भारतीय प्रौद्योगिकी संस्थान कानपुर
Indian Institute of Technology Kanpur

COGNITIVE SCIENCE

POST GRADUATE PROGRAM

COGNITIVE SCIENCE

Cognitive science asks fundamental questions mental functions such as attention, perception, learning, language, decision-making etc, which give rise to the human mind. It is a multidisciplinary endeavour to understand human mental functions and behaviours through the lens of Cognitive Psychology, Philosophy, Neuroscience, Linguistics/Psycholinguistics, and Computer Science (Computational Modelling of mental functions, more precisely). Fascinating questions addressed in Cognitive Science include questions about how individual process the incoming stimuli from the environment using sometimes the information processing or embodied metaphor of the human mind. It also asks the harder questions about the nature of consciousness, the innateness or learned capabilities of mental faculties, or even how different modalities work together as a unified mind. A specific focus in Cognitive Science also revolves around cognitive deficits and develop interventions for mental disorders. In addition, it has critical applications that overlap with other science and engineering disciplines. IIT Kanpur is the first IIT to start a full-fledged department of Cognitive Science. The department of Cognitive Science houses state of the art research tools to study mind and brain. We use an array of empirical methods to understand how these insights can be translated to real world including applications in fields of clinical population, education, and technology. Students in the department receive training in both critical thinking about research as well as data analysis. They also get hands on training on methodologies like behavioural techniques, and experimental design including high density EEG, high sampling rate eye-trackers, VR and AR techniques, and TMS. The breadth and diversity of faculty members in Cognitive Science allows students to design their own curriculum focusing more on topics and techniques that fit better with their interests. The department is also involved in collaborative research with various academic departments within and outside the Institute as well industry. Students graduating from the department are expected to possess a range of skills that would allow them to be well trained for further career in both research and industry.

POST-GRADUATE PROGRAMMES OFFERED

Mtech in Cognitive Systems
- **Duration:** 2 years
- List of Core Courses
  - Foundations of Cognitive Science
  - Basic statistics, data analysis and inference
  - Experiment design and analyses.
  - Basics of Psychophysics
  - Computational Cognitive Science
  - Human Centered Computing
  - Seminar Course
- A range of elective courses
- Additionally, student is also supposed to submit and defend a research thesis/project for successful completion of the program

MS (by research)
- **Duration:** 2 years (for those with a 4-year degree)
- **Duration:** 3 years (for those with a 3-year degree)
- List of Courses
  - Computational tools for Cognitive Science
  - Foundations of Cognitive Science
  - Basic statistics, data analysis and inference
  - Experiment design and analysis
  - Basics of Psychophysics
  - Basics of EEG
  - Eye tracking and VR
  - Mind: Philosophical Investigations
  - Seminar Course
- A range of elective courses
- Additionally, student is also supposed to submit and defend a research thesis/project for successful completion of the program

PhD (Cognitive Science)
- **Duration:** Variable
- List of Courses
  - Computational tools for Cognitive Science
  - Foundations of Cognitive Science
  - Basic statistics, data analysis and inference
  - Experiment design and analysis
  - Basics of Psychophysics
  - Basics of EEG
  - Eye tracking and VR
  - Cognitive Neuroscience
  - Mind: Philosophical Investigations
  - Introduction to Profession and Communication Skill
  - Seminar Course
- Additionally, student is also supposed to submit and defend a research thesis for successful completion of the program

LABS/FACILITIES

- High density EEG facility
- High Sampling eye-tracking
- Mobile EEG facility
- Mobile eye-tracking
- HMD based VR lab
- Psychophysics labs
- Transcranial Magnetic stimulation Lab
- VR – Treadmill Lab

FACULTY LIST

- **Anweshna Srivastava (IIT Bombay; IIT Kanpur):** Education and Cognitive Science, learners thinking and reasoning processes in STEM concepts, cognitively informed pedagogical resources development.
- **Ark Verma (University of Ghent):** Laterality of Cognitive Functions; Social Cognition. Attention and Perception: Visual Word Recognition in Hindi & other Indian Langauges; Bilingualism; and Corpus Linguistics.
- **Devpriya Kumar (University of Allahabad):** Perception and Action; Attentional Processing, Intentionality, Volition, Agency and Self; Event Perception and Cognition.
- **Himanshu Yadav (University of Potsdam):** Linguistics, Computational Linguistics, Corpus Linguistics. Sentence Processing, Working Memory Constraints, Language and Mind.
- **K.M. Sharika (NBRC, Manesar; Duke University; University of Pennsylvania):** Affect; Motivation; Decision Making.
- **Narayanan Srinivasan (University of Georgia):** Consciousness; Emotion and Cognition; Attention; Mindfulness; Decision making.
- **Nisheeth Srivastava (University of Minnesota; UCSD):** Meta reasoning, recommendation systems, decision making.
- **Pragathi B. Balasubramani (IIT Madras; University of Rochester; University of California Sandiego):** translational neuroscience, computational cognitive neuroscience, neural engineering

BROAD RESEARCH AREAS

- Perception and Attention
- Memory
- Consciousness
- Decision Making
- Meditation
- Emotions
- Translational Neuroscience
- Cognitive Neuroscience
- Psycholinguistics
- Linguistics
- Social Cognition
- Education
- Human computer interactions

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COGNITIVE SCIENCE DEPARTMENT

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