public.[374]

A cancer research center established in FY01 at SOMS became the SimmonsCooper Cancer Institute at SIU in FY06. Construction of its primary facility, a state-of-the-art $21.5 million building with 63,000 square feet on three floors, was completed in 2008. It provides programs of research, patient care, education, and outreach to improve cancer care in central and southern Illinois. The institute's researchers are engaged in basic and clinical oncology research in two major areas: cancer molecular genetics and early detection, and

371 http://www.casd.siuc.edu/.
372 http://fisheries.siuc.edu/wetland/.
373 http://www.chem.siu.edu/meyers-institute/Homepage.html.
374 http://paulsimoninstitute.org/.

experimental therapeutics and prevention. Collectively, the institute's researchers have received external support in excess of $10 million.[375]

The Department of Geography and Environmental Resources (College of Liberal Arts) is the administrative home of the Universities' Council on Water Resources (UCOWR), which consists of more than ninety member universities and organizations throughout the world. UCOWR's main objectives are to facilitate water-related education at all levels; promote meaningful research and technology transfer on contemporary and emerging water resources issues; compile and disseminate information on water problems and solutions; and inform the public about water issues with the objective of promoting informed decisions at all levels of society. The council holds an annual conference that provides a forum to explore key and timely topics of interest to water resources researchers and educators. UCOWR publishes the *Journal of Contemporary Water Research and Education*, presenting scholarly work and current water resources news.[376]

### *Memberships in Consortia*

SIUC is a member of several regional, national, and international consortia and coalitions that offer learning, research, and development opportunities for faculty and students. Except for ORAU/ORISE and OTS, these memberships have begun in the last decade.

SIUC is a member of the Organization of Tropical Studies (OTS), a non-profit, international consortium of academic institutions based at Duke University, which focuses on tropical biology research and education: "OTS offers hands-on, research-oriented, field courses in tropical biology and related fields; awards an array of research fellowships to graduate students from the OTS consortium; and provides course scholarships for a growing number of U.S. and Latin Americans, including students from the OTS consortium and students underrepresented in the sciences." [377]

The St. Louis BioBelt is a coalition of universities and industries in the St. Louis region engaged in a regional technology economy and focused on plant- and life science-based R&D, including development and production of medicines, agricultural chemicals, organic chemical manufacturing, and medical equipment manufacturing.[378]

The Consortium for Plant Biotechnology Research supports biotechnology research that

375 According to the Director of the Institute on http://www.siumed.edu/.
376 http://ucowr.siu.edu/.
377 http://www.ots.ac.cr/index.php?option=com_content&task=view&id=356&Itemid=261.
378 http://www.stlrcga.org/biobelt.xml.

has practical applications; advances technological innovations based on new understandings and uses of plants and other organisms; provides multidisciplinary training and research opportunities for a new generation of scientists and engineers; and connects industry needs with university and industry suppliers.[379]

The Great Rivers Cooperative Ecosystem Studies Unit is one of a network of ecosystem research units focusing on high-quality science, usable knowledge for resource managers, responsive technical assistance, continuing education, and cost-effective research programs. The Great Rivers CESU, housed at the University of Missouri, Columbia, is a cooperative effort of seventeen institutions and seven federal agencies whose goal is to address these objectives in the upper and middle Mississippi valley. SIUC was invited to be one of the founding members of this initiative in 2002.

Oak Ridge Associated Universities (ORAU)[380] is a consortium comprising ninety-nine research institutions in partnership with national laboratories, government agencies, and private industry. ORAU is managed through the Oak Ridge Institute for Science and Education (ORISE), established by the U.S. Department of Energy (DOE) in 1992 as a national leader in advancing science education and research programs and creating opportunities for collaboration through partnerships with other DOE facilities, other federal agencies, the academic community, and industry. The institute focuses on scientific initiatives to research health risks from occupational hazards, assess environmental cleanup, respond to radiation medical emergencies, support national security and emergency preparedness, and educate the next generation of scientists.[381] Membership in ORAU gives SIUC faculty and student researchers access to its facilities, funds, and other opportunities, including eligibility for the Ralph E. Powe Junior Faculty Enhancement Awards. ORAU also sponsors select students to travel to the Lindau Meeting of Nobel Laureates and students in Germany; two SIUC graduate students were recently selected for this honor and experience.[382]

## Support for Faculty Scholarly and Creative Work

The previous section identified general evidence demonstrating SIUC's commitment to a life of learning among members of its community. This section focuses on the kinds of support, university- and college-based, for the research, scholarly, and creative activities of new and tenured faculty.

379 http://www.cpbr.org/.
380 http://www.orau.org.
381 http://orise.orau.gov.
382 Source: Office of the Vice Chancellor for Research.

### *Support for New Faculty*

SIUC places a high priority on nurturing new faculty members, especially those who are not yet tenured. The provost and vice chancellor hosts an annual orientation for new faculty to introduce them to the university. Similarly, ORDA conducts annual orientations and workshops for new and continuing faculty on the Carbondale campus to ensure that they are familiar with its research services. Of equal if not greater importance are the programs conducted by individual colleges and departments specifically aimed at new faculty members to get them off to a good start in their teaching, research, and service activities.

For example, since 1995, the College of Applied Sciences and Arts (CASA) has had a mentoring program for new faculty that includes a detailed orientation, monitoring, and mentorship by senior tenured faculty and the associate dean. Grant-writing workshops are offered to promote funding for faculty research and creative activities. CASA's Research Committee funds pilot research and creative work proposals.

In the College of Education and Human Services, all newly hired tenure-track faculty are invited to participate in the college's new-faculty mentoring program. New faculty members are formally assigned a mentor during their first year based on stated preferences for assistance in teaching, research, and service. Also during their first year, new faculty members are invited to attend training workshops that cover orientation to the college, proposal writing, effective teaching, and academic writing/publishing. The college also hosts luncheons to promote collegiality among its new faculty.

The College of Engineering has sustained a faculty mentoring program for the last decade. Its objective is to provide assistance to junior faculty members as they adjust to the rigors of academia and to offer guidance as they prepare for the tenure and promotion process. The program helps foster excellence in teaching, research, and scholarship; service to the university community; and professional growth to new faculty members. Mentors are assigned during the first year of the junior faculty member's career at SIUC and are asked to schedule regular meetings with faculty and report progress at least annually to the associate dean.[383]

Mentoring of new faculty in the College of Science operates at the department level with chairs responsible for identifying and appointing one or more mentors to new faculty members. For example, a faculty member may have different mentors for teaching and research. New faculty retain mentors throughout their probationary period leading up to

383 Response from college to Criterion 4 Committee survey.

tenure and promotion. Mentors may have input to the annual review of all probationary faculty that occurs each spring semester.[384]

At the School of Medicine, a mandatory expanded development program for new faculty members, addressing both teaching and research, was implemented in 2008. The school's departments also encourage the development of research and grant procurement skills within their faculties. For example, the Department of Physiology developed an informal mentoring program in which senior faculty read and critique proposals and manuscripts written by more junior faculty; the Departments of Anatomy, Pediatrics, and Pharmacology have similar programs. The Department of Internal Medicine supports a monthly research conference in which the work of junior faculty may be reviewed and subjected to the critique and advice of others in the department. The Obstetrics and Gynecology department holds weekly research meetings for a similar purpose.

Senior faculty in several departments (for example, the Department of Psychiatry) meet with faculty on a one-on-one basis to further support their individual research activities and/or assist them in starting new projects. The Department of Family and Community Medicine, through its Research Management Unit, provides professional and clerical support to faculty for research and scholarship; services include technical, editorial, design and analytic aspects of research and scholarship. The Department of Medical Humanities has developed a "works-in-progress" research discussion group to help advance research in the department. Several departments provide administrative and financial support for faculty who are developing grant proposals; others work with the medical school's Statistics and Research Consulting unit to provide bio-statistical and other methods support.

### *Professional Development Leaves*

As discussed in the *SIUC Employees Handbook*, the SIU Board of Trustees has approved numerous policies for faculty and others to take leaves, some paid, for personal, medical, and professional reasons. For example, SIUC faculty and staff are entitled to Family and Medical leave (in accordance with the federal Family and Medical Leave Act of 1993), and leave for disaster relief services, bereavement, jury duty, and military service.[385]

Other forms of centrally-provided support are designed to help faculty members achieve career and professional goals, particularly those related to research, scholarship, and creative activities. These include personal leaves (without pay) and leaves of absence and release time with pay, which include various kinds of brief professional development activities

384 Response from college to Criterion 4 Committee survey.

385 http://www.siuc.edu/~policies/employees_handbook/chapter_06.1.html.

such as attendance at professional meetings, internships, and continuing education.

Perhaps the most important of these for faculty scholarly development is the sabbatical leave. The SIUC policy for sabbatical leave with pay, approved in 1980 and revised in 1986, states that sabbatical leaves are "essential to provide opportunities for continued professional growth and development of the faculty and to insure that the academic vitality of the university is maintained." Sabbaticals may be granted at six-year intervals to full-time, tenured faculty for periods of a semester, six months, or a full year, with varying conditions of compensation. Faculty applications for sabbatical leave must include a plan that incorporates research, additional study, course development, or preparation for work in a different field, and that will contribute to the university's academic excellence.[386]

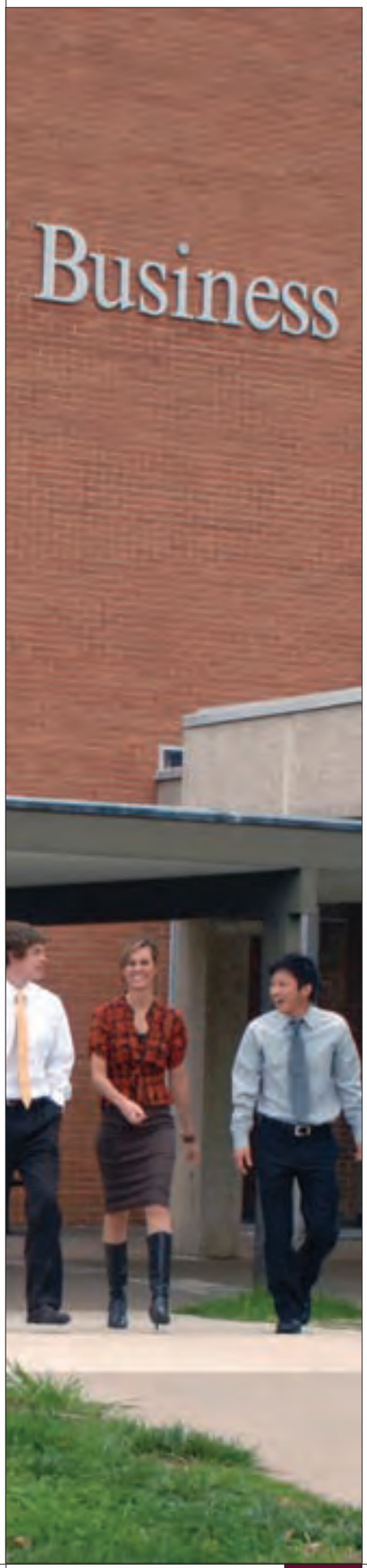
### *College and Departmental Support for Scholarly Activities*

Considerable internal support for faculty research, including travel, comes from individual colleges and departments:

**College of Agricultural Sciences:** After summer teaching contracts have been allocated, the college awards any remaining salary dollars for summer research projects. The college has awarded 115 Summer Fellowships to date. The Department of Forestry has Internal C-FAR (Illinois Council on Food and Agricultural Research) grants, and gives support for faculty to attend grant-writing seminars and for graduate students to attend professional conferences.[387]

**College of Business:** Support is provided in several ways, including summer salary for new faculty members, travel support, and monetary compensation. A reduced teaching load is available to Rehn Scholars.

**College of Mass Communication and Media Arts:** The college supplies significant travel support for faculty and graduate students to present, screen, and exhibit their work at national and international conferences. This support has ranged from $19,000 to $33,000 over the past five fiscal years. The college routinely supplies small amounts of money ($150 to $750) to support things like indexing recent research book projects as well as money for start-up packages to support research in the form of equipment and contractual services. Through the Global Media Research Center, the college has also provided research support to faculty and post-docs as well as a speaker series and support staff. Over the past five fiscal years (FY05-09) this has amounted to $50,000 per year, plus $132,504 in post-doc




386 http://www.siuc.edu/~policies/policies/leavefap.html.

