Featured Speaker

Thomas McMahon Memorial Lecturer 2014

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TITLE: "Toward Clinically Viable Brain-Machine Interfaces"

ABSTRACT: Brain-Machine Interfaces (BMIs) aim to help with paralysis by translating neural signals from the brain into control signals for guiding computer cursors, prosthetic arms, and other assistive devices. Intracortical electrode arrays measure action potentials and local field potentials from individual neurons, or small populations of neurons, in the motor cortex of the brain and can provide considerable information for

controlling prostheses. Despite several compelling proof-of-concept laboratory animal experiments and ongoing FDA Phase I clinical trials, at least three key challenges remain which, if left unaddressed, may hamper the translation of these systems into widespread clinical use. I will briefly review these challenges: (1) achieving able-bodied levels of performance across tasks and across environments, (2) achieving robustness across multiple years, and (3) restoring able-bodied quality proprioception and somatosensation. I will also describe some emerging opportunities for meeting these challenges, as well as recent results from our laboratory. If these challenges can be met, intracortically-based neural prostheses may achieve full clinical viability and help increasing populations.