Southern at 150

College of Science

1. Vision

In 2019, the programs in the College of Science (COS) will continue to be central to the comprehensive, student-centered research university envisioned in the "Southern at 150" reports. A solid education in mathematics and the sciences will be essential in the mid-21st century to prepare citizens for an increasingly complex, technology-driven world and to prepare teachers, physicians, and other science professionals to continue to meet the many challenges of that world. In addition, faculty and staff in the COS will continue to pursue both basic and applied research to develop new knowledge, new techniques, new procedures, and new products. A high level of research productivity of the faculty in the COS is essential if SIUC is to meet its goal to become one of the top 100 public research universities in the country.

The COS will continue to have undergraduate and graduate programs in the life sciences, the physical sciences, mathematics, and computer science. In some of these key areas, particularly in the physical sciences, growth of faculty numbers must occur. All faculty will participate in doctoral programs which are either in the COS or are interdisciplinary. We believe that graduate education will be even more important to prepare professionals for the workplace.

Classrooms, teaching laboratories, and research laboratories will be well equipped and up to date. High-quality, extensive field-related educational experiences will be available in appropriate disciplines. A considerable amount of instruction will involve distance and/or asynchronous learning.

While we propose no specific vision of the structure of the COS, we do not envision growth to mean new administrative units. Rather, we will examine the administrative and programmatic units in the COS to see that they are both efficient and flexible. However, we expect to have strong programs in Biological Sciences, Chemistry and Biochemistry (including materials chemistry and forensic chemistry), Computer Science (including bioinformatics), Geology (including environmental and resource geology), Mathematics, Microbiology (including molecular genetics, immunology, and microbial diversity), Physics (including applied, theoretical, and experimental), Plant Biology (including ecology and systematics), and Zoology (including areas of biodiversity, conservation, wildlife ecology, fisheries biology, aquatic ecology, evolution, genetics and population biology).

2. Mission

(A College's mission statement is mandated by the contract between the Faculty and the Board to be a part of its Operating Paper. It cannot be modified except as stated in the Operating Paper. The following, therefore, is a quote of that statement.)

"The College of Science and its departments and programs serve the faculty, staff, and students of Southern Illinois University Carbondale. It offers programs in the sciences leading to bachelor's, master's, and doctoral degrees and service courses for other units and programs throughout the University. As a unit with graduate programs in every department, the College expects and encourages its faculty to conduct original research in their disciplines and to keep current with

recent developments in their disciplines through professional activities both nationally and internationally. The College has a role in furthering scientific education throughout the University and raising awareness of science and science education throughout the region. This is accomplished by providing resources and encouraging quality teaching among the faculty in the College."

3. Context

With regard to specific programs in science, it is difficult to predict exactly what the needs of the nation, the state, and the region will be in 2019. There can be no doubt of the need for high-quality undergraduate programs in the basic sciences and mathematics. For more specialized areas, it is important that the COS maintain flexibility (e.g., so that Geology does not have to retool if there are shifts in the needs for resource geologists as compared to environmental geologists). Clearly, the current trend toward large, often interdisciplinary research teams, will continue. As we do not envision a large increase in the number of faculty at SIUC, in order to build and maintain nationally and internationally recognized research programs, the units within the COS need to choose research foci that they can build in depth. While doing this, they need to be cognizant of research expertise and teaching needs in other Colleges and Schools at SIUC. More effort must also be placed in developing consortia in specific areas with other universities, both nationally and internationally. The overall context in which changes will be made needs to be one of planning and coordination.

In identifying a research focus, the units must also consider current and historic academic/research strengths, funding opportunities, and the regional environment and potential for development. Examples of such current efforts in the COS are the Wildlife Research Laboratory and the Fisheries and Illinois Aquaculture Center associated with Zoology and the Materials Chemistry group in Chemistry and Biochemistry. Cross-disciplinary cooperation will continue to be encouraged such as existing relationships with the College of Engineering and the College of Agricultural Sciences.

4. Challenges

There are several challenges facing the University as well as the COS which must be met in order to bring our vision to a reality by 2019. Foremost among these is adequate funding: funding to sustain quality programs, funding for infrastructure, and funding for improvements, renovation, and construction of facilities. Mechanisms must also be found to prevent feast and famine cycles in funding so that improvements and replacements can be made systematically. We do not anticipate large increases in state funding, so the COS must redouble its efforts in seeking external funds. We must also expand the number of faculty, particularly in the physical sciences, while preventing further erosion of faculty lines. This will require increased state funding, since significant reallocation within the COS is not possible. We must continue to recruit top-flight faculty and students into all programs. In some cases, programmatic changes will be needed. For example, it is not possible to imagine a Top 100 Research University without a doctoral program in Physics. Almost all changes will require the active participation and approval of the faculty and units involved.

The COS and most of its academic units must also take steps to develop advisory boards containing alumni and other external experts to help us plan for 2019. One challenge that must be faced is the need to plan for continuous change. The COS and SIUC must remain flexible enough to be able to accommodate unforeseen opportunities and challenges that will certainly arise in the next 20 years.

We believe that steps must be taken to recruit students with stronger technological and quantitative preparation in order to be successful in a modern, academically rigorous curriculum.

Further, we must assure that quality research and internship experiences are available outside of the classroom.

5. Priorities

Our highest priority will be to continue to hire highly-qualified faculty in key programmatic areas. We need faculty with a commitment to both teaching and research, and they must be supplied with sufficient start-up resources to build a high-quality, well-funded research program. Long-term research program planning, including decisions about disciplines for new hires, is a key to this process. As a standard procedure, the focus of the new hire will be based upon teaching and program development needs as well as potential to complement existing areas of programmatic strength. Obviously, before such hiring can begin, each unit must develop its own long-range plan.

In order to be in the top 100 public research universities by the year 2019, the level of research activity by programs in the COS must continue to expand, as must efforts to secure external funding for this research and for the support of graduate students involved in the research. Units within the COS must continue to strengthen their ties with other academic units on campus, as well as with similar academic units in other colleges and universities in the region, thereby solidifying our role as a leader in the surrounding research community and becoming a program of choice for students from those institutions seeking quality graduate programs.

6. Summary

In the year 2019, the world will be faced with an ever-increasing number and complexity of biological problems. Men and women trained in the sciences and mathematics will be needed in increasing numbers to fill key positions in organizations (education, industry, state, and federal) that seek to understand and overcome these problems. Therefore, the COS sees its educational and research mission as increasingly central to the University's vision of itself and its goals for that year. In support of this mission, the departments within the COS must strive to be research departments of national and international stature, while maintaining a strong commitment to the teaching of mathematics and science necessary to supply the needs of a scientifically trained workforce and a technologically literate populace. We believe graduate degrees will be increasingly important to prepare students for the workplace and that graduate programs in the COS will need to be strengthened and expanded. The undergraduate and graduate training programs in the COS will continue to involve quality faculty whose research will be focused on contemporary issues relevant to 2019.