387 Response from department to Criterion 4 Committee survey.

salaries in FY06. The college also supports graduate research assistantships for students to assist faculty in various projects, totaling more than $200,000 in each of the past five fiscal years. Total research support in all forms over the past five fiscal years has ranged from $289,999 to $432,000.[388]

In addition, the New Media Center, in the College of Mass Communication and Media Arts, represents a working partnership between the college and Information Technology embodied in the combination of an open access Computer Learning Center with dedicated classrooms/labs specifically designed to meet the needs of faculty, staff, and students engaged in producing digital media. Besides supporting the research, teaching, and service activities of the college, the center maintains an open access policy for other members of the university community in need of its unique tools and services. Two specialized classrooms/labs are equipped with enhanced computers, unique peripheral devices, and powerful software to facilitate work in various visual and audio media. The labs support work in digital imaging, web design, multimedia authoring, digital video and audio, MIDI applications, 3D modeling and animation, and large format inkjet printing. College staff use the labs to produce digital media to help disseminate research results, enhance and expand educational activities, and assist community groups in various projects.[389]

The **College of Science** (CoS) provides internal support for research through the operating budget of the college (~$150,000 annually); scholarship funds from CoS foundation-administered funds (~$40,000 annually); indirect cost returns to CoS from grants generated by CoS faculty (~$100,000 annually); non-RAMP funding obtained from external sources (highly variable); RAMP funding obtained through the Illinois Board of Higher Education (amounts vary); and CoS-level grant applications to support research, equipment, or facilities (amounts vary; two pending applications total $1,750,000). In addition, each department provides additional funds for research from departmental travel and indirect cost account funds.[390]

## Recognition, Awards, and Rewards

The growth in productivity and success in the full range of "research" activities on campus—including publications, performances, exhibitions, and external funding among other measures—has led to the creation of new mechanisms to recognize and reward success. The breadth and nature of these achievements provide tangible evidence of the value which the faculty and students place on learning, research, scholarship, and creative activity of all types.

388 Source: Office of the Dean, College of Mass Communication and Media Arts.

389 http://nmc.siu.edu/.

390 Response from college to Criterion 4 Committee survey.

One way of recognizing and celebrating faculty and student research, scholarly, and creative accomplishments on the Carbondale campus is the annual "Research Day" and "Research Town Meeting" organized by the OVCR/GD. The first such meeting, held in spring 2003, was a forum featuring faculty and student posters and exhibits, a presentation by the VCR on the status of the newly resurrected campus research enterprise, and an opportunity to ask questions. Since this initial brief gathering, the concept has expanded to a half-day event, a "Research Town Meeting and Fair," co-sponsored by faculty and student constituency groups across campus, with a wine-and-cheese reception and entertainment by students from the School of Music. The 2008 Meeting and Fair featured some 150 posters and 36 exhibits; in 2009 there were 162 posters, 15 videos, 73 tabletop exhibits/displays of various sorts. The event also incorporates visits, in person or via teleconference, with several external research program officers, allowing SIUC scholars the opportunity to learn more about the agencies' funding priorities and ask questions. This popular gathering provides an opportunity for faculty, staff, students, and administrators from across the campus to learn about what their colleagues in other departments are doing, which can stimulate important and fruitful interdisciplinary collaborations.

### *Excellence through Commitment Awards*

In 2003 former SIUC Chancellor Walter W. Wendler created the prestigious "Excellence through Commitment" (ETC) Awards program to recognize the accomplishments of the university's faculty, civil service, administrative/professional, graduate student, and student employees in fulfilling the university's educational, research, and service missions. The ETC awards echo the core values of *Southern at 150: Building Excellence through Commitment*: "We will recognize that Southern Illinois University Carbondale is a place that values people and the human spirit."[391] Each year ten awards are given at the university level, including an Outstanding Scholar and an Outstanding Teacher, and each college also presents two awards, one for a College Outstanding Scholar and one for a College Outstanding Teacher. In addition, two awards, one for faculty and one for a graduate assistant, are given for excellence in instruction in the University Core Curriculum.[392] Other awards are also part of this program.

The Outstanding Scholar Award, the primary university-wide honor for research excellence, is open to faculty on the Carbondale and Springfield campuses. Established in 1985, the Outstanding Scholar Award selection process is coordinated through the OVCR/GD, which maintains a webpage giving the winner's names, pictures, and brief descriptions

391 *Southern at 150: Building Excellence through Commitment*, p. 15.

392 http://www.siuc.edu/ExcellenceAwards/index.html.

of their research interests.[393] As seen in Table 4-4, winners of the Outstanding Scholar Award span the sciences, humanities, and arts.

Table 4-4. Winners of the SIUC Outstanding Scholar Award.

| Year | Name | Department |
|---|---|---|
| 1985 | Dale F. Ritter | Geology |
| 1986 | Jerome S. Handler | Anthropology |
| 1987 | Andrzej Bartke | Physiology |
| 1988 | Robert H. Mohlenbrock | Botany |
| 1989 | George J. Gumerman | Anthropology |
| 1990 | Dennis L. Molfese | Psychology |
| 1991 | Rodney G. Jones | English |
| 1992 | Mark L. Johnson | Philosophy |
| 1993 | Steven Scheiner | Chemistry and Biochemistry |
| 1994 | Robert S. Corruccini | Anthropology |
| 1995 | Richard L. Lanigan | Speech Communication |
| 1996 | F. Bary Malik | Physics |
| 1997 | Prudence M. Rice | Anthropology |
| 1998 | Rongjia Tao | Physics |
| 1999 | Eric P. Mandat | Music |
| 2000 | Scott J. Spector | Mathematics |
| 2001 | Michael T. Madigan | Microbiology |
| 2002 | Larry A. Hickman | Philosophy |
| 2003 | Donald M. Caspary | Pharmacology (SOMS) |
| 2004 | Charles Fanning | English |
| 2005 | Leonard P. Rybak | Surgery (SOMS) |
| 2006 | Salah E. A. Mohammed | Mathematics |
| 2007 | Izumi Shimada | Anthropology |
| 2008 | David J. Gibson | Plant Biology |
| 2009 | Carl L. Faingold | Pharmacology (SOMS) |

"Your work enhances the reputation of the University, helps attract students to our campus and brings considerable funding from many valued partners"

Remarks of Chancellor Samuel Goldman, Research Town Meeting & Fair. April 14, 2009

### *Recent Faculty Scholarly and Creative Achievements*

SIUC faculty are at work every day—in the lab and in the library, in the field and online, in the classroom and in the studio—to expand knowledge and contribute to society.[394] The following is a sampling of their recent (2007-2009) achievements, all of which serve as evidence of the devotion to a life of learning and scholarly contribution that marks the SIUC faculty as a whole.[395]

CAREER Awards: The NSF awards prestigious five-year grants for activities that combine

393 http://www.siuc.edu/ExcellenceAwards/Scholar/index.html.

394 http://www.vcresearch.siuc.edu/profile.html.

395 Sources, unless otherwise indicated, http://www.vcresearch.siuc.edu/highlights.html and *Perspectives*.

teaching and research, and SIUC faculty have won thirteen of them since 1999. The Department of Chemistry and Biochemistry now boasts a total of seven CAREER award winners out of a total of fifteen faculty: the two most recent are Ling Zang (2007) to investigate nano-sized filters that can capture single molecules from explosives or poisons; and Punit Kohli (2008) to develop "nano-pen" arrays to control deposition and patterning of molecules on surfaces at the submicron level. Other awardees in the department are Gary Kinsel (1999), Daniel Dyer (2001), Shaowei Chen (2001), Yong Gao (2004), and Boyd Goodson (2004).

In addition, four faculty members in the Department of Physics have recently won CAREER awards: Mark Byrd (2006) to study quantum computing error correction and support for a national conference at SIUC;[396] Shane Stadler (2006) to develop high-quality, half-metallic alloys; María de las Mercedes Calbi (2008) to study how molecules and atoms bind to carbon-nanotube bundles; and most recently, Mesfin Tsige (2009).

PECASE Award: Physics professor Maria de las Mercedes Calbi was also selected by NSF to be one of only twenty national Presidential Early Career Awardees in Science and Engineering (PECASE) in 2009.[397]

Rodney Jones (Department of English), the 1991 Outstanding Scholar, received the 2007 Kingsley-Tufts Prize for his latest collection of poetry; the award is the top international prize for a mid-career poet and carries a $100,000 purse.[398]

Law Professor Marshall Kapp received the 2009 American College of Legal Medicine's Gold Medal, the organization's highest award for service, professionalism, dedication, and contributions.

Anthropology professor Izumi Shimada, an archaeologist specializing in the ancient civilizations of northern Peru, was awarded Peru's Congressional Distinguished Service Medal in 2006 and was named SIUC's Outstanding Scholar in 2007.[399]

Emeritus professor Jack Crelling, Department of Geology, received the 2007 Reinhardt Thiessen Medal from the International Committee for Coals and Organic Petrology. He is one of only a handful of Americans to receive this award, a top honor in the study of fossil fuels, during its fifty-year history. Crelling is an expert in coal characterization.[400]

396 See also http://news.siu.edu/news/July06/070606tjc6138.jsp.
397 http://news.siuc.edu/news/July09/070909tjc9058.html.
398 See also http://news.siu.edu/news/February07/020907sm7029.jsp.
399 See also http://news.siu.edu/news/November06/112906sm6176.jsp.
400 See also http://news.siu.edu/news/October07/102507tjc7105.jsp.

Patricia Elmore (College of Education and Human Services) received the 2007 American Counseling Association's Extended Research Award for high-quality research that has contributed significantly to the field for at least ten years.[401] She is a Fellow of the American Counseling Association (2006) and of the American Educational Research Association (2009).

Y. Paul Chugh (Mining and Mineral Resources Engineering), head of the Combustion Byproducts Recycling Consortium-Midwestern Region, was selected as a Fulbright Senior Specialist and spent six weeks at the Indian School of Mines in Dhanbad.[402]

Patricia Ross McCubbin (Law School) was named a Fulbright Scholar to China in environmental law.[403]

Larry Hickman (Philosophy), director of the university's Center for Dewey Studies, was honored as the 2007-2010 National Scholar of Phi Kappa Phi—a prestigious national award given only once every three years by the national honor society. SIUC is now the only university in the U.S. to boast two winners of this award; physiologist Andrzej Bartke of SOMS received the honor in 2001-2004.[404] Both are former Outstanding Scholars.

David Rush, head of SIUC's playwriting program, won first place in the 2007 Firestone Theatre New Play Contest for his submission *One Fine Day*.[405]

Dale Wittmer and Peter Filip (Department of Mechanical Engineering and Energy Processes) have recently patented composite materials that are 800 times more wear resistant than those currently used in practice, and are researching applications in mining.[406]

In 2007–08, ten SIUC faculty were named fellows in their respective fields. Peggy Stockdale and Kathie Chwalisz (Psychology) were named fellows of the American Psychological Association for contributions to the field that have had national impact. Lisabeth DiLalla (Community Medicine) was named a fellow of the Association for Psychological Science. Ramanarayanan "Vish" Viswanathan (Electrical Engineering) was named a fellow of the Institute of Electrical and Electronics Engineers; less than 0.1 percent of IEEE members are so honored. Shing-Chung "Max" Yen was named a fellow by the Society for Experimental

401 http://spotlight.siu.edu/04182007/Elmorehonored.html.
402 http://news.siuc.edu/news/August06/081006pr6091.jsp.
403 http://news.siu.edu/news/March06/040506pr6032.jsp.
404 See also http://news.siu.edu/news/May07/051707ah7024.jsp; OVCR Selected Examples of Excellence (1/31/08; rev 5/12/08).
405 http://www.perspect.siuc.edu/07_sp/kudos.html.
406 See also http://www.perspect.siuc.edu/05_fall/diamond.html.

Mechanics. Physics professor emeritus F. Bary Malik was named a fellow of the American Physical Society. J. E. McPherson (Zoology) was named a fellow by the Entomological Society of America. Dean of the College of Science Jay C. Means was elected fellow by the Academy of Toxicological Sciences and also named a diplomate by the American Board of Toxicology. B.J. Spielman (Medical Humanities, SOMS) was named a fellow by the American Bar Association. Harald Lausen (Clinical Family and Community Medicine, SOMS) was named a fellow by the American Academy of Family Physicians.

Samuel Ma (Civil and Environmental Engineering) was one of fifteen researchers worldwide named a 2009 "Green Talent" by the German government for his research on environmental remediation in the context of bio- and nanotechnology.

Ajay Mahajan (Mechanical Engineering) won first prize in the medical category in the "Create the Future" Contest sponsored by NASA Tech Briefs, Hewlett-Packard, Solidworks, and Comsol. His invention, an ultra-sonic 3-D navigation system for image-guided brain surgery, topped a field of more than 1,000 entries.[407]

### *Honor Societies*

Chapter 072 of the national honor society of Phi Kappa Phi was installed in Carbondale in 1956. The primary objective of the society is

> *… the recognition and encouragement of superior scholarship in all academic disciplines. The Society is convinced that in recognizing and honoring those persons of good character who have excelled in scholarship, in whatever field, it will stimulate others to strive for excellence. Moreover, the Society serves the interests of the student capable of excellence by insisting that in order to acquire a chapter of Phi Kappa Phi, an institution provide the means and atmosphere conducive to academic excellence.*[408]

The SIUC chapter has both faculty and student members. It co-sponsors SIUC's annual Research Day and an annual awards program that recognizes an Outstanding Scholar and an Outstanding Artist on campus.[409] In 2009 it was designated a "Chapter of Excellence" by the national office for exceeding "basic national standards and [demonstrating] strong ongoing commitment to honor and excellence through chapter programs and activities."[410]

407 http://www.vcresearch.siuc.edu/2008_gradhighlights.html#journal.
408 http://www.pkp.siuc.edu/index.html.
409 For a list of awardees, see http://pkp.siuc.edu/pkpsub/scholarartistawards.html.
410 *Chronicle of Higher Education*, October 9, 2009, p. A27.

