

Creative Metaphors to Stimulate New Approaches to Visualizing, Understanding, and Rethinking Large Repositories of Scholarly Data

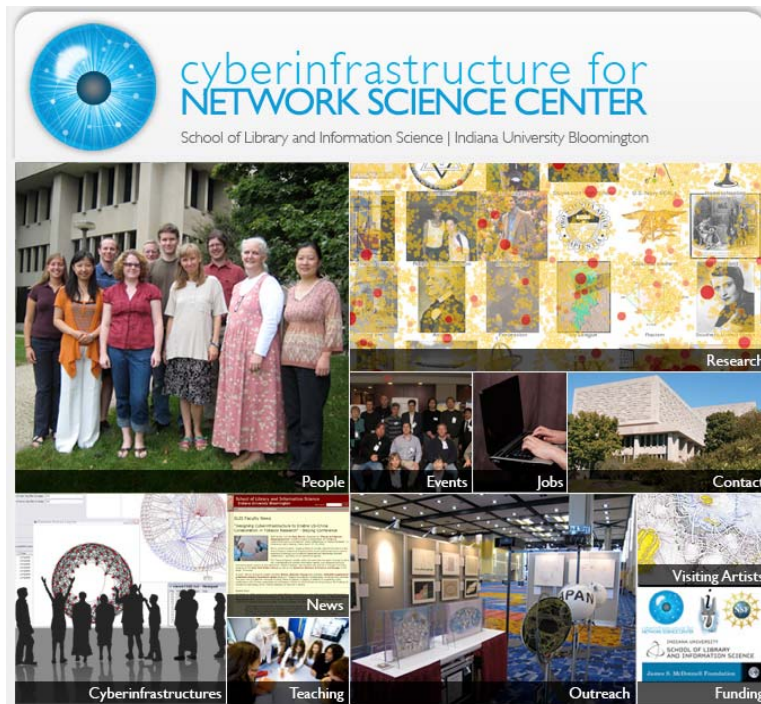
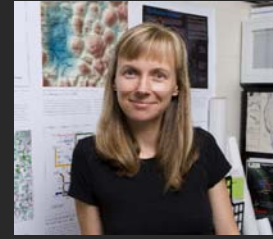
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CreativeIT Program PI Meeting, <http://smiki.cs.colorado.edu/CreativeIT/263>
Arlington, VA

January 15-16, 2009




<http://cns.slis.indiana.edu>


People
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Cyberinfrastructures


CIs Developed and Served




[Science of Science Cyberinfrastructure Portal](#)




[Epidemics Cyberinfrastructure \(EpiC\) Tool](#)




[InfoVis Cyberinfrastructure](#)




[Network Workbench Tool](#) and [Community Wiki](#)



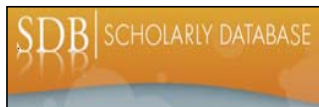
[Scholarly Database](#) of 18 million scholarly records



[Lab/Center Management System](#)



[Cyberinfrastructure Shell](#)



Scholarly Database: Web Interface

Search across publications, patents, grants.

Download records and/or (evolving) co-author, paper-citation networks.



Cyberinfrastructure for Network Science Center, SLIS, Indiana University, Bloomington

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In the News

Whitfield, John. 2008. *Unsupervised*. Nature, 455, 9: 729-732.

Please Cite As:

Li, Yiping, et al. 2008. *Network Science*. Progress, John, et al. *Network and System*. 2008. The Scholarly Database and the Utility for Systemic Research. In Proceedings of the 12th International Conference on Systematics and Information, Madrid, Spain, June 25-27, 2007, pp. 877-882. <http://sdb.slis.indiana.edu/~4/ny/paper/12%20conf%20sdb.pdf>


Acknowledgments

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Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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First Year:

Last Year:

1999 - 2009

1991 - 1997

1993 - 2004

1978 - 1997

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If multiple terms are entered in a field, they are automatically combined using "OR". So, "breast cancer" matches any record with "breast" or "cancer" in that field.

You can put AND between terms to combine with AND: "breast AND cancer" would only match records that contain both terms.

Double quotation can be used to match compound terms, e.g., "breast cancer" returns records with the phrase "breast cancer", and not records where "breast" and "cancer" are both present, but not the exact phrase.

The importance of a particular term in a query can be increased by putting a "*" and a number after the term. For instance, "breast cancer"50 would increase the importance of matching the term "cancer" by ten compared to matching the term "breast".

