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Roles in E-Science for Health and Science Librarians

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Roles in E-Science for Health and Science Librarians

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University of Massachusetts and New England Area
Librarian E-Science Symposium, April 6, 2009



UNIVERSITY OF MINNESOTA
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Science Libraries at Minnesota

Minneapolis Campus

Science and Engineering

Academic Programs

Karen Williams



St Paul Campus

Agriculture,
Biology,
Environment



5 miles

Bio-Medical

Health Sciences Libraries

Linda Watson



Veterinary Medicine



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“Science in the 21st century
will be conducted in a fully
digital world.”

Interagency Working Group on Digital Data, 2009



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What is E-Science?

- “Cyberinfrastructure, e-science and e-research are shorthand terms for new forms of **data-intensive, information-intensive, collaborative, distributed** forms of scholarship.” (Borgman, 2008)
- “The entire e-science infrastructure is intended to empower scientists to do their research in faster, better and different ways.” (Hey, 2006)



Cyberinfrastructure and E-Science

PEOPLE (Scientists, virtual
organizations)

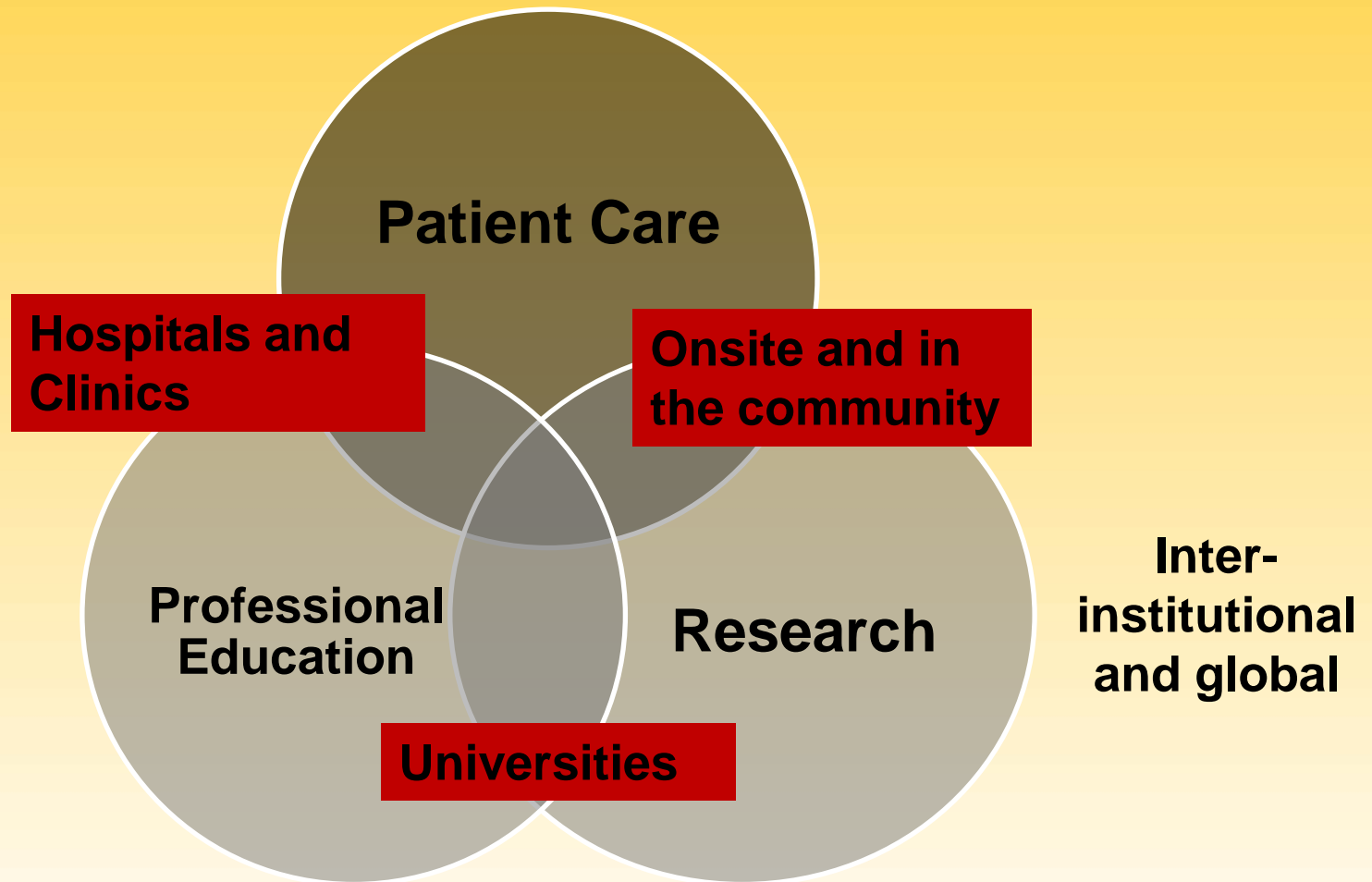
CONTENT (data,
databases, digital libraries)

