# Advanced neural decoders for the restoration of communication

https://neurodegenerationresearch.eu/survey/advanced-neural-decoders-for-the-restoration-of-communication/

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**Country**

USA

**Title of project or programme**

Advanced neural decoders for the restoration of communication

**Source of funding information**

NIH (NINDS)

**Total sum awarded (Euro)**

€ 3,386,627.52

**Start date of award**

01/04/2015

**Total duration of award in years**

4

**The project/programme is most relevant to:**

Motor neurone diseases

**Keywords**

Locked-In Syndrome, alternative communication, Augmentative and Alternative Communication, restoration, Brain Stem Infarctions

**Research Abstract**

? DESCRIPTION (provided by applicant): Difficulty with communication is a widespread problem, reported by more than 2 million people in the US. Communication may be a particular

challenge for people with total paralysis (“”Locked-in Syndrome”” or LIS) from disorders such as brainstem strokes or advanced Amyotrophic Lateral Sclerosis (ALS). People with these disorders rely on augmentative and alternative communication (AAC) technology that can be inefficient, often not designed with their unique access needs in mind, and therefore frustrating to implement successfully. Brain-computer interface (BCI) systems provide one promising avenue for restoring communication capabilities to people with LIS. However, these systems currently offer performance well below that achievable by able-bodied computer users. The overall objective of the proposed research is to evaluate advanced neural decoding methods and interfaces for a high-performance communication system for people with LIS. To accomplish this, we propose 3 Specific Aims as follows. Aim 1: We will evaluate whether advanced decoding techniques developed in the animal laboratory can improve continuous point-and-click control of a computer cursor from signals decoded from human motor cortex. Aim 2: We will optimize parameters for high-speed discrete target selection (i.e., typing) by decoding movement intent from pre-motor cortex. Aim 3: We will test new communication interfaces based on the results of Aims 1 and 2 against each participant’s usual AAC system, with the goal of providing faster and easier communication. Finally, we will assess the ability of research participants to control a commercial computer GUI and typing interface while switching between continuous and discrete decoding.

**Lay Summary**
PUBLIC HEALTH RELEVANCE: Difficulty in communication is a widespread problem, with an estimated 2.5 million people in the US reporting trouble with speech and communication. People with late stage amyotrophic lateral sclerosis (ALS) and locked in syndrome (LIS) from brainstem stroke have unique communication needs that are difficult to address with augmentative and alternative communication technology. Our proposed research aims to dramatically increase the performance of computerized communication systems driven by decoded brain activity, with the goal of improving the quality of life for people with unique communication needs.

**Further information available at:**

**Types:**
Investments > €500k

**Member States:**
United States of America

**Diseases:**
Motor neurone diseases

**Years:**
2016

**Database Categories:**
N/A

**Database Tags:**
N/A