Register for free access at <http://sdb.slis.indiana.edu>

Datasets available via the Scholarly Database

Dataset	#Records	Years Coverage	updated	Restricted Access
Medline	16,053,495	1898-2008	Yes	
PhysRev	398,005	1893-2006		Yes
PNAS	16,167	1997-2002		Yes
JCR	59,078	1974,1979,1984,1989,1994-2004		Yes
USPTO	3,710,952	1976-2007	Yes	
NSF	174,835	1985-2003	Yes	
NIH	1,043,804	1972-2002	Yes	
Total	21,456,336	1893-2008	4	3

Aim for comprehensive temporal, geospatial, and topic coverage.

Mapping Science Exhibit – 10 Iterations in 10 years

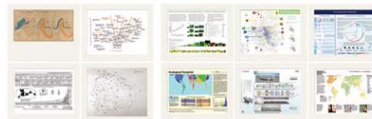
<http://scimaps.org/>



The Power of Maps (2005)



Science Maps for Economic Decision Makers (2008)



The Power of Reference Systems (2006)



Science Maps for Science Policy Makers (2009)

Science Maps for Scholars (2010)

Science Maps as Visual Interfaces to Digital Libraries (2011)

Science Maps for Kids (2012)

Science Forecasts (2013)

The Power of Forecasts (2007)



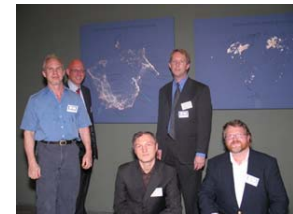
How to Lie with Science Maps (2014)



Exhibit has been shown in 49 venues on four continents. Also at
 - NSF, 10th Floor, 4201 Wilson Boulevard, Arlington, VA.
 - Chinese Academy of Sciences, China, May 17-Nov. 15, 2008.
 - University of Alberta, Edmonton, Canada, Nov 10-Jan 31, 2009
 - Center of Advanced European Studies and Research, Bonn, Germany,
 Dec. 11-19, 2008.

Illuminated Diagram Display

W. Bradford Paley, Kevin W. Boyack, Richard Kalvans, and Katy Börner (2007)
Mapping, Illuminating, and Interacting with Science. SIGGRAPH 2007.



Large-scale, high resolution prints illuminated via projector or screen.

Questions:

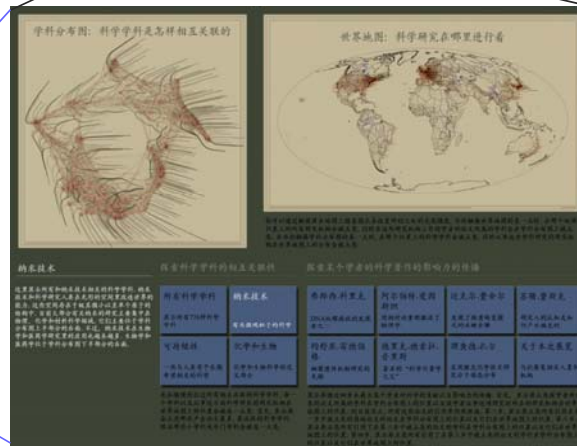
- Who is doing research on what topic and where?
- What is the 'footprint' of interdisciplinary research fields?
- What impact have scientists?



Interactive touch panel.

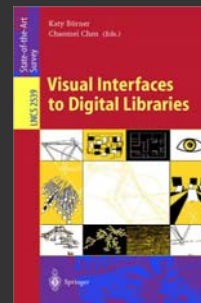
Contributions:

- Interactive, high resolution interface to access and make sense of data about scholarly activity.

