



A non-profit initiative

Information and Technology Transfer from Research
Environment to Health Care System

Brain Computer Interfaces for Personalized Communication

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Overview

- ❖ Brain Computer Interface (BCI)
- ❖ Non-Invasive BCI
- ❖ Invasive BCI
- ❖ Personalized Communication

Brain Computer Interface (BCI): Why?



If we are left alone everything becomes unbearable.
- Antonio Porchia



Brain Computer Interface (BCI) : The Need

❖ Paralysis

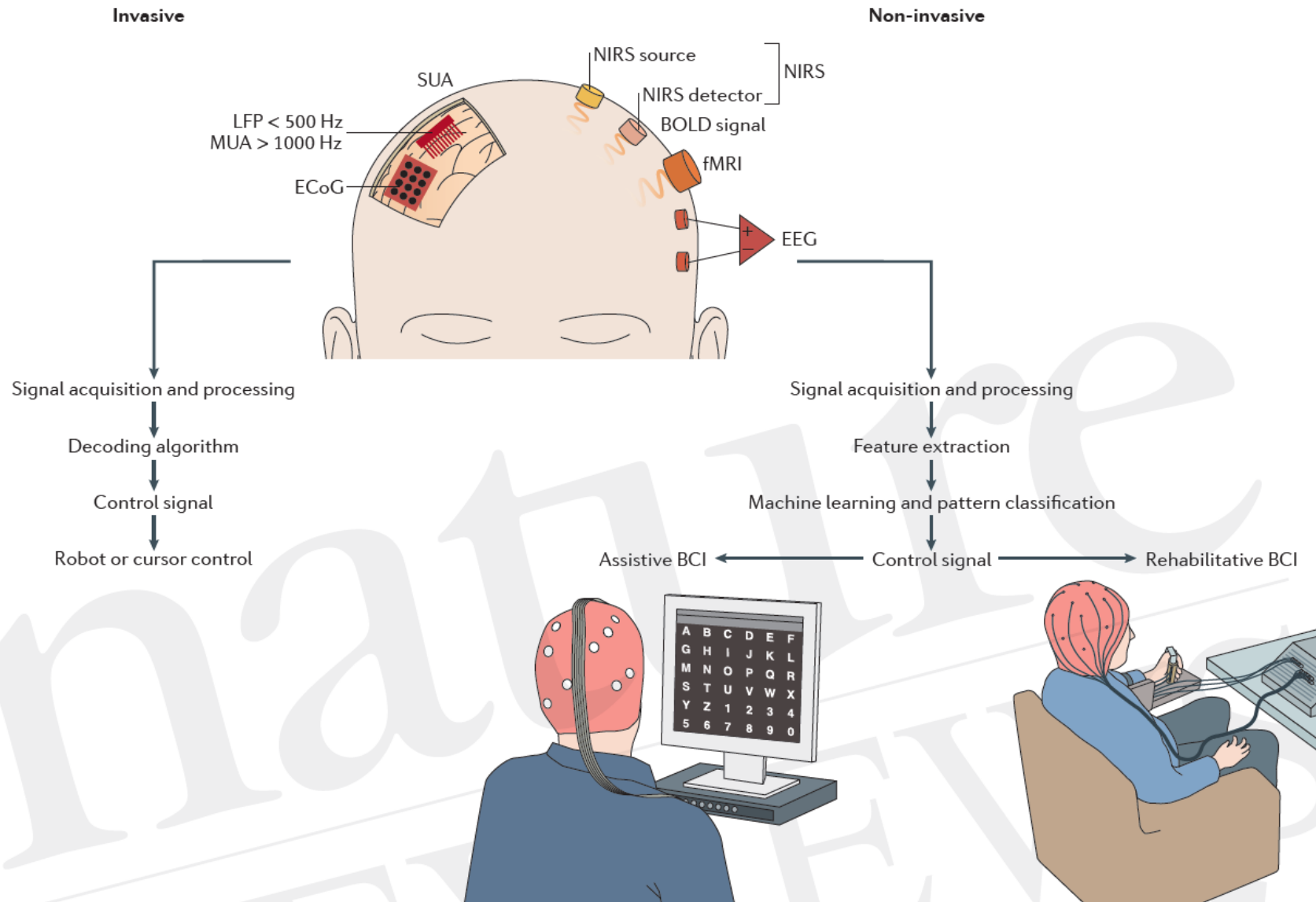
- Motor Neuron Disorders – ALS, MS...
- Stroke
- Tetraplegia
- Spinal Cord Injury

❖ Loss of Motor function

❖ Loss of communication means

Chaudhary et al., Annals of physical and rehabilitation medicine 2015; Chaudhary et al., Nature Reviews Neurology 2016; Chaudhary et al., Progress in Brain Research 2016; Chaudhary et al., The Journal of physiology 2021; Chaudhary et al., International journal of neural systems 2021.

