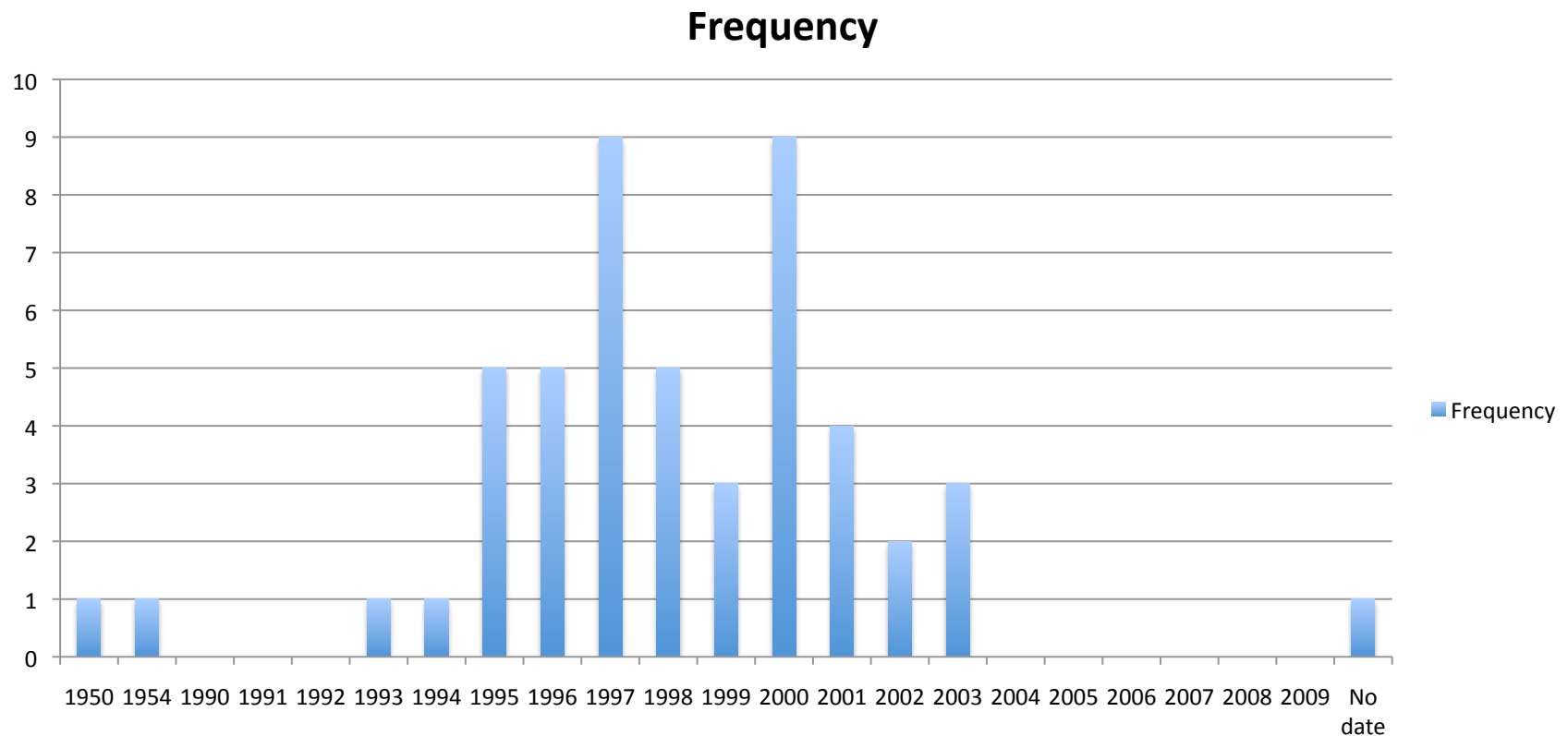


“Digital library” term usage



First 50 items retrieved in Google Scholar with term “digital library,” June 8, 2009

Digital Libraries, defined

Social Aspects of Digital Libraries, Report of NSF workshop, 1996

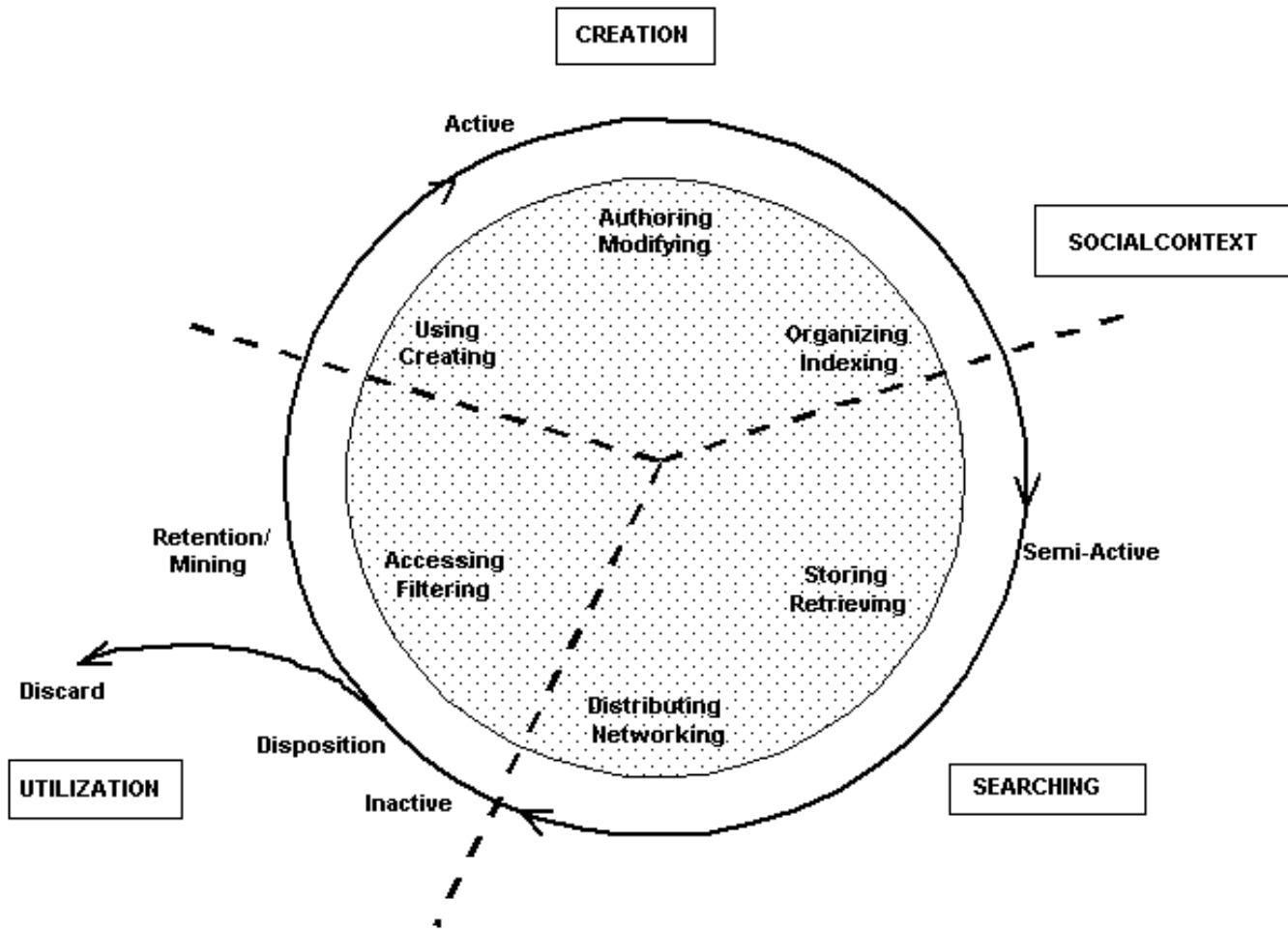
1. **Digital libraries are a set of electronic resources and associated technical capabilities for creating, searching, and using information.** In this sense they are an extension and enhancement of information storage and retrieval systems that manipulate digital data in any medium (text, images, sounds; static or dynamic images) and exist in distributed networks. The content of digital libraries includes data, metadata that describe various aspects of the data (e.g., representation, creator, owner, reproduction rights), and metadata that consist of links or relationships to other data or metadata, whether internal or external to the digital library.
2. **Digital libraries are constructed—collected and organized—by [and for] a community of users, and their functional capabilities support the information needs and uses of that community.** They are a component of communities in which individuals and groups interact with each other, using data, information, and knowledge resources and systems. In this sense they are an extension, enhancement, and integration of a variety of information institutions as physical places where resources are selected, collected, organized, preserved, and accessed in support of a user community. These information institutions include, among others, libraries, museums, archives, and schools, but digital libraries also extend and serve other community settings, including classrooms, offices, laboratories, homes, and public spaces.

Digital Libraries, deconstructed

- Action: create, search, use information
- Content:
 - digital data in any medium
 - data and metadata
- Access: distributed networks
- Relationships:
 - links to other data or metadata
 - internal or external to the digital library
- Design: community participation
- Capabilities: support community practices
- Institutions: libraries, museums, archives, schools, ...



