This article originally was published as: Rasmussen E., Atkins H. B., Börner K., McCain K. W. (2002). Visualizing knowledge domains. ASIST 2002: Proceedings of the ASIST Annual Meeting 39: 476-477, Information Today Inc., Medford.

# Visualizing Knowledge Domains

## Sponsored by SIG CR, SIG VIS

**Edie Rasmussen (moderator)**
School of Information Sciences, University of Pittsburgh, Pittsburgh, PA 15260.
Email: erasmus@mail.sis.pitt.edu

**Helen Barsky Atkins**
HighWire Press, Stanford University, 1454 Page Mill Road, Palo Alto, CA 94304.
Email: hatkins@highwire.stanford.edu.

**Katy Borner**
School of Library and Information Science, Indiana University, 10th Street and Jordon Avenue, Main Library 019, Bloomington, IN 47405.
Email: katy@indiana.edu.

**Katherine W. McCain**
College of Information Science and Technology, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104-2875.
Email: kate.mccain@cis.drexel.ed

**Information visualization can be a powerful tool for simplifying access to complex material. This panel will explore the use of visualization techniques to organize and display the structure of knowledge in subject domains, and the extent to which it is successful in clarifying the scope of individual fields and the relationships between concepts within fields and with related fields. New work in topic maps and other visualization techniques for scientific disciplines will be presented.**

### Helen Barsky Atkins: Topic Maps for Information Access to the Journal Literature

Topic maps are an XML-encoded means for visualization of subject domains. This talk will discuss the implementation of Topic Maps on the HighWire Press web site, and analyse user feedback on their interpretation and use.

### Katy Borner and Chaomei Chen: Visualizing Knowledge Domains in Science

This talk reviews visualization techniques to map the ever-growing knowledge domain structure of scientific disciplines, including emerging techniques in interactive data analysis and information visualization. Diverse algorithms are applied to demonstrate different analysis and visualization techniques on a bibliographic data set that includes articles from the citation analysis, bibliometrics, semantics, and visualization literatures. This serves to map the relationships within and between the four fields that together form domain visualization. The talk concludes with a discussion of promising new avenues of research.

More information about Professor Borner's projects can be found at http://ella.slis.indian.edu/~katy/.

### Katherine W. McCain, June M. Verner, Gregory W. Hislop, William Evanco, and Vera Cole: How do Software Engineers Envision their Field? A Comparison of Author Cocitation- and Knowledge Elicitation-based Structures

As part of an extensive domain analysis of Software Engineering, we used Author Cocitation Analysis to map the field based on the citations to 60 prominent software engineering authors over the period 1990 - 1997. We identified 8 author clusters representing key SE topics. These include approaches to programming and analysis ("standard" and object-oriented approaches and "formal methods" such as mathematical tools for detecting errors in software), software architecture and software reuse, software project management, and software metrics. The clusters are arrayed along two dimensions--"programming in the small" to "programming in the large" and a continuum of interest reflecting more or less "formal"

content of their work. We also used a standard knowledge-elicitation method, card sorting, to obtain perceptions of the 60 authors and their work from 46 practicing software engineers in academia and industry. The aggregate card sorting tallies were mapped and clustered. Comparison of the two structures reveals interesting similarities and differences between the way that authors in Software Engineering are perceived and the way their work is used in scholarship and research. Respondents in the card sorting recognized, for the most part, the same clusters that were identified in the bibliometric analysis (e.g. OO approaches, formal methods, software metrics) and the same major organizing principle ? micro vs macro level research and application in software engineering. However, in creating their card sorting piles, the respondents tended to identify a significant number of authors as "text book writers" and similar labels. This resulted in a second, vertical continuum that appears to stress breadth and generality of authors' contributions rather than the degree of formal content.