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Presentation Abstract

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| Program#/Poster#: | 252.02/KK5 |
| Presentation Title: | Collaborative, multi-institutional intracortical bci research and the key role of the clinical neurotechnology research assistant |
| Location: | WCC Hall A-C |
| Presentation time: | Sunday, Nov 16, 2014, 1:00 PM - 5:00 PM |
| Presenter at Poster: | Sun, Nov. 16, 2014, 2:00 PM - 3:00 PM |
| Topic: | ++D.18.d. Neuroprosthetics: Control of real and artificial arm, hand, other grasping devices |
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| Abstract: | The BrainGate pilot clinical trials represent an important, ongoing collaborative |

effort to translate fundamental neuroscience and neuroengineering into a powerful assistive device for people with tetraplegia due to cervical spinal cord injury, stroke, muscular dystrophy, or motor neuron diseases including amyotrophic lateral sclerosis. There are four actively enrolling clinical trial sites: Massachusetts General Hospital (coordinating center), Providence VA Medical Center, Stanford Medical Center, and Case Western Reserve University. Researchers from those institutions, as well as at Brown University, also play a central role in the analysis of neural data, the creation of novel decoding algorithms, and the integration of the volitionally controlled neural signals. There have been nine participants enrolled thus far, with more than 6000 intracortical array implant days across those participants. Since January 2013, two active participants have been engaged in research sessions at Brown/MGH/PVAMC and Stanford. Of note, all BrainGate research sessions occur primarily in the research participant's place of residence. This ensures that the investigational BrainGate system is being developed and tested in the environment where such an assistive device must function for its future users. Through April 2014, there have been 123 research sessions run at Stanford University and 71 sessions run at Brown/MGH/PVAMC with the current two participants, both of whom have ALS. Sessions begin with a 20-30 minute setup period and usually last 2-4 hours, depending on the energy level, engagement, and daily schedules of the participants. Sessions involving neural cursor control typically consist of 10-20 blocks of data collection with 20-200 trials in each block (approximately 2-10 minutes). Clinical Neurotechnology Research Assistants (CNRAs) at both sites conduct sessions with a consistent style of interaction and "participant first" priority while enabling multiple scientific and engineering questions to be posed. The simultaneous enrollment of these two participants creates new opportunities and challenges in terms of both validating and deploying research sessions. The ability to test scientific hypotheses simultaneously with multiple participants has proven useful, allowing us to quickly iterate the development of advanced decoding methods for communication and multi-dimensional control of external devices.

Disclosures: **C.H. Blabe:** A. Employment/Salary (full or part-time):; Stanford University. **B. Sorice*:** A. Employment/Salary (full or part-time):; Massachusetts General Hospital. **D. Bacher:** None. **V. Gilja:** None. **M. Homer:** None. **B. Jarosiewicz:** None. **T. Milekovic:** None. **P. Nuyujukian:** None. **C. Pandarinath:** None. **J.A. Perge:** None. **J. Saab:** None. **A.A. Sarma:** None. **K.V. Shenoy:** None. **J.D. Simeral:** None. **J.P. Donoghue:** None. **J.M. Henderson:** None. **L.R. Hochberg:** None.

Keyword (s): AMYOTROPHIC LATERAL SCLEROSIS

BRAIN Computer Interface

Support: Office of Research and Development, Rehabilitation R&D Service, Department of Veterans Affairs (B6453R)

NIDCD (R01DC009899)

NICHD-NCMRR (N01HD53403)

NICHD-NCMRR (N01HD10018)

Doris Duke Charitable Foundation