Information Life Cycle



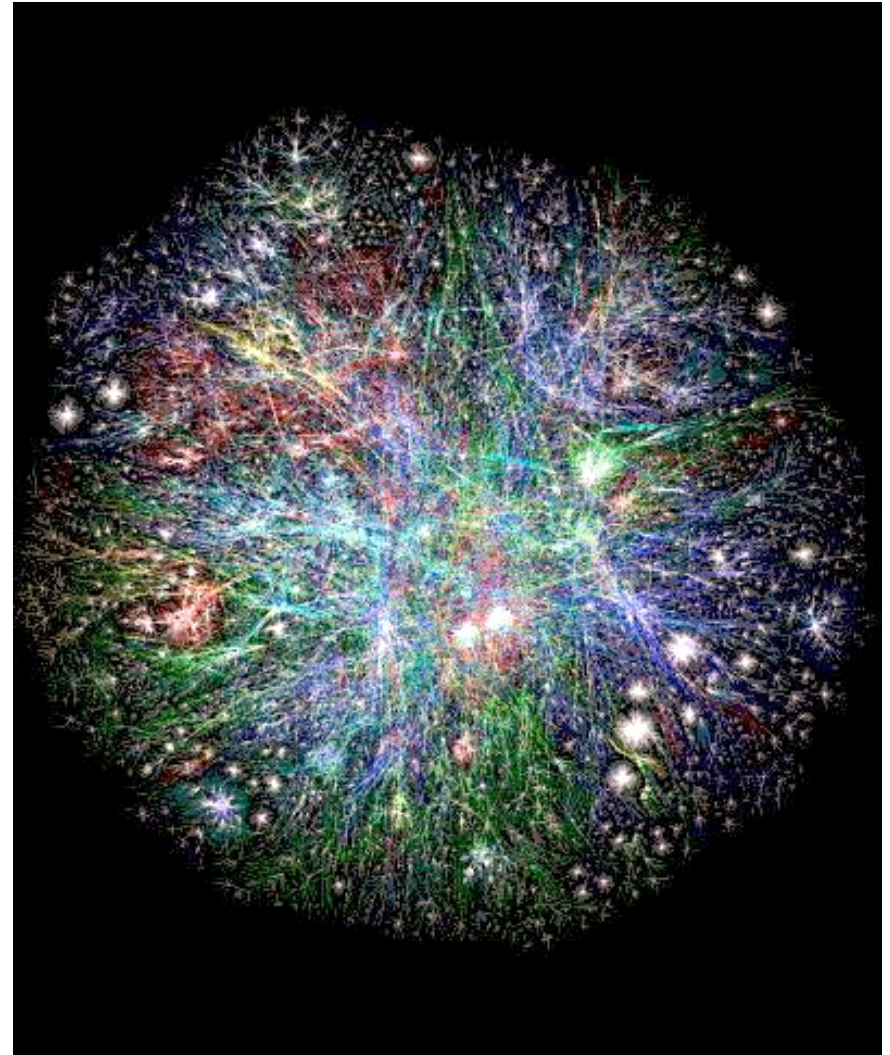
Information Life Cycle

Borgman et al.:
Workshop Report on
Social Aspects of
Digital Libraries:
[http://www-lis.gseis.
ucla.edu/DL/](http://www-lis.gseis.ucla.edu/DL/) 5

NOTE: The outer ring indicates the life cycle stages (active, semi-active, and inactive) for a given type of information artifact (such as business records, artworks, documents, or scientific data). The stages are superimposed on six types of information uses or processes (shaded circle). The cycle has three major phases: information creation, searching, and utilization. The alignment of the cycle stages with the steps of information handling and process phases may vary according to the particular social or institutional context.

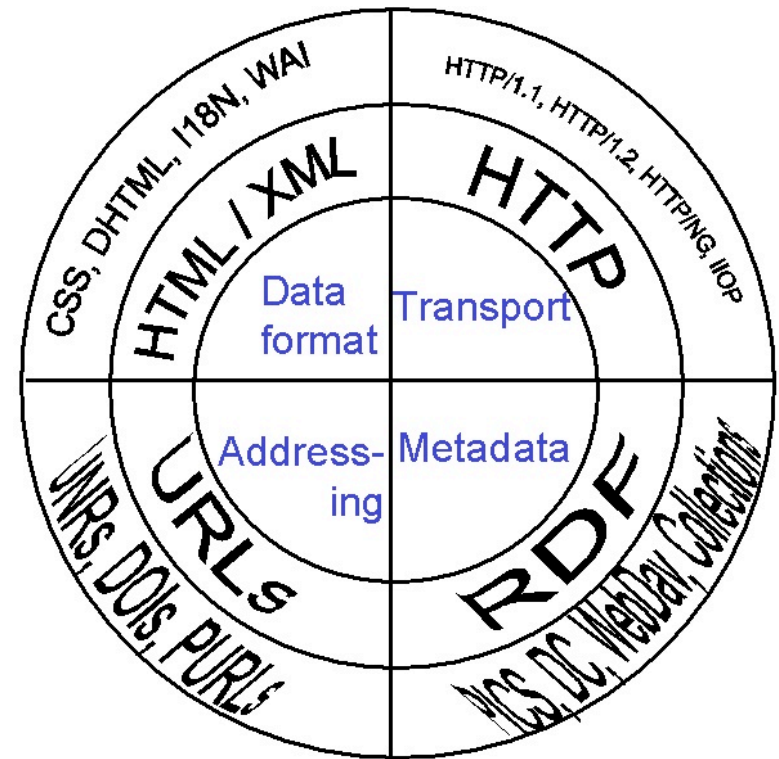
Digital libraries – consolidation or connectedness*?

- NSF Digital Libraries Initiative
 - Phase 1, 1994-1998
 - Phase 2, 1999-2004
- Search engines
 - Archie, 1990
 - Google, 1998
- World Wide Web, 1994
- Cyberinfrastructure, 2003



World Wide Web

- Web architecture and services
 - Initial architecture, 1990
 - Mosaic browser, 1993
 - “Year of the Web,” 1994
- NSF Digital Libraries Initiative
 - Phase 1, 1994-1998
 - Phase 2, 1999-2004
- Open Archives Initiative
 - Protocol for Metadata Harvesting
 - Objective Reuse and Exchange







shakespeare first folio

Search

[Advanced Search](#)
[Preferences](#)

Web [Show options...](#)

Results 1 - 10 of about 1,260,000 for [shakespeare first folio](#). (0.34 seconds)

[The Shakespeare First Folio](#)

The following sources were used in compiling the **First Folio** database: Mr. William **Shakespeares** comedies, histories, & tragedies. Published according to the ...
etext.virginia.edu/shakespeare/folio/ - [Cached](#) - [Similar](#)

[University of Virginia Shakespeare Resources Online](#)

The Electronic Text Center's holdings include a variety of **Shakespeare** resources that range from early Quartos, the complete 1623 **First Folio**, ...
etext.virginia.edu/shakespeare/ - [Cached](#) - [Similar](#)

[First Folio - Wikipedia, the free encyclopedia](#)

The **First Folio** of **Shakespeare**, Introduction by Doug Mostin, ... Greg, W. W. The **Shakespeare First Folio: Its Bibliographical and Textual History**. ...
en.wikipedia.org/wiki/First_Folio - [Cached](#) - [Similar](#)

Image results for [shakespeare first folio](#) - [Report images](#)



[William Shakespeare - The First Folio](#)

Visit this William **Shakespeare** site including information about the **First Folio**. Educational resource for the **First Folio** and William **Shakespeare**.
www.william-shakespeare.info/william-shakespeare-first-folio.htm - [Cached](#) - [Similar](#)

[First Folio Shakespeare Festival](#)

Equity, not-for-profit theatre specializing in outdoor summer **Shakespeare** productions and educational touring. Based at the Peabody Estate at Mayslake ...
[Show map of 146 Juliet Ct, Clarendon Hills, IL 60514](#)
[Macbeth - Design for Living](#) - [Dan Allar](#) - [Dining & Lodging](#)
www.firstfolio.org/ - [Cached](#) - [Similar](#)

[Preface to Shakespeare's First Folio](#)

Apr 4, 2008 ... Prefatory Material to **Shakespeare's First Folio**, 1623.
shakespeare.palomar.edu/folio1.htm - [Cached](#) - [Similar](#)

[Amazon.com: The First Folio of Shakespeare: The Norton Facsimile ...](#)

Amazon.com: The **First Folio** of **Shakespeare**: The Norton Facsimile: Folger **Shakespeare** Library, William **Shakespeare**, Charlton Hinman, Peter WM Blayney: Books.
www.amazon.com/First-Folio-Shakespeare-Norton-Facsimile/dp/0393039854 - [Cached](#) - [Similar](#)

[News on the Rialto: William Shakespeare first folio gets £435250 ...](#)

Jun 6, 2008 ... A rare **first folio** of **Shakespeare's** plays, regarded as the most important book in the history of English literature, has sold for £435250 at ...
shakespearemag.blogspot.com/2008/06/william-shakespeare-first-folio-gets.html - [Cached](#) - [Similar](#)

Sponsored Links

[Shakespeare First Folio](#)

