Understanding Cross-Boundary Knowledge Networks in the Context of Information-Intensive Transnational Problems

The governments of the world are evolving toward a more complex global network of political, societal, and economic dependencies, driven in large part by the expanding capabilities of information and communication technologies (ICT). ICT has become so ubiquitous and integrated with social behavior that the distinction between social and technical interactions becomes arbitrary at best. A street protestor who snaps a camera phone picture and emails it instantly across the world may not be thinking about computers, but is using an enormous computing system nonetheless. The potential of these social and technical interactions and relationships has the potential to transform political (witness Iran), economic (witness eBay) and organizational behavior (witness AirNow). These new capabilities support highly computing-based social systems that must work within the evolving global network of dependencies. Governments strive to combat terrorism, manage air quality, and promote international commerce by jointly constructing new knowledge sharing systems. The transnational effects of these new forms of computing based social systems remain poorly understood, as do the related threats and opportunities.

The US and others must produce scholars trained in methodological tools to work effectively on research questions associated directly with international computing-based social systems. International engagement demands deep understanding of how these new systems affect the way nations and cultures respond to public needs and engage one another in response to transnational problems, like air pollution. We propose to develop new social ICT models and tools for computing based knowledge sharing across geographic and political boundaries focused on air pollution. This will be based on study of current and proposed international efforts at collaboration on air quality monitoring and reporting systems. It encompasses both comparative and transnational work in the domain of air quality monitoring and reporting systems in the US, Mexico, and China.

The following research questions will guide the work:

- How do participants in different countries perceive the dimensions, stakeholders, benefits, and risks of engaging in intergovernmental systems for information and knowledge sharing?
- What are the similarities and differences in these perceptions? What cultural, political, economic, and social factors might account for them?
- How do the participants attempt to create shared understanding of technologies, context, terms, processes, and contingencies that generate capabilities for effective action?
- Which strategies, tools, and behaviors are more likely to lead to successful international knowledge networks that benefit individuals, organizations, and communities?
- What preparation, methods and tools are best suited for research on these questions?

**Intellectual merit:** This proposal begins to build a knowledge base of cross-cultural investigations and empirical case studies of how new social ICT systems can be used on information-intensive international problems. The case studies and cross-case analyses will provide new comparative material and contribute to improved methodologies for cross-cultural research. The case analyses will lead to new testable models of information flow that accompany interactions and dependencies that cross national boundaries and cultures, as well as a future research agenda to refine both models and the methodologies.

**Broader Impacts:** This work extends information sharing and integration research to cross-national settings in which two or more countries share responsibility for a common problem, need, or initiative. In addition, the program will enlarge a collegial network and equip faculty and students to conduct research on problems of international or global import with deeper understanding of cultural factors and with the application of rigorous methodologies. This capacity-building feature will have long-lasting effects in the form of international science partnerships. Links to government officials as research hosts and advisors will provide not only research context and venues, but also opportunities to share findings that inform more culturally-aware public policies and government practices. The project will also lay the groundwork for teaching cases, course modules, and other curricular material.