# ASET@TIFR

# Brain-Computer Interfaces (BCIs) for restoring lost speech and movement in people with neurological injury


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Neurological injury or neurodegenerative diseases can lead to paralysis causing severe speech and movement impairments, dramatically reducing the quality of life and independence in millions of people. Brain-computer interfaces (BCIs) can offer a potential solution to restore lost speech and movement by bypassing damaged parts of the nervous system and directly deciphering their brain signals. The speaker will talk about her research on implanted intracortical BCIs to restore naturalistic speech to persons with ALS. She has decoded their neural signals into words or directly synthesized their voice from the activity of hundreds of single neurons recorded from surgically implanted microelectrode arrays in the speech-motor cortex. She will also give an overview of her previous neurotechnology research on non-invasive BCIs for detecting movement intention from aggregate brain waves recorded from the surface of the scalp using EEG sensors, neurotechnology for motor and language rehabilitation after stroke, and affective robotics for at-home dementia care.

*Dr Maitreyee Wairagkar is a neuroscientist and neuroengineer developing advance neurotechnology using artificial intelligence. She is a Postdoctoral Scholar at the University of California Davis, USA where she has built implanted brain-computer interfaces (BCIs) to enable people with severe speech and motor impairments to communicate directly via their brain signals. Previously, she was a Postdoctoral Research Associate at Imperial College London, UK. She earned her PhD and Meng degrees in AI and Cybernetics from the University of Reading, UK. Her research focuses on healthcare applications of neurotechnology in rehabilitation and assistive devices for people with different neurological conditions, for example, enabling a person with paralysis to fluently speak through a neuroprosthesis, neurorehabilitation for stroke recovery, and robotic care for dementia. Her previous research has also been commercially translated. She has received the 2023 International BCI Award, 2022 Nature Inspiring Women in Science Award runner-up, and India UK Achievers Honours 2023.*

**March 1 2024 at 4 p.m.**
**(Hybrid) Lecture Theatre AG 66, TIFR**

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