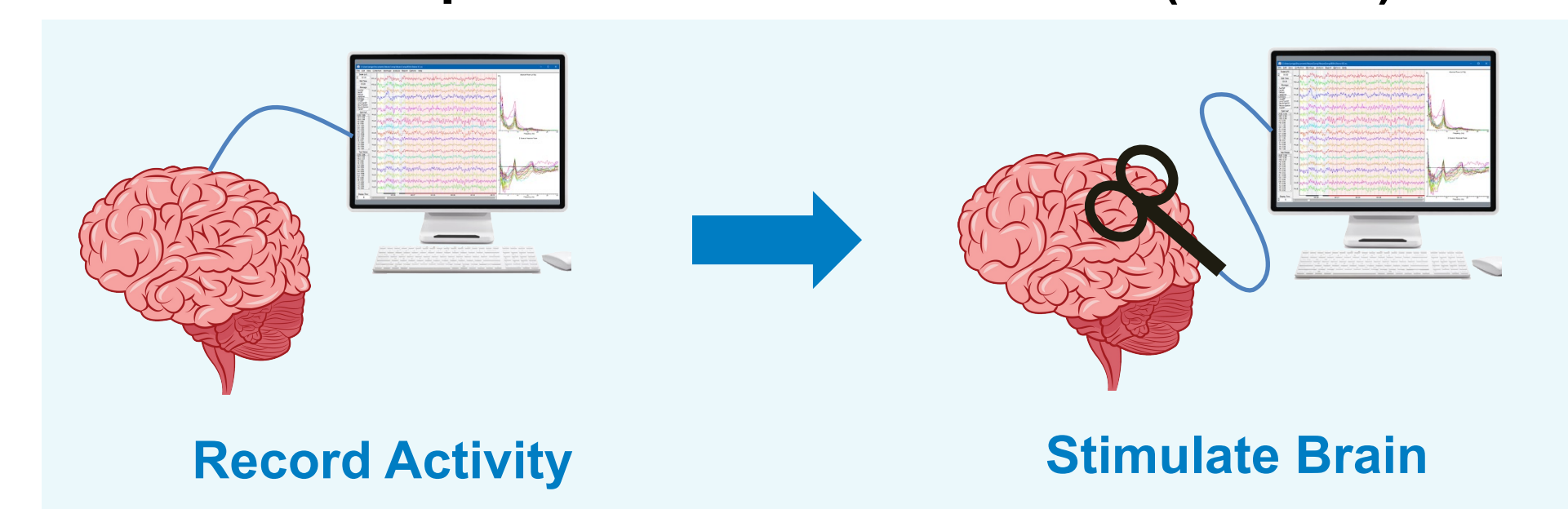


Brain State-Dependent Brain Stimulation: a Review of the Current Implementations and Preliminary Interpretations from the EEG of Youth

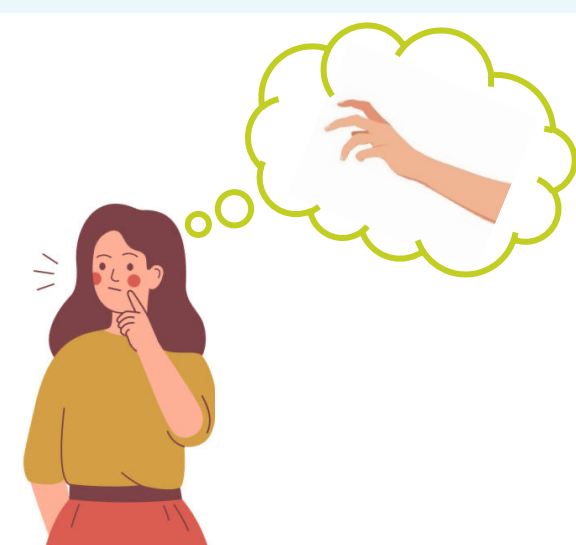
Sofia Varon¹, Nilou Hashemi^{1,2}, Deryk Beal^{1,3}, Tom Chau^{1,2}
 1 Bloorview Research Institute, Holland Bloorview Kids Rehabilitation Hospital
 2 Institute of Biomedical Engineering, University of Toronto
 3 Rehabilitation Sciences Institute, University of Toronto

Background

Brain State-Dependent Brain Stimulation (BSDBS)