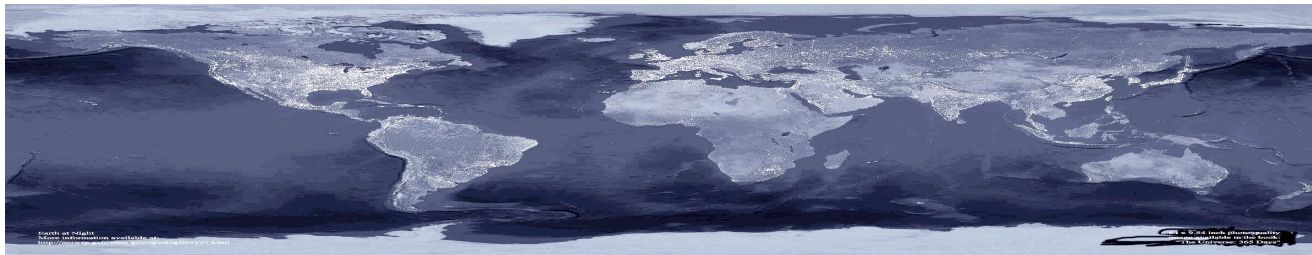
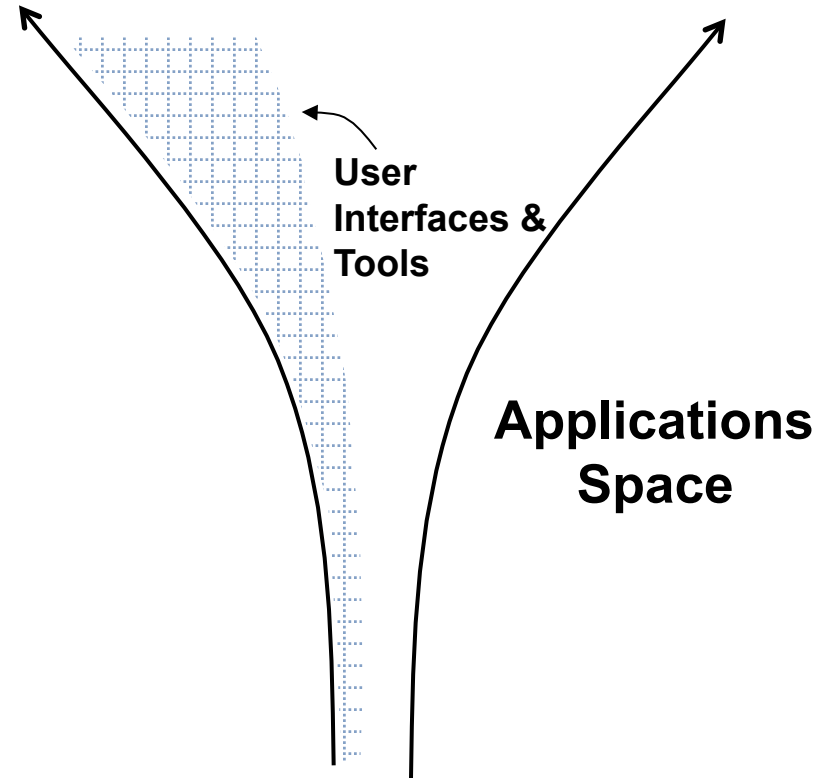
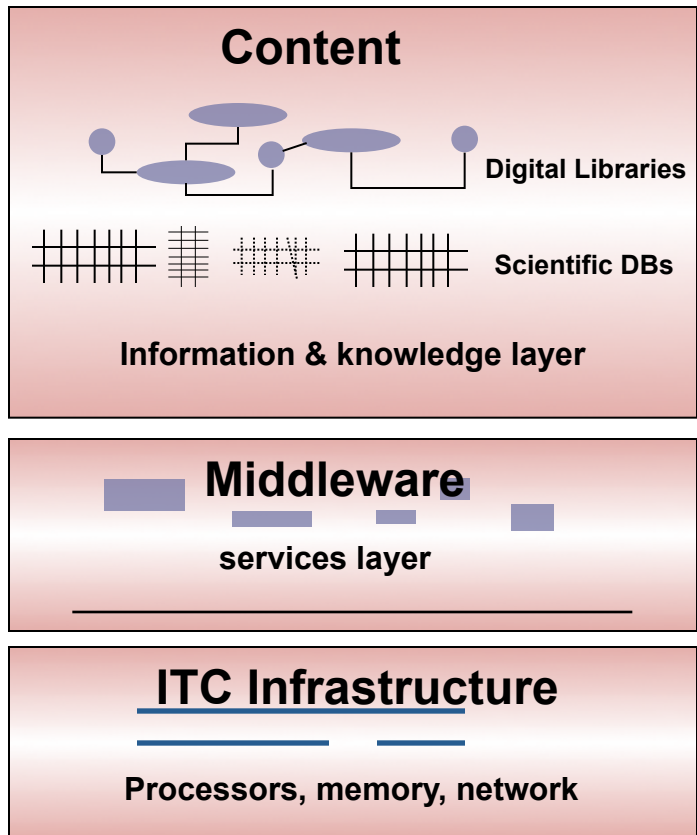
Millions of titles, new & used.
Qualified orders over \$25 ship free
Amazon.com/books

Infrastructure



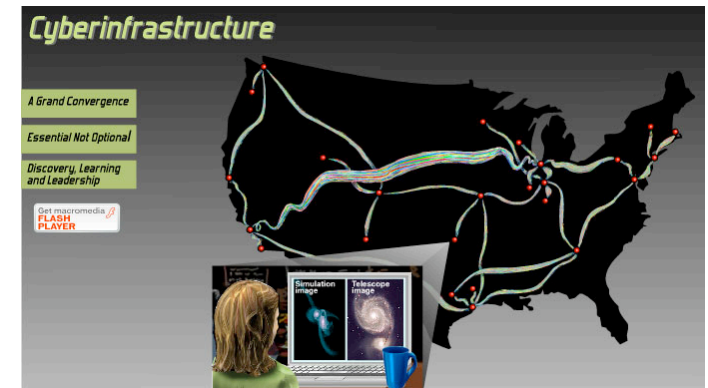
[http://www.warwickshire.gov.uk/Web/corporate/pages.nsf/Links/5C513189873EB0B180257122003E3FB3/\\$file/28_04_06+071.jpg](http://www.warwickshire.gov.uk/Web/corporate/pages.nsf/Links/5C513189873EB0B180257122003E3FB3/$file/28_04_06+071.jpg)

Cyberinfrastructure: Layered Model



Scholarly Information Infrastructure

- Cyberinfrastructure, eScience, eSocial Science, eHumanities, ...eResearch
- Goal: enable new forms of scholarship that are
 - information-intensive
 - data-intensive
 - distributed
 - collaborative
 - multi-disciplinary