The SIUC chapter of Sigma Xi, an international honor society for science and engineering researchers, was established in 1957, first as a club and then as a formal chapter in 1966. The SIUC chapter sponsors a series of public lectures, co-sponsors the annual campus Research Day, and recognizes scholarship on campus through the annual (since 1962) Leo Kaplan Memorial Lecture and Award, named after a former president of the SIUC chapter.[411]

## Programs and Activities that Encourage and Reward Student Scholarly and Creative Achievement and a Life of Learning

### *Graduate Student Awards and Recognition*

Working closely with faculty, graduate students are a vital component of the SIUC research enterprise. They learn the latest methods in their fields and experience the excitement and value of scholarly discovery. Several awards for graduate students are coordinated by the OVCR/GD and Graduate School. These include the Outstanding Graduate Student Researcher Award (part of the ETC Award program), the Outstanding Dissertation Award, and the Outstanding Master's Thesis Award.

*Graduate Highlights*, an annual newsletter published by the Graduate School since 2000, focuses on achievements, honors, and awards of graduate students and graduate faculty. The following is a sample of graduate student achievements that have attracted regional, national, and international recognition and have appeared in that publication.[412] Not listed here are the many peer-reviewed publications by graduate students in prominent regional and national journals.

- In three of the last eight years, an SIUC master's student has won one of the two Outstanding Thesis Awards, and another was runner-up, in the annual competition held by the Midwest Association of Graduate Schools, which has 150 members.
- Three SIUC graduate students have won highly competitive STAR awards from the U.S. Environmental Protection Agency.
- Bryan Stinchfield, a doctoral student in the College of Business, was one of only fifteen doctoral candidates world-wide chosen to attend the "Climate Change, Uncertainty and Strategic Management" seminar at the Swiss Federal Institute of Technology in Zurich, Switzerland, in January 2008.[413] He presented a co-

411 http://sigmaxi.siuc.edu/.
412 Ibid.
413 OVCR Selected Examples of Excellence (1/31/08; rev 5/12/08).

authored paper titled "Climate Change Strategies and Firm Performance."

- MBA student Cassie Bishop was one of just twelve students nation-wide selected to receive a Golden Key Graduate Scholar award, which comes with a $10,000 prize.[414]
- Several graduate students, including Nicholas Whiting and Kathleen Chaffee (Chemistry), were invited by the NSF (through ORAU) to be among ~50 graduate researchers attending the annual Lindau Meeting of Nobel Laureates and Students in Germany.[415]
- Four students in the Rehabilitation Institute are working with a new (2007) peer-reviewed publication, the *Rehabilitation Counselors and Educators Journal*. Two doctoral students, Quintin Boston and Gent Dotson, are assistant editors and two master's students, Brian Ercoline and Warren Bowles, are editorial assistants.
- Everett Beidler (Art & Design), whose work was part of an exhibition at the International Sculpture Center's Grounds for Sculpture in New Jersey, won that organization's Student Achievement Award in 2007. His work was also featured in the October issue of *Sculpture Magazine*.
- Miao Chang (Medical Microbiology) won the 2007 Elsevier New Investigator Award over 270 other new researchers at the 13th annual meeting of the International Federation of Placenta Associations in Ontario, Canada, for her oral presentation on pregnancy-related research.

### *Undergraduate Student Programs and Achievements*

The University Honors Program (UHP) is a university-wide undergraduate program that engages SIUC's best students to foster high academic achievements. It provides students a taste of the private college experience at a state-university price. The heart of the UHP is its small classes (enrollment is capped at fifteen students), unique in character and specially created for UHP students by outstanding UHP faculty to satisfy requirements of the University Core Curriculum as well as in the major. Freshman students are now eligible for entry into the University Honors Program.[416] The recent overhaul of Honors is discussed in Core Component 3.c.

The UHP Office of Major Scholarship Advising (OMSA) is the central coordinating office on campus that provides information, advice, and support for students who wish to apply for major nationally competitive scholarships. Through the OMSA, SIUC students have


414 Ibid.

415 Source: Office of the Vice Chancellor for Research.

416 http://honors.siuc.edu/.

won scholarships or honorable mention in the competitions for Morris K. Udall, Barry M. Goldwater, and Homeland Security Scholarships, NSF Graduate Research Fellowships, Phi Kappa Phi Graduate Fellowships, and the *USA Today* All-USA College Academic Team (see also Core Component 3.c).[417]

The SIUC chapter of Phi Kappa Phi rewards academic excellence with a Sophomore Scholarship, a Junior Scholarship, and a Senior Fellowship for graduate study. Since 1996, four SIUC student nominees have moved on to win national awards, three of them fellowships and one an Award of Excellence. In addition, Sigma Xi's Grants-in-Aid of Research Program provides highly competitive awards supporting students who are working toward undergraduate or advanced degrees. Three SIU students have received this award in the last ten years: Kristin Bell (mentored by Lisabeth DiLalla), 2007; Luke Wiley (mentored by Laura Murphy), 2005; and Daniel Vaughn (mentored by Ken Anderson), 2004.

The innovative Undergraduate Assistantship program allows students to work on campus in fields of their academic interest (e.g., a student majoring in Accounting might work in the office of Accounting Services) to get an early taste of what their future working lives might be like, and to earn a monthly salary while doing so.[418] This program provides substantial financial support to more than one hundred students each year, a large percentage of whom engage in research, scholarly, and creative endeavors with faculty mentors.

The Department of Chemistry and Biochemistry has just completed a multi-year grant from the highly competitive NSF "Research Experiences for Undergraduates" (REU) program. This established a summer training center for undergraduate students from SIUC and other institutions to learn about the most up-to-date techniques in chemistry research.

In 2009 the Center for Innovation in the College of Business began a student "Innovation Competition" for "innovative ways to use technology to improve quality of life."[419] Prizes of up to $1,000 are awarded.

Research-active undergraduates at SIUC formed a Registered Student Organization, SPEAR (Students Promoting Educational Advancement and Research) for students interested in research and having the goal of pursuing a master's or doctoral degree.[420]

417 http://www.majorscholarships.siuc.edu/.
418 http://www.siuc.edu/~fao/jobs/index.htm.
419 http://www.innovation.siu.edu/2009_Innovation_Competition.pdf.
420 http://www.mcnair.siuc.edu/rso/index.html?submenuheader=5.

SPEAR tries to build a strong support system to guide students through the transition between undergraduate and graduate studies. It offers activities to help undergraduates prepare for graduate school, including personal and professional development activities in all majors and disciplines.

The following are other examples of recent (2007-2009) scholarly and research-related achievements by SIUC undergraduate students.[421]

- The SIUC Debate Team won first place in the 2008 National Parliamentary Tournament of Excellence.[422] This continues a long tradition of national first-or second-place finishes for the team.
- Architecture students Robert Clodi, Christopher Malone, and Benjamin Boyles traveled to New Orleans in 2007 to present their master planning proposals for a community market in one of the areas hardest hit by Hurricane Katrina.
- Andrew Dennhardt (Zoology) was one of sixty undergraduates chosen to present his research in the Posters on the Hill competition in Washington, D.C. His research deals with the spatial movements of juvenile peregrine falcons.
- Amanda Rabideau (Physiology) won a $4,000 Summer Research Fellowship from the Endocrine Society for her work counting ovarian follicles in mice.
- Students from MCMA continue to succeed in the regional chapter of the National Academy of Television Arts and Sciences "Emmy" awards. In 2007 the student-produced half-hour alternative TV news magazine "alt.news 26:46" was nominated in eleven categories and won in five. Winners included entries by Andrew Kastler and Kyle Tekiela, Sean Brown, Adam Slutsky, and Jordan Gzesh. Kastler also won a Walter Cronkite Scholarship, one of only three students in the chapter to do so.
- Jamie Douglas (Agriculture) received $1,000 from Alltech, a global corporation specializing in animal and human nutrition, for her paper on the ill effects of fescue poisoning on beef cattle reproduction. Hers was one of 700 entries from eighty universities world-wide.
- Joe Batir (Geology) is one of only eighty U.S. students to win a $5,000 Morris K. Udall Foundation scholarship. Batir is interested in the increased use of noninvasive geophysical data collection and manipulation techniques in environmental remediation.
- Jared Burde (Physics and Electrical Engineering) won a $5,000 national Phi Kappa Phi Graduate Fellowship. He is interested in developing applications

421 Most of these examples are taken from http://www.reach.siuc.edu/undergrad_research_2008.pdf.
422 http://news.siu.edu/news/March08/031708amh8057.jsp.

for filtration and chemical detection using adsorption of molecules on carbon nanotubes.

- Krishna Pattisapu (Speech Communications) won second place in the undergraduate competition at the 2007 National Communication Conference for her research into how interracial relationships were represented in a film.
- Ryan Jansen's new yard-rake design, "The Rake N' Take," won first place and $5,000 in the 2008 "Eye for Why" - Dyson Student Design Competition. The rake picks up the leaves, in addition to moving them. He has a patent pending on his invention and several options for marketing.
- Three students—Joe Batir (Geology), Lisa Furby (Mechanical Engineering), and Sean Goodin (Physiology and Philosophy)—were selected for the 2009 All-USA College Academic Team by *USA Today*. In their application essays, all three credited the importance of their undergraduate research experiences.
- A team of engineering students won the National Association for Industrial Technology robotics competition. This was only the second year SIUC fielded a team.
- The SIUC Wind Ensemble and Concert Choir toured China as part of a concert tour and cultural exchange.

At the School of Medicine in Springfield, medical students may augment their education by participating in research and other career development opportunities through the Mentored Professional Enrichment Experience (MPEE) program. MPEE is an optional eight-week elective offered between the first and second years of medical school through which students may pursue interests in research and career development that they would otherwise be unable to investigate. Students are given a list of SOMS faculty's research interests, and faculty members serve as mentors to the student researchers. Under the guidance of a faculty mentor, the student develops the initial question, designs a method to obtain an answer, establishes clear goals and objectives to achieve an outcome, and writes a brief proposal that is reviewed and ranked by SOMS faculty. Projects must last for eight weeks and follow a structured research approach to achieve specific objectives. At the conclusion of this work, students present their findings before an audience of faculty and peers.

MPEE project areas include "traditional" laboratory research, clinical research, or investigations in health-related areas such as rehabilitation, social work, health education, public health, or academic medicine. MPEE students receive up to $3,000 to defray expenses during the summer session. Students present their work at a school-wide seminar

in September of their second year, and successful completion is worth three credit hours on their transcript. As a result of these activities, approximately 40–50 percent of the school's medical students participate in research during their four years of medical school.

The SOMS's graduate science programs balance classroom learning with in-depth research training. The medical school offers graduate science study (M.S. and Ph.D.) in the fields of pharmacology, physiology, and molecular biology, microbiology, and biochemistry, under the cooperative MBMB program with the SIUC College of Science. Each program consists of formal course work in the field of study, research, public presentations to the departments and at professional meetings, and publication of research. The programs seek to provide a thorough understanding of the field which may be used for a career of independent research and teaching for academic institutions, industrial laboratories, or government research and administrative agencies. Specific information detailing the research interests and objectives for each faculty member is provided to each student, and students must fulfill the requirements of both the SIUC Graduate School and the medical school department to receive the advanced degree.

## Programs and Activities that Encourage Staff Scholarly and Creative Achievement and Learning

A 2006 report titled "Rewarding Excellence among Civil Service Employees" is available from the State Universities Civil Service System (SUCSS) website.[423] Appendix C of that report lists benefits, rewards, and incentives for its Civil Service employees that serve to promote a life of learning for its staff. Many of these have been adopted by SIUC:

- The university provides access for all Civil Service employees to university network resources including software downloads, email accounts, and discounts on Dell and Apple computer purchases.
- The university offers education assistance in the form of three different tuition waver benefits: waiver of tuition and fees for employees; 50 percent waiver of tuition for children of seven-year employees to all state universities; and waiver of tuition for dependents of deceased employees.
- Employees are granted library privileges at Morris Library.
- The university provides a discount program for a wide range of items including travel, automobile rental, cell phones, theme parks, local and national retailers. This program is described on the university's website.[424]

423 http://www. sucss.state.il.us/.

424 http://www.siu.edu/~humres//html/discount.html.

- The university's Dependent Care Assistance Plan enables employees to set aside up to $5,000 tax free for dependent care.
- Employee Service Awards: Recognition, certificates and pins are given to each staff member upon completing years of service with the university beginning with ten years of service and continuing every five years.
- The Lindell Sturgis Award: The family of the late Lindell W. Sturgis, former member and chair of the SIU Board of Trustees, established an endowed fund in 1979 to support recognition of public service efforts by SIUC faculty and staff members.
- The University Women of Distinction Award recognizes SIUC women who have made significant contributions to the advancement of other women and whose achievements in teaching, research, and service have had an impact at the local, national, and international levels.
- An Educational Assistance Fund administered by the Educational Assistance Committee (established in 1982 by the Civil Service Employees Council of SIUC) provides financial assistance for dependents of Civil Service employees who attend SIUC.
- Flex-time scheduling assures that the university's goals are met in an orderly and efficient manner, while at the same time permitting employees and their supervisors to establish work schedules which recognize individual needs.
- Release time may be granted to employees for testing, interviewing, or participating in university-sponsored training and development.
- University employees and spouses may use the Student Recreation Center and participate in Intramural-Recreational Sports and other fitness programs.
- The University Club, whose membership is open to SIUC faculty, civil service personnel, and A/P staff, offers opportunities to join with one another for conversation, refreshments and a variety of cultural activities throughout the year. The club is described on the university's website.[425]

## Programs and Activities that Encourage Learning among Members of the Public

SIUC does not limit support for learning to faculty, students, and staff. The university recognizes and accepts its responsibility to provide opportunities for learning and growth among the residents of Carbondale and other communities in the rural southern Illinois region. Thus, SIUC actively seeks to promote learning outside the classroom in ways that



425 http://univclub/.siuc.edu.

are accessible not only to the university community but also to the public as a whole (see also the chapter on Criterion 5). These include a wide variety of public lectures conducted throughout the academic year, including events offered by the Paul Simon Public Policy Institute and a multitude of outstanding cultural events presented year-round by the School of Music and the Department of Theater. The following are just some of the ways in which SIUC seeks to encourage a life of learning among its public constituencies.