SERVICES (tools,
standards for sharing,
data preservation)

HIGH PERFORMANCE
COMPUTING (hardware,
software, networks)



The Interdisciplinary Challenge



The Interdisciplinary Challenge

“the most formidable challenges in the evolution of biomedical research...**require expertise from disciplines that fall at the boundaries of most AMCs and their parent universities.** These include disciplines that encompass the applied and theoretical physical sciences, including engineering, as well as the social sciences, law, and business... **As intellectual campfires of interdisciplinary research and learning form, significant barriers born from entrenched institutional practices and culture surface, and, if unchecked, these barriers may drown the flames of discovery.”**

Balser and Baruchin, 2008



The Interdisciplinary Challenge

“Sharing biomedical research and health care data is important and difficult...Many initiatives fund, request or require researchers to share their data. These initiatives address the technical aspects of data sharing, but rarely focus on incentives for key stakeholders.”

Selected recommendations:

- Educate trainees and current investigators on responsible data sharing and reuse practices;
- Encourage data sharing practices as part of publication and funding policies
- Fund the costs of data sharing and support for repositories

Piowar et al, 2008



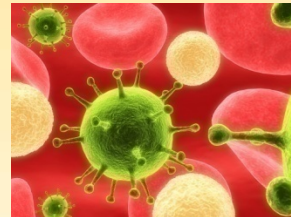
IAIMS: Integrated Advanced Information Management Systems

- Grew from **Matheson-Cooper Report** which defined a future role and changed paradigm for the academic library operating within the complex information environment of the academic health center
- Since 1984, librarians at institutions receiving IAIMS funding from the National Library of Medicine have had key roles in leadership and implementation
- Among lessons: challenge of integration is more about information policies/politics and human behavior than about the technology



CTSA: Clinical and Translational Sciences Awards

- Similar goals and challenges as IAIMS
- NIH goal to develop an infrastructure to support the effective and efficient translation of scientific discoveries into medical practice
- 38 institutions to date; 60 by 2012
- Likely areas for librarian involvement
 - Bioinformatics Core
 - Community Engagement
 - Support of clinical scholars and other communities of practice – librarians as connectors
- Libraries in CTSA - a new blog: <http://ctsa-lib.blogspot.com>

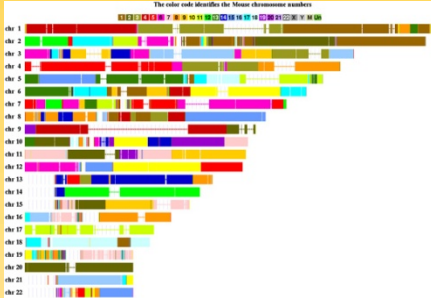


The Data Challenge

- “collaborative scientific enterprises...require access to very **large data collections**, very large scale computing resources and high performance visualization back to the individual user scientists” (UK’s National e-Science Centre)
- “data is the currency of science, even if publications are still the currency of tenure. To be able to exchange data, communicate it, mine it, reuse it, and review it is essential to scientific productivity, collaboration, and to discovery itself” (Gold, 2007)
- The data challenge applies to both “big science” as well as the individual scientist



The Data Challenge



“E-science fundamentally alters the ways in which scientists carry out their work, the tools they use, the types of problems they address, and the nature of the documentation and publication that results from their research. E-science requires new strategies for research support and significant development of infrastructure.”