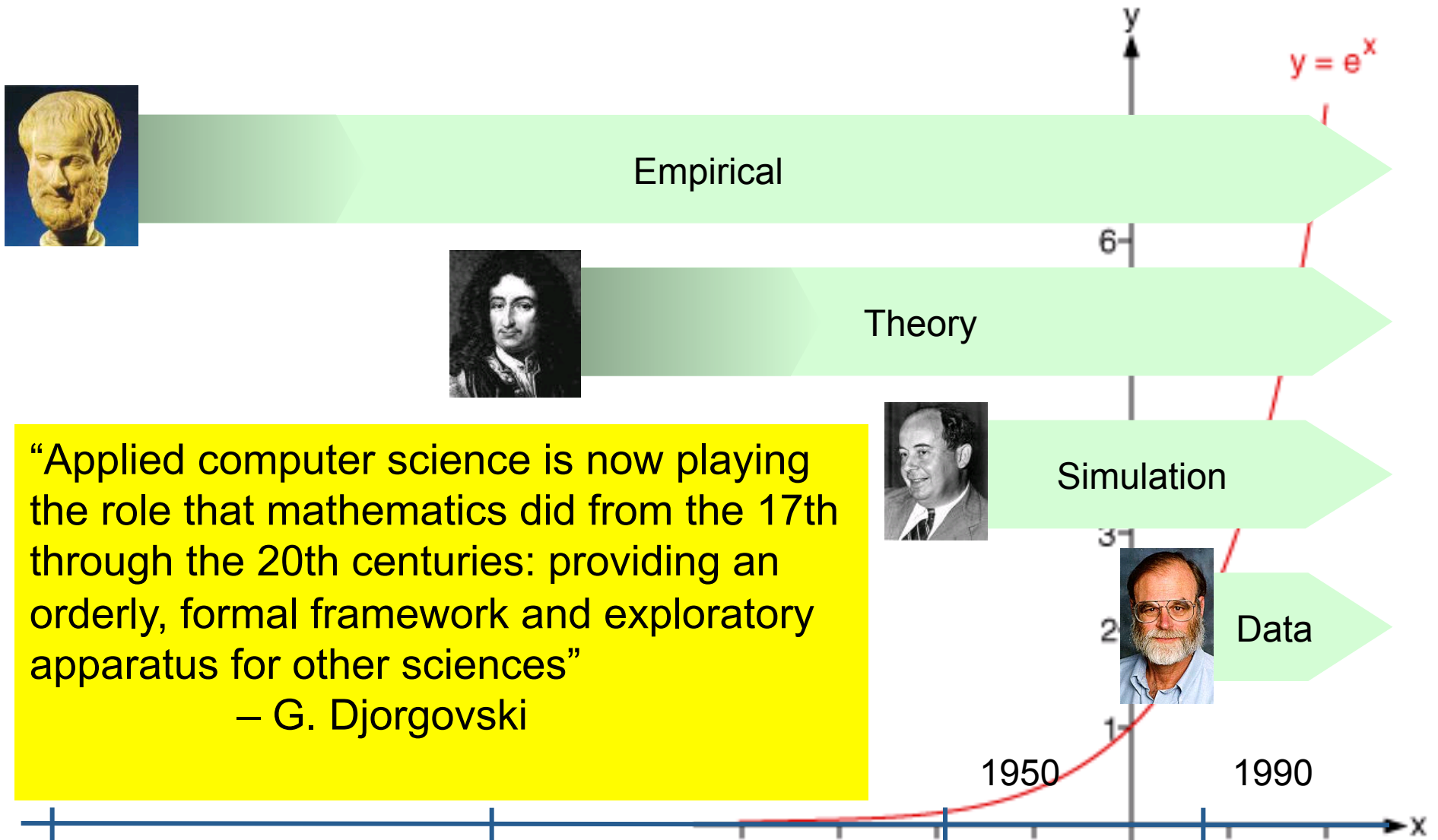


http://www.nsf.gov/news/special_reports/cyber/images/noflashintro.jpg



http://images.iop.org/objects/cern/cern/46/3/14/CCEbig1_04-06.jpg

New problem solving methods



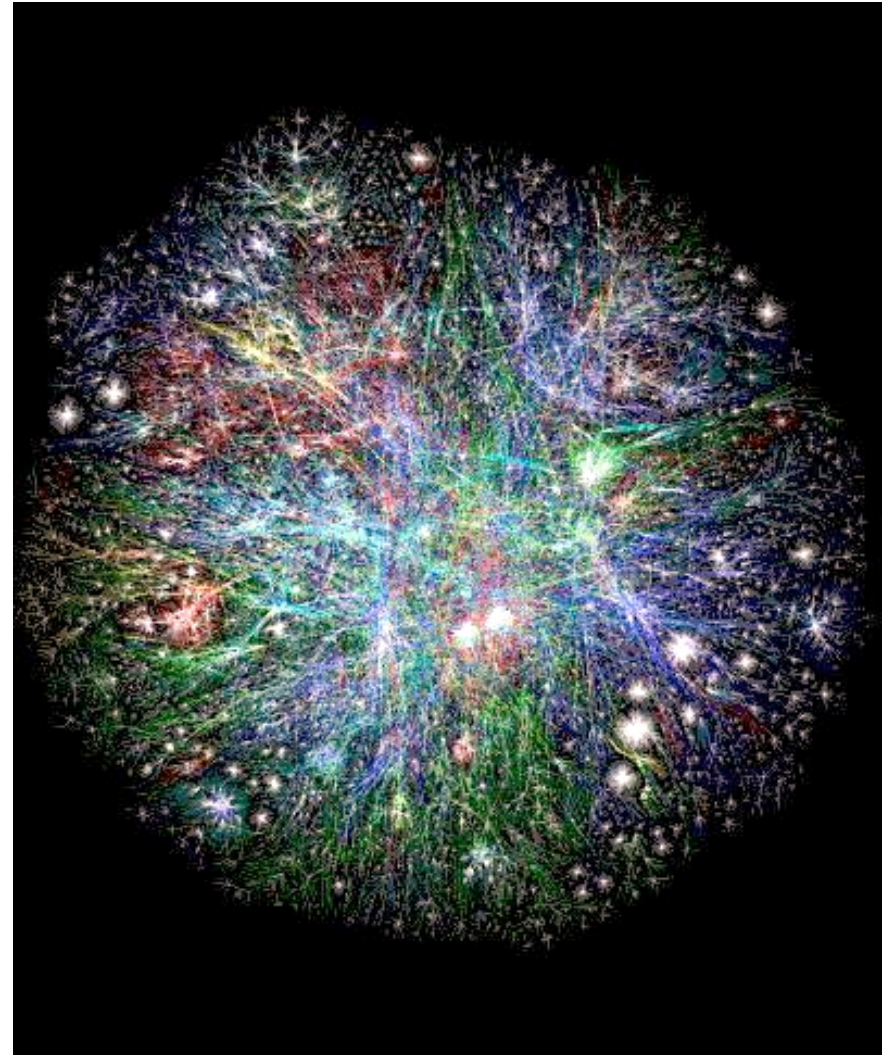
“Applied computer science is now playing the role that mathematics did from the 17th through the 20th centuries: providing an orderly, formal framework and exploratory apparatus for other sciences”

– G. Djorgovski

Digital libraries

Consolidation, Connectedness, Communities, Collaboration

- Alexandria Digital Earth, 1994-2005
- Data practices in embedded networked sensing, 2002-
- Cyberlearning, 2008-
- Cyberinfrastructure, 2003-
 - Life under your feet
 - Teachingwithdata.org
 - Rome Reborn
 - Worldwide Telescope





Evaluating a Digital Library for Undergraduate Education: A Case Study of the Alexandria Digital Earth Prototype (ADEPT)

Christine L. Borgman

University of California, Los Angeles

ADEPT PI: Terence Smith, UCSB

Co-Investigators, Education & Evaluation team:

Anne Gilliland-Swetland, Gregory Leazer, UCLA; Richard Mayer, UCSB

Student Researchers: Jason Finley, Rich Gazan, Laura Smart, Annie Zeidman
(UCLA); Tricia Mautone, Rachel Nilsson, UCSB

Research funded by U.S. National Science Foundation, Digital Libraries Initiative



Project scope

- Alexandria Digital Library
 - DL-1, 1994-1998, T.R. Smith et al
 - DL of primary data sources in geography
 - Maps
 - Satellite Observations
 - Remote Sensing
 - Physical observations
- ADEPT
 - DL-2, 1999-2004, Smith, Borgman, et al
 - Build learning layer on ADL
 - Study science learning and pedagogy



Studying digital libraries in context

- Instructional applications
 - Facilitate distributed access to content
 - Facilitate instructional design
 - Content in useful formats
 - Services to construct lectures, labs, lessons
 - Student learning environment
- University infrastructure
 - Content delivery for teaching
 - Technical capacity for distributed delivery



ADEPT instruction scenario: river networks

- Instructor
 - Prepare class lecture with ADEPT
 - Discover relevant geographic objects
 - Describe objects for personal and shared use
 - Integrates objects into personal digital libraries
 - Present lecture to students using ADEPT
- Teaching assistants
 - Review topics in lab sessions using ADEPT
 - Prepare study sessions using ADEPT
- Students
 - Use ADEPT for lab exercises
 - Use ADEPT to study for exams



Alexandria Digital Earth ProtoType

Alpha prototype

The screenshot displays the ADEPT (Alexandria Digital Earth ProtoType) web application. The top window shows a search menu with options: **Search**, **Classification**, **Lesson**, and **Visualization**. The search menu is open, showing options: **Gazetteer**, **Keyword** (highlighted), **General**, **Author**, **Title**, and **Index**. The address bar shows the URL: <http://www.dlese.org/servlet/SearchClient?requestType=DleseBrief&textSearchValue=drainage+basin&searchCriteria>.

The bottom window displays a page titled **GEOGRAPHY 3B** with the subtitle **Hydrology and Fluvial Geomorphology** by **Terry Smith**. The page content includes a detailed section on **Drainage Basin:**

- (A) NETWORKS**: System of interconnected stream channels found in a drainage basin.
- (A1) DIVIDES**: Topographic border between adjacent drainage basins or watersheds.
- (A2) DRAINAGE AREA**: The area of land that drains into a particular stream or stream network.
- (B) DRAINAGE PATTERNS**: A characteristic pattern assumed by a drainage network, which is typically produced by topography and geology.
- (B1) DENDRATIC**: A drainage network that resembles a tree, with a single main channel and many smaller tributaries.
- (B2) RECTANGULAR**: A drainage network that is formed by a series of parallel channels that meet at right angles.
- (B3) RADIAL**: A drainage network that is formed by a series of channels that radiate from a central point.
- (B4) ANNULAR**: A drainage network that is formed by a series of channels that form a ring or circle.
- (C) NETWORK EVOLUTION**: The temporal variation in network characteristics, driven by internal and external forces.
- (C1) EMPIRICAL OBSERVATION**: Lateral migration.
- (C2) EXPERIMENTAL STUDIES**
- (C3) PHYSICAL THEORIES**

The taskbar at the bottom shows the Start button, several open windows (Prototype page, C:\Program File..., VKB <<C:\Wl..., file:///C:/Pw..., Drainage Basin..., LView Pro 1.B/...), and the system clock showing 1:24 PM.



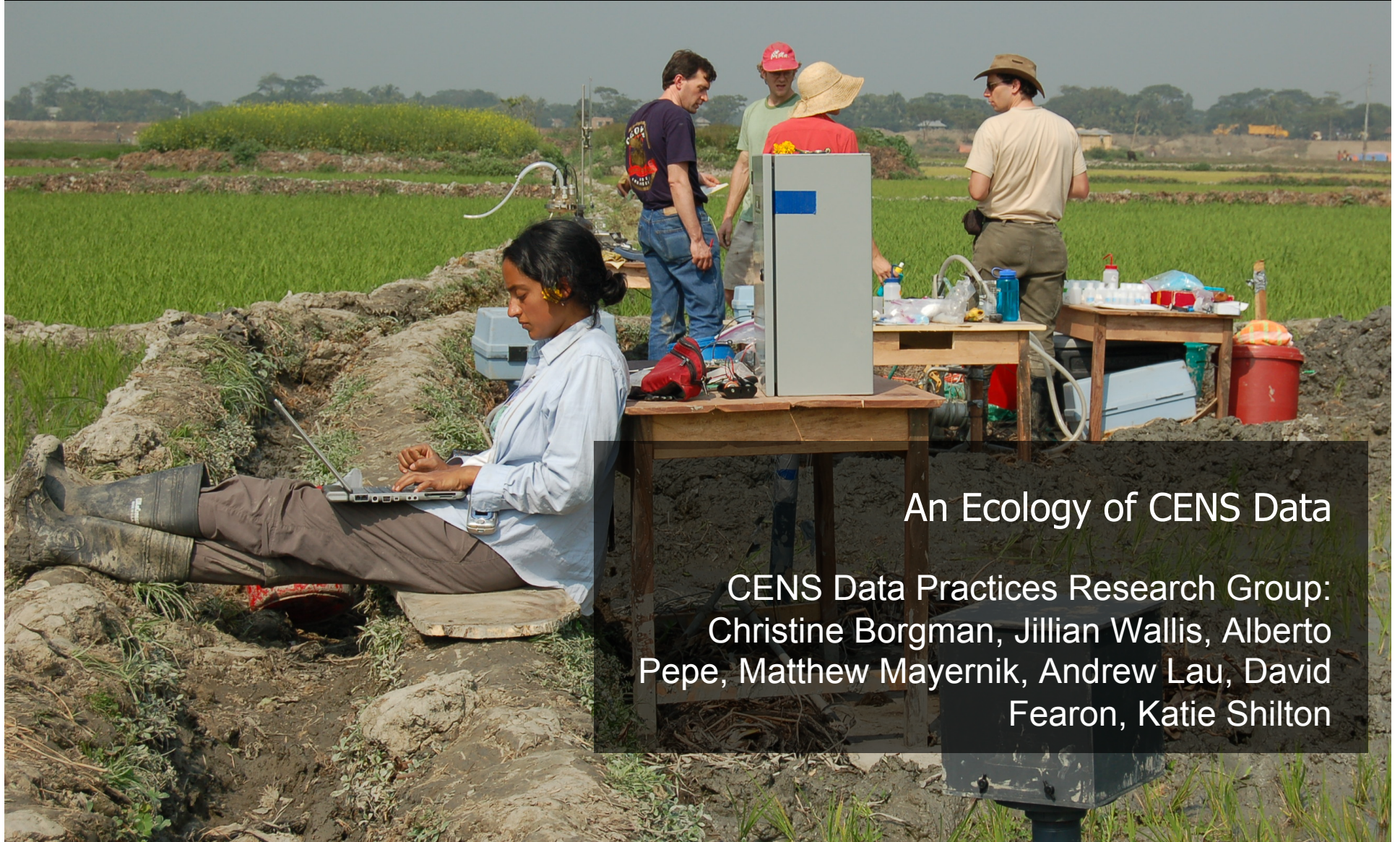
What did we learn?