### *Public Lectures*

The University Honors Program sponsors several lecture series whose purpose "is to give University Honors students and the community an opportunity to meet and talk with men and women of pre-eminent character and accomplishment."[426] A full list of speakers in each of these series is provided on the UHP's website; recent speakers have included:

- University Honors Program Distinguished Lecture Series: Garrison Keillor, humorist, "Lake Wobegon Days" (10/3/05); and Sean Carroll, geneticist and author, "The Making of the Fittest" (2/12/08)
- Charles D. Tenney Distinguished Lecture Series: Story Musgrave, astronaut and physician, "A Space Story" (10/7/05); David Levy, astronomer, "Poetry of the Night Sky" (2/7/06); and Patricia Ryan Madson, emerita professor, Stanford University, and author, "Improv Wisdom: Don't Prepare, Just Show Up" (4/8/08)
- Michael and Nancy Glassman University Honors Lecture Series: Judith Viorst, author, "Necessary Losses" (9/26/06); and Eugene Jarecki, documentary film maker, "Why We Fight" (9/18/07)

The Hiram H. Lesar Lecture Series, established in 1992 in the School of Law, honors the founding dean of the SIU law school. National and international speakers are invited to lecture during the spring term on matters of law and public policy. Lectures are open to the public.

The Paul Simon Public Policy Institute sponsors varied symposia and other events that are open to the public. Among the issues the institute has considered recently are "Future of the Media," April 24–25, 2007; "Asian Americans and the Meaning of Americanism: Education and Workplace Diversity," April 7, 2006; and "Judicial Independence," February 17, 2006.[427] The institute also brings renowned speakers to the SIUC campus to speak on a variety of issues impacting today's society. Every event is free to the public and sign-

426 http://www.honors.siuc.edu.

427 For the complete list, see http://www.paulsimoninstitute/events.symposiums.htm.

language interpreted. A full list of speakers sponsored by the institute is available on its website,[428] but even a short list of some recent guests illustrates the richness of the learning opportunities made available to SIUC and the surrounding community: David E. Sanger, Chief Washington correspondent, *New York Times* (4/16/08); Patrick J. Fitzgerald, U.S. Attorney for the Northern District of Illinois (3/27/08); Wole Soyinka, 1986 Nobel Prize laureate for literature (2/28/08); Morris Dees, founder, Southern Poverty Law Center (11/6/07); Maya Angelou, poet, author, civil rights leader (5/2/07); Rick Kittles, geneticist and cancer researcher (4/12/07); Christine Todd Whitman, former EPA Administrator and New Jersey governor (2/6/07); Martin Luther King III, Civil Rights Leader (8/26-27/06); and Clarence Page, nationally syndicated columnist (4/6/06).

### *Cultural Events and Activities*

In addition to lectures, symposia, and the like, SIUC offers a large and continuous array of cultural events and activities—theater productions, musical performances, operas, dance recitals, variety shows, art exhibits, etc.—that are open to the public as well as the university community. In so doing, SIUC is the premier sponsor of cultural events in the southern Illinois region. Some of SIUC's cultural contributions to the community are given below:

The Southern Lights Entertainment Series (formerly Celebrity Series) brings nationally prominent artists and productions to SIUC's Shryock Auditorium. The 2008–09 series included performances by Lily Tomlin, B.B. King, Crystal Gayle, Hal Holbrook, Michael Flatley, the Vienna Boys Choir, and Garrison Keillor.[429]

SIUC's Department of Theater has an annual production schedule in two venues. The main stage, McLeod Theater, offers four major productions during the academic year and outside professionals participate in the McLeod Summer Playhouse program.[430] In addition, the Christian H. Moe Laboratory Theater is an intimate and flexible black box space where there is a showcase every Monday afternoon, in which students try out whatever they are interested in. Summer brings a three-play season of student-written full-lengths, and each spring sees a fully mounted bill of student-written (and directed and designed) short plays.

The School of Music presents a continuous program of concerts, educational offerings, scholarly and artistic exchanges, and outreach programs. Among the latter are the Southern Illinois Children's Choir, Southern Illinois Symphony Orchestra, Southern Illinois Civic

428 http://www.paulsimoninstitute/events.speakers.htm.
429 http://www.southernlightsentertainment.com/events.php.
430 http://www.mcleod.siuc.edu/.

Orchestra, a six-week Southern Illinois Summer Music Festival, and Southern Illinois Chamber Music Society.

The University Museum collects, preserves, researches, displays, and educates using a diverse and engaging range of artifacts and objects and educational methods covering a wide range of interests in the arts, sciences, and humanities. As a teaching museum, it offers hands-on opportunities in progressive museum practices.[431] The museum's programs provide SIUC students, faculty, and staff, and the people of southern Illinois with a rich and varied educational experience.

## Core Component 4.b: The organization demonstrates that acquisition of a breadth of knowledge and skills and the exercise of intellectual inquiry are integral to its educational programs.

A breadth of knowledge and skills and the exercise of intellectual inquiry are integral to SIUC's educational programs as demonstrated by the importance attached to its University Core Curriculum for undergraduate students; the various undergraduate research opportunities programs; the internships, externships, and other "hands-on" work that is aimed at ensuring students are prepared for careers related to their study discipline; and the numerous study-abroad programs and opportunities that are available to students. The following discussions examine each of these aspects of SIUC's educational programs.

### University Core Curriculum

Every undergraduate who receives a degree from SIUC must have satisfied the University Core Curriculum's requirements. The SIUC Undergraduate Catalog (p. 54) describes the University Core Curriculum (UCC) as:

> *…a carefully structured and deliberately sequenced program of study required of all SIUC undergraduate students. The program's objectives are to develop students' abilities to communicate orally and in writing, to think mathematically, and to analyze and conceptualize effectively. The Core is grounded in the traditional arts and sciences, and fosters a life of inquiry, creativity, and civic participation. As a matter of principle, the program limits curricular choice in favor of greater conceptual coherence . . . .*

The UCC is administered by a faculty director, assisted by two university-wide committees, to oversee the implementation of curricular policy as set by the provost and the Faculty

431 http://www.museum.siu.edu/.

Senate. To provide quality control, all UCC courses are reviewed and student learning in them assessed at least once every five semesters. The Core is also subject to program review on a regular schedule established by the Illinois Board of Higher Education and the Higher Learning Commission of the North Central Association of Colleges and Schools.[432]

The UCC program at SIUC is designed to provide students a basis for continued learning throughout their lives. As described by the program director, "[c]ourses in the Core introduce [students] to the traditional riches of western civilization as well as to the contemporary perspectives of interdisciplinary and multicultural studies. Many students find that Core courses help them select a major, whereas others value the Core experience for the perspective it provides on the universe of human knowledge."[433] Every undergraduate student is required to take forty-one semester hours from a list of courses selected and periodically reviewed by a committee of faculty to ensure that the following six goals of the program are satisfied. A complete listing of UCC requirements is available on the program's website.[434]

1. Improve communication and numerical literacy. Every undergraduate student must complete a total of twelve semester hours of courses focusing on the foundational skills of composition, numeric literacy, and oral communication. The six semester hours of composition must be completed with a grade of "C" or better. Introduction to Contemporary Mathematics (MATH 113) is designed to show how elementary mathematical principles "relate to a variety of applications in contemporary society."435 Introduction to Oral Communication: Speech, Self, and Society (SPCM 101) integrates both theory and practice in the development of students' oral communication skills with attention to various contexts in a culturally diverse world.

2. Expose students to the universe of human knowledge and provide perspective across disciplines in an academically challenging course of studies. Students must take twenty-three hours from disciplinary studies. These include three hours from fine arts, two hours from human health, six hours from humanities, three hours from a physical science, three hours from a life science, and six hours from social sciences. Students who are particularly skilled in one or more of these areas have the opportunity to satisfy these requirements through advanced courses.

432 http://www.corecurriculum.siuc.edu; also *SIUC Undergraduate Catalog, 2008-09*, p. 54; available at http://registrar.siu.edu/eval/catalog.htm. See also Core Component 3.a.

433 http://corecurriculum.siuc.edu/welcome.html.

434 http://corecurriculum.siuc.edu/requirements.pdf.

435 *SIUC Undergraduate Catalog 2009-2010*, p. 61.

3. Develop students' critical and analytical abilities. The Core Curriculum Executive Committee reviews every course in the UCC on a periodic basis. One criterion is whether the course requires students to develop and exercise their critical and analytical abilities rather than simply memorize information and demonstrate their recall on purely "objective" exams.

4. Encourage intellectual maturity through interaction with instructors and peers. The Executive Committee makes every effort to minimize class size in Core courses and to verify during the review process that class size limits are respected. For example, English composition courses are limited to twenty students. When student demand requires the use of large lecture formats, weekly discussion sections provide opportunities for students to interact with instructors and peers in a smaller class setting.

5. Enhance understanding and appreciation of diverse cultures and environments. In today's global environment, understanding human diversity in all its forms—historical, linguistic, biological, social, cultural, and political—is essential for workplace success, no matter what the student's occupation after graduation. In the Disciplinary Studies portion of the UCC, students are required to choose from courses in Fine Arts, Human Health, Humanities, Science, and Social Science. After having completed this portion of the Core, they proceed to the Integrative Studies portion of the curriculum where there is an emphasis on linking the principles learned in the Disciplinary Studies and encouraging students to make connections that cross the borders of disciplines.

6. Prepare students for ethical and responsible citizenship. Students are required to take six semester hours in Integrative Studies: three hours focusing on multicultural diversity in the United States and three hours focusing on interdisciplinary studies. Examples of the former include: History of African American Art; Crime, Justice, and Social Diversity; and The Anthropology of Latino Cultures. Examples of the latter include: Women, Blues, and Literature; Women in Science; Engineering and Technology; and Geography, People, and the Environment. Many of these courses address issues that encourage the development of students into ethical and responsible citizens. Examples include Crime, Justice, and Social Diversity; Philosophy and Diversity: Gender, Race, and Class; Social Perspectives on Environmental Issues; and Language, Gender, and Power.

SIUC's commitment to the UCC program is evidenced by the fact that each year one faculty member and one graduate student are named as that year's "Outstanding Instructor in the Core Curriculum" through the Excellence through Commitment Awards program. This recognition includes a monetary award of $2,000 for faculty and $1,000 for graduate students. University Core Curriculum teacher winners must demonstrate excellence in a specific area, such as innovative course design, thoughtful assessment strategies, effective communication skills, and the ability to bring the curriculum's goals to life. The first awards were made in 1998—twelve faculty members and eighteen graduate students have been subsequently honored—and they represent the university's commitment to effective instruction. Each year no fewer than a half dozen faculty and a dozen graduate assistants are nominated in an increasingly competitive process. In 2009, Anne Fletcher, Associate Professor of Theater, received the faculty award, and Abigail Gitlitz, a master's of fine arts candidate in the School of Art and Design, won the graduate student award.436

## Undergraduate Research Activities

Individualized, inquiry-based learning opportunities for undergraduate students help them learn early in their education what a life and career based on their chosen major would be like. These opportunities help students get more engaged with learning; they allow students to get to know faculty better; they help students make decisions about careers and graduate school; they teach critical thinking and evaluative skills; they make students' résumés shine. An informal assessment suggested that students engaged in these research, scholarly, and creative activities under the guidance of faculty mentors, and often working closely with graduate students, graduate more quickly and with a higher GPA than other students.

In 1999, then-Chancellor JoAnne Argersinger began an undergraduate research opportunities program at SIUC, following recommendations of the 1999 "Boyer Report,"[437] and there are now three such programs: REACH, McNair, and Research Rookies. These programs are managed in ORDA. A fundraising effort is in the planning stages, with the goal of establishing an endowment to enhance undergraduate research opportunities on campus.

REACH—"Research Enriched Academic CHallenge"—is a competitive program, funded by the Office of the Provost and Vice Chancellor and overseen by a faculty advisory board,

436 http://spotlight.siu.edu/05022007/Graduatestudentshonored.html.