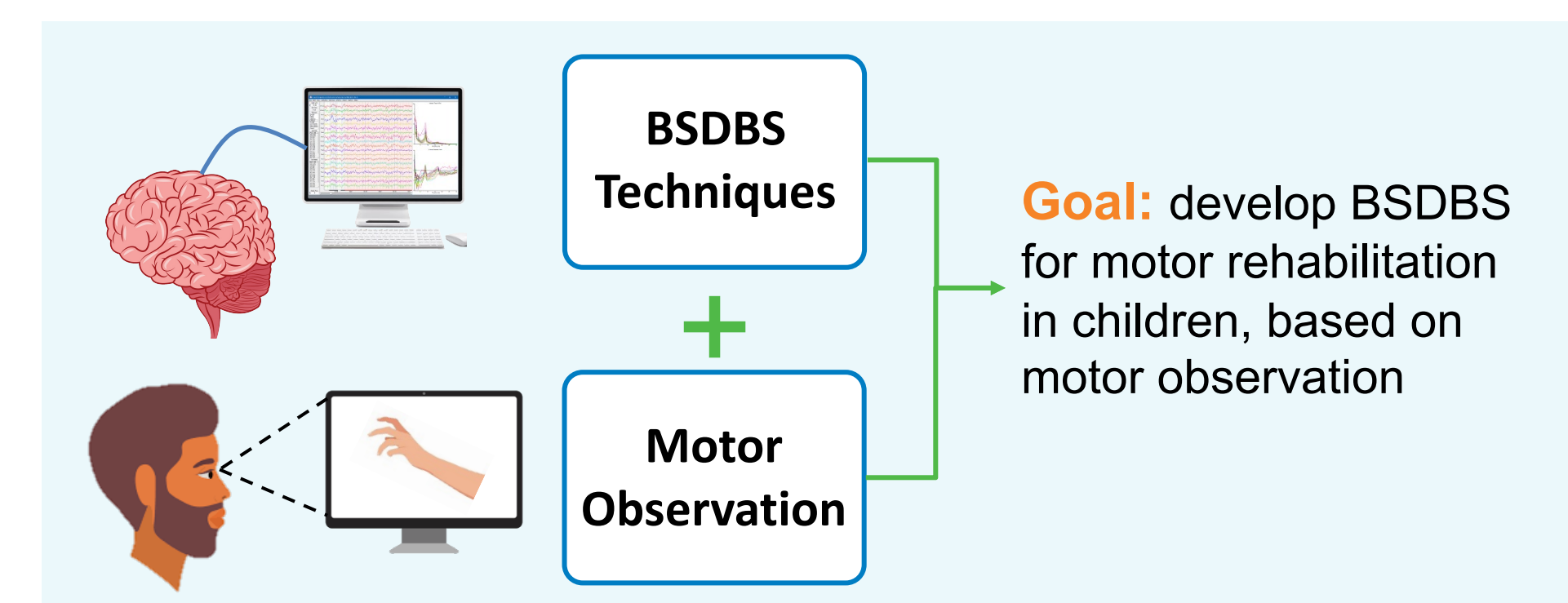


- Stimulation of the brain based on the activity of the brain
- Commonly used in motor rehabilitation in adults, based on **motor imagery**