*ARL Agenda for Developing E-Science in Research Libraries Final Report and Recommendations...
November 2007*

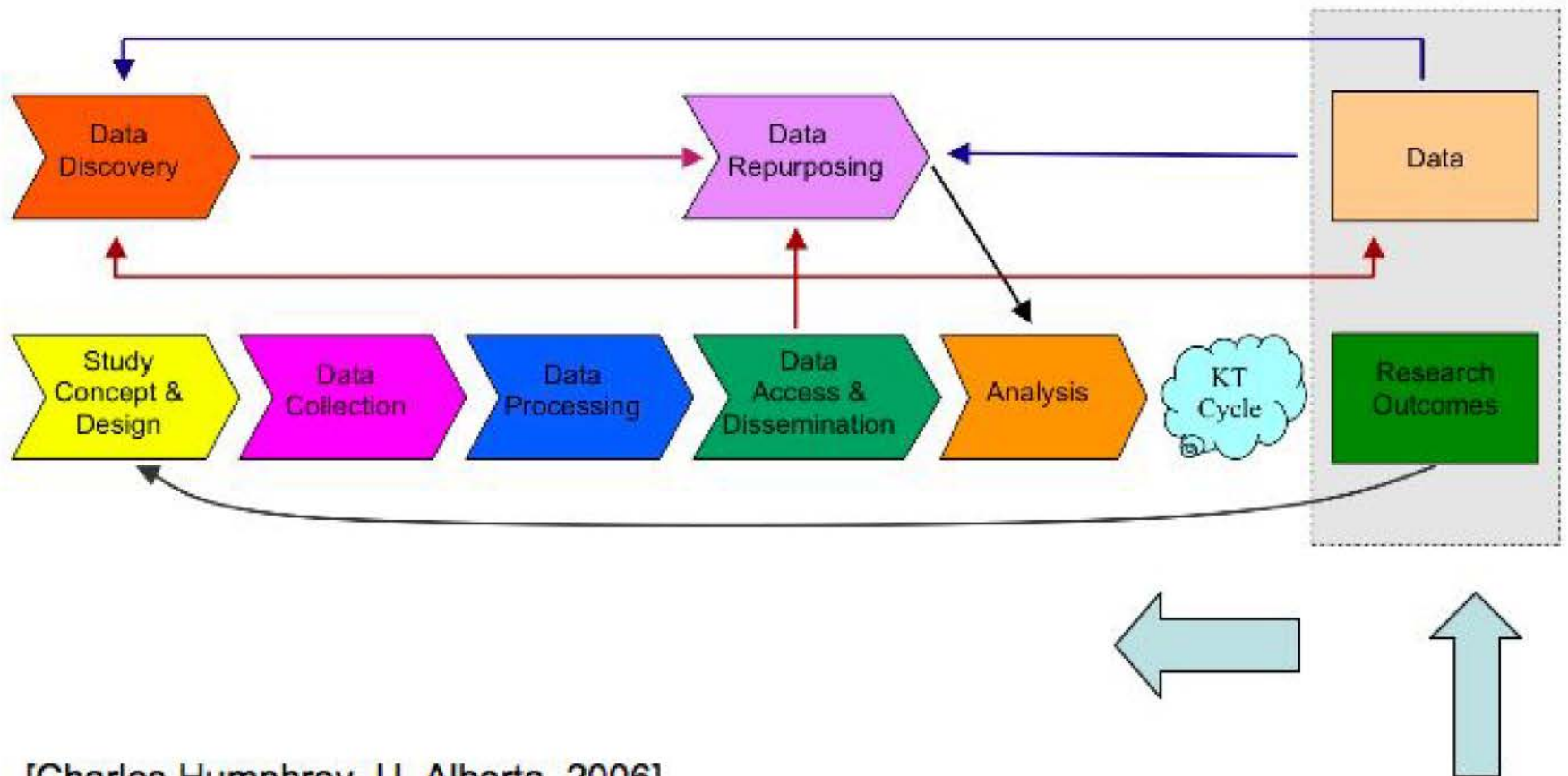
“digital content creates opportunities for new forms of research and scholarship that are qualitatively different from traditional ways of using academic publications and research data” (NSF and JISC, 2007)