437 Shirley Strum Kenny, ed., *Reinventing Undergraduate Education: A Blueprint for America's Research Universities*. The Boyer Commission on Educating Undergraduates, 1999. http://naples.cc.sunysb.edu/Pres/boyer.nsf/webform/images/$File/boyer.txt 1999.

that provides twenty undergraduate students with one-year awards to engage in research, scholarly, or creative projects under the guidance of a faculty mentor. Awards include $1,500 to cover expenses, plus a ten-hour "undergraduate assistantship" (see below) that pays them a weekly salary. Awardees are required to present a poster on their project at the Undergraduate Research Forum held each spring.[438]

SIUC is proud to host a Ronald E. McNair Postbaccalaureate Achievement Program, begun in 2004 with a four-year grant from the U.S. Department of Education (one of the TRIO programs of the Higher Education Act) and renewed in 2008. The goal of the McNair Program is to prepare students from groups traditionally underrepresented in graduate education and first-generation, low-income students for graduate school and careers as professors and researchers. The SIUC program supports up to twenty-six junior and senior McNair Scholars who attend a summer research institute and carry out individual research/creative projects during the following year under the guidance of a faculty mentor. During the year they also get assistance in preparing for the GRE examination necessary to get into graduate school and gain experience presenting the findings or their projects on campus and at academic conferences, including the Undergraduate Research Forum. The McNair Program has an advisory board composed of faculty and administrators.[439]

SIUC is one of seventeen Illinois postsecondary institutions hosting an Illinois Louis Stokes Alliance for Minority Participation (ILSAMP) program. This opportunity seeks to increase participation of undergraduates from underrepresented groups in science, technology, engineering, and mathematics (STEM) disciplines. It is funded by the National Science Foundation and stresses the importance of minority participation in STEM professions.[440]

A new program, initiated in fall 2008, is "Saluki Research Rookies," designed to introduce academically high-achieving freshmen to the opportunities and challenges of inquiry-driven learning. This program is envisioned in part as a stepping stone to other research activities available to more advanced undergraduates. In 2008-2009, the first year of its operation, there were fifteen participants in the Saluki Research Rookies Program, and twenty-three in its second year, 2009-2010.[441]

In 2003, then-Chancellor Walter V. Wendler inaugurated an innovative new program of

438 http://reach.siuc.edu/.

439 http://mcnair.siuc.edu/.

440 For details of this program, see http://ilsamp.siuc.edu/.

441 Julia Spears, "Saluki Research Rookies Program: Building Partnerships Across Campus," *CUR Quarterly*, vol. 30, no. 1, (2009), 25-28 (www.cur.org/quarterly/webedition.html); http://srrp.siuc.edu/ for more information on the Saluki Research Rookies Program.

Undergraduate Assistantships managed in the Office of Financial Aid. Similar in some ways to graduate assistantships, but not covering tuition or fees, these allow undergraduate students to work up to twenty hours per week in a campus office related to their academic major, while earning a monthly salary. These were not envisioned by the program's administrators as research assistantships, but that was primarily how faculty perceived them: ~80-85 percent of the ~150-170 undergraduate assistants per year between FY03 and FY09 worked with faculty members on various kinds of research projects. Given the budget for Undergraduate Assistantships – more than $800,000 a year – they represent a profound commitment to undergraduate research at SIUC.

The Undergraduate Research Forum, begun in 2002, is held in spring semester in conjunction with Research Day on campus. Undergraduate students who have conducted an original research, scholarly, or creative project under the guidance of a faculty mentor are invited (or required, if they are in the REACH and McNair Programs) to display a poster or exhibit at the forum's poster session. Faculty, students, staff, and the general public are invited to attend. Prizes are awarded for the top posters, which are also displayed at the Research Town Meeting and Fair. The accomplishments of SIUC's undergraduate scholars are noteworthy as they compete successfully on a regional and national level with students from more prestigious private institutions, as discussed earlier. Those successes prompted the creation, in 2006, of a tabloid-type news publication, *Undergraduate Research at SIUC*, to highlight the research and creative accomplishments of these students and their faculty mentors.[442]

## Internships, Externships, and Other "Hands-On" Work

SIUC is committed to ensuring that its students are prepared to commence careers in their chosen disciplines upon completion of their degrees. One important way the university seeks to meet this commitment is by providing undergraduate students with numerous opportunities to participate in a wide variety of internships, externships, and other forms of "hands-on" work in their particular fields, including research through assistantships, REACH, McNair, and other programs. While some of these are university-wide opportunities, the bulk are provided by individual colleges and departments as required or optional components of their curricula. The following briefly describes a sampling of opportunities available to SIUC students.



442 http://www.reach.siuc.edu/tabloid.html.

### *University-Wide Opportunities*

**Vince Demuzio Governmental Internship Program:** Students selected into the Governmental Internship Program work directly for an Illinois legislator in his/her district office or in the office of one of the code departments in a position that is related to his/her career/academic discipline. In addition, the student is enrolled in an internship course and receives credit toward the fulfillment of his/her course requirements. These positions are salaried and students selected into the program are able to earn up to $880 per month. The program does not provide a tuition or fee waiver to the student. Legislative internships are coordinated through the Office of the President, while the internships in the code departments are coordinated through the Paul Simon Public Policy Institute at SIUC.[443]

**SIUC Alumni Association Extern Program:** Established in 1984 to provide students with the opportunity to observe and experience their chosen career fields, the Extern Program matches students with alumni and friends of SIUC during spring break in March. An externship enhances students' college education with a "real world" professional experience while networking with professionals. The sponsors, in turn, are given the opportunity to view the quality of SIUC students and benefit from their knowledge. Many sponsors see the program as an opportunity to interview potential employees, with an average of 40 percent of extern participants offered future, full-time employment or internship positions. The Extern Program attends to the administrative details and helps facilitate the connections for the students, but it is the responsibility of the students to clearly communicate their goals and interests to the sponsor.[444]

### *College and Department Opportunities*

Many opportunities for internships, externships, student work, and the like are housed and operated within the colleges and individual departments. The following list illustrates the range of these programs and is by no means exhaustive.

**College of Agricultural Sciences:**

- The Department of Forestry actively supports and encourages summer employment of students and has a spring-break extern program.
- Courses in the Animal Science, Food, and Nutrition department stress "hands-on" or applied experiences in laboratories at the college's 2,000-acre farm with four livestock facilities, and in food-service in kitchen settings at Quigley Hall,

443 http://www.siu.edu/pres/internship/policies.html.

444 http://siualumni.com/s/664/index.aspx?sid=664&gid=1&pgid=356.

the residence halls, and the Old Main Dining Room. Internships are required for graduating in the Hospitality and Tourism Administration major and the Equine Science specialty, and they are strongly encouraged in the college's other majors and specialties.

- The Department of Plant, Soil, and Agricultural Systems provides externship and internship opportunities, and work-experience credit is offered in research laboratories, teaching and research greenhouses, and experimental farms.[445]

**College of Applied Arts and Sciences:** Varied "hands-on" work-experience opportunities provided by each program, including internships, externships, and clinical rotations, enroll more than 300 students annually. Some are required and others elective; some are paid; academic credit may range from one to twelve semester hours. Work experiences are located throughout the United States and abroad and include rural and urban settings and small and large organizations. Examples include:

- The Physical Therapy Assistant program concludes with two full-time, six-week clinical internships at facilities throughout Illinois, Indiana, Kentucky, Tennessee, and Missouri.
- The Automotive Technology department offers paid internship partnerships with General Motors, Ford, Chrysler, Toyota, Nissan, Robert Bosch, Sherwin-Williams, Cummins Engines, Jasper Engines, and Enterprise Rental.
- The Aviation Management and Flight department initiated the first flight operations internship agreement in 1987 with United Airlines. Since then, similar agreements have been signed with UPS, Delta Airlines, Northwest Airlines, American Airlines, Air Tran Airways, ATA Airlines, and Mesa Air Group. In 2007, AAR Corporation agreed to host an aviation management internship, becoming the university's first aviation internship geared toward students majoring in aviation management and aviation technology programs.[446]

"We appreciate the relationships we have with aviation companies, facilities and associations throughout the country. Internships obviously provide great hands-on learning experiences for our students, and help them make important career connections."

Remarks of Chancellor Samuel Goldman, Chicago-area Aviation Alumni Gathering. September 19, 2008

**College of Education and Human Services:** The college has twelve nationally accredited academic and professional programs, including one for teacher education accredited by the National Council for Accreditation of Teacher Education. Students preparing to become teachers must successfully complete all field-experience requirements (student teaching) in their respective majors. Students studying for careers as athletic trainers, counselors, behavior therapists, health educators, human resource specialists, training and development specialists, social workers, speech pathologists, and recreation therapists

445 Response from college to Criterion 4 Committee survey.
446 Response from college to Criterion 4 Committee survey.

must satisfy the fieldwork requirements (practicum and internship) set by professional accreditation standards.[447]

- Recreation Program — All students majoring in recreation are required to complete two field experiences and an internship with a professional recreation agency, local or off-campus, during the summer months. Formal internships are semester-long, full-time experiences, often with a salary or stipend, under the supervision of trained recreation professionals. Students have completed internships with Disney World, Chicago Rehabilitation Institute, Veterans Administration hospitals, Illinois Children's Research Hospital, and the Land Between the Lakes Environmental Center, among others.[448]

**College of Engineering:** The college works closely with industry representatives to coordinate cooperative education and internship/externship opportunities for engineering and technology students. The college's database, with contact information for more than a thousand engineering- and technology-related firms, is also an invitation list for career fairs and for providing students with possible contacts and opportunities. The college also maintains a list of related opportunities for students on its website.[449]

**School of Law:** The School of Law conducts both judicial and public-interest externship programs. The former offers opportunities in the chambers of trial or appellate courts, on both the federal and state levels, for students who have completed their first or second year of law school. The latter gives students the chance to work in publicly-funded law offices that provide public "service"-type legal assistance such as state's attorney offices, public defender offices, legal service offices, worker's compensation arbitrator's offices, etc. Students may also work in non-profit organizations that have in-house counsel and federal, state, or local agencies that have attorneys on their staff.[450]

**College of Liberal Arts:** Several programs and departments in the College of Liberal Arts help students find internships, including History, Masters of Public Administration (Museum Administration), Masters of Fine Arts in Creative Writing, Speech Communication, School of Music, Center for Archaeological Investigations, and the Paralegal Studies Program.

447 Response from college to Criterion 4 Committee survey.

448 http://web.COEHS.siu.edu/Public/her/index.php?content=recugrad&nav=navrec#Internship.

449 http://www.engr.siu.edu/coop/resources.html. Response from college to Criterion 4 Committee survey.

450 http://www.law.siu.edu/clinics.asp.

- The Department of Foreign Language and Literatures requires internships of all Foreign Language and International Trade majors. Foreign language credit is offered for foreign internships. Countries that have hosted interns include: France, Canada, Japan, Russia, Germany, Austria, China, Taiwan, Hong Kong, and several Spanish-speaking countries.[451]
- Each year the Counseling Center at SIUC offers full-time, twelve-month internships to five doctoral-level graduate students from Counseling Psychology and Clinical Psychology programs. These internship positions begin August 1, 2008, carry a minimum salary of $23,664 per annum, and include all university benefits (i.e., vacation, holidays, sick leave, retirement plan, medical, dental, and life insurance).[452]

**College of Mass Communication and Media Arts:** The "Studies Programs," summer internships sponsored by the Departments of Radio-Television, and of Cinema and Photography and by the School of Journalism, allow students to gain hands-on experience in Hollywood, Chicago, New York City, Nashville, and Washington, D.C.[453] Students receive academic credit and in some cases are paid. In 2007, fifty-seven students participated in these internship programs, and there were ninety-one applicants for the 2008 programs. The college also participates actively in the university's externship program. In addition, the college provides hundreds of opportunities for students to gain "hands-on" experience through WSIU Public Broadcasting, the *Daily Egyptian*, the Big Muddy Film Festival, River Region Evening Edition News, and student production groups like Digital Dawg records and alt.news 26:46, which has won numerous regional Emmy awards.[454]

**SIU School of Medicine:** Students complete clinical rotations and electives in patient care clinics. Family and Community Medicine and Psychiatry clerkships are performed in community "preceptor" sites that, collectively, promote the students' development as physicians within realistic situations comparable to what they will encounter in practice. Residencies and fellowships, conducted in the clinical setting, continue training in "real-life" venues. Medical students may participate in research and other career development opportunities, such as:

- The Mentored Professional Enrichment Experience (MPEE), described earlier. During the second and third years, students may be involved in research if time permits and funding is available if the research is considered substantial. During the

451 http://www.siu.edu/~flit/internship.html.
452 http://www.siu.edu/offices/counsel/intern.html.
453 http://mcma.siu.edu/inner.php?pageID=700.
454 Response from college to Criterion 4 Committee survey.

fourth year, students may be involved in research electives with funding available at the discretion of the faculty and the ADRFA. Student research opportunities are listed on the Research Affairs website. Through these activities, approximately 40 – 50 percent of the school's medical students participate in research during their four years of medical school.

- The school's graduate science programs balance classroom learning with in-depth research training. The school offers graduate science study (M.S. and Ph.D.) in the fields of pharmacology, physiology, and molecular biology, microbiology, and biochemistry under the cooperative MBMB program with the SIUC College of Science. Each program consists of formal course work, research, public presentations to the departments and at professional meetings, and publication. The programs seek to provide a thorough understanding of the field which may be used for a career of independent research and teaching in academic institutions, industrial laboratories, or government research and administrative agencies. Choosing from a variety of specializations when picking a research advisor and a research topic, students compete for research assistantships and are mentored by departmental faculty through all stages of their study.[455]

**College of Science:** The college strongly encourages faculty to engage students in research work in their laboratories and field projects outside of formal courses. It is estimated that more than 250 undergraduate students are given such opportunities annually through externally and internally funded research grants, work-study funds, and/or faculty member-sponsored efforts.

