Report of the

Life Sciences Working Group

Cornell University Library

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Introduction

This is a report on the Cornell University Library activities in response to two linked faculty initiatives, the Cornell Genomics Initiative (CGI) and the New Life Sciences Initiative (NLSI). The Cornell University Library has always supported the life sciences, through instruction on the use of Medline and Biosis since before this incoming freshman class was born and through exemplary collections in the life sciences. This report describes how the Library responded to the two University initiatives in the life sciences that began in 1998. In Phase I (CGI) the activity was centered in Mann Library, in Phase II the activity was in transition, in Phase III (NLSI) the library participation expanded to all the science units.

Phase I Cornell Genomics Initiative 1998-2002:

Investigation and Partnerships

In 1998 the Deans and Directors of the Division of Biological Sciences; Nutrition; the Colleges of Agriculture and Life Sciences; Arts and Sciences; Engineering; Veterinary Medicine; and Medicine; and the Boyce Thomson Institute commissioned a task force of @30 faculty to 'develop a campus-wide genomics initiative that has long term vision with respect to biological, agricultural, engineering and medical research.' Later that year the Genomics Task Force released a three year plan to respond to the genomics revolution: "Driving this revolution is genomics – a set of increasingly sophisticated tools designed for large data acquisition and analysis." The over arching goal is to "understand the flow and control of information from the genome and the interaction of that information with information from the environment."

The defining characteristics of the genomics revolution are the speed of change of the technologies, the attendant amount of data they can generate, the innovations in computational analysis techniques, and the interdisciplinary teams of scientists approaching each problem.

The Library learned of the Genomics Initiative in 1999. Mann staff spent over a year interviewing Cornell principals and learning about the science, literally as it was developing. High through-put sequencing (which enabled the human genome to be published ahead of schedule in the spring of 2003) and microarray technologies (the gene on a chip) were developed during this time.

By 2001 we had a basic understanding of the scope of the science involved. We were aware of the activities at Cornell and that the CGI spanned 5 Colleges and included several hundred faculty. We began to identify how the library could help the CGI. Our initial work was with the

faculty in the Ethics, Legal, and Social Implications (ELSI) Focus area. Communication was part of their charge, and Chiang had collaborated with the ELSI co-chair (Bruce Lewenstein) before. We discussed how the Library could help organize and deliver information to the various audiences of the CGI (students, researchers, interested citizens). Lewenstein and Chiang submitted a proposal to the NSF for information delivery which was not funded.

We met with the Dean of the College of Agriculture and Life Sciences (Susan Henry), the faculty lead on the CGI (Steve Tanksley) and the Vice Provost for the Life Sciences (Kraig Adler). We worked with the Office of Government Affairs who invited us to participate in Cornell's 2001 Legislative Day in Albany, which was snowed out. Davis began evaluating our collections in support of the Initiative. Fortunately many of the resources were online and free. We monitored the commercial value-added databases and began talking to faculty about whether the library should be providing central support for those resources.

Corson-Rikert and Chiang were invited to become members of the CGI Task Force, and Chiang was invited to be on the ELSI Focus Group. Lewenstein and the Library drew up a description of the information delivery component of the Genomics Initiative. The proposal was included in the Phase II Genomics proposal which became part of the fund raising initiative called the New Life Sciences Initiative.

Phase II Cornell Genomics Initiative and the New Life Sciences Initiative 2002:
Transition year 2002

In 2002 the New Life Science Initiative was announced. The NLSI is a broad statement of vision and values for scientific research at the University centered around a development campaign for 500 million dollars. The CGI Phase II proposal became the center of the NLSI fund campaign.

A Life Sciences Technology building was approved for upper alumni field. The plans include a tunnel to Plant Science creating a life sciences corridor extending from the new building and Biotechnology through to Mann Library. The CGI meetings continued with presentations by the newest initiatives: Bioengineering and Biomedical Engineering, Biogeochemistry and Biocomplexity and Neural Systems and Behavior. Two meetings were held on the ELSI initiative. ELSI is at a disadvantage because the Genomics Initiative does not have the same priority status in the social science/humanities units as it does in the science programs. The CGI recognized the importance of ELSI and discussed ways in which that Focus area could be promoted and supported.

