

Dhruv Jain

Title: *Advancing Sound Accessibility*

Abstract: The world is filled with a rich diversity of sounds ranging from mundane beeps and whirs to critical cues such as fire alarms or spoken content. These sounds can be inaccessible not only to people with auditory-related disabilities, such as those who are deaf or hard of hearing, but also to hearing people in many situations. We all find conversations difficult to hear in noisy bars, doorbells inaudible over a vacuum cleaner running, or may miss a phone ringing while showering. In this talk, I will discuss my lab's ongoing efforts in advancing "sound accessibility" through design of interactive systems that leverage state-of-the-art in machine learning, signal processing, and wearable technology to sense and provide sound feedback.

Wei Hu

Title: *What is Weird about Deep Learning and What Can Theory Do?*

Abstract: Deep learning has been widely applied and has achieved remarkable empirical success in AI across a variety of application domains, with far-reaching impacts across scientific communities, industry, and society. However, the complex and oftentimes surprising behavior of deep neural networks goes far beyond what classical statistical and optimization theories can capture. This talk will explain some of the major theoretical questions in deep learning and present a few attempts toward building a theoretical foundation of deep learning.

Sile O'Modhrain

Title: *Supporting Spatial Literacy for Blind Learners using Haptic Technology*

Abstract: It is a common misconception that spatial literacy is dependent on being able to see. True, vision is the optimal sensory modality for perceiving spatial attributes such as the relative position and orientation of objects in a scene. These same attributes are also available to the haptic modality when presented at an appropriate scale.

The increasing requirement for spatial literacy, the ability to read graphs and charts and to interact with dynamic models, that is driven by rapid advances in techniques for visualizing data is changing how students are required to learn. Consequently, educational curricula are being redesigned to address this need.

In this talk, I propose that spatial thinking is not synonymous with visual thinking and that blind learners need to acquire the same skills as their sighted peers if they are to compete for jobs in today's knowledge economy. But to have equivalent access, they need new tools, tools which we, as designers of haptic devices and haptic interaction, are well situated to provide. I will present findings from the growing body of work on haptic representations designed for blind users and will indicate where there are still significant challenges that need to be addressed.

Stella Yu

Title: *Learning Visual Organization from Nothing but Data*

Abstract: Suppose that you have collected a lot of images. You would like to know: What are essential patterns to focus on in this data collection? How many types of patterns are there? What are the relationships among them? Our key insight is that structures in the visual data can be discovered without a model being taught what to see. I will present our recent work on unsupervised learning of visual recognition: seeing objectness (figure/ground) from watching unlabeled videos, recognizing individual objects and parsing a visual scene into hierarchical semantic concepts simply from a collection of unlabeled images. Our data-driven computational modeling not only sheds light on human visual perception, but also opens up exciting new ways for scientists, engineers, and clinicians to analyze their data and make novel discoveries.