Can librarians add data management to their repertoire of information management skills and engagement?



life cycle model of research knowledge creation

FIGURE 1: THE LIFE CYCLE MODEL OF RESEARCH KNOWLEDGE CREATION



[Charles Humphrey, U. Alberta, 2006]

The Data Landscape and Challenge

- Production and management of large amounts of information in more “raw” formats
 - Discovery / identification / interoperability
 - Retention / preservation
 - Access / policy issues
- Non-digital collections



The Data Challenge

- “Reinventing Science Librarianship”
 - Increased nimbleness and flexibility
 - New skills related to data
- New information disciplines
 - Digital curators
 - Digital archivists
 - Data scientists
 - Informationist
- **Opportunity or threat to librarians?**



Library Roles

(from IWGDD: NLM and Wellcome as examples)

- Analyze and revise data to improve their quality or usefulness
- Collect derived data products, **principally publications**
- Combine data from multiple sources
- **Convert analog information or materials to digital formats**
- **Create bibliographic and other reference data**
- Develop instruments, techniques, or processes for data collection or production, processing, management, or dissemination
- Develop and enhance software tools that will enable gene discovery
- **Preserve publications**
- Preserve original and/or derived data
- **Provide access to bibliographic or other reference data**
- **Provide access to publications**
- Provide financing for projects in other organizations to produce, disseminate, or access data

Health and science libraries: we already do some of this.



Example at Minnesota

- Loose coordination among science librarians
- 2006/2007: University funding for three new science librarian positions
 - Recruited simultaneously as a “science cohort”; one new librarian for each of the main science libraries
 - Science Assessment Project <http://purl.umn.edu/5546>
- 2008: expanding the “cohort” to include additional science librarians
 - NIH Public Access Policy Implementation (with our Scholarly Communications Collaborative)
 - E-Science and Data Services Collaborative formed
- CIC Spring Conference on E-Science (May 2008)
- ARL/CNI Forum (October 2008)



E-Science and Data Services Collaborative – U Minnesota



From ARL/CNI Poster by John Butler and Kristi Jensen

What's Ahead for Science Librarianship?

- There are blurring distinctions between data, scientific publications, and synthesized knowledge; and likely expansion of data-sharing mandates. We need to
 - develop more skills in data management; and model the Informationists (dual domain individuals)
 - is this on the radar of our library schools? Are the iSchools taking on eScience?
 - embrace a learning curve; step outside our comfort zone to provide assistance to our researchers
 - be at national and campus tables where infrastructure is being designed and implemented, including standards work
 - Work with our professional organizations to advance e-science engagement and with each other



For Discussion (here or at home)

- Has your institution been addressing data management and data-sharing issues? Is your library involved?
- Is your library involved in any campus-wide or academic health center-wide e-Science initiatives, including CTSA?
- Does your library's strategic plan specifically address engagement in e-science or e-research?
- How interested / comfortable / knowledgeable / expert are your library's staff in understanding or contributing to the data landscape and challenges at your institution?
- What should NLM or MLA or AAHSL or ARL be doing to support our engagement in e-science?
- What else? Your turn!!



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