- We built it and they did not come...
- Why were geography faculty not interested in using ADEPT?
 - Mismatch of ADL content to their courses
 - Mismatch of ADEPT capabilities to their teaching practices
 - Lack of university infrastructure
- What did they like about ADEPT?
 - Tools to make own data useful for teaching
 - Construct personal digital libraries



CENTER FOR EMBEDDED NETWORKED SENSING

UCLA USC UCR CALTECH UCM



An Ecology of CENS Data

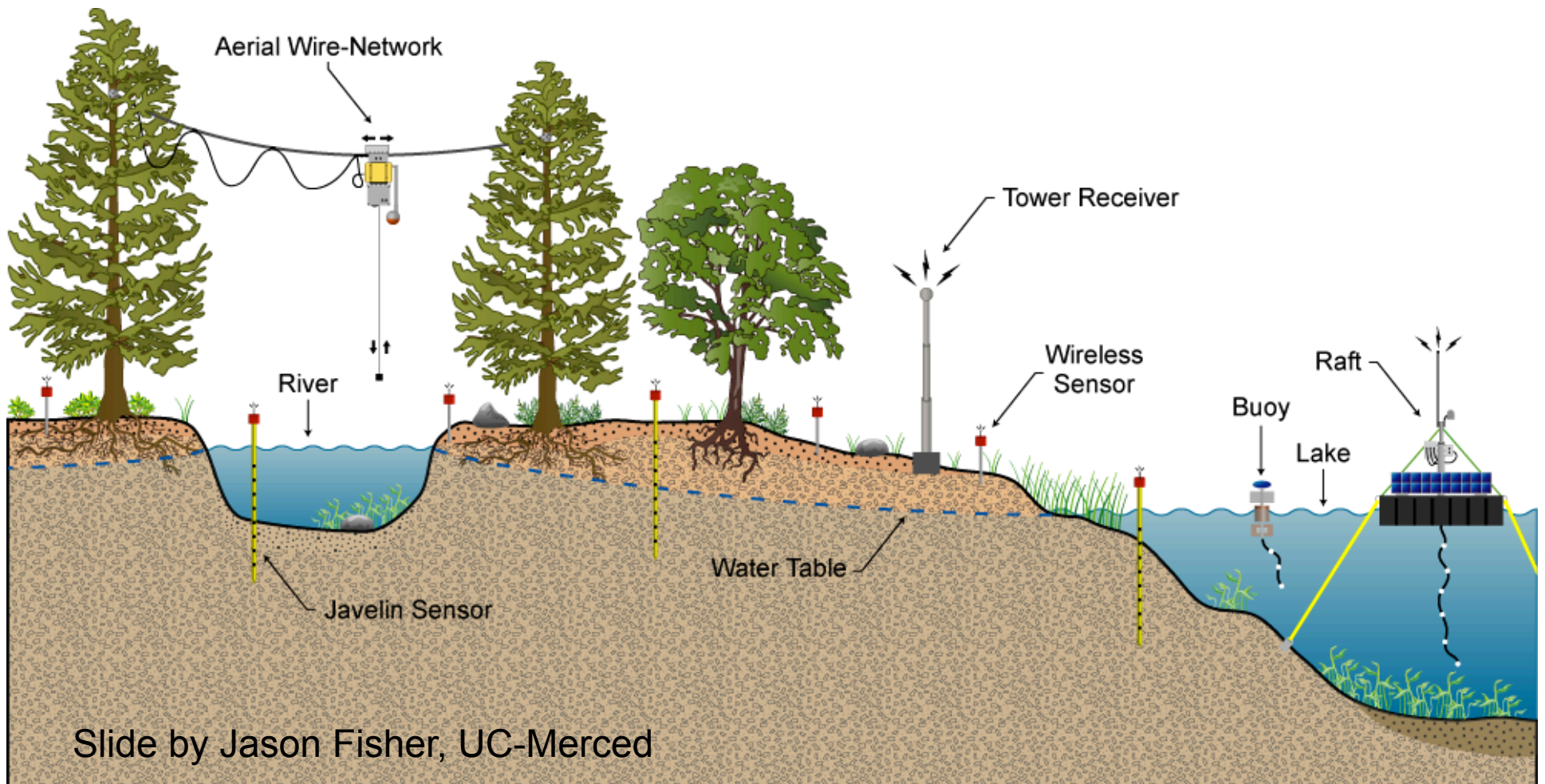
CENS Data Practices Research Group:
Christine Borgman, Jillian Wallis, Alberto
Pepe, Matthew Mayernik, Andrew Lau, David
Fearon, Katie Shilton



Field Deployment of Embedded Sensor Networks

CENTER FOR EMBEDDED NETWORKED SENSING

UCLA USC UCR CALTECH UCM



Slide by Jason Fisher, UC-Merced



Science and Education Data Models

CENTER FOR EMBEDDED NETWORKED SENSING

UCLA USC UCR CALTECH UCM

| METADATA FOR SENSOR DATA FOR HABITAT MONITORING | | | METADATA FOR EDUCATION MODULES FOR HABITAT MONITORING | | |
|--|--|--|---|-----------------------------------|--|
| CENS Schema | SensorML | EML 2.0 | LOM | GEM | ADL |
| CENS_Node.Node_Name Name of Node | Sml:IdentifiedAs (2.2.2) | | | | |
| CENS_Node.Node_Desc Description of Node | AssetDescription: sml:description (2.2.12) | | | | |
| CENS_Location.Location_ID Unique location ID | CrsID (2.2.5) | Eml-Coverage (2.4.4) | | | |
| CENS_Location.X_Pos (Position on X axis) | HasCRS (2.2.5) ObjectState (3.3.6) | Eml-Coverage- GeographicCoverage (2.4.4) | | | |
| CENS_Location.Time_Recorded Time location was captured | | Eml-Coverage- TemporalCoverage (2.4.4) | | | |
| CENS_Location.Time_Type_ID Refers to type of time of Time_Type ID table | | Eml-Coverage (2.4.4) | | | |
| | | | Educational-Typical Age Range (5.7) | Audience-Age | Audience |
| | | | Life Cycle-Contribute (2.3) | Creator | Resource Creator |
| | | | General-Coverage (1.6) | Coverage-Spatial, Temporal | Coverage (spatial and temporal) |
| | | | Life Cycle-Date (2.3.3) DateTime (8) | Date | Creation date Accession date |
| | | | General-Description (1.4) | Description | Description |
| | | | Educational (5) | Pedagogy | Educational |



Filtering data for multiple communities

CENTER FOR EMBEDDED NETWORKED SENSING

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| DateTime | Value | RawValue | SiteKey | MeasurementKey | SensorKey | DataKey |
|---------------------|--------|----------|---------|----------------|-----------|---------|
| 2004-04-30 11:17:27 | 57.25 | 0 | 3 | 1 | 0 | 32271 |
| 2004-04-30 11:17:27 | 22.09 | 0 | 3 | 2 | 0 | 32270 |
| 2004-04-30 11:17:27 | 41.3 | 0 | 3 | 3 | 0 | 32269 |
| 2004-04-30 10:59:05 | 46.25 | 0 | 1 | 1 | 0 | 10758 |
| 2004-04-30 10:59:05 | 23.63 | 0 | 1 | 2 | 0 | 10757 |
| 2004-04-30 10:59:05 | 1591.3 | 0 | 1 | 3 | 0 | 10756 |
| 2004-04-30 10:57:27 | 40.75 | 0 | 3 | 1 | 0 | 32268 |

Sets of **Data** collected



run through
Filters and Tools

New Load Save Graph

Change Selection

Location: Station 1 Variable: Humidity Data Set: Average Time Interval: By Hour Go

Current Graph

Humidity

Save This Graph

Change Start/End Date

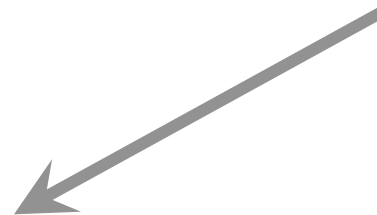
Start Date: 04-25-2004 End Date: 04-30-2004

