
# UNDERSTANDING RESEARCH BEHAVIORS, INFORMATION RESOURCES, AND SERVICE NEEDS OF SCIENTISTS AND GRADUATE STUDENTS

# General Themes from the Study

- Discovery and access
- Interdisciplinary and collaborative research
- Graduate research
- Data/resource organization, storage, and preservation

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# The Researchers

- 52 faculty members
- 2 postdoctoral research associates
- 18 graduate students

- Academic Health Center
- College of Biological Sciences
- College of Food, Agricultural, and Natural Resources Science
- Institute of Technology

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# Methodology

– Nonrandom sample

– Focus groups or individual interviews

– 16 science librarians participated
- advisor
- moderator
- analysis

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# Examples of what some scientists mean by "data"

- Images, e.g. photomicrographs and x-rays (physical films as well as electronic derivatives)
- Protocols for experimental design, techniques, data collection and analysis
- Soil or rock samples
- Specimens, e.g. insects, plants, animals (whole organisms as well as tissue sections)

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# Data Organization/Manipulation

"The Libraries have a tremendous opportunity to lead this, and to provide ways to interpret, validate, and build on the data produced."

From a professor of genetics/cellular biology

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# Data Organization/Manipulation

"There are multiple ways to retrieve things now, but why not data?

…You could find pieces that are related to it, but still keep things organized by project, table, and descriptor.

It would be great if you could create new folders with a common link, keep it in multiple formats or reassemble it."

From a professor of pharmacology/neuroscience

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# Data Organization/Manipulation

"If I'm taking raw data—sequencing work of genome—can I Google the data to find out what's known about it?

Is there technology that will help me do it?

How do you do raw data comparisons?

Are there search engines just for data sets, even the ones that are constantly changing?"

From a bioinformatics professor

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# Data Organization/Manipulation

"We are trained in how to collect data, how to write it up, but not how to organize and keep track of everything."

From a professor in fisheries, wildlife and conservation

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# Data Storage/Security/Sharing

LOCKSS—electronic and/or paper copies

From a professor of epidemiology and community health:

Agencies require database development and data sharing—but how?

Data should be made publicly available—but most is stored on closed servers

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# Data Security/Sharing: Another Perspective

"We all collect samples together in the field, but when you come back to process the samples, people want the data without any understanding or agreement about ownership."

From a postdoc in the geological sciences

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# Data Security/Sharing: Another Perspective

"You have to have a good reason to share…You need to ask yourself if you are ready to share, why, and for what purpose."

From a professor in the biomedical sciences

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# Data Preservation

"Am I worried it [data] won't be there in 20 years? No.

Am I worried it won't be there in 100? It doesn't matter.

By that point, data become irrelevant except as historical curiosity."

From a professor of computer science

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# Data Preservation

"It's important to maintain data for two or three years—saved on disks—but after that the field moves so quickly that it's no longer relevant…

I hadn't really thought much about [researchers who might be interested in the work in 10, 20 or 30 years]. But it wouldn't be good if they couldn't find the data, would it?"

From a postdoc in the geological sciences

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# Data Preservation

"Data storage [preservation] is fundamental to all of us, but it's not as though there is an IRS rule for keeping it for 7 years.

We keep data long enough for people to know about it."

From a professor in the plant sciences

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# Data Preservation

"In 1972, I did experiments in Scotland. Now I have a USDA grant that…uses the same techniques.

I gave my postdoc that lab book from 1972…[it has] more data than the papers that came out of the work."

From a professor of horticulture

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# Data Preservation

According to a professor of geology

"…[is] the responsibility of journals, but where is the guarantee?

With electronic publishing, where are the permanent archives of human knowledge going to be?...

I am on the board of an online peer-reviewed journal. We archive with CDs, but already they are breaking down."

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# Data Preservation

"The Libraries could facilitate the curation and preservation of data by scholars, and teach researchers how to better organize it."

From a professor of geophysics

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# Study Conclusions

- Workflow problems
- Better methods for retrieving data, connecting data, and relating data to published research accounts
- Clear policies to guide data preservation and curation
- Institutional repositories a solution?
- Scholarly communication education

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# Current Activities

Research Cyberinfrastructure Alliance

Web Services Steering Committee

E-science Collaborative

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# Reports available

University Digital Conservancy
http://conservancy.umn.edu

University Libraries' website
http://www.lib.umn.edu/about/scieval

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# Key Personnel

Project coordinator:

- Cecily Marcus, Ph.D.

Project sponsors:

- Linda Watson, Director, Health Sciences Libraries
- Karen Williams, Associate University Librarian for Academic Programs

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