1. Role of information science at Cornell

The initial report of the Task Force on Computing and Information Science, "Cornell in the Information Age" (June 1999) reflects Cornell's concentrated strengths in computer science. The dispersion of Cornell's strengths in information science throughout the university is also reflected in the report. More emphasis on teaching and research in information science -- which we understand as an interdisciplinary pure and applied science that studies the human creation, collection, organization, use and communication of information -- would bring focus to this side of the strategic discipline of Computing and Information Science.

Information is at the heart of Cornell. In the research endeavor it is, for example, the geneticist identifying sequences to understand a pathway, or the historian locating and studying texts to understand a revolution. Part of Cornell's educational mission is to graduate students capable of creating and using information. Computing innovations have resulted in powerful information technologies, which in turn have resulted in what is commonly referred to as the information revolution. The current information environment is a rich, dense, complex, and rapidly changing environment.

Information science studies the entire cycle of people's information activities. The cycle spans the creation or discovery of information, its distribution and retrieval, people's use of that information, and the subsequent creation of new information. The computing and information science initiative will be most effective in returning Cornell to a leadership position if it includes support for the full 360 degrees of this circle.

The Cornell University Library (CUL) is well positioned to contribute to this initiative. Cornell librarians and archivists are nationally and internationally recognized for their contributions to research, scholarship, standards development, and information science organizations. Last year, for example, Library staff:

- received 21 grants totaling over $2 million
- authored over 50 articles and monographs
- edited key journals in library & information science
- served in leadership positions in professional organizations, commissions, and standards bodies
- consulted nationally and internationally (Europe, Latin America, Africa, Asia, Southeast Asia, Australia)
- were acknowledged for their contributions through awards for excellence in teaching, research, and service, including the USDA Secretary's Honor Award for development of the USDA Economics and Statistics System <http://usda.mannlib.cornell.edu>.

2. Recommendations: General

A. Create an additional FCI subunit for Information Science
We recommend that Cornell's traditional interest and expertise in information science be explicitly recognized in the proposed Faculty of Computing and Information (FCI) through the creation of a new subunit within the FCI devoted specifically to the field. The proposed subunit on IS would join the other proposed subunits -- namely the current Computer Science Department and the 3 interdisciplinary focal areas of Digital Arts and Culture, Human and Social Systems, and Computational Science and Engineering -- to constitute the FCI. The IS subunit would be a locus for the theoretical and applied research and education programs in information science already underway in various campus academic units, and in particular would be the locus for the research and teaching efforts of the Library. We envision a unit in which CUL librarians with appropriate education or experience would have the opportunity for joint, adjunct appointments and would be able teach or co-teach courses in digital libraries and information management. We would expect that library staff teaching FCI classes would be represented on FCI curriculum committees with full voting privileges. In addition, we would expect that the FCI would wish to hire other full-time faculty in Information Science and Information Management to create and coordinate an active program in this fundamental area.

In addition to participating in the curriculum and research program of an Information Science unit, we anticipate that library staff could effectively collaborate in teaching and research with other FCI faculty. In particular, we feel that librarians may be able to help students in the proposed introductory courses to sharpen their informational literacy skills along with their computational literacy skills (as is proposed in the Task Force report).

If instead of the FCI an alternative organizational structure is implemented, such as a virtual college or research center or any other structure that is designed to promote interdisciplinary teaching and research but is based on existing academic departments, we strongly advocate giving Information Science a home within the Computer Science Department and naming this new, expanded department Computing and Information Science (CIS). The new IS component of the CIS would function in the same way as the IS subunit of FCI, described two paragraphs above.

B. Create a Digital Library Informatics group in the Cornell University Library

We also recommend the creation of a Digital Library Informatics group, which would apply information technologies to the real world functional integration of the heterogeneous elements of large and small scale information systems. The library, where theory and practice intersect, is an ideal base for this kind of teaching and research.

A Digital Library Informatics group, established within the University Library, would focus on applied research and R&D projects. This group would be integral to balancing pure research and practice in the digital library arena at Cornell. The unit's work would extend the limits of digital library practice to the edges of technological capabilities, making the University Library one of the CIS resources that would attract the best students and faculty to Cornell.

3. Recommendations: Specific

A. Teaching

We envision CUL staff participating on a number of levels:
as faculty offering separate courses
• as co-instructors in a multi-disciplinary/team teaching approach
• as guest lecturers or resource providers in others’ courses
• as advisors for graduate assistantships and internships.

We can offer our expertise in areas such as:
• copyright law
• contract negotiations
• digital publishing
• electronic text design
• selection and maintenance of large information systems for large populations where accuracy and reliability are paramount
• organization and classification of knowledge
• document/resource management
• GIS
• digital preservation
• digital imaging.

There are many skilled, experienced teachers on the CUL staff. Library faculty/instructors could work with subject faculty to develop and present computer literacy courses tailored to the needs and interests of undergraduates from various disciplines and participate on teams of faculty to teach core FCI courses. They could also take responsibility for digital library courses that would draw on work taking place within the University Library. The digital library arena is one in which Cornell is particularly strong. Digital library courses within the FCI might even grow to become a concentration, minor, or major available to undergraduates and graduate students.