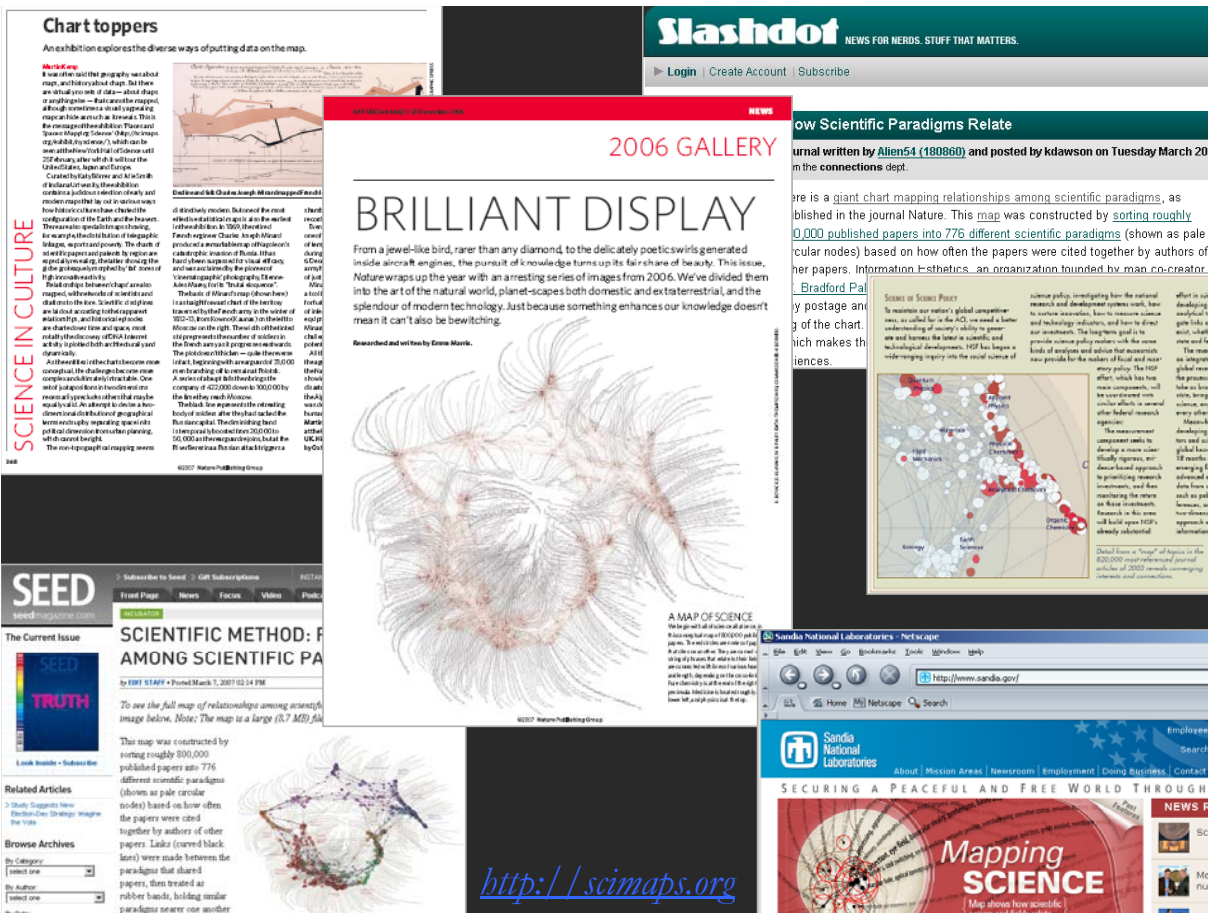


Computational Scientometrics: Studying Science by Scientific Means

Results are frequently communicated via 'Science Maps'.



- Börner, Katy, Chen, Chaomei, and Boyack, Kevin. (2003). *Visualizing Knowledge Domains*. In Blaise Cronin (Ed.), *Annual Review of Information Science & Technology*, Medford, NJ: Information Today, Inc./ American Society for Information Science and Technology, Volume 37, Chapter 5, pp. 179-255. <http://ivl.slis.indiana.edu/km/pub/2003-borner-arist.pdf>
- Shiffrin, Richard M. and Börner, Katy (Eds.) (2004). *Mapping Knowledge Domains*. *Proceedings of the National Academy of Sciences of the United States of America*, 101(Suppl_1). http://www.pnas.org/content/vol101/suppl_1/
- Börner, Katy, Sanyal, Soma and Vespignani, Alessandro (2007). *Network Science*. In Blaise Cronin (Ed.), *Annual Review of Information Science & Technology*, Information Today, Inc./ American Society for Information Science and Technology, Medford, NJ, Volume 41, Chapter 12, pp. 537-607. <http://ivl.slis.indiana.edu/km/pub/2007-borner-arist.pdf>
- *Places & Spaces: Mapping Science* exhibit, see also <http://scimaps.org>.



