

## Technology Rules: Understanding and Supporting Emerging Practice in Ecology

Ann Zimmerman, Bonnie Nardi, and Susan Sim

In the last decade several environmental sciences have begun the journey from small to big science. In ecology, for example, the NSF-funded National Ecological Observatory Network (NEON) is intended to transform ecological science through a vast network of sensors and associated cyberinfrastructure to support the study of continental-scale processes. This paper describes our ongoing work that investigates the transformation to big science currently underway in ecology. This work includes participation by two of us in NEON as members of the Information Technology and Communication Subcommittee (a.k.a. the “Cyberinfrastructure Committee”). We seek both to deepen the theoretical understanding of transformations in scientific practice and to support the development of cyberinfrastructure to foster collaboration. This presents two distinct challenges. First, we are trying to gain what Andrew Pickering (1993) called a “real-time” understanding of scientific practice by observing ecologists who are attempting the difficult transition toward big science as exemplified by their work with other scientists, engineers and technicians, their adoption of new technologies, and their cooperation with other ecologists in the use of expensive resources such as sensor networks. Second, as social scientists who study computer-supported collaborative work, we aim to influence those who will build the cyberinfrastructure that ecologists will use. We emphasize the human linkages that are necessary for the successful use of advanced information technologies, though there is no easy way to inject these findings into development efforts. Pickering noted that no one can predict the outcome of the co-emergence of scientific practice and technology. It is this unruly reality that we aim to both study and affect.

Presented at the Society for Social Studies of Science Conference, Pasadena, California, October 2005.