BCI: What and How?





Auditory Spelling by Patient 16










Auditory Spelling by Patient 11

ARTICLE

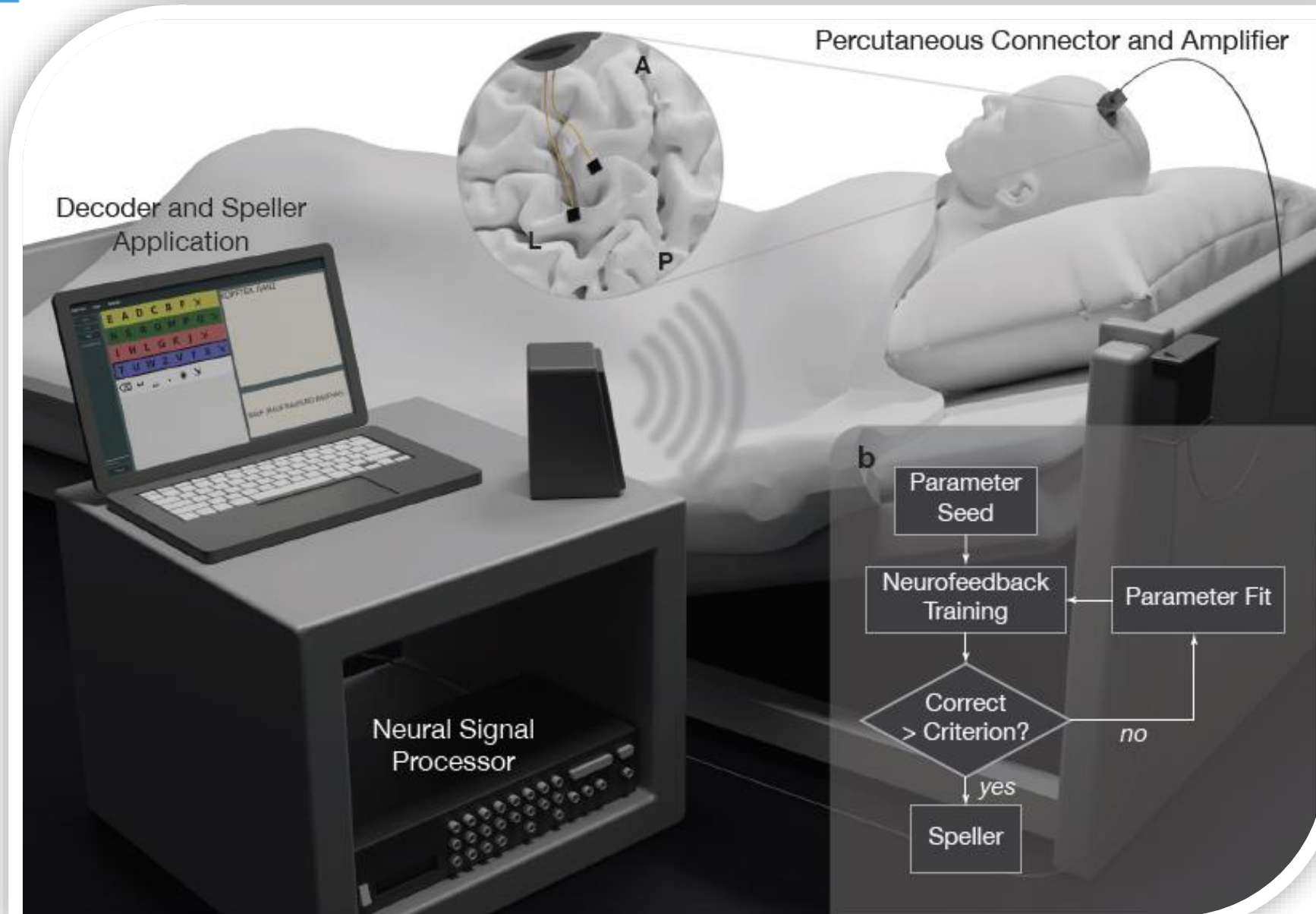
<https://doi.org/10.1038/s41467-022-28859-8>