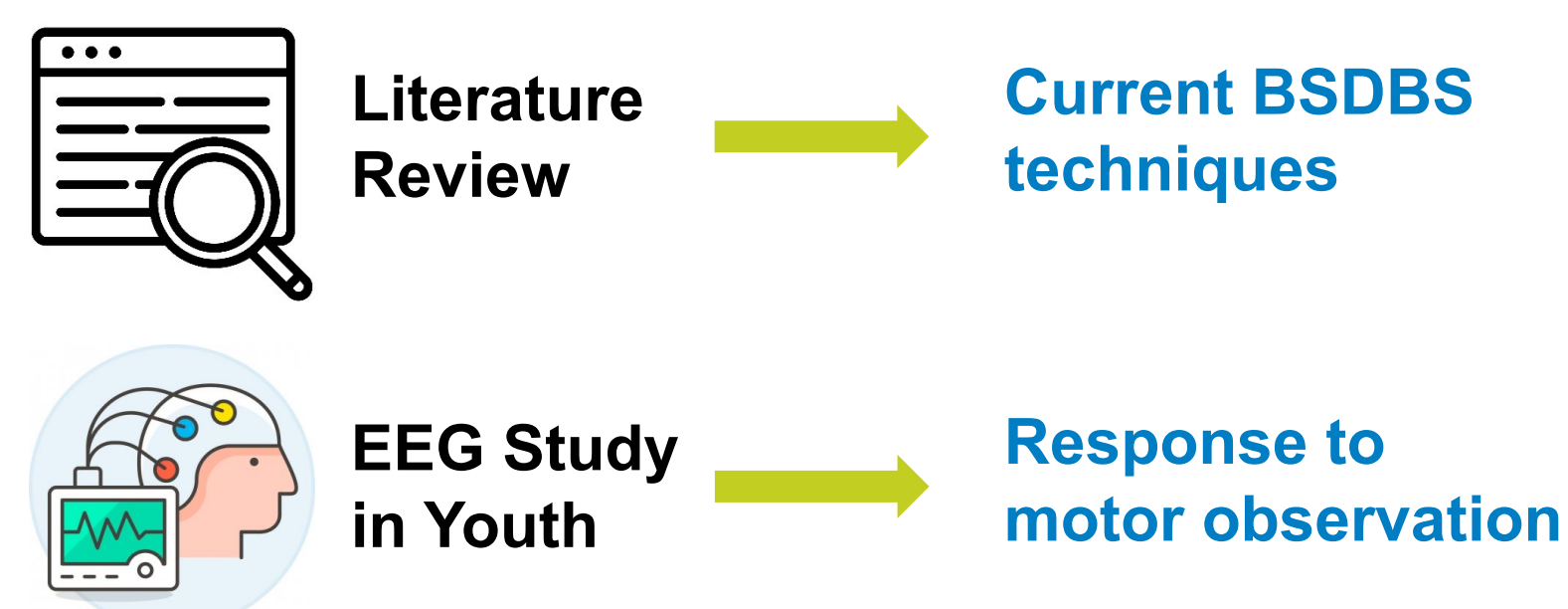


Objective

- BSDBS has not been used for motor rehabilitation in children
- **Obstacle:** Motor imagery is unreliable in children



Design



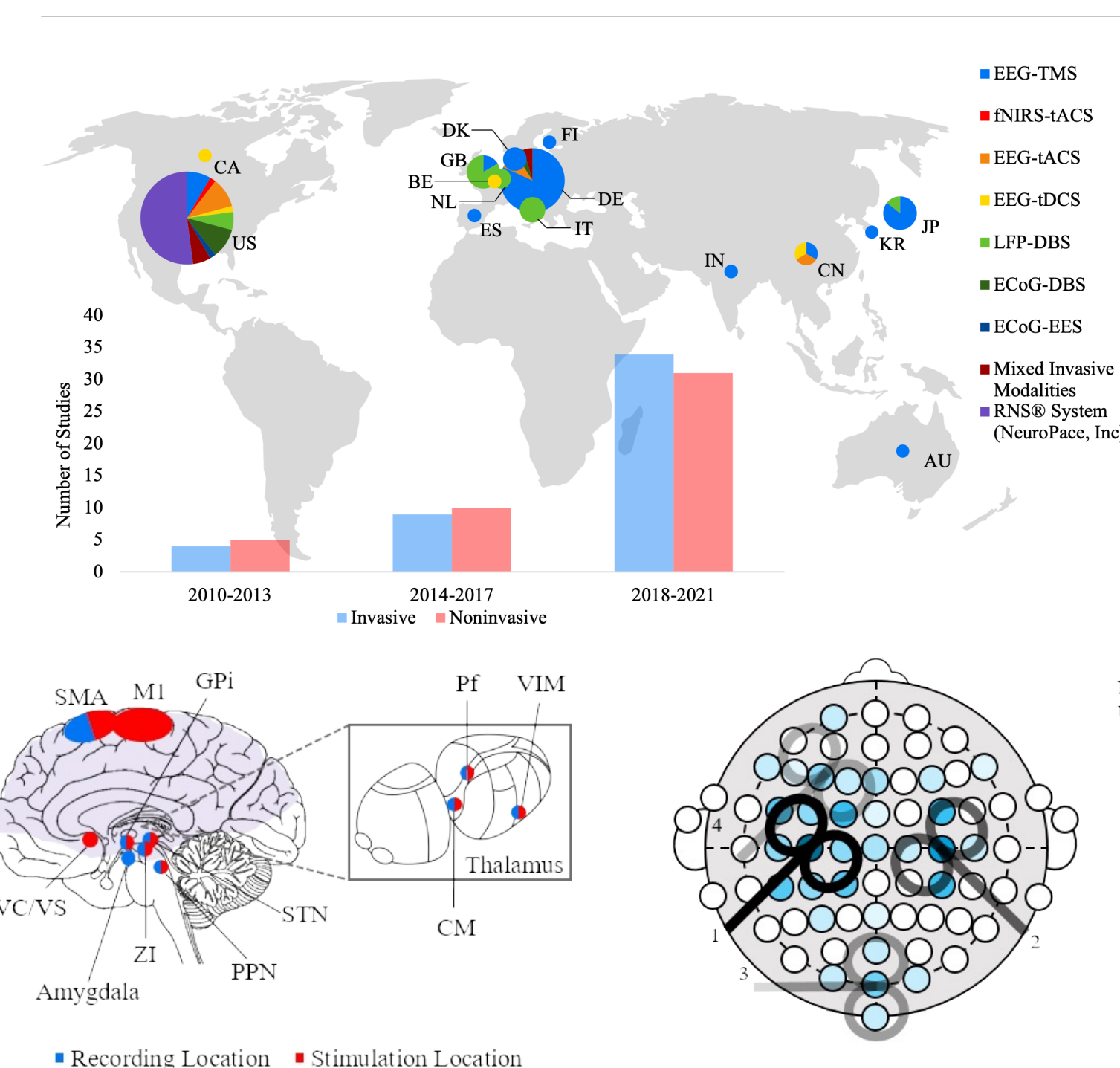
Observation of a movement can be used to develop a new method of motor rehabilitation for children with upper limb paralysis or weakness



