Brief Bio and (PR)²: Problems & Pitches – Raves & Rants by Katy Börner

Biography (about 250 words)

Katy Börner is an Associate Professor of Information Science in the School of Library and Information Science, Adjunct Associate Professor in the School of Informatics, Core Faculty of Cognitive Science, Research Affiliate of the Biocomplexity Institute, Fellow of the Center for Research on Learning and Technology, Member of the Advanced Visualization Laboratory. She directs the Information Visualization Laboratory and is the Founding Director of the Cyberinfrastructure for Network Science Center at Indiana University. Her research focuses on the development of data analysis and visualization techniques that improve information access, understanding, and management. She is particularly interested in the study of the structure and evolution of scientific disciplines; the analysis and visualization of online activity, e.g., user actions in 3D virtual worlds; and the development of cyberinfrastructures (CI) for large-scale scientific collaboration and computation such as the Information Visualization CI (http://iv.slis.indiana.edu) and the recently funded Network Workbench CI (http://nwb.slis.indiana.edu).

She co-edited a book on 'Visual Interfaces to Digital Libraries' published by Springer in 2002, a special issue of PNAS on 'Mapping Knowledge Domains' published in April 2004, a special issue on 'Collaborative Information Visualization Environments' in PRESENCE: Teleoperators and Virtual Environments, MIT Press that appeared in Feb. 2005, and a special issue on 'Information Visualization Interfaces for Retrieval and Analysis' in the Journal of Digital Libraries that appeared in March 2005. Börner is the recipient of many fellowships and awards, including Outstanding Junior Faculty Award, Pervasive Technology Laboratories Fellowship, SBC Fellow, NSF CAREER Award, and Trustees Teaching Award. She is currently PI or Co-PI on 12 grants that are funded by NSF, the James S. McDonnell Foundation, 21st Century Fund, and SUN Microsystems.

Photo: http://www.slis.indiana.edu/images/faculty/f_borner.jpg
Homepage: http://ella.slis.indiana.edu/~katy/

General Questions

What is your main interest in attending the workshop?

I am interested in the design of effective knowledge management (KM) and science mapping tools. I would like to learn in more detail what information needs governmental agencies and companies have so that I can ensure that the scholarly data acquisition, integration, analysis, and visualizations we perform best serves those information needs. I am confident that governmental agencies and companies can benefit from advanced KM and science mapping tools and hope the workshop will succeed in cross-fertilizing between the two groups.

What is your main interest in 'mapping science' and/or 'knowledge management (KM) tools'?

Today, humanity's knowledge is stored in an exponentially increasing number of papers, books, emails and in other formats. No man and no machine can process this enormous amount of data and hence most of the knowledge gets reinvented, is duplicated across sciences, or is simply lost forever after a short period of time.

However, to survive as a species, we will need to preserve our planet or find means to sustain life as we know it by other means. Besides achieving survival, we should aim to enable all human beings to live a healthy, productive and fulfilling life. Meeting these challenges requires the design of cyberinfrastructures that provide access to humanity's collective knowledge, data and tools and support the 'global brain' that is emerging on this planet.
Questions for Map Makers
Please provide higher resolution images, a brief description, and if available citation references for up to three science maps you have created and are most proud of. Use one page per map.

See pages 3-6.

What opportunities/solutions do maps of science / KM tools offer for what stakeholders?

I will answer this for science maps:

- **Students** can gain an overview of a particular knowledge domain, identify major research areas, experts, institutions, grants, publications, patents, citations, and journals as well as their interconnections, or see the influence of certain theories.

- **Researchers** can monitor and access research results, relevant funding opportunities, potential collaborators inside and outside the fields of inquiry, the dynamics (speed of growth, diversification) of scientific fields, and complementary capabilities.

- **Grant agencies/R&D managers** could use the maps to select reviewers or expert panels, to augment peer-review, to monitor (long-term) money flow and research developments, evaluate funding strategies for different programs, decisions on project durations, and funding patterns, but also to identify the impact of strategic and applied research funding programs.

- **Industry** can use the maps to access scientific results and knowledge carriers, to detect research frontiers, etc. Information on needed technologies could be incorporated into the maps, facilitating industry pulls for specific directions of research.

- **Data providers** benefit as the maps provide unique visual interfaces to digital libraries.

- Last but not least, the availability of dynamically evolving maps of science (as ubiquitous as daily weather forecast maps) would dramatically improve the communication of scientific results to the **general public**.

See also


http://www.pnas.org/content/vol101/suppl_1/


http://ella.slis.indiana.edu/~katy/paper/arist02.pdf

What main challenges do you foresee for designing effective maps of science / KM tools?

Gaining access, integrating, and preserving all scholarly data – in all languages and of all types, e.g., publication, patent, grant, scholar, data, software. See also


Then of course, this data needs to be analyzed and mapped but given access to cyberinfrastructures this is less a technical but might be a serious political problem.
See animated gif at http://iv.slis.indiana.edu/ref/iv04contest/Ke-Borner-Viswanath.gif
Mapping Topic Bursts

Co-word space of the top 50 highly frequent and bursty words used in the top 10% most highly cited PNAS publications in 1982-2001.

Spatio-Temporal Information Production and Consumption of Major U.S. Research Institutions


Does Internet lead to more global citation patterns, i.e., more citation links between papers produced at geographically distant research institutions? Analysis of top 500 most highly cited U.S. institutions.

Each institution is assumed to produce and consume information.

\[ \gamma_{82-86} = 1.94 \ (R^2=91.5\%) \]
\[ \gamma_{87-91} = 2.11 \ (R^2=93.5\%) \]
\[ \gamma_{92-96} = 2.01 \ (R^2=90.8\%) \]
\[ \gamma_{97-01} = 2.01 \ (R^2=90.7\%) \]