OPEN

Spelling interface using intracortical signals in a completely locked-in patient enabled via auditory neurofeedback training

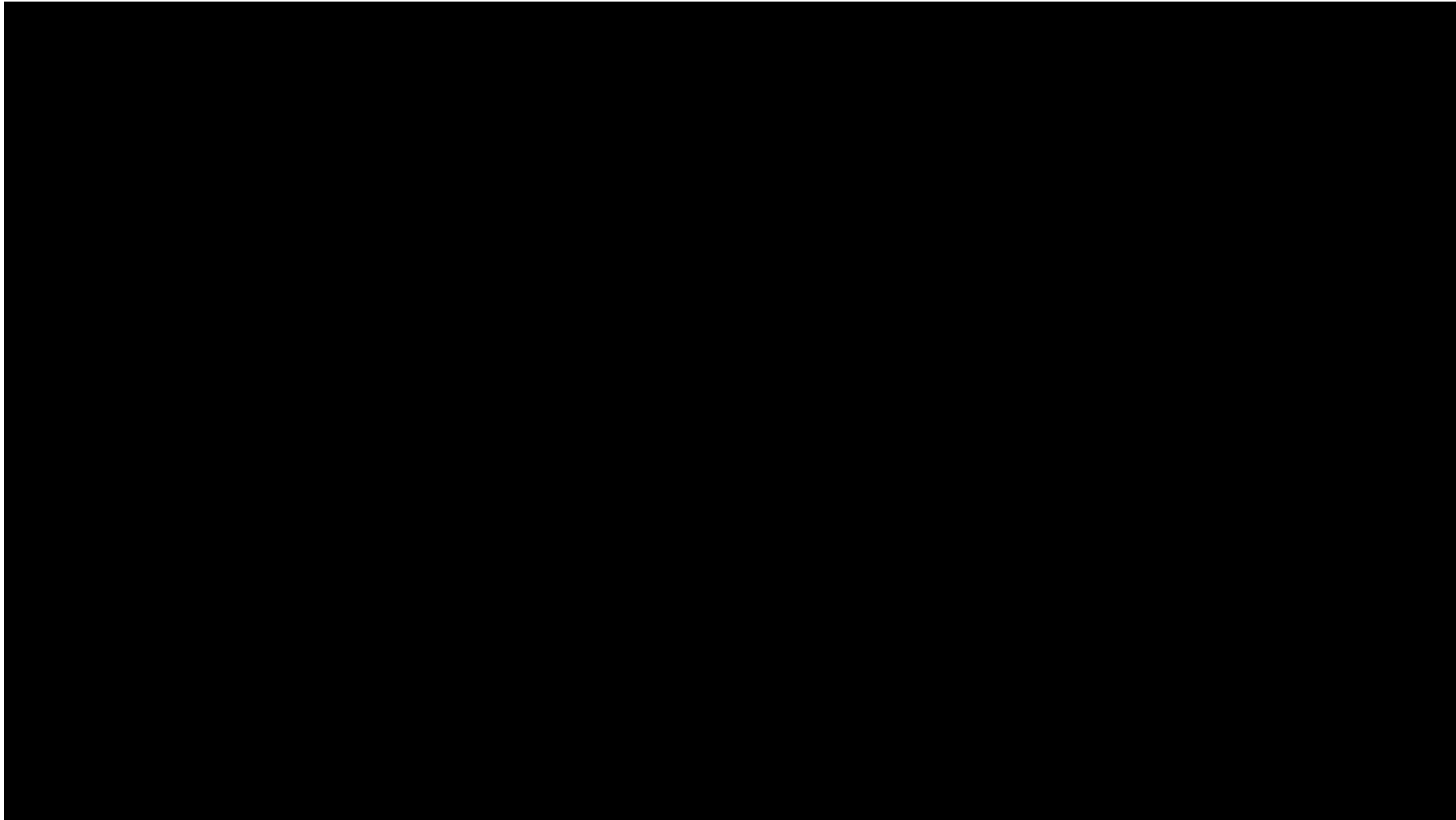
Ujwal Chaudhary ^{1,8✉}, Ioannis Vlachos^{2,8}, Jonas B. Zimmermann ^{2,8✉}, Arnau Espinosa ²,
Alessandro Tonin^{2,3}, Andres Jaramillo-Gonzalez ³, Majid Khalili-Ardali ³, Helge Topka⁴, Jens Lehmberg⁵,
Gerhard M. Friehs⁶, Alain Woodtli², John P. Donoghue⁷ & Niels Birbaumer^{3✉}