- The Department of Geology has a longstanding program with the Illinois State Geological Survey that provides work experience for undergraduate and graduate students.
- All undergraduate students pursuing degrees in the Department of Chemistry and Biochemistry are encouraged to engage in research with faculty, and ACS-certified Bachelor of Science degrees require such work. Recent surveys indicate that more than 66 percent of the students have engaged in this type of experience.
- The Department of Chemistry and Biochemistry was awarded a National Science Foundation Research Experiences for Undergraduates (REU) grant, which brings ten undergraduate students to campus for a ten-week research and general science-training experience. The goal of the REU program is to encourage chemistry, physics, and engineering students to pursue graduate studies in the

455 Response from SIU School of Medicine to Criterion 4 Committee survey.

interdisciplinary field of materials research. Working with a faculty mentor, students from diverse backgrounds pursue research heavily geared toward nano-science and nanotechnology as well as analytical and biological chemistry.[456]

### *International Study Abroad Programs and Opportunities*

At SIUC, "breadth of knowledge" includes not only an opportunity to learn about other cultures within a Carbondale classroom, but also numerous opportunities to travel to foreign countries and experience cultural differences first hand. These university-level, international study opportunities, available as semester- or year-abroad programs, short-term travel/study, and educational exchanges, are managed by the Office of International Programs and Services (IPS). IPS is the key institutional office for promoting and coordinating international activities on the SIUC campus, including working with prospective and matriculated international students and international scholars, international development, and study abroad.[457]

Other opportunities include programs developed by SIUC in cooperation with overseas institutions such as Salzburg College, the University of Wales Swansea, and Universidad Veritas, or by affiliated study-abroad provider organizations such as CEA or AustraLearn. As an example of the former, SIUC offers overseas study in cooperation with Salzburg College in Austria which features extensive business offerings each spring semester.[458] As an example of the latter, AustraLearn provides college/university students with study abroad opportunities in Australia, New Zealand, and the South Pacific. Students may participate in a semester or year abroad or earn an entire degree at one of more than thirty major universities.[459]

In conjunction with the International Student Exchange Program (ISEP), a network of 275 colleges and universities in thirty-nine countries, SIUC students have opportunities to study at sites in Asia, Africa, the Americas, Australia, and Europe for extended periods of time. ISEP students gain intercultural competence through integration into their host institution and host culture while exploring the international dimensions of their academic field. ISEP is a one-for-one exchange plan under which SIUC students pay their normal fees and tuition, including room and board, and apply the credit earned toward their degrees.[460]

456 Response from college to Criterion 4 Committee survey.
457 http://www.ips.siu.edu/index.html.
458 http://www.ips.siu.edu/SA/salzburg.html.
459 http://www.australearn.org/.
460 http://www.ips.siu.edu/SA/ISEP.html; http://www.ips.siu.edu/SA/exchanges.html.

SIUC also participates in the MAUI (Mid-America Universities International)-Utrecht Network Exchange that allows students from member universities, including SIUC, to study at another member institution for a semester or academic year while paying tuition to their home institution. Students from any SIUC academic unit may participate in this program, subject to departmental approval.[461]

Finally, SIUC has bilateral exchanges with overseas schools in Australia, Austria, France, Germany, Japan, Sweden, and Switzerland. These programs are coordinated either by the sponsoring academic department or by IPS's Study Abroad Programs section. Most of these opportunities are restricted to juniors, seniors, or graduate students.[462]

Short-term study abroad options are offered during summer months and intersession periods. These include one in Ghana to introduce students to the cultural similarities of people in Ghana and those of the African Diaspora;[463] summer programs in Egypt and Greece with an interdisciplinary group of faculty that explores a particular topic from a variety of perspectives;[464] another focusing on international business in Europe; and a summer program that studies social services in urban and rural Ecuador. A complete list of these experiences is maintained on the IPS website.[465]

## Core Component 4.c: The organization assesses the usefulness of its curricula to students who will live and work in a global, diverse, and technological society.

### Program Reviews

#### *Internal Program Reviews*

Internal program reviews are handled by the Office of the Provost and Vice Chancellor, with the assistance of the new Office of Assessment and Program Review, and are conducted in conjunction with all external reviews on the schedule mandated by the Illinois Board of Higher Education (IBHE) (see Core Component 2.a). The SIUC Faculty Senate, through its Undergraduate Education Policy Committee, and the SIUC Graduate Council, through its Program Review Committee, approve and/or provide internal faculty reviewers as appropriate for program reviews. The internal review team interacts with

461 http://www.ips.siu.edu/SA/exchanges.html; http://www.umsl.edu/services/abroad/maui/index.html.

462 http://www.ips.siu.edu/SA/exchanges.html#.

463 http://www.ips.siu.edu/SA/Ghana.html.

464 http://www.ancientlegacies.org/egypt.html; http://www.ancientlegacies.org/greece.html.

465 http://www.ips.siu.edu/SA/shortterm.html.

external reviewers during the process, especially during the campus visit, and submits a report to the provost's office.

The results of program reviews mandated by IBHE are reported to the SIU Board of Trustees. Review findings and recommendations are presented during public meetings of the Academic Matters Committee of the BOT. Representatives of the programs under review typically participate in this process.

Program review findings are used by chairs and directors in the development of new budget and program requests. Strategic planning reviews (such as those conducted by the vice chancellor for research and graduate dean) use program review reports as starting points for campus-wide examinations. The program review recommendations and follow-up actions are reported in unit self-studies.

During the period since the last accreditation site visit, internal program reviews have been conducted regularly. In 2010, more than twenty programs are scheduled for review.

### *External Reviews and Accreditations*

Many of SIUC's programs or units are accredited by diverse accrediting bodies. Accreditation is a public assurance that a program meets, and will continue to meet, the highest national standards and expectations for education. The accreditation process begins with critical self-analysis and moves to consultation with knowledgeable persons from other institutions, all of which should lead to improvements in quality of content and delivery of programs. A full, searchable list of all the SIUC accreditations is available on the website of Institutional Research and Studies by college/unit, program/unit, or specific accrediting agency.[466] A few examples are discussed here.

The SIU School of Medicine's academic programs are fully accredited and compliant with current requirements regarding professional skills and knowledge. The medical education programs are accredited by the appropriate national accrediting bodies: Liaison Committee for Medical Education for the undergraduate medical education (UME) program; Accreditation Council for Graduate Medical Education (ACGME) for clinical residencies and fellowships (Graduate Medical Education, GME); and the Accreditation Council for Continuing Medical Education for the continuing medical education (CME) program. SOM's UME and CME programs were reviewed by their accrediting bodies in 2007 and each received full, unconditional accreditation for the maximum number of



466 http://www.irs.siu.edu/webRoot/accredit/Index.asp.

years. The GME programs were reviewed by the ACGME in 2008 and also received full, unconditional accreditation. All accrediting agencies are comprised of medical educators, physicians, and scientists from peer institutions.[467]

The U.S. Department of Education recognizes the Council and Accreditation Committee of the Section of Legal Education and Admissions to the Bar of the American Bar Association (ABA) as the national agency for the accreditation of programs leading to the first professional degree in law. Law schools are reviewed every seven years. The SIU School of Law was first accredited by the Council in 1974 and has been successfully reaccredited after each such visit since its initial accreditation. In November 2008 the school was visited by the ABA accreditation team, and its Accreditation Committee considered the team's report at its October 2009 meeting.[468] The School of Law is also a member of the American Association of Law Schools, which has a representative on ABA accreditation teams and issues its own reports.

Other accreditations include (but are not limited to):

- Aviation Flight is accredited by the Aviation Accreditation Board International until 2014, and is certified until 2010 by the Federal Aviation Administration Flight Standards District Office (in Springfield).
- The Vivarium/Laboratory Animal Programs at both SIUC and SOMS are fully accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care (AAALAC); the Carbondale facility was reviewed in November 2009.
- The University Museum is accredited by the American Association of Museums; its next review is 2009.
- The College of Education and Human Services has twelve nationally accredited academic and professional programs, including its teacher education program accredited by the National Council for Accreditation of Teacher Education.
- Programs in the College of Engineering are accredited by the Accreditation Board for Engineering and Technology and the National Association for Industrial Technology,
- The School of Music, which offers undergraduate degrees in eight specializations and graduate degrees in seven concentrations, has been accredited by the National Association of Schools of Music for more than forty consecutive years.[469]

467 Response from college to Criterion 4 Committee survey.
468 Source: Frank Houdek, Interim Dean of the School of Law.
469 http://music.siuc.edu/.

## Assessments Used to Determine Outcomes Related to Professional Competencies

Among the most important assessments of professional competencies are the results of mandated examinations required for practicing medicine, law, and accountancy. The trends in the data for students in the SIU School of Medicine, for example, who pass the Senior Clinical Competency Examination the first time they take it is remarkably high; for the past five years, between 87 and 93 percent of the students succeeded; and in the same period, only one student was unable to pass the examination after a required month-long remediation course. These results are among the highest in the state. Similarly, students in the SIU School of Law have a higher pass rate than the state-wide average; in 2008, the latest year of available data, 94 percent of all recent graduates passed the state bar exam in order to practice law; the average for the state was 92 percent. In the equally competitive domain of the CPA examination, our graduates from the School of Accountancy also scored above the national average. These figures are significant achievements; they suggest that SIUC's professional programs are successful in preparing students for competence in the workplace.[470]

## Advisory Boards

SIUC is committed to ensuring that the curricula, learning outcomes, and learning experiences of each of its programs are current with the professional skills and knowledge required in the field. Program reviews, both internal and external, and outcome assessment are employed to measure the level of success in achieving this end. Another approach used by SIUC colleges and departments for measuring the relevance of a program to requirements in the field is the use of advisory boards composed of current practitioners, who meet at least once a year. The following are examples of the use of this approach in various colleges and departments.

**College of Business and Administration:** The Dean's External Advisory Board advises the dean and considers curriculum modifications and additions, addresses accreditation requirements, performs program assessment, and meets with departmental faculty and students. The College of Business Minority Board meets semi-annually and advises the director of minority affairs on various aspects of the college's Business Minority Program and its goals. The following departmental boards meet semi-annually to advise the appropriate director or chairperson on various aspects of the department and its goals:

470 Source: Debra Klamen, School of Medicine; Frank Houdek, School of Law; and Allan Karnes, School of Accountancy, 12/2/2009. For more on assessment, see Chapter 3.

School of Accountancy Board of Advisors, Department of Finance External Advisory Board, Department of Management External Advisory Board, and Department of Marketing External Advisory Board.[471]

**College of Education and Human Services:** The college has two advisory boards that advise and make recommendations to the dean on various matters. The Alumni Constituency Board has a representative selected from each of the eight departments in the college. The Dean's Advisory Council serves a similar function and also facilitates the college's development and fundraising efforts. In addition, several departments make use of advisory boards specific to their academic programs.[472]

**College of Applied Sciences and Arts:** All programs in the college benefit from advisory boards comprising licensed professionals, leaders in the field, and academics from peer institutions. Members review student work, consider curriculum modifications and additions, address accreditation requirements, perform program assessment, and meet with current students.[473]

**College of Agricultural Sciences:** The college has established an Agricultural Sciences Leadership Board to help guide and support its teaching, research, and outreach programs. The ninety-member board meets twice a year to provide an industry perspective on keeping programs current. It has been used to critique the college's curriculum, research programs, facilities, farms, and capital campaign. Working alongside the faculty, the board has provided great ideas and support.[474]

**College of Engineering:** The college, as well as each of its departments, maintains an advisory board. Each board is made up of industry representatives, often alumni of SIUC, who are interested in sharing feedback and offering advice regarding future directions in the college or department. These boards are an important part of the college's accreditation review by the Accreditation Board for Engineering and Technology and the National Association for Industrial Technology, which consider whether programs are consistent with industry needs. Industrial advisory boards also provide advice and oversight to two engineering research centers, the Center for Advanced Friction Studies (CAFS) in the College of Engineering and the Materials Technology Centers reporting to the OVCR/GD.

**College of Liberal Arts:** The College of Liberal Arts Council (CoLA Council) is one of the oldest and most extensive advisory bodies among the colleges. No one seems to recall

471 Response from college to Criterion 4 Committee survey.
472 Response from college to Criterion 4 Committee survey.
473 Response from college to Criterion 4 Committee survey.
474 http://www.coas.siu.edu/default2.asp?active_page_id=162; response to Criterion 4 Committee survey.

just when the CoLA Council was established, but it has been in operation for well over thirty years. CoLA Council is an elected body consisting of representatives from CoLA departments with the mission of facilitating communications between the dean of the college and the faculty and of advising the dean on policy matters. A fuller description of the purpose and function of CoLA Council can be found in the college operating paper.[475]

## Core Component 4.d: The organization provides support to ensure that faculty, students, and staff acquire, discover, and apply knowledge responsibly.

As articulated in its Student Conduct Code, SIUC "is dedicated not only to learning, research, and the advancement of knowledge, but also to the development of ethical and responsible persons."[476] This commitment to ensuring that SIUC's faculty, students, and staff acquire, discover, and apply knowledge in a socially and professionally responsible way is demonstrated by the regulations, policies, and procedures it has developed to govern academic and research integrity. Many of these are applied university-wide, but some are specific to individual colleges, departments, and other campus units. The following discussion examines some of these efforts.

