

Reinventing Science Librarianship: Themes from the ARL-CNI Forum

Elisabeth Jones, PhD Student, University of Washington Information School, and Research Assistant on e-Science and Cyberinfrastructure, University of Washington Libraries

On October 16–17, 2008, more than 230 science librarians and library directors gathered at the ARL-CNI Fall Forum in Arlington, Virginia, to consider the implications of e-science and e-research for science librarians and the changing nature of their work. The forum, “Reinventing Science Librarianship: Models for the Future,” was orchestrated by the ARL E-Science Working Group and brought together panels of scientists, science librarians, and research library directors to address the needs of scientists working in distributed and collaborative networked environments, the priorities for retraining science librarians, and the importance of new directions in library practices. A comprehensive collection of forum resources is available from the ARL Web site and the author’s blog;¹ this article focuses on three thematic threads woven throughout the various panels and presentations:

1. The Process of Reinventing Science Librarianship
2. Serving Future Generations of Users
3. The Librarian as Middleware

Each of these themes recurred frequently at the forum, and each represents an area of particular relevance for science librarians—and in many cases, for research librarians more generally. For this author, the themes represent the substantive takeaway messages from the forum that should influence libraries’ next steps in responding to the needs of scientific researchers.

The Process of Reinventing Science Librarianship

Several speakers put forth ideas about what the science librarian of the near future may look like in terms of skills, capacities, and institutional positioning. Three points of general consensus emerged: first, because scientific research is itself being transformed, science librarians (and their libraries) need to become more adaptable to changing conditions; second, in order to understand changing conditions and respond to evolving user needs, science librarians need to focus



Listen to Rick Luce on the need for more flexible staffing in science libraries (2:00 MP3)
<http://www.arl.org/bm~doc/luceexcerpt.mp3>

more on strategies for library service assessment, evaluation, and improvement; and finally, the fundamental role of the science librarian needs to expand to incorporate skills related to organizing and manipulating data and data sets.

At the outset of the forum, Richard (Rick) Luce emphasized that, in an era of e-science, research libraries need to become nimbler, allowing for more fluid and dynamic allocation of staff resources. Emerging forms of scientific practice will require different kinds of library support at different times. He envisioned future science libraries that have the capacity to create multi-skilled information-management teams on the fly, embedding librarians within research teams or departments. Science libraries must develop more flexible staffing structures

in order to be more responsive to the needs of this kind of research. This will, in turn, require highly adaptable science librarians, in terms of both skill set and attitude.

Further, as Sayeed Choudhury, Fran Berman, and others suggested, successful adaptability requires a clear sense of direction, and successful direction requires effective application of library service assessment and evaluation procedures. Institutional requirements are diverse, and ever changing. Becky Lyon quipped, "When you've seen one research library, you've seen one research library." In other words, in order to know how best to serve one's own institution, one must understand the particular needs and features of that institution. What works at one research library will not necessarily port directly to another. Still, as Neil Rambo suggested later in the forum, librarians should not let their institutional

differences get in the way of learning from one another's experiences. For example, helpful models may be found in health science and medical library settings. All of these speakers suggested that science librarians must engage in an ongoing process of measurement, assessment, and revision with regard to the services they provide—learning from and building upon the experiences of others where it is reasonable to do so.²



Listen to Liz Lyon on the increasingly data-intensive nature of science librarianship (2:16 MP3)

<http://www.arl.org/bm~doc/lyonexcerpt.mp3>

Finally, as emphasized in particular by Liz Lyon, Catherine Blake, and Carole Palmer, many of the roles that science librarians will be called upon to play focus on *data*, as science becomes more data-driven itself. Science librarians will need to become data consultants, data distributors, data service providers, data analysts, data miners, and data curators. They will be called upon to enforce data quality, aid in data retrieval, construct data applications, and ensure that data collections are properly annotated and preserved. This will require science librarians to

repurpose and expand upon their existing competencies—especially information organization and retrieval—to meet the challenges of managing data in addition to literature and other more traditional research products.

Serving Future Generations of Users

A second recurring theme of the forum was the need to create sustainable models for data preservation and reuse. The explosion in the volume of scientific data entails a need to both determine data selection and preservation procedures and find ways of maintaining access and usability as data management systems change. Furthermore, lurking beneath all of these issues lies another: how to financially sustain complex data systems over long periods of time.

One compelling strategy for developing sustainable data life-cycle solutions was voiced by William Michener early in the conference, and reiterated frequently thereafter: discussing the issue of long-term support for scientific research, Michener asserted the need for “domain-agnostic solutions.” That is, he contended that a single cyberinfrastructure system should be capable of

supporting a range of disciplines, so that each discipline would not need to develop its own system. Such an adaptable system would reduce the cost of both up-front development—which would require less duplication of effort—and ongoing support—since one support structure could serve many fields. Furthermore, a standardized, domain-agnostic solution would help to enhance data interoperability across domains, thus facilitating future collaboration within and across disciplines.

