

The University of Iowa

The University of Iowa Informatics Initiative

*A Proposal for Enhancing the
Information and Computational Sciences
and their Application*

13 February 2001

(A report to Provost Jon Whitmore and Vice President for Research David Skorton from the faculty members and staff who served on the Informatics Study Committee.)

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Executive Summary

America is becoming an "Information Society." The State of Iowa's commitment to being part of that information society is evident in its investments in network infrastructure and technology-related economic development. However, being an information society is not about computers, or software, or networks. The real issue is how these amazing tools, along with sophisticated mathematical, computational, and information methods, enhance our ability to create new products and services, to accelerate our research endeavors, to educate our citizens, and to enrich and protect our society and personal lives. This initiative is aimed precisely at this issue. This University of Iowa Informatics Initiative calls for: 1) programs of study designed to yield professionals skilled in problem solving, and 2) an augmentation of research programs that are fueled by the application of informatics. These University of Iowa graduates and this growth in research will contribute significantly to achievement of Iowa's goals in education, economic development, and quality of life.

The Informatics Study Committee

For several years, informatics programs and activities have been springing up in colleges and departments around The University of Iowa campus. In 1999 and 2000, faculty-led conversations, recommendations and proposals for action began to circulate. Sparked by local research interests and strengths, these conversations and proposals recognized growing levels of external support for interdisciplinary, informatics-based attacks on problems in science, health care, the social sciences, and even in the arts and humanities. Also recognized was the obvious relationship of these issues to economic and workforce development issues, both in Iowa and elsewhere.

Some of the ideas and proposals developed by the faculty were submitted to the offices of the Provost and the Vice President for Research, who elected to form a study committee to develop an institutional response to the calls for informatics-related programs of study, research support, and interdisciplinary activity. This report is the result of that Committee's work.

Recommendations

The Committee proposes creation of a University of Iowa Informatics Initiative. Central to such an initiative is a set of core disciplines, including Library and Information Science, Computer Science, Mathematics, Statistics, Biostatistics, Management Science, and Electrical & Computer Engineering. Based on the following three overarching goals, the intent is to stimulate interdisciplinary collaborations between these core informatics areas and all other disciplines making up the University's academic profile:

- Foster interdisciplinary interaction and collaboration in the application of information, computational, mathematical, and statistical sciences to problems in a broad array of disciplines,

- Establish and maintain a critical mass of expertise in the applied information and computational sciences, and
- Build and nurture an internationally competitive computational community and culture at The University of Iowa.

To accomplish these goals, the Committee offers seven specific recommendations:

1. **Create an ongoing and identifiable position with responsibility for oversight, facilitation, and development of this initiative.** Reporting to the Provost, perhaps through the Dean of the Graduate College, and the Vice President for Research, and guided by both an internal academic advisory board and an external advisory board, the responsible faculty member would be a champion for and would facilitate action on all of the recommendations stated here, provide publicity, and assist in dissemination of information related to the initiative. Coupled with these activities would also be a set of outreach activities to K-12, other Iowa institutions of education, and other relevant constituencies.
2. **Sponsor programs of interdisciplinary and collaborative activities.** Sponsor an annual, renewable program of interdisciplinary and collaborative activities designed to identify, accelerate, and strengthen University of Iowa programs of research and education in informatics.
3. **Strengthen existing programs in the applied information, mathematical, and computational sciences.** Faculty numbers in the core informatics disciplines as well as in programs already engaged in informatics teaching and research need to be increased. Joint appointments will be an important strategy, along with hiring incentives and attention to removal of interdisciplinary barriers.
4. **Devise and facilitate general strategies for development of new programs of study in informatics-related fields.** Of particular interest is a strategy for development of a shared, flexible, interlinked informatics curriculum substrate across the set of core disciplines. This would mutually strengthen these core programs and provide a rich medium for incubating new interdisciplinary informatics-related programs, as well as assisting in activation of such programs already proposed.
5. **Promote agility in the deployment of research and development efforts in response to emergent informatics-related opportunities.** As opportunity and progress dictates, establish, recognize, and coordinate interdisciplinary Informatics Research Units to provide focus for emerging growth areas in the application of information and computational science to research and scholarship throughout the institution. Position the institution to be able to respond rapidly to external funding opportunities and sources of support.
6. **Promote basic information literacy and computational fluency for University of Iowa students.** Establishment of an information and computational culture begins with our students. Ability to use computers is not a sufficient goal—individuals must learn to think in organized, information-based, computational ways. We propose formation of a committee, composed of faculty, librarians, and staff to explore the establishment of basic information and computational fluency requirements for all University of Iowa students. Starting points for this effort may include those described in the National Academy of Sciences report *Being Fluent with Information Technology* and the *Information Literacy Competency Standards for Higher Education* report developed by the Association of College and Research Libraries.
7. **Contribute to and promote the evolution and support of infrastructure required to sustain an informatics initiative, including both its educational and research components.** Infrastructure of all types will be necessary to sustain the objectives cited above. Perhaps most critical will be the human resources necessary to support technology-based work and informatics-related research. As interdisciplinary collaborations emerge, co-location of involved parties may become a critical issue.

Thus, space planning will be necessary. Support for advanced information and computational infrastructure will be needed to help fuel the initiative. Particular attention should also be focused on funding to acquire electronic information resources and funding to support research efforts such as an Iowa Digital Library Initiative.

Rationale

Motivation for an initiative at this particular moment in time includes:

- **Increasing dependence of the University of Iowa scholarly and research enterprise on the integrated involvement of information methods; computation, modeling, and simulation; and the sophisticated connections of humans to the “knowledge bases and concepts” represented by these information and computational resources.** These ideas touch every college and numerous departments, research units, and centers.
- **Emergence of Federal programs designed to stimulate and expand informatics-related efforts.** Important programs at NIH, NSF, NASA, NOAA, DOE, DOD, and other agencies are aimed directly at the interdisciplinary work represented by informatics and computational science activities and research. Many advances require expertise from individuals in several disciplines, including especially the mathematical and information sciences. This reality is one reason the government is investing so heavily in interdisciplinary work.
- **Ability to accelerate current research activities.** Several important research projects on this campus, including simulation, hydroinformatics, nursing and health informatics, intelligent information retrieval, statistical genetics, and computational genomics already employ the kinds of integrated information and computational science activities described here. If these programs are properly included, the proposed initiative should provide a means to accelerate the recognition, work, and funding opportunities.
- **An increasing number of faculty proposals to establish interdisciplinary programs of study involving information and computational science.** Proposals for certificate and degree programs in health informatics, information science, and computational biology, among others, have been submitted to the Graduate College in recent years, and some have been approved.
- **Important linkages to activities within the state.** The relationship of the proposed initiative to workforce development, and to the integration of information and computational science skills and research results into a broad range of industries, may provide significant capabilities and a significant leading edge for Iowa’s future.
- **Expectations for educational preparation of our students in these areas.** There have been numerous calls for programs of study designed to prepare individuals in enhanced problem solving skills and information/computational fluency. The College of Liberal Arts’ strategic plan, for example, calls for “literacy in mathematics, computing, and science.” This initiative embraces such plans and integrates them with plans for the streaming of students into related research activities and preparation of the workforce of the future.
- **Competitive position vis-à-vis peers.** A significant number of the nation’s research universities have already established colleges, institutes, centers, or other initiatives in this area. More than a few are using these occasions to attract support on a larger scale from sponsors as well as donors.