Daytime (6am to 6pm) All day

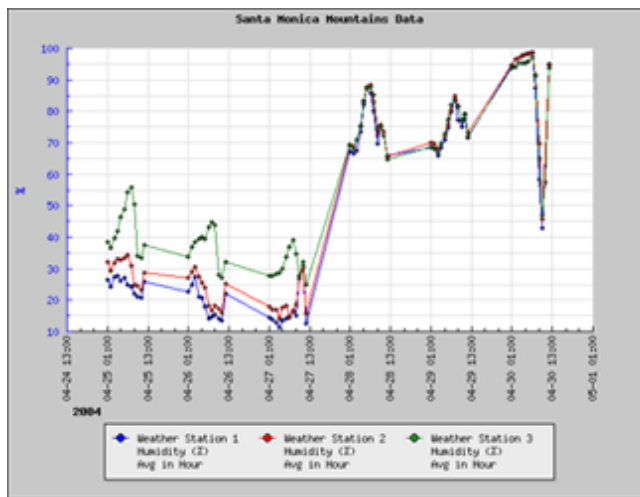
Change

Compare Graphs

With other station: Station... With other variable: Variable...



to produce understandable
Tables, Charts and Graphs





CENSEI interface

CENTER FOR EMBEDDED NETWORKED SENSING

UCLA USC UCR CALTECH UCM

Step 1 Choose Variables and Locations

Location 1: Weather Station 1

Variable 1: Humidity

Location 2: Weather Station 3

Variable 2: Humidity



Step 2 Choose Date Range

Start Date: 2004-03-14

End Date: 2004-08-19

Daylight Only (6a-6p) All Day

Step 3 Choose Value and Interval

Value: Average

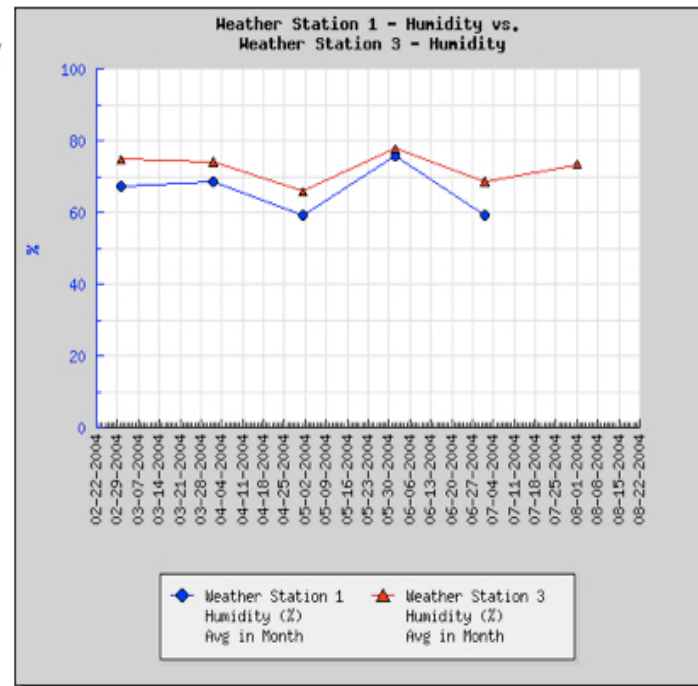
Time Interval: By Month

Show Graph

Step 4 Enter Notes & Save

You MUST enter a note to save your graph!

Save





Use and reuse of CENS research data

CENTER FOR EMBEDDED NETWORKED SENSING

UCLA USC UCR CALTECH UCM

- **Research questions:**
 - What are CENS data?
 - When, how, and with whom will they share data?
 - What contextual information is necessary to interpret the data?
 - What resources exist to provide metadata?
- **Application of results:**
 - Architecture to capture, manage, and provide access to CENS data
 - Leverage data resources for research and learning



Documenting Data for Interpretation

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- ***“Temperature is temperature.”***
- ***“There are hundreds of ways to measure temperature. ‘The temperature is 98’ is low-value compared to, ‘the temperature of the surface, measured by the infrared thermopile, model number XYZ, is 98.’ That means it is measuring a proxy for a temperature, rather than being in contact with a probe, and it is measuring from a distance. The accuracy is plus or minus .05 of a degree. I [also] want to know that it was taken outside versus inside a controlled environment, how long it had been in place, and the last time it was calibrated, which might tell me whether it has drifted..”***



What are CENS Data?

CENTER FOR EMBEDDED NETWORKED SENSING

UCLA USC UCR CALTECH UCM

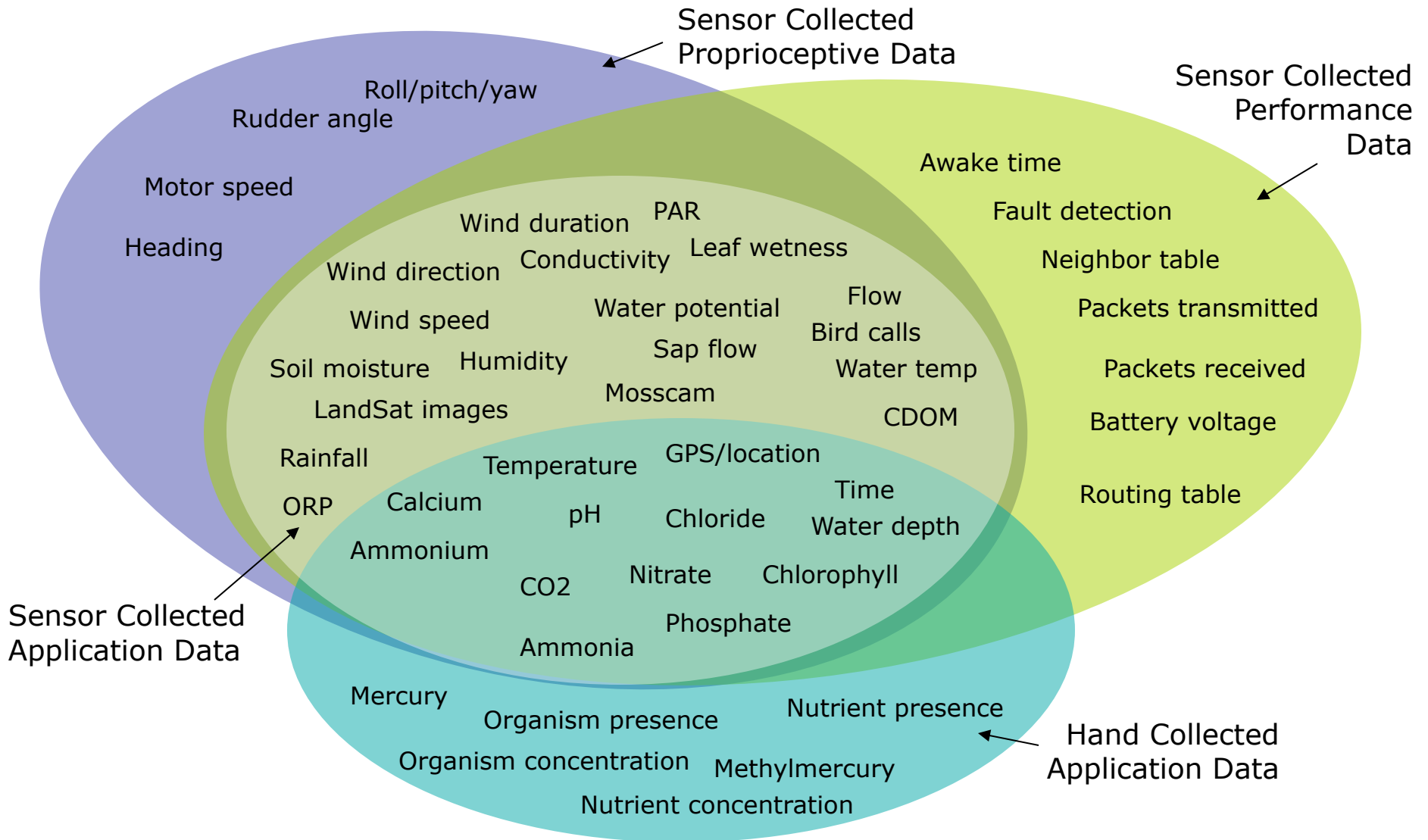


Figure by Jillian Wallis, UCLA



What Data Exist to Release?

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- **What are the states of the data?**

- Raw data
- Processed data
- Verified data
- Certified data
- Models
- Software & algorithms

- **Where are the data?**

- Refrigerators
- Hard copies
- Computers of individual students, staff, faculty
- Lab servers
- On CENSWEB, SensorBase





Artifacts and the Scientific Life Cycle

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[0906.2549] Technology to Represent Scientific Practice: Data, Life Cycles, and Value Chains

http://arxiv.org/abs/0906.2549

hip in the Di... Christine L. Borgman CCLE-Moodle IS Dept Gmail craigslist: account lo... Google Images Google Calendar G

LAT Los Angeles Times - News fro... (Untitled) [0906.2549] Technology to Rep...

arXiv.org > cs > arXiv:0906.2549

Computer Science > Digital Libraries

Technology to Represent Scientific Practice: Data, Life Cycles, and Value Chains

Alberto Pepe, Matthew Mayernik, Christine L. Borgman, Herbert Van de Sompel

(Submitted on 14 Jun 2009)

Datasets

Fostering Learning in the Networked World:

The Cyberlearning Opportunity and Challenge

A 21st Century Agenda for the National Science Foundation

Report of the NSF Task Force on Cyberlearning

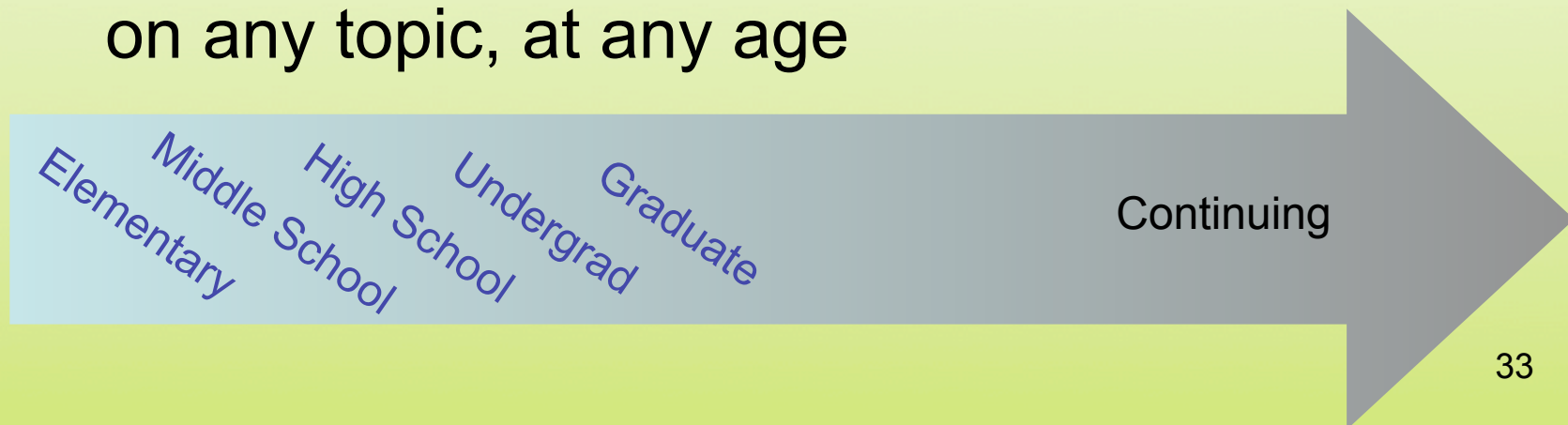
June 24, 2008

Borgman, C. L., Abelson, H., Dirks, L., Johnson, R., Koedinger, K. R., Linn, M. C., Lynch, C. A., Oblinger, D. G., Pea, R. D., Salen, K., Smith, M. S. & Szalay, A. (2008). *Fostering Learning in the Networked World: The Cyberlearning Opportunity and Challenge. A 21st Century Agenda for the National Science Foundation. Report of the NSF Task Force on Cyberlearning. Office of Cyberinfrastructure and Directorate for Education and Human Resources. National Science Foundation.*

http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf08204

What Is Cyberlearning?

- The use of *networked* computing and communications technologies to support learning
- Interactions among communities of learners across space and time
- Customized interaction with diverse materials, on any topic, at any age



Why Is Cyberlearning Important?

- Leverages learning through
 - Communication technologies
 - Students' technology skills
- Extends capacity of educational institutions into life-long learning opportunities
 - Increases public understanding of science
 - Prepares citizens for complex, evolving, global challenges

War

Recession

Global Warming

Epidemics

Poverty

Enable Students to Use Data

- **Strategy:** Transforming STEM disciplines and K–12 education
 - New ways of looking at and understanding content
 - Preparing students for “computational thinking”
- **Opportunity:** Teaching students and teachers how to harness large amounts of data
 - Scientific research
 - Responsible use of data

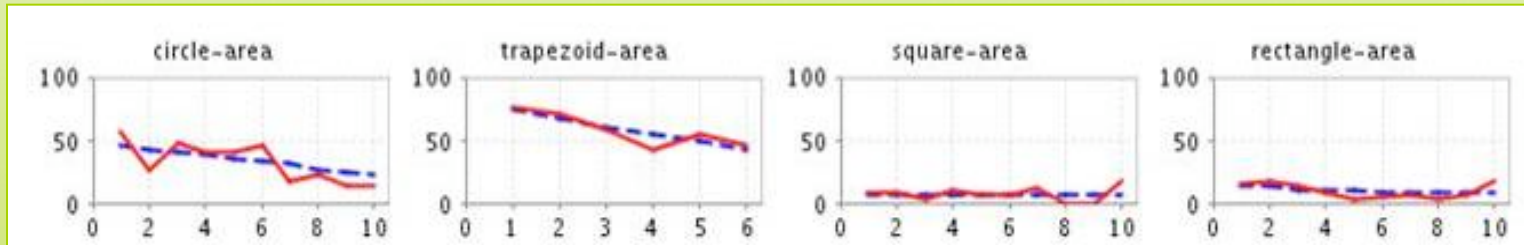
GALAXY ZOO.org



Astronomer Caroline Zundel uses the galaxyzoo.org website to classify a spiral galaxy.
Credit: www.galaxyzoo.org

Harness Learning Data

- **Strategy:** Leveraging the data produced by cyberlearning systems
 - Teachers interacting with students and their school assignments
 - Students' educational histories
- **Opportunity:** Encouraging shared systems that allow large-scale deployment, feedback, and improvement



Promote open educational resources

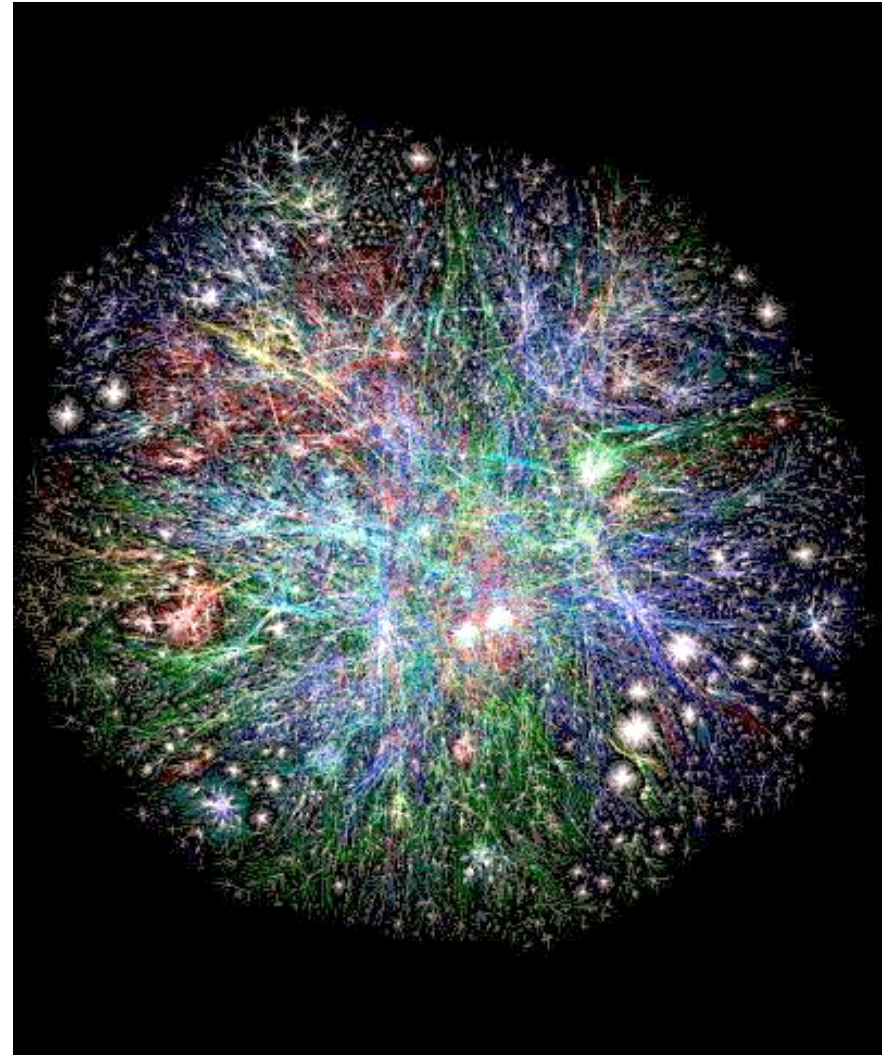
- Make materials available on the web with permission for unrestricted reuse and recombination
- New proposals should plan to make their materials available and sustainable



Digital libraries

Consolidation, Connectedness, Communities

- Alexandria Digital Earth, 1994-2005
- Data practices in embedded networked sensing, 2002-
- Cyberlearning, 2008-
- **Cyberinfrastructure, 2003-**
 - Life under your feet
 - Teachingwithdata.org
 - Rome Reborn
 - Worldwide Telescope



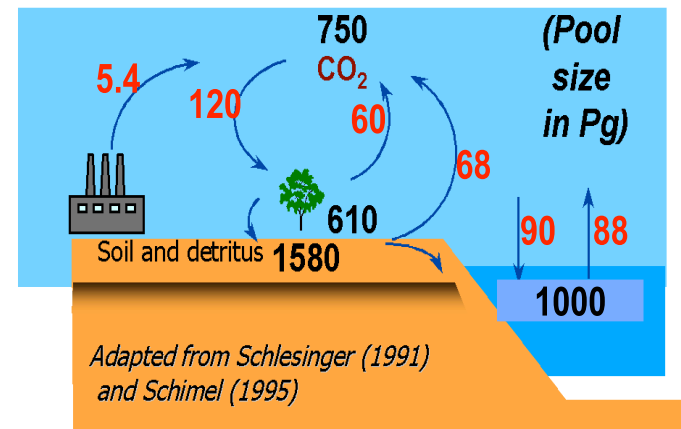
Life Under Your Feet

- **Role of the soil in Global Change**

- *Soil CO₂ emission thought to be >15 times of anthropogenic*
- *Using sensors we can measure it directly, in situ, over a large area*


- **Wireless sensor network**

- *Use many wireless computers (motes), with 10+ sensors each, monitoring*
 - *Air +soil temperature, moisture, ...*
 - *Few sensors measure CO₂ concentration*
- *Long-term continuous data, >20M measurements/year*
- *Complex database of sensor data, built from the SkyServer*
- *Data on SensorNet*



with K.Szlavec (Earth and Planetary), A. Terzis (CS)

<http://lifeunderyourfeet.org/>

Archive Help
 Dataarchive is o... leave a message

 Type **here** and hit enter to
 offline message.
 edit nickname: meebogues

What's New?
How to Search this
Quick Links
Data Portals
Other Archives
Government Sites
U.S. National Surve

Archive Policies
 The UK Data A... data in the soc... provides resou... Deposit by The...
 The speciality of... medical data se... Programme Da... co-ordination of...

