

Overview

Neurometrics Lab investigates behavioural and physiological traits linked to neurological and neuropsychiatric states to determine disease-specific signatures that distinguish them from clinically ambiguous presentations. Our team applies neurometric principles to quantify pathological biomarkers associated to neurobiological deviations and integrates big-data analytics to classify disease conditions and predict their progression. Ultimately, our vision is to develop deployable tools that enhance diagnostic accuracy and aid precise patient stratification in resource-limited settings.

Research areas

Differentiating epilepsy from functional dissociative seizure (FDS):

Misdiagnosis of FDS as epilepsy is a global problem. In India it is as high as 1 in 3 individuals. In this project, we analyze surface-EEG and blood metabolome profiles of patients with these diseases to capture distinctive features related to each condition. Goal is to develop an assay which can be easily deployed in the rural part of India to assist in epilepsy and FDS classification.

Unmasking attention deficit hyperactivity disorder (ADHD) in Epilepsy comorbidity:

ADHD is one of the most prevalent neuropsychiatric comorbidities in children with epilepsy, with reported rates as high as 77%, compared to 3–5% in the general paediatric population. Strong manifestations of epilepsy — particularly deficits in metacognitive control — often suppress or obscure ADHD phenotypes, making diagnosis difficult. To address this diagnostic challenge, our lab is developing an integrated screening framework that combines speech acoustic profiling and eye-tracking metrics to identify robust, differentiable markers of ADHD within the epilepsy spectrum.

Impact of Anti-Seizure Medications (ASMs) on Endothelial Function and Vascular Health:

Epilepsy often requires lifelong ASM therapy, yet growing evidence links both the condition and its treatments to heightened vascular risk. Epidemiological data show increased mortality from ischemic heart disease (SMR 1.2–2.5) and an even greater risk of cerebrovascular mortality (SMR 3.7–5.3). Enzyme-inducing ASMs have been associated with adverse changes in vascular risk markers, while enzyme-inhibiting agents such as valproic

acid, though avoiding induction pathways, can trigger severe metabolic disturbances, including obesity in up to 71% of patients. The complex interplay between these pharmacologic effects and vascular physiology remains unclear. Our research aims to delineate how different ASM classes impact endothelial function, arterial stiffness, and cardiovascular and cerebrovascular outcomes.

Current Group Members

Suman Das
(Assistant Professor) : Group Lead

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Neha Priya Shrivastava
(Project Research Scientist-II) : Bachelor of Dental Sciences (Bangalore) and PG Diploma in Public Health Management (IIPH-Delhi) with 6+ years of research experience. Currently working as Project Scientist on an ICMR-funded study focused on neurophysiological biomarkers for differentiating dissociative seizures from epilepsy, with key responsibilities in data collection and management.

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Akanksha Subudhi
(Project Research Scientist- I) : Completed M.Tech in Artificial Intelligence from DIAT, Pune. Currently working as a project scientist under the ICMR funded project 'Differentiating epilepsy and functional dissociative seizures (FDS)' by analysing neurophysiological biomarkers.

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Kajal Sharma
(Senior Research Fellow) : Completed masters in Biotechnology, secured AIR 135 in CSIR UGC NET and currently working on a project focused on Attention-Deficit/Hyperactivity Disorder (ADHD), where my responsibilities include data collection (Visual tracking and voice task) and subsequent epigenetic analysis."

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Ujjawal Chandela
(Junior Research Fellow)

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: Completed M.Tech in signal processing and communication from DIAT, Pune. Currently, working as a JRF for SERB-DST funded project 'Identifying early signs of attention-deficit/hyperactivity disorder (ADHD) in children by decoding their acoustic vocal profile'.

Former Group Members

Sulagna Sana
(Research Intern)

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: Completed M.Sc. in Cognitive Science from the Indian Institute of Technology (IIT) Delhi. Worked as a Research Intern on the project "Effects of anti-seizure medications on local and regional arterial stiffness in epileptic patients."