"As you grow and learn, so do all of us with whom you share your knowledge and talents. You are students, but like Dr. McNair, you also are teachers and leaders."

Remarks of Chancellor Samuel Goldman at McNair Summer Research Symposium. July 10, 2009

### Regulations, Policies, and Procedures Governing Academic Integrity and Ethics

#### *Students*

The Student Conduct Code[477] describes a student's rights and responsibilities, defines acts of academic dishonesty (e.g., cheating and plagiarism) and social misconduct (e.g., theft and substance abuse), and states disciplinary actions and procedures relevant to the violation. The purpose of the Code is to establish and maintain an orderly environment conducive to learning, free expression, free inquiry, intellectual honesty, respect for others and participation in constructive change, and protection of relevant legal rights of students.[478] The policies in the Student Conduct Code are reviewed every five years and are administered by Student Judicial Affairs.[479] The current code was approved on May 1991, with amendments on October 3, 1997, May 22, 2001, and August 15, 2003, in accordance with provisions set forth by the SIU Board of Trustees. The Student Conduct Code

475 http://cola.siuc.edu/documents/CoLAOperatingPaperRevisedSeptember2006.pdf.
476 SIUC Student Conduct Code, "Purpose" section, available at http://policies.siuc.edu/policies/conduct.html.
477 Ibid.
478 http://sja.siuc.edu.
479 Ibid.

Revision Committee submitted its final report to Chancellor Goldman on May 8, 2008.[480] As a result, revisions in the Student Conduct Code, based in part on the recommendations of this report, were implemented in Fall 2008.

In addition to the Student Conduct Code, which is applied to students on a university-wide basis, students also may be subject to conduct-related policies of individual colleges and departments. Some examples follow.

**College of Liberal Arts:** The college developed a set of "Procedures To Follow When Faculty Suspect Plagiarism" from the Report of the Ad Hoc Plagiarism Committee of the CoLA Council in spring 2006.[481]

**SIU School of Law:** The SIU School of Law operates under a strict Honor Code, which is taken seriously by both students and faculty. The ethical standards set forth in the Honor Code are a precursor to the standards which must be met in the legal profession. The code has two parts. Article I covers the procedures to be followed when there is an allegation of misconduct: a hearing officer conducts a hearing and makes written findings of fact and conclusions as to which, if any, violations were committed. Article II identifies the misconduct covered by the code, as well as the sanctions that may be imposed for such misconduct. The article details four degrees of academic misconduct, several other acts constituting Honor Code violations, and acts of criminal misconduct and violations of the Illinois Code of Professional Responsibility for Lawyers.[482]

**SIU School of Medicine:** SIU School of Medicine's medical students, graduate science students, clinical residents, and fellows are subject to all academic integrity-related policies established by Southern Illinois University, SIU Carbondale, and SIU School of Medicine. Learners are subject to the standards of conduct and related provisions published in the *Student Handbook*. These policies are reviewed frequently with the students, including during presentations at annual orientations for medical students and clinical residents, and can be found online.[483] Possible violations are reported to the associate dean responsible for the particular program (i.e., the associate dean for student affairs for undergraduate medical students) and formal processes to review and resolve claims of violation are in place.[484]

480 See http://studentsaffairs.siuc.edu/pdfs/ConductCodeCommitteeReport.pdf.

481 See http://cola.siuc.edu/PlagiarismProcedurestoFollow.html.

482 Response from School of Law to Criterion 4 Committee survey.

483 See http://www.siumed.edu/oec/HANDBOOK/student_handbook/html/standards_of_conduct.html.

484 Response from SIU School of Medicine to Criterion 4 Committee survey.

### *Research-Related Ethics, Responsibilities, and Compliances*

The research and scholarly enterprises of the nation's universities must be conducted according to the highest ethical standards, and it is widely agreed that this is a moral, social, and professional responsibility. The issue is how best to institutionalize this as a positive norm and value among all scholars and researchers, faculty, staff, and students, especially given that related training and compliance committee activities constitute a costly but unfunded mandate.

Both the SIUC Code of Ethics for faculty and the SIUC Student Conduct Code stress the importance of intellectual honesty.[485] This extends to research integrity and adherence to ethical standards by researchers and their staff and students, as defined by ORDA in its resource webpage on the Responsible Conduct of Research.[486] Depending on the scope of the policies and the degree to which they must conform to strict federal guidelines, formal policies affecting research conduct are considered by the Research Committee of the Graduate Council and other constituencies (Faculty Senate, Faculty Association), approved by the vice chancellor for research and legal counsel, and then by the SIUC chancellor and/or SIU president as appropriate (see SIUC *Sponsored Project Guide*).[487]

Increasingly frequent (or perhaps only increasingly publicized) breaches of research and scholarly ethical standards in the U.S. and world-wide have prompted intense public scrutiny of the ways in which research is carried out and vetted. This scrutiny has resulted in intensified federal oversight of research (e.g., establishment of the Office of Research Integrity, ORI, in the U.S. Department of Health and Human Services); ever more stringent rules relating to research involving human subjects, vertebrate animals, and hazardous substances; and more elaborate structures for ensuring compliance with these regulations. The new regulations have been accompanied by calls for formal training programs in ethics and the "responsible conduct of research" (RCR) to ensure that research activities are carried out everywhere with the highest degree of integrity, responsibility, and ethical principles.

Research universities, including SIUC and SOMS, have responded to these mandates by creating a variety of institutional oversight committees, policies, and training programs that fall under the general heading of "compliance" with federal, state, and institutional regulations. SIUC has had in existence or has newly established numerous committees

485 Faculty: http://policies.siuc.edu/policies/ethics.html; students: http://policies.siuc.edu/policies/conduct.html.

486 http://www.orda.siuc.edu/general/rcr.html.

487 http://www.orda.siuc.edu/guide/chap10.html.

since the last accreditation review, and created or updated policies designed to explain and rigorously enforce compliance with the nine core issues of responsible conduct of research (RCR). The compliance programs for research at SIUC and SOMS have been informed by, and developed in accordance with, the national standards for such activities.[488] These committees include the following:

- Both campuses have Institutional Review Boards (IRBs) that review research protocols involving human subjects.[489]
- Both campuses have Institutional Animal Care and Use Committees (IACUCs) to review protocols and enforce ethical and humane guidelines for the use of live vertebrate animals in research.[490]
- A new Stem Cell Research Oversight (SCRO) Committee approves the use of human stem cells in research funded by the state of Illinois.[491]
- The Institutional Biosafety Committee (IBC) reviews Memorandum of Understanding (MOU) applications for use of materials deemed biological hazards in research.[492]
- The Center for Environmental Health and Safety (CEHS) ensures university and laboratory compliance in the use of radioactive materials, occupational safety, and disposal of laboratory and hazardous waste in compliance with university and federal regulations.[493]

Compliance policies state that researchers must receive approval for research protocols that require the use of animals, human subjects, many types of hazardous materials, and stem cells in their projects regardless of sponsorship, in accordance with university and federal guidelines. Research non-compliance would first be addressed by the chair of the appropriate institutional committee (e.g., IRB, IACUC) to discuss the situation and the necessary steps to bring the project into compliance. If such advice is not followed, the issue may be referred to the Office of the Provost and Vice Chancellor for pursuit under the research misconduct policy.

All SIUC research-related policies have been, or are being, reviewed and updated as necessary during the last decade in order to assure compliance with the latest guidelines, directives, and regulations. Policies currently undergoing revision and review by Legal

488 See http://www.orda.siuc.edu/compliances/ and http://www.orda.siuc.edu/general/rcr.html.
489 http://www.orda.siuc.edu/human/index.html; http://www.siumed.edu/adrfa/scrihs1.html.
490 http://www.iacuc.siuc.edu/.
491 http://www.orda.siuc.edu/compliances/stemcells.html.
492 http://www.cehs.siu.edu/biological/ibc/.
493 http://www.cehs.siu.edu/facts/default.htm.

Counsel and Risk Management include those related to research misconduct, conflict of interest/conflict of commitment, and export controls. SIUC has been fortunate in that we have had no incidents of research-related misconduct to report to ORI in the past decade.

### *Policies Related to Intellectual Property*

The products of SIUC's faculty, staff, and student research, scholarly, and creative activities are the traditional academic and scholarly works that are created through independent faculty effort and intellectual property that result from university-based scholarship. In 2003, a new intellectual property agreement was negotiated with the Faculty Association as a side-letter to the contract also being negotiated at the time, and is accepted as "policy" for SIUC faculty. As in the previous policy on Intellectual Property, Copyrights, and Patents,[494] "patentable inventions, products, processes, or discoveries developed with University support belong jointly to the University and the creator."[495] Any inventions and copyrightable works are disclosed to the university Intellectual Property Committee, which is composed of faculty members who represent each college plus a Faculty Association representative. The associate vice chancellor for research, the senior technology transfer specialist, and a university legal counsel representative are ex-officio members. This committee makes recommendations to the vice chancellor for research and graduate dean on the disposition of the intellectual property.[496] The technology transfer offices of SIUC and SOMS have recently and collaboratively developed a set of guidelines for the two campuses for taking equity in university-business start-ups, as well as a database for tracking intellectual-property activity on campus.

## Entities Responsible for Enforcing Academic Integrity

### *Students' Academic Behavior*

At SIUC, Student Judicial Affairs (SJA) is responsible for the administration of the Student Conduct Code. SJA conducts hearings when appropriate to determine if a student's behavior has violated the Student Conduct Code. Sanctions imposed by SJA for Code violations are intended to change student behavior and to make it more ethical and responsible.[497]

494 Available at http://www.orda.siuc.edu/reports/IPprovisions.pdf.
495 http://www.orda.siuc.edu/guide/chap10.html#patents.
496 http://techtransfer.siuc.edu/resources/presenting.html.
497 http://sja.siuc.edu.

The College of Applied Sciences and Arts maintains a Student Academic Grievance and Dishonesty Committee that follows established guidelines and procedures for reviewing grade disputes and cases of academic dishonesty. All course syllabi reference the university's Student Conduct Code. Oversight and enforcement are the responsibility of the instructor, and issues not resolved in the classroom are then taken to the director or chair.[498]

### *Research-related Compliances*

The Office of the Provost and Vice Chancellor handles allegations of research-related academic misconduct, following the procedures for inquiry and subsequent investigation, if necessary, of the campus research misconduct policy. Note that the SIUC research misconduct policy available online[499] has been completely revised in accordance with federal guidelines, but the new version has not yet passed through the highest levels of administrative review for posting, and its procedures need to be negotiated with the Faculty Association bargaining unit.

The extensive online Sponsored Project Guide maintained by ORDA[500] reminds investigators that their projects supported by non-university funds are awards not to them as individuals but rather

> *to the institution—specifically, the Board of Trustees of Southern Illinois University—on behalf of the principal investigator, the person who is primarily responsible for carrying out the requirements of the award. . . . In developing a proposal and administering a grant or contract, the principal investigator is representing the University and is responsible for upholding the high standards expected of SIUC projects.*[501]

To help the researcher fulfill this responsibility, chapter 10 of the *Guide* covers "Research Policies and Compliances."

ORDA's RCR webpage provides an educational tool on Responsible Conduct of Research for new or visiting researchers and an easily accessible resource for experienced researchers. It provides links to information aimed specifically at principal investigators (e.g., eligibility and responsibilities; code of ethics), as well as those covering conflict of interest and commitment, data management, and research policies and compliance.[502]

498 Response from college to Criterion 4 Committee survey.
499 http://policies.siuc.edu/policies/rmiscond.html.
500 http://www.orda.siuc.edu/guide/index.html.
501 *Sponsored Project Guide*, sec. 1.1, http://www.orda.siuc.edu/guide/chap1.html#over.
502 See: http://www.orda.siuc.edu/general/rcr.html.

The Institutional Review Board (IRB) or "Human Subjects Committee" has the responsibility for reviewing all non-medical research involving humans as subjects that is conducted by faculty, students, or other employees of SIUC. *Human Subjects Protection: A Guide for Researchers* was prepared to help researchers submit applications to the committee for its review. It discusses principles and policies related to the use of human subjects in research as well as common problems that researchers encounter in their interactions with the committee.[503]

In conjunction with increasing federal demands for greater oversight of research integrity, many universities are establishing central compliance offices. SIUC has elected to establish a Research Compliance Oversight Committee (RCOC) consisting of the faculty or administration heads of committees and offices charged with research-related compliances: IRB, IACUC, biosafety, hazardous materials, stem cells, misconduct, risk management, etc. Coordinated by the director of ORDA, the RCOC meets every semester, or more often as needed, to ensure coordination and information exchange among these many units responsible for research-related compliances and to seek solutions if problems are reported.

Similarly, since 2000, as the calls intensified for formal, university-wide education programs in ORI's nine points of RCR, many universities developed their own programs, some of which can be accessed by other institutions and/or are on the web. SIUC, which has not had the resources to develop its own program, joined the CITI Program[504] in fall 2009. CITI Program is an organization based at the University of Miami that provides online training and testing on all aspects of RCR compliances to universities, laboratories, and other research entities. The courses were developed in partnership with DHHS and are regularly updated.

