Title: Understanding Infrastructure: dynamics, tensions, design, and data

Goals:

a) Present results of the *Understanding Infrastructure* project.
b) Conduct an exploratory discussion of major open issues in the qualitative study of large scale e-science and e-social science project.

Description:

This workshop presents the results of a collective project, initiated in summer 2006, on how history, social studies, and theory of infrastructure can contribute to the design, development, and understanding of new scientific cyberinfrastructures. The project began with a conference involving historians, social scientists, domain scientists, cyberinfrastructure developers, and NSF program officers. This led to an NSF report, *Understanding Infrastructure: Dynamics, Tensions, and Design*, released in January 2007. Presenters at this workshop include PIs from that project, plus Paul Wouters, who is collaborating with us on follow-on projects on data sharing.

The *Understanding Infrastructure* project seeks to articulate general patterns and principles of infrastructure development, to the extent that this is possible, as well as the tensions and struggles inherent in the process. Drawing upon historical and comparative research into numerous major infrastructures, the project report distilled usable, concrete stories, models, and metaphors that might guide and improve efforts to nurture new scientific cyberinfrastructures. The project has generated a new research and action agenda centered around cultivating social, cultural, and organizational change in support of better tools for large-scale, multi- and inter-disciplinary science.

The workshop would begin with short presentations on the *Understanding Infrastructure* project's principal findings to date, as well as the many open research questions it has generated. Participants would then proceed to an open discussion of two key issues:

1) Qualitative methods for the study of large-scale e-science and e-social science activities. Typical e-research practices involve multiple scales, time frames, levels, and layers. The traditional approach to qualitative research is immersion in a particular "tribe," project, or group. As dispersed communities interact increasingly through cyberinfrastructure, researchers attempting to follow them face greater difficulty in tracking and interpreting their structure and interaction. What tools, methods, and approaches do social scientists and information scientists need to move freely among the many facets of large-scale scientific cyberinfrastructures? How can existing methods be adapted to work for large, diverse teams of qualitative researchers? What new methods are needed?

2) Data sharing is a principal goal of cyberinfrastructure projects in the sciences. Yet what counts as "data" varies widely across disciplines. This "data diversity" is

well recognized, but progress toward sharing across disciplines remains elusive. Further, sharing is not always or automatically desirable. Can we identify prospects and dimensions for comparative study of data sharing (including practices as well as technical capabilities)? Can data and data sharing practices be compared across the divides separating natural sciences, social sciences, and humanities? How might qualitative, comparative studies of data sharing practices interact with the design of interfaces?

Presenters and qualifications

Paul N. Edwards, Assoc. Professor, School of Information, University of Michigan. PI on the Understanding Infrastructure project. Specializes in history and politics of information technology.

Steven Jackson, Asst. Professor, School of Information, University of Michigan. Co-PI on the Understanding Infrastructure project. Specializes in science and technology studies approaches to information and communication technology.

Cory Knobel, PhD candidate, School of Information, University of Michigan. Graduate assistant on the Understanding Infrastructure project.

David Ribes, postdoctoral associate, School of Information, University of Michigan. Specializes in ethnographic and sociological approaches to cyberinfrastructure (recent dissertation on GEON).

Paul Wouters, Director, Virtual Knowledge Studio, Amsterdam, Netherlands. Specializes in new uses of information technology in the humanities and social sciences.

Intended participants: social scientists and others interested in qualitative approaches to studies of large-scale e-Science and e-Social Science.

Max number of participants: 30

Duration: 3 hours

Equipment needed: computer projector

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