The Library could also provide venues for information science internships and graduate assistantships. The Electronic Text Center, for example, could serve as a laboratory for graduate students in linguistics, literature, or computer science whose research focuses on such areas as digital dictionary and thesaurus design, hypertext fiction, and related subjects.

B. Research

Areas of research in which we could contribute our knowledge, expertise, and access to users include:
• user satisfaction and human-computer interactions, including interface evaluation
• navigation through complex information spaces
• use of literature in electronic form vs. in other formats
• impact of electronic publishing on research and learning
• digital preservation
• digital imaging
• electronic records research
• metadata.

We would like to emphasize the collaborative nature of research in the digital library realm. We need librarians, archivists, information scientists, computer scientists, evaluation experts, lawyers, and others to work together in conducting research, especially applied research and development. The NSF-funded DLI2 grant <http://www.prism.cornell.edu> is a good
example. The project is a collaborative one involving the Library, the Computer Science
Department, and the Human-Computer Interaction group (HCI). We have adopted a team-
based approach to all aspects of this effort: needs assessment, requirements setting,
prototyping, programming, iterative design, scenario development, testing, refinement,
evaluation, and promulgation.

There are also areas in which we can conduct research on our own and with non-Cornell
collaborators. We have already been doing such work at Mann Library, in the Rare and
Manuscript Collections Division, and in the Department of Preservation and Conservation.
We have partnered with industry, professional societies, imaging scientists, other libraries,
and library professionals at the national and international level.

C. Service

CUL’s mission includes providing services that support physical and intellectual access to
information resources in fulfillment of the present and anticipated needs of Cornell students,
faculty and staff and, as appropriate, to alumni and the broader public. New and emerging
needs are monitored and they form the basis of new library services. CUL will work with the
FCI to identify its unique needs and offer new services to meet these needs.

4. Recommendations: Implementation considerations

There are a number of ways in which the recommendations above could be implemented. The
following suggestions represent our initial assessment of the issue:

A. Actions within the proposed Faculty of Computing and Information

We recommend that the FCI hire full-time faculty in Information Science and Information
Management to direct a concentration in Information Science. As a start two faculty
members would be needed whose specialization could be in any of the areas of information
science that are not currently well-represented on the Cornell faculty, and might include
information retrieval, knowledge visualization, user interface design, and information policy
and management.

B. Library-based implementations

The computing and information science initiative should support activities in four different
areas within the Library:

i) Establishment of a Digital Libraries Informatics unit within CUL

CUL researchers and designers are developing new ways of organizing and presenting
large, heterogeneous information resources. The Library Gateway
<http://campusgw.library.cornell.edu>, "My Library," and "Creation Station"
<http://www.hci.cornell.edu/projects/projs/creation.htm> projects are just three of the ways
that CUL staff have sought to meet the changing information-seeking needs of students
and faculty. Much more applied research could be done by utilizing as a testbed the
millions of records and information resources available in, or coordinated by the Library.
With additional resources, further experiments on information visualization, the automated
description and indexing of information resources, and the further integration of print, video, audio, and graphic materials could be carried out by the Library.

We propose, therefore, that the computing and information science initiative support the creation of a Digital Libraries Informatics unit within CUL. This group would work closely with other FCI researchers, but it would be distinguished by its interest in applied research using large, actively-utilized information resources. With an initial staff of nine new information scientists and programmers, CUL would be in a position to extend into digital realms the high levels of service traditionally offered to users of the print collections. Some of the FTE time reflected in the creation of this new unit could be used for teaching FCI courses, either singly or in cooperation with other faculty.

(ii) Release time for teaching activities of CUL staff

There are many skilled, experienced teachers on the CUL staff. In addition, the Library also employs internationally-recognized leaders in the areas of metadata, digital preservation, and digital libraries. The involvement of CUL staff in the academic program of the proposed FCI could only strengthen the entire program. Since curriculum development and teaching are not normally part of the duties of CUL staff members, we will need to support release time for the staff members who can actively contribute. This support would make it possible to use staff instructional expertise far beyond the Library's existing workshops and course-related sessions.

(iii) CUL staff as research team members

One of the most effective ways that CUL could support the initial efforts of the proposed FCI would be through the designation of a dedicated information specialist to each FCI research group. As an active part of each research group, the information specialist would be able to anticipate and meet the information needs of specialists in the group. The information specialist could also work with the library to organize and disseminate research results.

In the future FCI grant applications should include funding for an information specialist, but at least initially there would be need for staff supported by Cornell funds to fill this role. The exact number of staff needed would be dependent on the number of FCI research projects, but we assume that one staff member could support up to three research groups.

(iv) Enhanced support for information science resources

While CUL currently has much material of use to computer and information scientists, our coverage is not comprehensive. Any major new University initiative will require additional support for the Library to acquire, license, catalog, and maintain relevant literature and other information resources in appropriate fields -- and to deliver these materials to the desktop. As a consequence, the FCI initiative should include enhanced funding for the Library's collection and services in the areas of computing and information science.

5. Conclusion
The Cornell University Library is a nationally recognized center of excellence and innovation for research, teaching, and service. The Library is also a site of application and production, where large and complex user populations interface with large and complex information systems. The Library looks forward to participating as a full partner in broadly integrating information science, hand in hand with computer science, into education for all students and into research and scholarship across the campus.

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