Alumni Affairs and Development held a series of meetings to familiarize faculty with the fund raising activities. The Corporate Strategic Alliance program was introduced and there were faculty meetings on the pros and cons of partnerships with the commercial sector. Several faculty participated in meetings with potential donors and interested corporations. The CGI began discussing core facility needs (e.g. for sequencing, and creation and maintenance of transgenic mice.)

In 2003 there was a general meeting of the New Life Sciences Initiative faculty with President Lehman and Provost Martin. The chairs of each of the focus groups gave presentations describing the purpose and status of their group. While the NLSI gained visibility and momentum, Chiang continued to meet with NLSI participants, and library activities in support of the CGI continued. Alpi and Chiang received a CUL internal grant for "Library support for bioinformatics and genomics initiative at Cornell: A joint needs assessment and staff development approach." Solla, Alpi and Hyland's proposal for a project to support science reference librarians was also approved. As the two proposals were complimentary, the reviewers asked the two groups to merge their budgets and coordinate their activities. In August 2002, Alpi taught the three-day NCBI Bioinformatics course to 14 library staff. A two-day Science Reference retreat was held in January 2003. Carole Palmer from the University of Illinois spoke on library support for interdisciplinary studies and a panel of Cornell scientists described how they use information, and the library.

Genesis of the LSWG

In response to the announcements on the NLSI, Poland, Heyns, Schlabach and Chiang met in 2002 to discuss models to support the NLSI. The Library created the Life Sciences Working Group (LSWG), a cross-unit team that parallels the colleges that dominate the NLSI. The membership was: Kathy Chiang (chair), helen-ann brown; Jon Corson-Rikert, Phil Davis, Zsuzsa Koltay, Marty Schlabach, Leah Solla, and Susanne Whitaker, with Erla Heyns, Janet McCue, and Jean Poland in monitoring roles. The charge for the group was created).

Phase III New Life Sciences Initiative 2003:
Library Life Sciences Working Group

This section is organized by the sections in the Charge. However, in an overflow of momentum, the group met most of the charge and then continued right on through to the activities it identified. Part of this change was due to an unanticipated professional resignation in Mann Library in the fall of 2002. At McCue's suggestion the position was redefined as a

bioinformatics/life sciences librarian.   The Life Sciences Working Group helped created the job description as the incumbent was intended to serve the full Cornell audience needing bioinformatics support services. The position was approved for posting in the summer of 2003 and was advertised in library and science job listings, including the Cornell sponsored *Science* advertisement for the New Life Sciences Initiative.

We had a pool from two arenas: new librarians specializing in bioinformatics, and molecular biologists interested in moving from 'the bench' to the greater service opportunities of such a position. The LSWG participated extensively in the search process. We were fortunate in being able to hire Medha Devare who was a research associate in the Department of Crop and Soil Sciences at Cornell. She began part time in mid-spring 2004 and full time in May, at which time she took over as chair of the Life Sciences Working Group.

The following details the 5 items in the Charge and presents LSWG activity for each item.

1. Reach some understanding of the NLSI and the Genomics Initiative as it impacts the library. What are the activities included under that title, who and where are the major players? Suggest the types of formal relationships to establish with those players.

The background history in this summary describes our understanding of the Genomics Initiative and the genesis of the NLSI. The Genomics Initiative was subsumed into the NLSI; although faculty involved used to meet formally, they have not done so for some time.

Main goals/activities of the NLSI *(areas which could benefit from library involvement italicized)*:
– strengthen key research areas
– *recruit faculty to work across disciplinary boundaries*   Prospective faculty and graduate students can use
     Vivo to see the scope and interdisciplinary nature of the NLSI.
– provide state-of the-art research facilities for life sciences research
– *develop curricula to train the new generation of life scientists*   See the Instruction section for details on the
     library's contribution to this goal.
– build industrial collaborations
– promote economic development
– *apply life sciences findings to outreach efforts*   Vivo is an excellent vehicle for delivering life sciences
     finding to a broader audience.

