

# Session for Interaction and Engagement: Personal Infrastructures of Distributed Scientific Collaboration

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## Abstract

The goal of this session for interaction and engagement is to explore and document the many individual practices of social scientists who collaborate at a distance with other scientists. We approach learning about the diverse spectrum of scientific practices common to conference attendees through an ethos of participatory design, show and tell, and performance of practice. This participation happens in three ways. The first is through both open and small group discussions of science practices and uses of digital resources. The second form is through drawing, concept mapping and diagramming scientific practices and uses of digital resources. Lastly, participation through comments and mark-ups of the records of discussions and artifacts from drawing, concept-mapping and diagramming. This session will also be of interest to the community of scholars that study scientific practices, social studies of science, and cyberinfrastructure.

**Keywords:** scientific practices; distributed collaboration; participatory design

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## 1 Description

This session for interaction and engagement (SIE) is designed to involve participants in depicting (a) their own arrangements of digital resources that support their own research and (b) imagining alternative arrangements, new resources, and other practices. As such, this SIE is partly a session on sharing contemporary practices and arrangements in digitally-enabled scientific practice, and partly a session on imagining possible future practices and arrangements.

The focus on illustrating and imagining digital resources for supporting research comes as an empirical, and localized response to the ways in which most studies of scientific cyberinfrastructure (CI) are concerned with the ways natural, physical, and biological scientists use pre-planned, purpose-built, and extensible computational resources to support large scale science. Contemporary CIs are typically motivated by a need for some combination of (1) computational power, (2) data storage and access and (3) shared uses of important (and often expensive) data collection, data analysis and visualization platforms. Because of these needs, CIs often provide high-speed networking technologies to support computation, data access, and tool access. The design requirements for CIs are often premised on large teams (i.e., dozens, if not hundreds, of scientists) conducting distributed, collaborative research on pressing, large-scale scientific problems (Atkins et al., 2003; Hey & Trefethen, 2003; Katz & Martin, 1997; Ribes & Lee, 2010).

The organizers of this session are keen to study the work of social scientists and smaller-scale science. The infrastructure of social scientists is remarkably different than the cyberinfrastructure of natural, physical, and biological scientists (Sharma et al., 2014; Willis, Sharma, Snyder, Brown, & Sawyer, 2014). Rather than having access to larger-scale computational resources directed at investigating certain problems or natural phenomena, social scientists perform a cobbling together of multiple consumer software solutions for storage, analysis, collaboration, and other common scientific practices. Distributed social scientists collaborating on research problems use consumer software to develop their own infrastructure that is continuously standardized and stabilized as the group conducts research. Integral to a study of distributed scientific collaboration, given the unique type of infrastructure described above, is to trace the flow of documents, both physical and digital (Østerlund, Snyder, Sawyer, Sharma, & Willis, 2014; Sawyer, Kazianus, & Østerlund, 2012; Sharma, Willis, Snyder, Østerlund, & Sawyer, 2015).

### 1.1 Purpose and Intended Audience

The goal of this session for interaction and engagement is to explore and document the many individual practices of distributed scientific collaboration. We approach learning about the diverse spectrum of

scientific practices common to conference attendees through an ethos of participatory design, show and tell, and performance of practice.

This session is relevant to conference attendees involved in their own scientific activities. Specifically, attendees that consider themselves to work in the area of social science – research that involves the human condition – and elicit data using a range of methodologies from computation to ethnography. Session attendees will benefit from learning about new ideas and methods for developing their own personal collaborative infrastructure. Attendees will also experience and consider ways their own practices of distributed science impact group members and how multiple personal scientific infrastructures interact in collaborations.

By the end of this session, we expect attendees to have concept maps and visualizations for how they collaborate with their other distributed group members on a research project. We also anticipate that attendees will generate a list of useful software and tools that make up an individual's personal infrastructure. Attendees will experiment and experience new tools, software, and methods for how they collaborate in their own groups.

## 1.2 Activities

This interactive discussion session seeks participation from attendees regarding their scientific practices and uses of digital resources. We see this participation happening in three ways. The first form of participation is through both open and small group discussions of science practices and uses of digital resources. The second form of participation is through drawing, concept mapping and diagramming scientific practices and uses of digital resources. The third form of participation will be through comments and mark-ups of the records of discussions and artifacts from drawing, concept-mapping and diagramming.

Building on techniques oft-used in participatory design, the session is designed in four parts. In the first part, attendees will be asked to talk with others about their own scientific practices (we expect that this will be part of the lunch-time discourse and it is why we start with a provided lunch – to encourage informal engagement). Building from this, we will host a full-group discussion of science practices -- building from the informal, table-centered, lunch-time discussions – with the goal of identifying common and unique practices and to encourage discussion of these.

During this first round of discussion, attendees will be guided to talk about their own personal scientific practices with group members. We want to stress the individuality of how researchers and attendees cobble together different personal infrastructures to actualize their scholarship and research collaborations.

From this, and again working in small groups, session organizers will task participants to map out or describe the participant's personal infrastructure in a concept map style of sketching. These personal infrastructure maps will then be shared with the remainder of the session attendees. We will discuss the similarities and differences of each participant's personal infrastructures, including discussion of the challenges, problems, and failure points of each personal system. We will also encourage screen sharing either on a projector or with participants gathered around a laptop in a "show and tell" style of storytelling. A participant might share their screen and perform scientific practices common to that participant. For example, a session participant might show the audience how they collaboratively write an article, manage citations, and perform an example workflow for how they manage digital field notes and other research data. Finally, and building from these, we will conclude with both table-level and group discussion of what has been shown and what might be possible to do, going forward.

This session will have two outputs at its conclusion. The first is the write-up of the discussion and documenting effort that will be emailed to attendees and other interested community members. This summary will also be available on a website to archive the session. The second output is a session write-up with some lessons learned and future directions to be submitted for inclusion in future conferences.

## 1.3 Relevancy

This session is relevant to the iConference community as the focus of the session is about exploring the ways social scientists (a title with which many conference attendees identify) collaborate at a distance with other scientists. The session will also be of interest to the community of scholars that study scientific practices, social studies of science, and cyberinfrastructure.

## 2 Event Length

Event organizers plan for a two and a half hour session. This includes a working lunch allowing participants to continue to interact and discuss session topics as they share a meal.

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