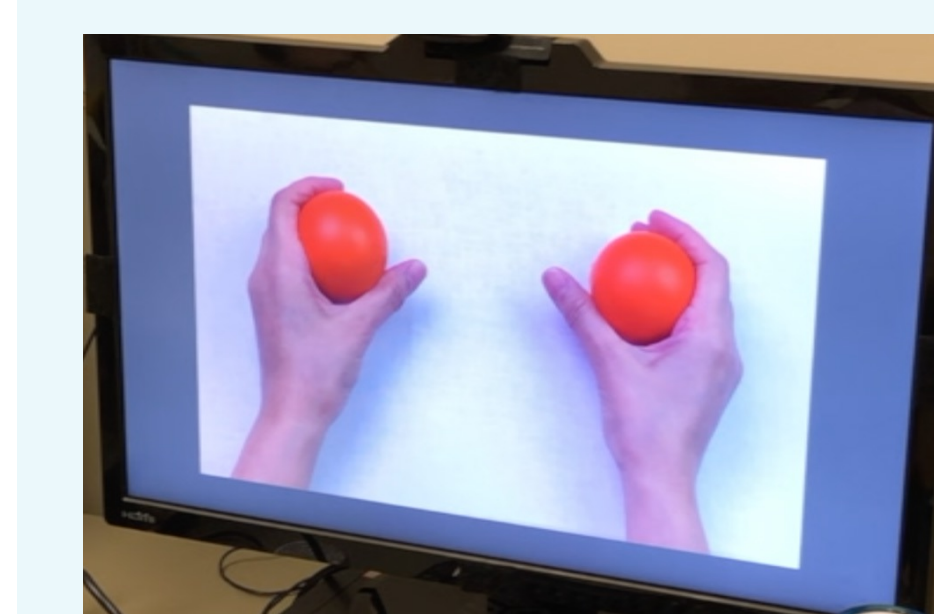
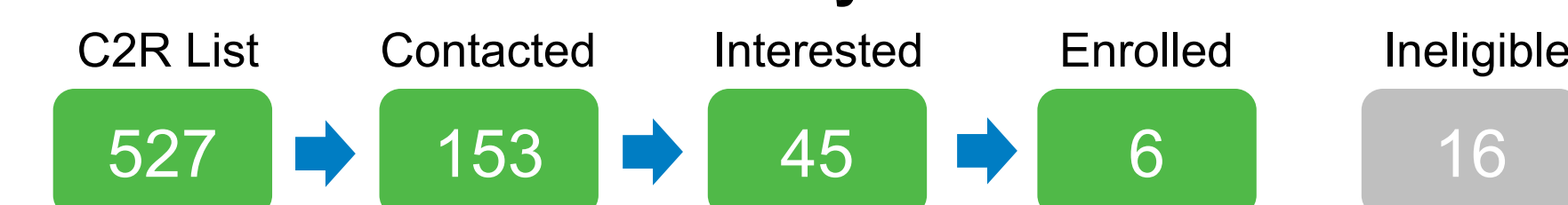
Methods