On a more general level, other speakers—particularly Fran Berman and Clifford Lynch—emphasized that preservation is not an end in itself, but is rather a step on the path to future *reuse*. Reuse of data created by others (or even by oneself) can accelerate advancement and discovery—purposes that should resonate with researchers and funders alike. Thus, characterizing data curation in terms of reuse has two advantages: first, it more accurately reflects the ultimate goal of such practices, elevating access and retrieval over static storage; and second, it enhances the appeal of data curation initiatives to those who are asked to contribute data and/or funding in order for those initiatives to succeed.

The Librarian as Middleware

A third theme—the librarian as middleware—was pervasive at the forum. Rick Luce introduced the idea (and the phrase) on the first panel, and subsequent speakers offered a number of variations and elaborations on it as the forum progressed. For the panelists, librarians became “bridges,” “facilitators,” “trusted arbiters,” and “relationship builders,” negotiating not just between people and systems, but also between systems and systems, and between people and people.

Mediating between people and systems is (or should be) a familiar role for librarians. Whether they are helping an elementary-schooler learn to use a call number system, or assisting a chemistry professor in navigating Beilstein CrossFire, librarians serve this “middleware” role every day. One sees a parallel, if more complex, role for science librarians in supporting e-science. Medha Devare emphasized the key role that librarians will play in mediating between e-science systems and their users, helping individuals to effectively utilize the collaborative data sets, online simulations, virtual environments, and other technological and/or networked resources that e-science will create. Further, as noted by Sayeed Choudhury, greater public access will entail a greater need for the mediation librarians can provide. As more scientific data is made freely available through research enterprises like the Human Genome Project or the

Sloan Digital Sky Survey, data will reach larger numbers of users dispersed across non-traditional audiences—undergraduates, K–12 students, and interested members of the public. This expansion in access will create a parallel expansion in users’ need for help with data navigation across a range of library settings.

Somewhat less obvious, perhaps, are the ways that librarians could become middleware agents between systems and systems, and between people and people.

Several presenters, including Catherine Blake, Fran Berman, and William Michener, pointed to the need for mediation between different systems, and indicated that librarians will have an opportunity to play a strong role in this area. In order to do so, however, librarians will need the skills to negotiate between different data systems and between different sorts and compilations of data sets. Some key concerns in this area will be interoperability, migration, and emulation—all points at which humans must take action in order for systems to begin to talk with each other, and to remain interoperable over time.

Arguably the most important role for librarians as middleware in the e-science context, however, is mediation between people and people. As Sayeed Choudhury pointed out, “human interoperability is more difficult than technical interoperability.” It requires trust, common vocabulary, and negotiation of values. And often—though not always—research librarians are uniquely well positioned to negotiate such issues within and beyond their institutions: they can inspire the trust of a variety of actors, thus enabling them to develop a shared vocabulary and value set. In an increasingly interdisciplinary and collaborative research environment, the capacity for expert mediation will become very important. Indeed, some panelists’ stories suggest that it already has: James Mullins recounted a situation at Purdue in which librarians were able to “bridge the gap” between researchers who did not have a “shared vocabulary.” Medha Devare characterized Cornell Library’s successful leadership role in the VIVO project as a consequence of their reputation as “trusted arbiters of information.” Interdisciplinary collaboration among researchers is increasingly important in the virtual communities formed by networked science, but that does not mean that it will be easy. To the extent that science librarians hold positions of trust within their communities, they will be in a unique position to play mediating and facilitating roles within and between those communities.

Conclusion

Closing speaker Clifford Lynch reminded the audience that what began only a few years ago as a more limited discussion of science data curation has

expanded to include the reuse of data, data management skills, cyberinfrastructure planning, interinstitutional collaboration, incorporation of smaller-scale e-science activities, and discussions of values and policies. Rather than imagine that science librarians will have to become experts in each of these areas, however, Lynch contended that many individuals may become proficient at one or two of these newly valuable skills.

The speakers and panelists outlined an array of perspectives and issues that could redefine the roles of science libraries and librarianship, and emphasized the potentially enormous benefits of

librarians becoming more familiar and engaged with the new and evolving practices of scientists and researchers. In the near future, however, librarians' support for e-science will most likely be defined by their "middleware" role. By forming a bridge between and among researchers, systems, and data, librarians have an opportunity to make a significant contribution to advancement in science, e-scholarship, and research in general.



Listen to Clifford Lynch on the expanding roles of science librarians (2:02 MP3)

<http://www.arl.org/bm~doc/lynchexcerpt.mp3>



¹ Forum resources, including speaker biographies, presentation slides and audio of their remarks, are available on the ARL Web site, <http://www.arl.org/resources/pubs/fallforumproceedings/forum08proceedings.shtml>. Detailed notes on the forum's presentations and discussion are available on the author's blog, <http://elisabethjones.wordpress.com/category/escience/>.

² To encourage learning from the experiences of others, 15 libraries contributed 14 posters for display at the forum showcasing their organizations' work in science librarianship. The forum proceedings include a document describing the contributed posters in three categories: Tools, Programs and Services, and Organizational Models, <http://www.arl.org/bm~doc/ff08posters.pdf>.

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