The NLSI has identified 12 research focus areas involving interdisciplinary groups of faculty across the Cornell campuses to facilitate collaborations:

– Bioengineering and Biomedical Engineering

– Biogeochemistry and Biocomplexity

– Business Innovation

– Computational and Statistical Genomics

– Ethical, Legal, Social Issues

– Evolutionary Genomics

– Mammalian Genomics

– Microbial Genomics

– Molecular and Chemical Ecology

– Neural Systems and Behavior, now called Neuroscience

– Physical Sciences/Life Sciences Interface

– Plant Genomics

Relationships established with major players in NLSI:

Kraig Adler (Vice-Provost, Life Sciences): Chiang, McCue, Corson-Rikert, Devare

Steve Tanksley (Chair, Plant Genomics focus): Chiang, McCue, Corson-Rikert, Devare.

Steve Kressovich (Chair, Genomic Technologies Enabling Group): Chiang, Corson-Rikert, Devare

Michael Kotlikoff (Chair, Mammalian Genomics focus): Devare

John Schimenti (Director of Graduate Studies, Genomics): Devare

Deborah Streeter (Chair, Business Innovation focus): Chiang, Corson-Rikert, Morris-Knower

Charles Aquadro (Chair, Computational and Statistical Genomics focus): Chiang

Steve Hilgartner, Bruce Lewenstein (Co-Chairs, ELSI focus): Chiang

Andrew Bass (Chair, Neurobiology Focus): Devare

Jaroslav Pilardy, Qi Sun (Computational Biology Service Unit): Chiang, Devare

James van Ee (Director, BioResources Center): Chiang, Devare

James Mazza (Director, NLSI Campaign, AAD): Chiang, Corson-Rikert, Devare

2. Collate the existing library services to LSI 'members', and (as quickly as possible) create a Web site that identifies our services, targeted to their needs. Make recommendations for other publicity/outreach venues to make our services known to the LSI.

2 A. Vivo

Vivo (http://vivo.library.cornell.edu) cross-indexes life science faculty, courses, events, database resources, and related activities at all four Cornell campuses and includes features to highlight library services.   The system was designed by Corson-Rikert in response to faculty comments about the difficulty of finding information, both about Cornell, and about research resources. We went substantially beyond a series of promotional or descriptive pages of library services. Vivo is scheduled for a full release in the fall of 2004. In the meantime we have demonstrated its succeeding iterations to all of the major stakeholders in the Genomics/New Life Sciences Initiative including faculty research focus area chairs, core facilities coordinators, Alumni Affairs and Development, and the offices of the Vice Provosts for Life Sciences and Research. They have all been very supportive of the resource and have indicated that Vivo fulfills an important need for cross-disciplinary and cross-institutional searching for the NLSI while also raising awareness of Library services and expertise. Devare and Corson-Rikert were invited to participate in a task force to evaluate and re-design the CGI and NLSI Web sites in 2004.

2 B. Publicity/outreach

To reach the faculty in the Initiative it has been most effective to work through the existing administrative, research, and teaching infrastructure.

– LSWG librarians regularly attended and participated in meetings of the Genomics Initiative.

– We attend departmental seminars.

– Whitaker and Devare are attending the Veterinary College summer series in Molecular Biology.

– We are on the e-mail lists for the Initiative, the Alumni Affairs mailings and the Computational Biology Service Unit.

– Just recently a Genomics Forum series was instituted. Devare has been attending those meetings, and will make a presentation to that group.

– LSWG and Vivo-related conference presentations:

– Presentation – Professional Development Week; May 2004 (all)

– Electronic poster – Medical Libraries Association (MLA); May 2004: (brown and Whitaker)

- Talk proposed – Digital Library Federation Fall Meeting; October 2004 (Corson-Rikert, Devare)
- Poster planned – Crop Science Society of America; November 2004 (Devare)
- Tie-in with AGORA discussed by AGORA team (Chiang and Devare)

3. Review other parallel or similar activities in other institutions as feasible.

Vivo appears to be more or less unique in its scope:

University of Washington's "HealthLinks" site is the most similar (http://healthlinks.washington.edu/index.cfm?id=210BCCB7-511A-4C6B-8B40-DFC47AABEA7F) . Devare showed Vivo to Mark Minie, the developer of the "Bioresearcher" part of the U. Washington site. Minie commented that Vivo "looked great" and appeared to "go several steps beyond Bioresearcher."

