SLIS Faculty News

Teaching Children the Structure of Science - and more

The San Jose Convention Center in California was the site of the Conference on Visualization and Data Analysis 2009 (EI108). The Conference (held January 19-20, 2009) was a part of IS&T/SPIE's International Symposium on Electronic Imaging 2009. It was co-sponsored by Hewlett-Packard.

Katy Börner, SLIS faculty member and the Director of the Cyberinfrastructure for Network Science Center at SLIS, and Russell Duhon (Senior Software Developer of the Center) both presented at the Conference. Elisha Hardy (Graphic Designer with the Center) and Bryan Hook (formerly with the Center), were co-authors on Börner's paper. Börner was also a Conference Chairperson. Excerpts from the program and abstracts of their talks are below.

- Conference Chairs
  Katy Börner, Indiana Univ.;
  Jinah Park, Information and Communications Univ. (South Korea)
- Conference Co-Chairs
  Matti T. Gröhn, Ctr. for Scientific Computing (Finland); Ming C. Hao, Hewlett- Packard Labs.;
  Jonathan C. Roberts, Bangor Univ. (United Kingdom); Pak Chung Wong, Pacific Northwest National Lab.

Teaching children the structure of science
Author(s): Katy Börner, Indiana Univ. (United States); Stephen M. Uzzo, The New York Hall of Science (United States); Fileve Palmer, Julie M. Davis, Elisha F. Hardy, Bryan J. Hook, Indiana Univ. (United States)

Abstract:
Maps of the world are common in classroom settings. They are used to teach the juxtaposition of natural and political functions, mineral resources, political, cultural and geographical boundaries; occurrences of processes such as tectonic drift; spreading of epidemics; and weather forecasts, among others. Recent work in scientometrics aims to create a map of science encompassing our collective scholarly knowledge. Maps of science can be used to see disciplinary boundaries; the origin of ideas, expertise, techniques, or tools; the birth, evolution, merging, splitting, and death
of scientific disciplines; the spreading of ideas and technology; emerging research frontiers and bursts of activity; etc. Just like the first maps of our planet, the first maps of science are neither perfect nor correct. Today's science maps are predominantly generated based on English scholarly data: Techniques and procedures to achieve local and global accuracy of these maps are still being refined, and a visual language to communicate something as abstract and complex as science is still being developed. Yet, the maps are successfully used by institutions or individuals who can afford them to guide science policy decision making, economic decision making, or as visual interfaces to digital libraries. This paper presents the process and results of creating hands-on science maps for kids that teaches children ages 4-14 about the structure of scientific disciplines. The maps were tested in both formal and informal science education environments. The results show that children can easily transfer their (world) map and concept map reading skills to utilize maps of science in interesting ways.

Understanding outside collaborations of the Chinese Academy of Sciences using Jensen-Shannon Divergence

Author(s): Russell J. Duhon, Indiana Univ. (United States)

Abstract:
Using Jensen-Shannon divergence to measure differences in collaboration patterns with outside collaborators makes it possible to understand the structure of those collaborations without direct information about how they collaborate with each other. Applying the approach to data on the outside collaborations of the Chinese Academy of Sciences and visualizing the results reveals interesting structure relevant for science policy decisions.

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