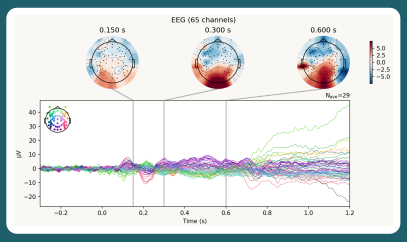
School of Interwoven Arts and Sciences · Krea University · Computational Cognition Laboratory

EEG Analysis Bootcamp

From a raw 64-channel recording to a clean event-related potential, twice: scripted in Python with MNE, then replicated in MATLAB with EEGLAB.

Saturday, 12 September 2026

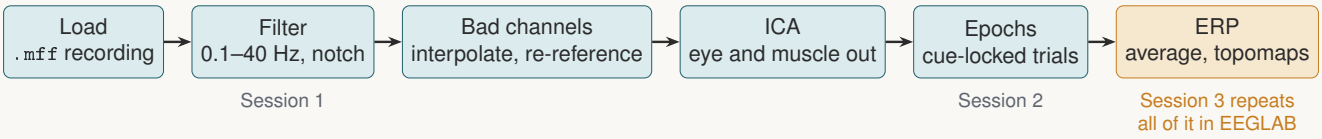
09:15 – 17:00 · three sessions, six contact hours
Computer lab, SIAS, Krea University, Sri City (room to be confirmed)



What participants produce by the end of the day: an event-related potential with scalp maps, from a real lab recording

A hands-on workshop offered through PSYC239 Programming for Psychologists · Instructor: Dr. Rakesh Sengupta

The pipeline participants build — twice



What the day is about

Every participant takes one real recording — a 64-channel EGI dataset from the Computational Cognition Laboratory's covert/overt articulation study — from the file on disk to a finished ERP, first in Python with MNE, then again in MATLAB with EEGLAB. The point is not only the pipeline but the comparison: what each step does, why two toolboxes make the same decisions in different clothing, and how to read a Methods section critically.

By the end of the day, each participant has

- a working Jupyter notebook that loads, filters, cleans, epochs and averages the dataset in MNE-Python;
- an EEGLAB `.set` file and script reproducing the same pipeline;
- a one-page written comparison of the two outputs (take-home, due the following week);
- a Methods paragraph they can defend, written from their own numbers.

Who should attend

Students of PSYC239 (Programming for Psychologists). Other SIAS students with an interest in cognitive neuroscience are welcome as seats allow. No prior EEG experience is assumed; basic Python familiarity helps. Participants bring their own laptops; lab machines with MATLAB licences are reserved for the EEGLAB session.

Three sessions, one dataset

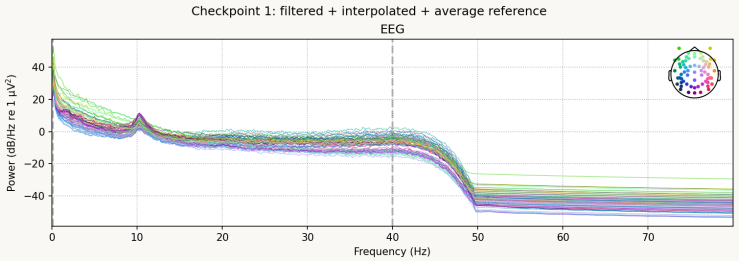
09:30	**Session 1 — MNE I: raw to clean.** Sampling, channels, reference; loading an `.mff`; filtering; bad channels; average reference.
11:45	**Session 2 — MNE II: clean to ERP.** ICA for eye and muscle artefacts; events and epochs; averaging; topographic maps; a first look at time–frequency analysis.
14:45	**Session 3 — The EEGLAB round.** The same pipeline replicated in EEGLAB; side-by-side comparison of the two ERPs and where they differ.
16:45	**Wrap-up.** Take-home briefing and feedback.

How the day is run

Three checkpoints, one per session, verified by the teaching fellow so that no one falls silently behind. Slide decks, scripts and a backup copy of the dataset are shared with participants; laptops are set up at an install clinic earlier in the week.

The dataset

One anonymised participant from the laboratory's study of alpha-band power during covert and overt articulation (Gundapaneni, Sengupta, Mandal & Maganti, in press): a 22-minute, 250 Hz, 64-channel EGI recording with 200 cued trials across five conditions — silently or aloud articulating real words and nonce words, plus a no-articulation control. Participants work with the same file, the same event codes and the same preprocessing decisions that appear in the published Methods, so the bootcamp doubles as a guided reading of a real paper.



Checkpoint 1 in Session 1: the power spectrum of that recording after filtering, channel repair and re-referencing — the alpha peak at 10 Hz is the participant's own.

Learning outcomes

- Explain what an EEG file contains and read its metadata: sampling rate, channels, reference, filters applied.
- Choose and justify filter settings, and describe what filters can distort.
- Identify and repair bad channels; explain why the reference matters and when to re-reference.
- Use independent component analysis to remove eye and muscle artefacts, and defend the components removed.
- Turn event markers into labelled epochs, apply baseline correction and rejection, and read a drop log.
- Produce and interpret an ERP, its topography and a condition comparison; report the pipeline as a Methods paragraph.
- Recognise the same decisions across two toolboxes and account for numerical differences between them.

Instructor

Dr. Rakesh Sengupta
Assistant Professor, SIAS
Principal Investigator, Computational Cognition Laboratory

Rakesh works on computational neuroscience — recurrent network models of visual working memory, numerosity and temporal cognition — alongside the philosophy of cognitive science. He holds a PhD from the University of Hyderabad and held postdoctoral positions at the Centre for Vision Research, York University, and at IIT Madras. He teaches psychology and neuroscience at Krea and runs the laboratory's EEG programme.

Teaching team

Lekhana Priya Gundapaneni — Teaching Fellow. Coordination, co-instruction, checkpoint verification; first author of the study the dataset comes from.

Rakshitaasai Karthinarayanan — Teaching Assistant. Python and MNE floor support, environment troubleshooting.

Arush Menon — Teaching Assistant. MATLAB and EEGLAB setup, lab-machine and logistics support.

Practical information

Date: Saturday, 12 September 2026
Time: 09:15 arrival; sessions 09:30–17:00
Venue: Computer lab, SIAS, Krea University, Sri City
Bring: your laptop and charger (install instructions circulated the week before; optional install clinic on the Thursday)
Contact:
rakesh.sengupta@krea.edu.in