Harvard University's "Research Matters" site; primarily publicity; no research resources (http://www.researchmatters.harvard.edu)

Oregon State University's "Oregon Invests" site for agricultural research; no online bibliographic or scientific research tools (http://oregoninvests.oregonstate.edu/)

4. Suggest new collections, services, and other programs the library could provide for the LSI:

4 A. Collections

Life sciences materials are already collected by Engineering, Geneva, Mann/Entomology, Medical, Physical Sciences and the Veterinary units. Collaborative collection building is handled by the Science Team. They have negotiated cross-campus access from Geneva (New York) through Ithaca, New York City, to Qatar, funding for which is handled through coordinated contributions. For example, Methods in Enzymology, a core life sciences serial monograph is being purchased by several of the units. Mann, Medical, and Physical Sciences each contributed 25% and Geneva and Vet split the remaining quarter of the cost. Most of the important data resources for molecular biology are free and Devare selects those for Vivo. Davis and Funk are reviewing additional materials in support of biomedical research on the Ithaca and NYC campuses.

4 B. Instruction:

The LSWG has been quite active in this area.

– Devare talked with Tanksley, Kotlikoff and Schimenti and has been encouraged to develop
bioinformatics modules for the Genomics minor currently being developed.

– Solla and Chiang began discussions with the CBSU on joint offerings of service workshops.
Devare revived those discussions and worked out a plan with the CBSU. The library will be
handling the administrative overhead for the bioinformatics training sessions (advertisement,
registration, etc.). Devare, other librarians, and CBSU staff will be doing the instruction.

– Devare took over teaching the Biological Sciences Resources/Informatics session of Solla's Chem
602 course: Information Literacy for the Physical Scientist.

– This summer Devare taught a very successful Bioinformatics workshop as part of the Mann
workshop series. The plan is to expand this to offer sessions at Vet and Geneva, and to
'cross list' the workshop through each library units' programs.

– Devare is working with the CBSU to organize a spring 2005 National Center for Biotechnology
Information (NCBI) session to be held at Cornell.

– Devare is now certified to teach NCBI bioinformatics courses having taken the NCBI advanced
course this August. At that workshop she discussed the possibility of offering a regional
workshop with Fred Stoss, Bioinformatics Librarian at the University of Buffalo.

– We will begin to advertise a consultation service in life sciences/bioinformatics. With the launch
of Vivo we expect to support reference questions at each of the units, with referrals to
Devare for the advanced questions.

4 C. Exploring new publishing paradigms

See Future section for our plans for this area.

4 D. Enhancing the interdisciplinary efforts of the LSI

Vivo is the most tangible accomplishment in support of interdisciplinary efforts. It is a
cross-disciplinary and cross-institutional resource which will enhance Cornell scientists' access to
collaborators, research resources and core facilities in disparate fields.. Jim Mazza, the head of the
NLSI Campaign remarked that it would help him find out who is doing what at Cornell. Lisa
Staiano-Coico thought Vivo would help strengthen the ties between Cornell operations in Ithaca
and New York City.

The Life Sciences Working Group may have greater overall knowledge of the NLSI than
most faculty working in their specialties. We also know about the range of science resources and
can help researchers identify resources when they are entering unfamiliar domains.

5. Resources and priorities

According to our charge, for each of the above activities we were to: *Describe the resources (financial, skills, etc.) and the ease of implementation for each suggestion. Make recommendations on the order in which the suggestions should be approached. Identify the possibilities for support for the projects, within CUL, within CU, or elsewhere.*

Chiang contributed the original exploration and liaison work as part of her responsibilities to track new developments in Mann's primary colleges (CALS and CHE). The Phase II Genomics Initiative budget includes an information management component. The commitment of each of the units in assigning someone to the LSWG has been critical to the success of our activities to date. The decision to dedicate a Public Services line in Mann (Devare) to this arena, and the commitment of a significant percentage of an IT line (Corson-Rikert) to this work has allowed the group to accomplish much of its original charge. Metadata librarians in Mann are developing expertise in biological information standards. McCue has also funded two students to assist Devare in the curating of Vivo.

In the Futures section we describe the funding possibilities we have identified.

