

## **Krishna Shenoy Title and Abstract**

Neural basis of reach preparation and communication prostheses

Our seemingly effortless ability to reach out and swat a fly or grab a cup belies the sophisticated neural computations at work in our nervous system. It has long been recognized that, before moving, we somehow prepare neural activity such that, when called upon, the desired movement unfolds. But the goals of movement preparation and the underlying neural mechanisms remain poorly understood. I will describe some of our recent electrophysiological investigations of how premotor cortex prepares and helps execute movements. Our results suggest that the brain is attempting to optimize preparatory neural activity and can delay movement until this activity is sufficiently accurate. With an increased understanding of movement planning, it is also possible to design real-time electronic systems capable of translating neural plans into prosthetic movements. I will also describe our recent electrophysiological investigations aimed at establishing the fundamental, neurobiologically dictated performance limits of communication prostheses. Our results suggest swift and accurate performance is possible, which is essential for starting to assess the potential benefits of clinical cortically-controlled prosthetic systems.