ICPSR | INTER... POLIT...
Data | **Courses & Learning Tools**


SEARCH
 in
 Web Site
 Data Holdings
 Publications
[based on our data](#) [See](#)

QUICK LINKS

 Established in 1962, ICPSR is
 largest [archive](#) of digital social
 We acquire, preserve, and dist
 research data and provide [train](#)

Quantitative Social Science Digital Library (QSSDL)

Set to launch in September 2009

The Quantitative Social Science Digital Library (QSSDL) is a repository of educational materials designed to improve quantitative literacy skills in social science courses. Built especially for faculty teaching post-secondary courses in such areas as demography, economics, geography, political science, social psychology, and sociology, the materials include stand-alone learning activities, tools, and pedagogy services.

Our goal is to make it easier for faculty to bring real social science data into courses across the curriculum ranging from introductory classes to senior seminars. Many of the activities can be used without the need for any additional statistical software.

About the QSSDL

QSSDL will provide a single portal where faculty can find and use real data in post-secondary classes. It will infuse quantitative reasoning throughout the social science curriculum by providing user-friendly, data-driven instructional materials. While building quantitative literacy skills, students will be exposed to the creativity and excitement of empirical research. Exposing students to data in early courses – even at the introductory-level – while the focus is primarily on content, can minimize the disconnect that students feel between substantive courses and research methods or statistics courses. At the same time, they will get a better idea of how social scientists work.

Two key components of the developing pathway are the [Social Science Data Analysis Network](#) and ICPSR's [Online Learning Center](#). Both of these resources provide:

- Data extracts
- Online analysis tools
- Student exercises
- Other materials that help instructors integrate data from the U.S. Census, opinion polls, and advanced social science surveys in their courses.

QSSDL will provide comprehensive links to these materials and other resources promoting quantitative literacy, such as teaching modules, social science data sources, applications

Join our listserv

[Sign up](#) to receive announcements about additions and updates to the QSSDL Web site. The first announcement will be the launch of the site and subsequent announcements will include notices of new teaching resources and tools and upgrades. This is strictly an announcement-only list and the volume of messages is likely to be fairly low.

Contact Us

If you have materials you would like to see included in the QSSDL or any other questions or comments related to the project, please contact either [John DeWitt](#) or [Lynette Hoelter](#).



Roman Forum, Western End, ca. 400AD, copyright Regents of the University of California



Experience WorldWide Telescope

Immerse yourself in a seamless beautiful environment.


WorldWide Telescope (WWT) enables your computer to function as a virtual telescope, bringing together imagery from the best ground and space-based telescopes in the world. Experience narrated guided tours from astronomers and educators featuring interesting [places](#) in the sky.

[Install](#) WorldWide Telescope 

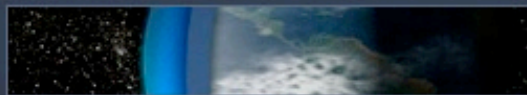
[Windows® System Requirements](#)
(For Mac OS X use the Web Client)

Preview the WorldWide Telescope Web Client

A Web-based version of WorldWide Telescope that enables seamless, guided explorations of the universe from within a web browser on PC and Intel **Mac OS X** by using the power of Microsoft Silverlight 2.0.


[Preview the Web Client](#) 

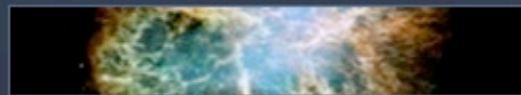
[Mac & PC - Compare Client Versions](#)



What is WorldWide Telescope?

WWT is an application that runs in Windows that utilizes images and data stored on remote servers enabling you to explore some of the highest resolution imagery of the universe available in multiple wavelengths.

[Learn More](#) 



Take a Tour


Watch and see what you are missing. You can see videos of the guided tours within WorldWide Telescope or if you have WWT already installed, you can download a tour and interactively explore what you see.

[Tours](#) 



Share the Experience

Why keep the seamless exploration of the universe WorldWide Telescope can provide a secret? Tell your friends and family!

[Share WWT](#) 

Why openness matters

- Interoperability trumps all
 - Import and export in open formats
 - Mixup and mashup
 - Add value
 - Avoid lock in
- Discoverability of related
 - Documents
 - Data
 - Assorted digital objects
- Usability and reusability
 - For research
 - For learning



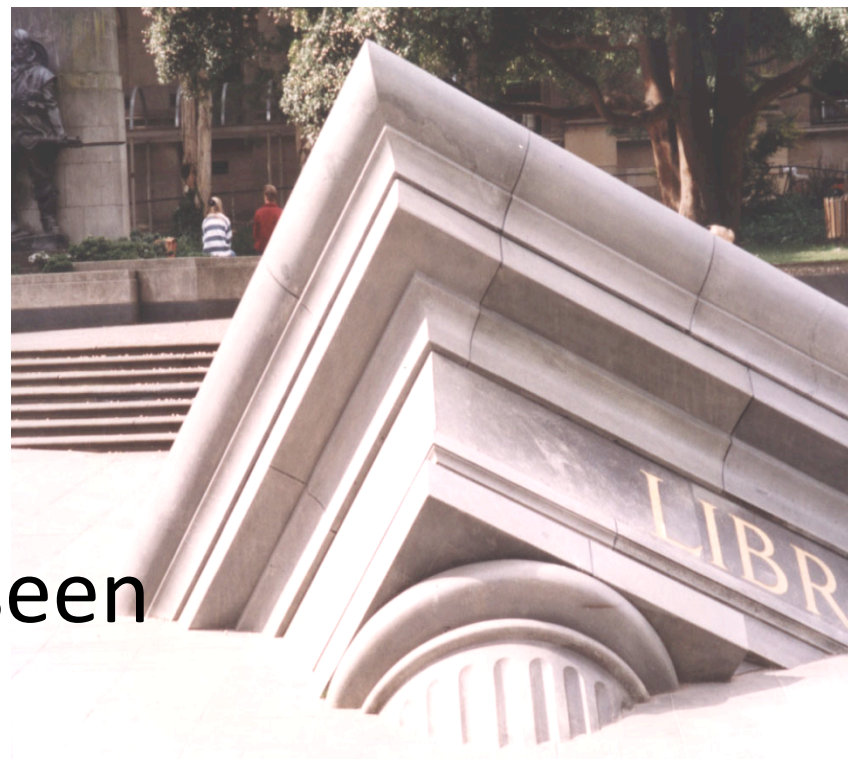
Inflection point?

Digital libraries are a set of electronic resources and associated technical capabilities for creating, searching, and using information.

Digital libraries are constructed—collected and organized—by [and for] a community of users, and their functional capabilities support the information needs and uses of that community.

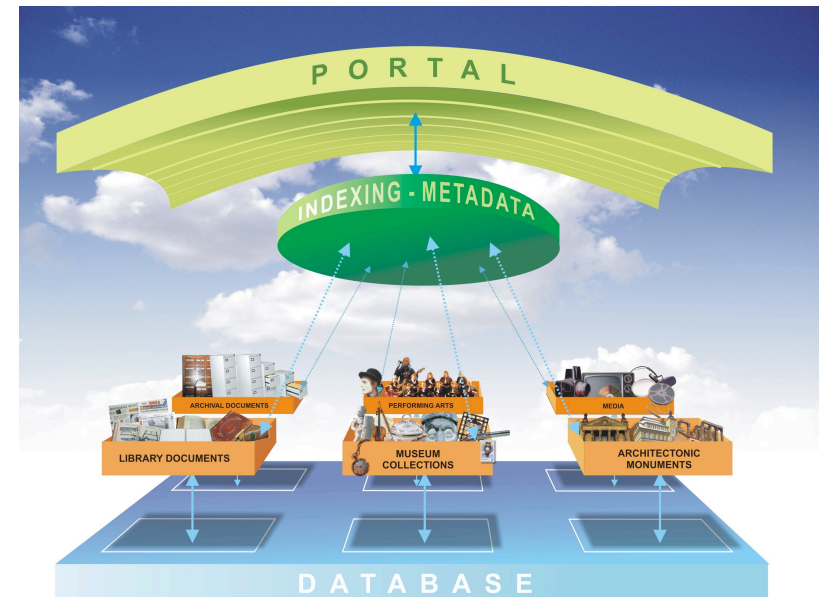
Digital Libraries: Now here, or nowhere?

- Is it digital or is it a library?
- Now here: Scope foreseen in DL initiative
- Nowhere: “digital library”



Digital library lessons learned

- If we build it they may not come
- Communities are rarely as homogeneous as they appear
- Community partnerships in design are essential
- Favor connectedness over consolidation
- Interoperability is still a major challenge
- Be open to new opportunities



http://www.ndk.cz/obrazky/ifontes_en/

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 - Monitoring, Modeling & Memory: Dynamics of Data and Knowledge in Scientific Cyberinfrastructures: #0827322, P.N. Edwards, UM, PI; Co-PIs C.L. Borgman, UCLA; G. Bowker, SCU; T. Finholt, UM; S. Jackson, UM; D. Ribes, Georgetown; S.L. Star, SCU)
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