

Research Experience

My research interests in Human-Computer Interaction (HCI) lie primarily in the domains of social computing and cognition. Whereas HCI as a whole is concerned with how people interact with computing systems, I am specifically interested in studying how people interact with technology and each other for the purposes of creating and exchanging knowledge. Through my research experience ranging from work in Barbara Tversky's STARLab to my current work with Peter Pirolli and Ed Chi in the Augmented Social Cognition Group at PARC, I have conducted numerous research studies on topics ranging from individual cognition to the spread of information over networks. In these projects, I have employed a wide range of approaches, from small-scale, in-depth ethnographic study of individuals to data mining and statistical modeling. Below, I present a summary of my most relevant and interesting work:

As a summer intern in Barbara Tversky's cognitive psychology lab at Stanford, I worked with Dr. Tversky and her two graduate students on a number of studies pertaining to gesturing, perspective-taking and event segmentation. The key questions answered in these studies concerned how spatial and temporal cues affected an individual's coding of information. For instance, one study demonstrated that the implication of action in a photograph encouraged viewers to take the spatial perspective of the actor. Collecting data in the laboratory and the field, I utilized methods ranging from surveys to think-aloud protocols to computer log data. The skills I gained in study design, data collection, and statistical data analysis have been invaluable in my research as I have continued with the Augmented Social Cognition group at PARC.

My first project at PARC, a collaboration with Brynn Evans and Peter Pirolli, examined the cognitive benefits of social interactions during online information seeking activities. The goal of this project was to integrate past research on the cognitive effects of offline social interaction and on the informational benefits of reaching out to others while searching. Through a small, ethnographic study of 8 expert searchers, we demonstrated how social interaction during search can provide not only informational benefits, but cognitive benefits in the form of stimulating problem reformulation and changes in query composition. During this project, we worked collaboratively to design and implement the study, as well as in collecting and analyzing the data. During data analysis, I contributed novel frameworks for processing the data, in the form of applied state-transition diagrams for modeling social search activities and visualizations for representing knowledge acquisition. Our submission of a poster and extended abstract for CHI 2009 won 2nd place in the Student Research Competition. In addition, the work ultimately led to a journal article which will be published in an upcoming special issue on *Collaborative Information Seeking* in the journal *Information Processing & Management*.

As part of a team led by Gregorio Convertino, I participated on another research project at PARC focusing on the characterization of the information needs for individuals working in ad hoc task forces. In IT services enterprises, such task forces form an interesting group for study as they need to quickly collaborate and coordinate around shared information streams in order to produce an end product, such as a bid for a contract. The key questions concerned what challenges these individuals faced in maintaining information across groups, how technological interventions could be designed to meet these challenges, and how this technology might be used to help others. In order to answer these questions, we conducted surveys and interviews with

members of two teams in a large document services organization; these individuals worked in ad hoc groups responsible for the creation and management of multi-million dollar collaborations with partner companies. I collaborated on data collection and analysis and helped contribute to the design of a prototype of a tool for the management of individual and collective information. This work led to a contribution to the Communities of Practice Workshop at the European Conference on Technology-Enhanced Learning in September, 2009. In addition, the design findings have been submitted in the form of a paper for CHI 2010.

My current work, a collaboration with Gregorio Convertino and Peter Pirolli involves the use of probabilistic topic modeling methods to explore the learning gains achieved by users of social annotation tools. Earlier study found that individuals using such tools with access to the annotations of an expert friend were able to more effectively navigate and learn in a novel knowledge domain. Drawing on relevant literature in the effects of domain expertise in web search behavior, I am using Latent Dirichlet Allocation to characterize the semantic space in which they navigated in order to provide a more fine-grained understanding of how the social annotations served as a scaffold for building domain expertise and increasing task performance. In this project, I have had the opportunity to lead the data analysis, from development of scripts for mining web and user data in Java, C++, and Python to implementation of the topic modeling analysis in MATLAB. We believe that the findings from this study will lead to better technologies for supporting individual learning of information on the web.

The experience that I have gained from these and other research projects has given me the knowledge and skills that I will need to succeed and excel in graduate study of social computing and cognition. I have gained an in-depth understanding of the research literature concerning individual and social cognition, and I have acquired the tools and abilities needed to pursue further study in this field, from ethnographic methods to computational data mining to statistical modeling. In addition, I believe that the technical and development skills I have gained will allow me to effectively translate this research into the development of social technologies that facilitate even greater information-sharing and learning.

Publications and Presentations:

Evans, B.M., **Kairam, S.**, and Pirolli, P. Exploring the Cognitive Consequences of Social Search. In *Proceedings of the Conference on Human Factors in Computing Systems (CHI '09)*, ACM Press. 2009. **2nd Place in Student Research Competition.**

Evans, B.M., **Kairam, S.**, and Pirolli, P. Do Your Friends Make You Smarter?: An Analysis of Social Strategies in Online Information Seeking. To Appear in *Information Processing & Management*, Special Issue on Collaborative Information Seeking. 2009.

Convertino, G., Stricker, T., **Kairam, S.**, et al. Learning Communities in a Large Enterprise. Workshop Paper presented at the *3rd International Workshop on Building Technology Enhanced Learning Solutions for Communities of Practice (Tel-CoPs '09)*. Nice, France. 2009.

Convertino, G. **Kairam, S.**, et al. Designing a Cross-Channel Information Management Tool for Workers in Enterprise Task Forces. [Submitted to] *Proceedings of the Conference on Human Factors in Computing Systems (CHI '10)*.

“Social Search: A Little Help From My Friends” - co-organizer of panel to presented at South by Southwest Festival. Austin, Texas. March, 2010.