

**Faculty preference - Chris Schmandt, Roz Picard, Joe Paradiso**

My interest in graduate study at MIT Media Lab is driven by the desire to enhance in-person human-human communication. Specifically, I would like to make mobile devices or applications to both bring people together and provide engaging interaction for all in a group. Studies have shown that computer systems stumble when designers attempt to model or recognize complex human behaviors. Comforting bedside manner, trusted friendships and inspirational leadership are components of human relations not amenable to building into machines. Promoting natural human communication, I believe, consists of three independent objectives— to bring people together, to allow engaging interaction for all and to teach people how to interact effectively. In graduate school, I plan to focus on the first two aspects viz. making devices to bring people together in a physical space and providing mediums for everyone present in the group to communicate effectively. Since the problem is critical for the disabled community, most of my work is focused around improving mobility and interaction for them. My research is inspired by the social, cultural and psychological implications of my own hearing impairment.

My primary research interest lies in navigation systems—to bring people together—from the forefronts of research in HCI, Embedded systems, Design and prototyping. My interest in this field started with my work in Assistive Technology Group at IIT Delhi where we observed the daily commute of visually impaired persons in India. Analyzing the three major mobility problems faced by them led us to create three projects: Smartcane (the knee-above obstacle detecting attachment for existing cane, for navigating on sidewalks), On Board (the easy bus identification and boarding system, to access public transport) and Roshni (the path-guided indoor navigation system, for walking indoors). I was the coordinator for multi-centric user studies of Smartcane, which is due for public release in March 2014, and improved the features and ergonomics of user modules for On Board. Roshni, my individual project, is an omnipresent mobile based indoor navigation system for blind which unlike existing systems, could give step-by- step path based audio directions from any location in the building. I covered the entire holistic and iterative product development cycle while also applying insights from social and psychological dimensions into technology development viz. formative studies, project design from scratch, taking feedback, prototype implementation, testing and feedback collection. We got support from Samsung and are currently pilot testing the deployment at one of the public museums in Delhi. Results from initial user studies have been published and I further plan to promulgate our novel design innovations and implementations. Clearly, my work has applications for non-disabled communities too and similar projects which got christened in Media Lab include Going my way, Guiding Light and Indoor Location Sensing Using Geo-Magnetism.

Despite numerous efforts in literature there are a number of open questions in the field of electronic travel aids. One such question which I have been working on as Research Associate in IIT Delhi involves a tradeoff between the technical complexity and the required user experience. Most of the travel aids now-a-days are being targeted from the technological perspective—mainly to provide stringent localization accuracy—thus making the device technologically complex and increasing the cost. It does not matter if the localization is not so accurate, provided the user is able to comfortably reach the destination. What are the desired usability features and goals and how much technical complexity is required to provide for them? I would be interested in researching this problem during my graduate career.

While it is important to bring people together, the task is incomplete if some people in the group are not able to communicate effectively. Thus, my research interests also include the “aids” which can provide engaging interaction for all in a conversation. This interest of mine originated from my own difficulties faced while conversing in a group. I have severe to profound hearing loss and in these ranges, one also has to depend on lip-reading. Group talks or interactive lectures involve rigorous changes in speaker turns and it is difficult to lip-read. I created a device called ‘Sound Compass’ to localize the direction of the instantaneous speaker in the room. This classroom tested novel device allows the hearing impaired to lip-read with only the required minimum augmentation of additional information—the direction indicator. At Microsoft Research, I am working on an application to evaluate speech prosody for reading fluency of school students in India. The application, which is first of its kind for English as a second language (ESL) school students, is expected to help them with pitch, loudness, tempo, rhythm skills of English speaking, which is vital for their social and career development.

I would like to build on the current work of the lab through projects on cognition maps based on the knowledge of the questions asked about a place; use of google glass to help autistic people understand the conversation and aid in social language development by presenting visual cues; real-time captions for speaker in a classroom and; mobile assisted sign language interpreter or recognizer.

To summarize, I am a multidisciplinary end-cycle researcher and I usually see the change I created out there. The communication devices, which I plan to develop, are expected to merely act as supporting characters rather than a central figure in the conversation. They will reduce barriers in human-human communication by filling only the necessary gaps to support the interactions; would be unobtrusive and easy to ignore if not needed.