CreativeIT: Artists in Residence

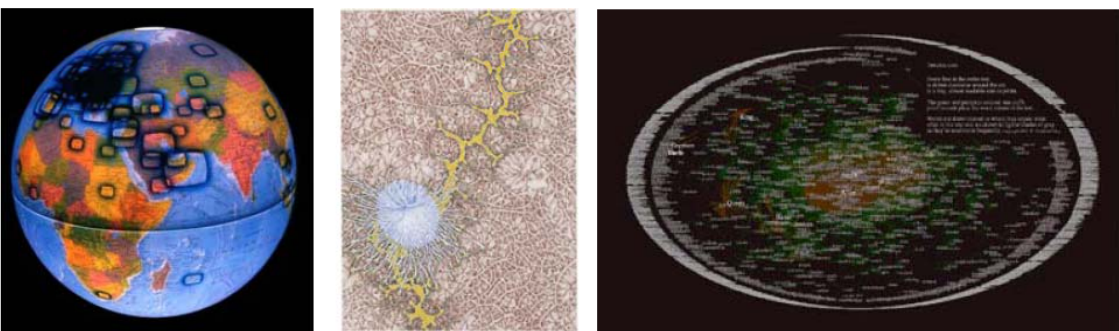


Figure 2. Worldprocessor Globe by Ingo Gunther: TV ownership (left), Drawing by Daniel Zeller: Microbial Interaction (middle), and Design by W. Bradford Paley: TextArc (right)

- Workshops
- Communicating Science Dynamics
- Interacting with Science
- Dramatizing Science Forecasts

Macroscope: A Fusion of Imagery, Dance, and Music That Communicates the Rise of Knowledge

A performance work that uses bodily movement, visuals projected on the back of the stage, and music to communicate to a general audience:

- (1) How much mankind's scholarly knowledge has increased over the last 1000 years,
- (2) What tools might be useful to access, manage, and utilize what we collectively know,
- (3) What the current and a desirable future look like.

OVERVIEW

Part I: Past



Part II: Present



Part III: Future



Macroscope: A Fusion of Imagery, Dance, and Music That Communicates the Rise of Knowledge

DETAILED VIEWS

Part I: Past

1 Stone Age



2 Agricultural Age



3 Machine Age



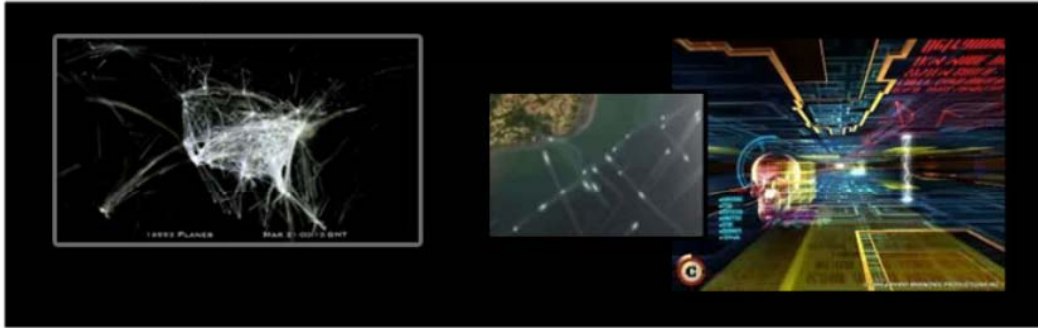
4 Industrial Age



Macroscopic: A Fusion of Imagery, Dance, and Music That Communicates the Rise of Knowledge

Part II: Present

5 Information Age



Macroscopic

Part III: Future

6 Destruction



7 Upload into the Net



8 Sustainable Living





Macroscope: A Fusion of Imagery, Dance, and Music That Communicates the Rise of Knowledge

Some of Many Open Questions

How might dancers 'fly' through an information space using a background roller coaster?

Can projected data streams truly 'attack' dancers?

Could a dancer stand on stage writing a book and then 'throw' it up on the screen?

Should dancers 'push' a projected button right before a new video segment starts?

Rather than using electronic sensors attached to dancers and/or musicians to trigger/impact visuals – can we use visual cues to synchronize visuals, dance, and (live) music?

Timeline

In January 2010, four performances of the 30 min piece will be presented as part of the Indiana University Dance Theatre's annual "Concert" in the Ruth N. Halls Theater, IUB. All four performances will be video recorded.

Macroscopic: Evaluation

Human subject studies with computer scientists and artists. The purpose of this study is to increase our understanding of what happens if:

- (1) artists are immersed in a scientific environment and are asked to rethink and reinvent the way we conduct our research, the tools we use and design, and the means of communicating results.
- (2) computer/information scientists are asked to work with dancers, composers, and others to communicate to a general audience
 - How much mankind's scholarly knowledge has increased over the last 1000 years,
 - What tools might be useful to access, manage, and utilize what we collectively know,
 - What the current and a desirable future look like.

What expectations exist in the beginning, how do these expectations change over time, who is contributing what to the end result? How does the (understanding of the) overall goal of the performance piece change?

Questionnaires will also be administered with the audience of the Macroscopic dance performance – what did they expect, what did they get (love/hate/take away)?

Open Issues

How to convert the results of this research into publications, citations, download counts, etc.?