Invasive BCI : Setup

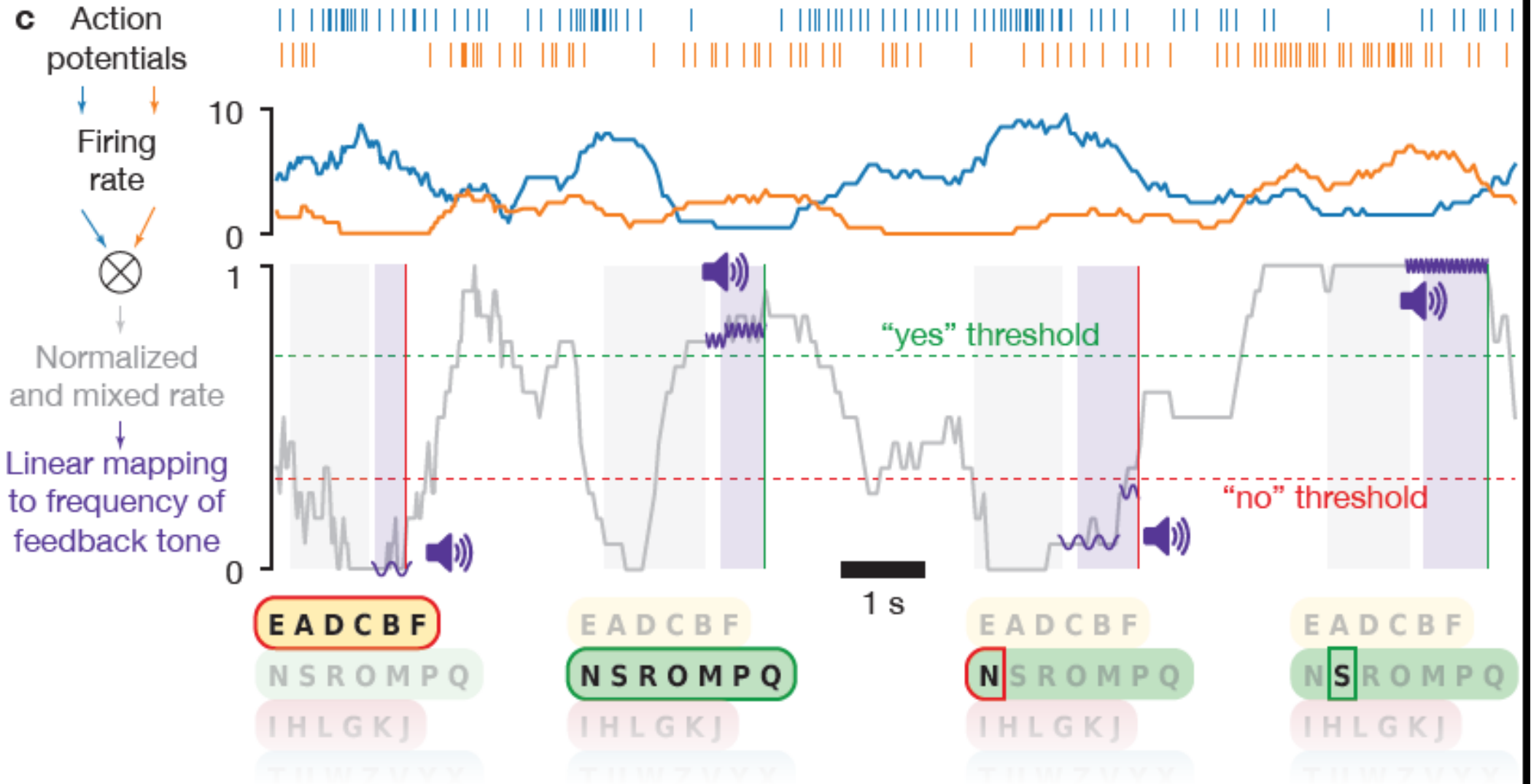




Neurofeedback with Reward

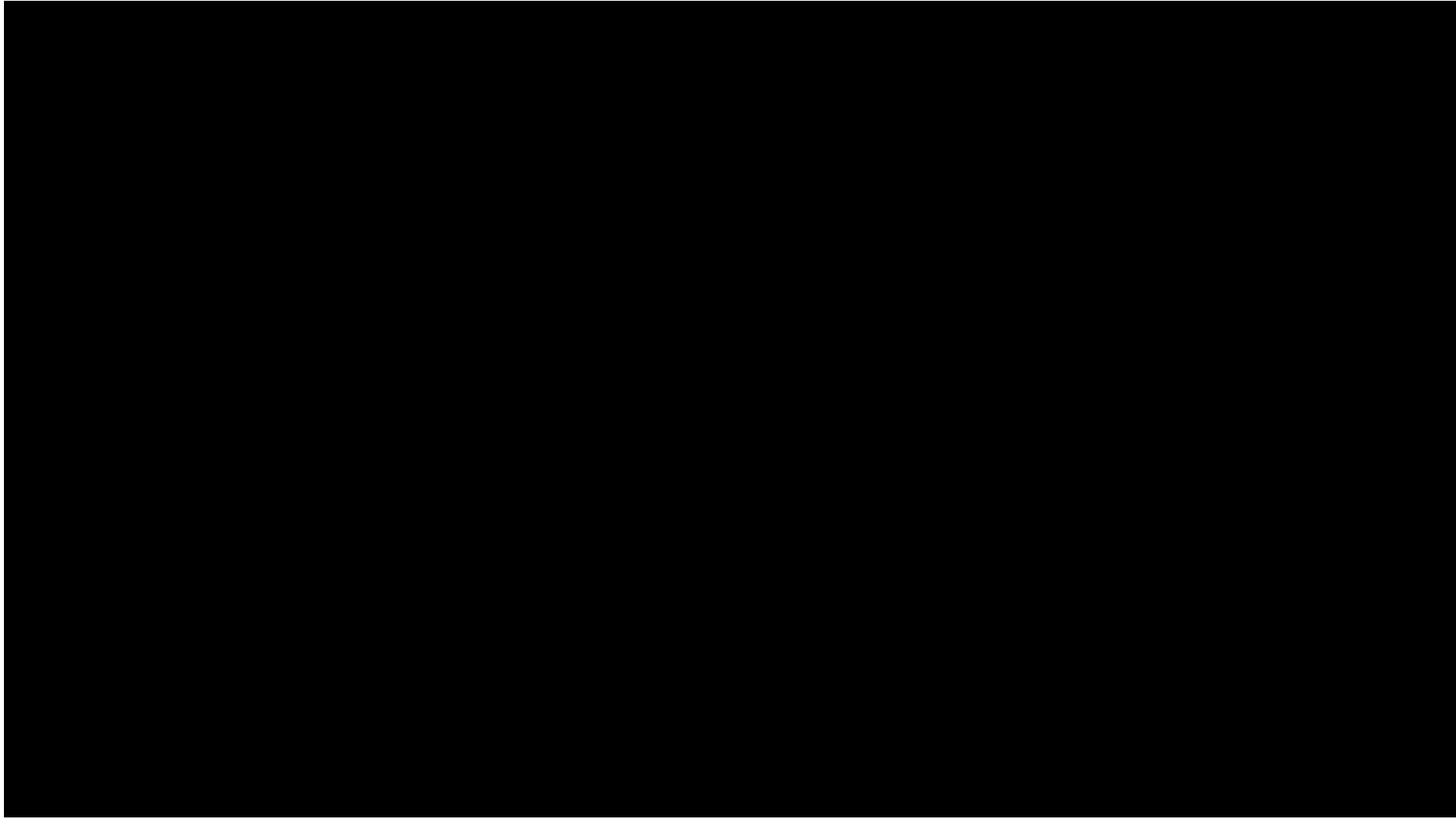


Neural Signal





An Auditory Speller Session





Personalized Communication Solution

- ❖ Non-invasive and Invasive BCI for communication
- ❖ Successfully demonstrated that communication is possible in completely locked in ALS patients

- We offer personalized communication services where we provide
 - ✓ Consultation and evaluation
 - ✓ An expert to facilitate communication and training
 - ✓ Regular assessment of the communication performance
 - ✓ Adaptation of the hardware and the software according to progression of ALS.



A non-profit initiative

Aims to provide *voice* to patients with communication deficits

alsvoice.org

Ujwal Chaudhary, PhD
Managing Director & Co-founder

contact@alsvoice.org

Thank you