Future

Library staff training and education.

The speed of change, in the fields, in the focus groups, in the faculty research projects, and the structure and organizations they create, present unique challenges for us. We need to be in a continuous education and training mode. We are planning on regular basic workshops for science library staff. Librarians with greater bioinformatics support responsibilities or interests would take the workshops we and the CBSU offer for patrons. We have worked with the OSP previously on CGI support; we plan to revive that partnership to evaluate our ability to provide grants assistance for the NLSI.

The faculty panel and lab tours at the science reference retreat were very useful and we would like to continue something like that, e.g. a faculty speaker and lab tours etc., on a regular basis. We will try and announce NLSI events of general interest on the CUL Events calendar. We will circulate other continuing education opportunities from the CBSU or other institutions. Several

of us attend departmental and institution seminars regularly. These have proven useful in learning more about the activities of the faculty.

Library services: instruction, reference, consulting

Instruction

 – Develop and deliver credit modules for the Genomics Minor

– Teach introductory, and perhaps advanced bioinformatics workshop.

– Expand workshop to other locations (Vet, Geneva), regional

– Explore

> course related possibilities, e.g. BIOBM 330 Principles of Biochemistry
>
> collaborative teaching, librarians and faculty
>
> video conferencing Ithaca and NYC
>
> customized training – e.g. lab visits

Reference and Consulting

– Provide reference services for the NLSI

– Conduct a user needs assessment on the level of reference and consulting we should provide.

– Develop a consulting service once we have more experience on our patrons' information needs.

Vivo

Continue to populate Vivo and open it up to the community. Develop additional harvesting of recent Cornell-authored publications. Collaborate with the Cornell News Service, the CUInfo Courses of Study administrators, and other Cornell-wide data originators to develop and share "feeds" of information into Vivo. Continue collaboration with Alumni Affairs and Development, the Vice Provost for Research, and the New Life Sciences Initiative administrative staff to improve direct interoperability between Vivo and Cornell's home web site, research pages, and a new Life Sciences Initiative website currently in the planning stages.

Mainstream the support of Vivo. We expect to continue to rely on librarians with domain and metadata expertise for curation, and on graduate students and upper-level undergraduates with life science knowledge for resource discovery and data entry. By next year we will be in a position to describe the resources and commitment required to keep Vivo running.

Outreach and publicity

We will continue to present Vivo to librarians in our specialties. Currently we are planning for two presentations – at the DLF and CSSA meetings. Once Vivo is released we will begin presenting it to our departments and other Cornell units. We want to create a brochure for office visits.

Interdisciplinary support, scientific publishing, other services.

Vivo is our primary service in support of interdisciplinary work. We are also planning a series of interdisciplinary 'coffees' to be sponsored by the different libraries and will try the first one this fall. We continue to discuss other services or systems we could support that would enhance interdisciplinary research in the life sciences.

Bioinformatics tools have potential relevance and applicability to other collections – a more long term goal is to expand the use of these tools to other databases and collections. We plan to investigate how Cornell bioinformatics researchers could use Biosis and other proprietary databases for data mining as they currently use PubMed.

We are planning a general discussion on scholarly/scientific publishing paradigms to identify areas for constructive work. We would like to arrange a meeting with the Open Access Task Force to discuss opportunities and implications of their work for the NLSI. A subgroup of the LSWG is interested in investigating whether the publishing choices of Cornell researchers have changed in the last decade.

Partnerships

We will attempt to increase our liaison/project participation in the NLSI focus areas by approaching focus group chairs about having a librarian as liaison on each group. We will develop collaborative partnerships with U Buffalo and other bioinformatics librarians across the country.

Funding

We will explore the potential for collaboration on a Faculty Innovation in Teaching Grants Program. The Library is part of Phase II Genomics Budget Proposal. We will continue to explore the possibility for actual funding from the NLSI.

External funding possibilities:

Biological Databases and Informatics(BD & I) Program of the NSF

Partnerships for Innovations (PFI) Program of the NSF

Concluding thought

      We feel the LSWG represents a good model for how the Library could support the University's interdisciplinary initiatives. The enthusiasm and commitment of the librarians on the group, each representing their different disciplines but in agreement on our common mission, has been very productive.