At the start of every semester, ORDA contributes a discussion of RCR to the training of graduate student research assistants, as part of the Center for Graduate Teaching Excellence. This one-hour program is an overview of the nine points of RCR, focusing primarily on issues of plagiarism. ORDA also presents a workshop on research compliances which provides overviews of researchers' obligations regarding human subjects, animal care, hazardous materials, and other compliance matters.

Other regularly scheduled workshops offer overviews of intellectual property/technology transfer, with information about safeguarding intellectual property and SIUC efforts in

503 http://www.orda.siuc.edu/human/HSguide.html#Section%201.

504 http://www.citiprogram.org.

the areas of patenting, licensing, and business start-ups.[505] The University Intellectual Property Committee makes recommendations on the disposition of intellectual property developed by university personnel using significant university resources.[506]

A page on the web called *Managing Your Intellectual Property Web Page*, maintained by the technology transfer office of ORDA, provides SIUC faculty, staff, and students with an easily accessible single source for useful information, including external links, related to all aspects of intellectual property.[507]

## Activities and Tools that Support Efforts to Ensure Academically Responsible Behavior

SIUC has recently adopted the use of the plagiarism detection and prevention system, Turnitin™, which not only assists in the development of student writing skills by teaching about plagiarism, but also helps promote academic integrity. The Turnitin service, available free-of-charge through the Instructional Support Services department of Morris Library,[508] allows students, faculty, staff, and administrators to upload computer-generated documents and check for originality. It is required that research papers, theses, or dissertations submitted to the Graduate School be checked by software such as Turnitin, prior to submission, for evidence of plagiarism or other copyright violations.

Many colleges and departments offer courses, workshops, and online resources that incorporate or focus on one or more aspects of academic integrity. Following are a few examples.

**College of Engineering:** The college previously offered ENGR 400, Engineering Professionalism and Ethics, for some majors (as required by accreditation criteria). In 2007, all undergraduate students began receiving engineering ethics training, including coverage of academic integrity issues, through ENGR 101, Introduction to Engineering.[509]

**College of Science:** In spring 2008, the dean of the College of Science instituted a series of training materials which brought SIUC into compliance with current National Institutes of Health requirements for research ethics training. At the graduate level in Chemistry, all incoming graduate students are required to enroll in and complete CHEM 592, Introduction to Research Techniques. This course deals with all aspects of research,

505 See http://www.orda.siuc.edu/workshops.html.
506 http://www.techtransfer.siuc.edu/resources/presenting.html.
507 See: http://www.techtransfer.siuc.edu/resources/managing.html.
508 See http://plone.lib.siu.edu:8181/Plonetest/ departments/iss/turnitinpanel.
509 Response from college to Criterion 4 Committee survey.

research integrity, proper citations, laboratory notebook keeping, etc.[510]

**College of Education and Human Services:** Academic integrity is discussed on the syllabi of most courses taught in the college. Professional responsibilities, conduct, and ethics for teachers, counselors, social workers, and trainers are discussed throughout the respective curricula.[511]

**Department of Animal Science, Food and Nutrition, College of Agricultural Sciences:** Academic integrity is usually discussed in the first lecture of every course. Research conduct is also discussed with graduate students during each seminar. Professional ethics is an accreditation competency in both the Dietetics Program and Hospitality and Tourism Program and is covered in a number of courses.[512]

**SIU School of Law:** In the first year of law school, students are introduced to various aspects of the legal profession in a multi-day orientation program preceding the beginning of classes. In particular, the program includes a presentation on professional expectations. First-year students also are required to attend professional development workshops that occur throughout the year. Taught by law school faculty and local experts, the workshops give students additional instruction on skills they need to enter the legal profession and succeed in law school. For instance, during the fall 2007 semester, the workshops included a presentation on professionalism for law students; a professional responsibility day (sponsored jointly with the SIU School of Medicine and including first-year medical students as well as law students) that explored ethical issues that arise in both professions; small group sessions in which students actively participated in the drafting of their class' professional oath; an induction ceremony officiated by Justice Lloyd Karmeier of the Illinois Supreme Court at which the class oath was administered to all students; and a panel discussion on professionalism. The workshop series was honored by the American Bar Association in August 2004 when it presented the law school with its E. Smythe Gambrell Professionalism Award "in recognition of outstanding achievement in the design and implementation of a model professionalism program."[513]

In addition, all students in the School of Law must take the Legal Profession course as a requirement for graduation. This course covers the ethical responsibilities of lawyers, focusing on the Model Rules of Professional Conduct and situations in which an attorney is subject to discipline. Topics include attorney confidentiality, communication between

510 Response from college to Criterion 4 Committee survey.
511 Response from college to Criterion 4 Committee survey.
512 Response from college to Criterion 4 Committee survey.
513 See http://news.siu.edu/news/July04/071204pr4084.jsp.

attorney and client, conflicts of interest, attorney fees, ethics in advocacy, and attorney advertising and solicitation. The course also covers attorney-client privilege, malpractice, attorney liability to third parties, judicial ethics, and admission to and disqualification from the bar.[514]

**SIU School of Medicine:** The SIU School of Medicine incorporates issues of academic integrity throughout its academic programs. Medical students are instructed on academic integrity and related policies during orientations at the start of each academic year as well as through course work, lectures, and group discussions in the Doctoring Curriculum.[515] A significant component of this training during the third and fourth years consists of electives in professional ethics offered by the Department of Medical Humanities. Graduate science students at the Springfield campus receive ethics training in the Research Methods (MBMB 504) course, which is required for all graduate students in the Departments of Pharmacology and Medical Microbiology, Immunology, and Cell Biology. Graduate science students in Physiology receive similar training (PHSL 501). Clinical residents and fellows learn policies regarding professional behavior during orientation to their programs as well as ongoing instruction through hospital-based ethics and continuing medical education programs.[516]

In fall 2009 ADRFA began an evening certificate course on Responsible Conduct of Research designed to meet NIH/ORI requirements, particularly intended for research trainees.[517] This course has been approved by the Graduate School for graduate credit beginning in spring 2010.

## Conclusion

Criterion 4 details the many ways SIUC fulfills its mission to value, stimulate, and nurture a "life of learning" in a global, technology-driven world through inquiry, creativity, and practice (collectively termed "research") in a socially responsible way.

In 1999 the Carbondale campus began a long and critical conversation about its research enterprise, a conversation prompted in part by recognition of the previous decade's slump in productivity and advocacy. This discussion engaged all campus constituencies and, not unpredictably, involved polarized disagreements about the roles of research "versus" teaching, about sciences "versus" humanities and the arts, and about funded "versus"

514 Response from School of Law to Criterion 4 Committee survey.

515 See: http://www.siumed.edu/medhum/index.htm and, especially, http://www.siumed.edu/medhum/curriculum/.

516 Response from SIU School of Medicine to Criterion 4 Committee survey.

517 Source: L. Toth, SIU School of Medicine.

unfunded activities. The commitment to rebuilding a culture of research on campus—to changing our way of doing things—was perceived as threatening in some quarters, a typical response to any change: the "someone moved my cheese" phenomenon. And the demonstrable need to create a high administrative position for research leadership was viewed with ambivalence in the campus climate of the time.

This ambivalence began to diminish (or at least quieten) after about 2002; and since the creation of the *Southern at 150: Building Excellence through Commitment* planning document to chart the way, there has been wide acceptance of the salient role of research writ large in the educational life of the institution. The perception lessened (or was less frequently expressed) that this was only about big-money science and that humanities scholarship and the creative arts were disrespected. At the same time, the value of external funding and returned F&A dollars—for faculty and students in all disciplines—began to be more widely appreciated. Table 4-5 presents a chronology of some important research achievements at SIUC.

Table 4-5. Timeline of research-related accomplishments.

| |
|---|
| **2002** |
| Creation of OVCR/GD |
| Establishment of Center for Graduate Teaching Excellence (OVCR/GD) |
| MA in Geology established (College of Science) |
| First Undergraduate Research Forum held |
| SIUC a founding member of the Upper and Middle Mississippi Cooperative Ecosystems Study Unit |
| **2003** |
| *Southern at 150: Building Excellence through Commitment* document published |
| Middle Mississippi Wetland Research Field Station established via MOU |
| First "Research Town Meeting" held |
| Creation of "Excellence through Commitment Awards" program |
| Undergraduate Assistantship program initiated |
| **2004** |
| Increases in Graduate Assistantships begin (see Fig. 4-2) |
| M.P.H. degree program established in Community Health Education (CASA) |
| One new company established from SIUC patent |
| Center for Health Law and Policy established |
| First two NSF CAREER grants awarded (Chemistry) |
| Ronald E. McNair Postbaccalaureate Achievement Program begun |
| **2005** |
| Center for Ecology established |
| Center for Integrated Research in Cognitive and Neural Sciences established |
| M.L.S. program in Legal Studies established (School of Law) |

| |
|---|
| **2005** |
| Ph.D. program in Applied Physics approved (College of Science) |
| **2006** |
| Interdisciplinary Seed Grant program in ORDA/OVCR/GD established |
| M.S. program in Professional and Media Management established (MCMA) |
| M.A.T. – master of arts in teaching - program established (College of Education and Human Services) |
| *Undergraduate Research* tabloid started |
| Jackson County external "opportunity analysis" for economic development emphasizes importance of SIUC research |
| Center for Innovation created |
| **2007** |
| Ph.D. program in electrical and computer engineering established |
| Ph.D. program in computer science established |
| M. ARCH – master in architecture – program established (CASA) |
| M.S.P.A. – physician assistant studies – program established (CASA) |
| One new company established from SIUC patent |
| A new-faculty mentoring program initiated at SOMS |
| **2008** |
| Center for Delta Studies established |
| Saluki Research Rookies program established |
| Three new grant programs in SOMS begun (FAAR, Clinician-Scientist Program, Concept Development Award) |
| M.S. in Biomedical Engineering established (College of Engineering) |
| Three new companies established from SIUC patents |
| Re-opening of renovated Morris Library |
| New interdisciplinary Ph.D. program in the College of Agricultural Sciences started |
| **2009 (to date)** |
| NSF IGERT grant awarded for watershed studies |
| First Technology and Innovation Expo held, featuring SIUC research |
| First Student Innovation Contest held in Center for Innovation |
| Two new companies established from SIUC patents |

It is notable that, particularly around 2005-2006 and thereafter as documented in all of these self-study chapters, a broad range of indicators of success in teaching and learning and research began to climb:

- More R&D dollars awarded and expended: Between 2001 and 2008, external funding brought into the university climbed from $33 to $70 million.
- More F&A returns: from $3.5 million to nearly $8 million, supporting new faculty hires, internal research programs, travel for faculty and students, Faculty Seed Grants in all disciplines, and many other similar endeavors.

- New graduate degree programs: 11 Master's and 4 Doctoral.
- New or significantly revised undergraduate programs: University Honors, McNair, Saluki First Year, Saluki Cares.
- New undergraduate research programs: REACH, Research Rookies, undergraduate assistantships. Students increasingly value research as a key element of their education: 79 percent of student respondents in the 2008 Campus Climate Survey agreed with the statement, "Conducting research with faculty members is an important aspect of academic and professional growth."
- New undergraduate academic successes: major national scholarships (Goldwater, Udall); major national presentations (Posters on the Hill), All-USA College Team.
- More doctoral degrees granted annually.
- New research centers created: Ecology, Neuroscience, Delta studies.
- Increased patent- and IP-related activity.
- New internal funding programs: travel, Interdisciplinary Seed Grants.
- New ways of recognizing and publicizing scholarship: Research Fair, Undergraduate Research Forum, Research Profile, Undergraduate Research tabloid, Graduate Highlights.
- New means of rewarding successes: Excellence through Commitment Awards (central and in colleges).
- New research-active faculty-hiring initiatives (many of whom have won teaching awards or training grants).
- New educational programming for ethical conduct in research.
- Construction of new facilities and renovation of old ones: Altgeld Hall, Morris Library, Simmons/Cooper Cancer Institute, Saluki Way.
- Increasing success in highly competitive federal programs for teaching and research: 13 NSF CAREER awards, IGERT.

In 2003, Dr. Shirley M. Malcom, winner of the National Academy of Sciences' Public Welfare Award, challenged her colleagues to "imagine something different."[518] This is what SIUC has done in the last decade. Through the ambitious goals of *Southern at 150*, we have imagined and planned and challenged ourselves to transform our university into "something different" —a major research institution—compared to what it was ten years ago. We accomplished this despite a steady diet of dwindling resources and unstable leadership.

518 2003 address to the National Academy of Sciences upon receiving the 2002 Public Welfare Award. http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12112002. Dr. Malcom is head of the Directorate for Education and Human Resources Programs of the American Association for the Advancement of Science (AAAS).

The first decade of the twenty-first century represents a renaissance, in many respects, of the SIUC envisioned by former President Delyte Morris half a century ago. All over campus, faculty, students, and civil service and A/P staff have been shrugging off the negativism and defeatist attitudes of the 1990s. Instead, the SIUC community has been refreshed, invigorated, and empowered by the introduction, implementation, and high expectations of the concept of "excellence": that excellence should be a campus-wide goal and that it will be recognized and rewarded. The data presented in this chapter—indeed, throughout the self-study—trace the process of this transformation.