Literature Review

BSDBS Studies Reviewed: 102



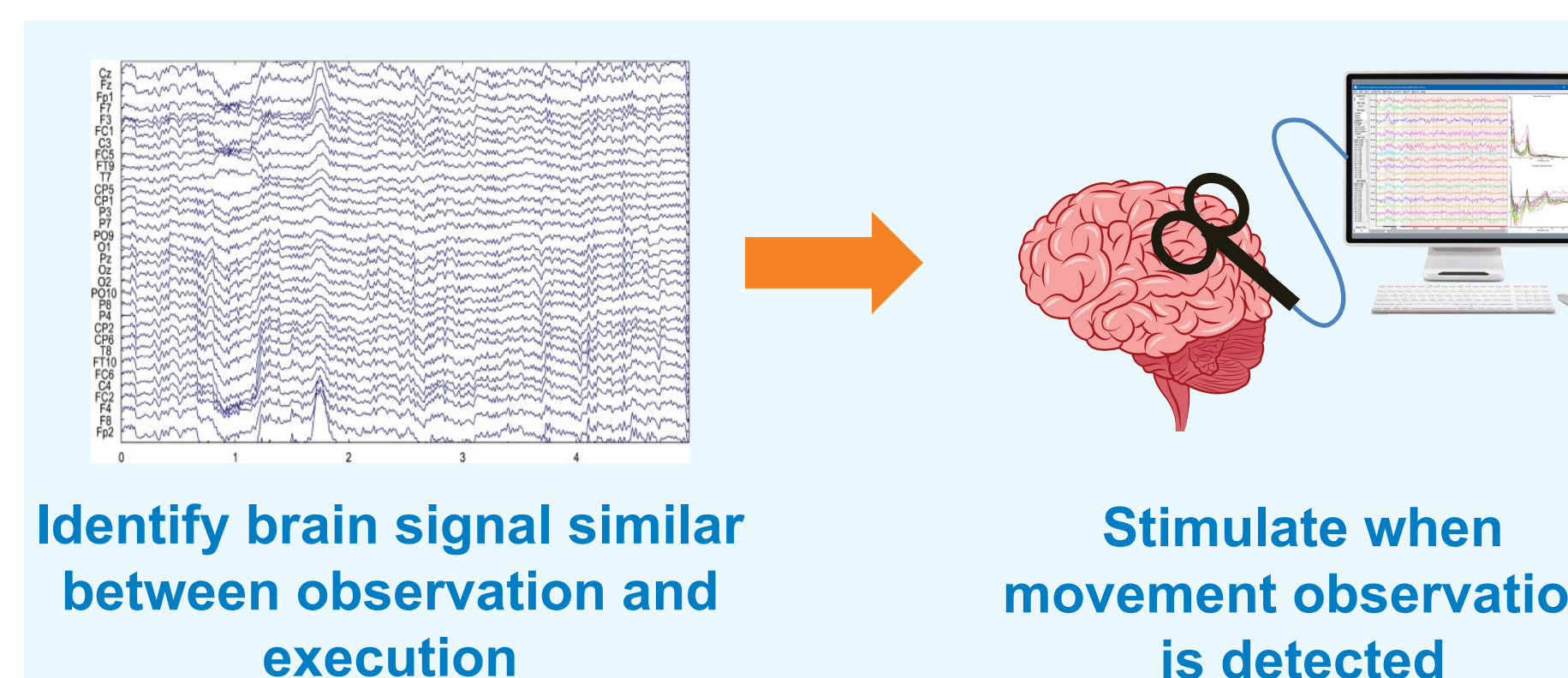
EEG Motor Observation Study



- Youth (9-19) with upper limb weakness or paralysis
- Observed or executed a hand squeezing motion
- GRASSP assessment

Results and Next Steps

- **RESULTS:** identification of brain signal with similar activity between observation and movement
- **NEXT STEPS:** develop brain-computer interface that triggers hand movement when movement observation is detected



Relevance to Holland Bloorview → new method of motor rehabilitation for children