

RANJITH JAGANATHAN

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EDUCATION

Master of Science, Cognitive Science June 2016
Centre of Behavioural and Cognitive Sciences (UGC Centre of Excellence)
University of Allahabad, Uttar Pradesh, India | Recipient of UGC's Post Graduate Merit Scholarship (2014 – 2016)

Bachelor of Engineering, Electronics and Communication Engineering May 2013
Faculty of Information and Communication Engineering, Anna University, Tamil Nadu, India

University of Tasmania, Australia (Online Courses)

- **Understanding Traumatic Brain Injury** | 5-week course | Oct 2023
- **Understanding Multiple Sclerosis** | 6-week course | May 2023
- **Understanding Dementia** | 7-week course | April 2023
- **Preventing Dementia** | 4-week course | Nov 2022

RESEARCH AND TEACHING EXPERIENCE

Neuromatch Academy, Los Angeles, CA | NeuroAI - Teaching Assistant July 2024 –

- Facilitating student learning and engagement in advanced NeuroAI concepts, including hands-on projects and course materials
- Leading discussions and addressing queries to enhance understanding of neuroscience and AI integration

Strate School of Design, Bangalore – Visiting Faculty Dec 2023

- Taught the course, “Cognitive Science and Research” to 30+ final-year postgraduate design students from interaction design, product design, and transportation design streams
- Delivered lectures for 30 hours; crafted modules and assignments - ensuring an engaging week of teaching

Neuromatch Academy, Los Angeles, CA | Deep Learning - Teaching Assistant (3 weeks, 120 hours) July 2023

- Closely mentored 2 student groups with 5 students each from different timezones and cultures
- Led daily Python tutorials and mentored projects on utilizing DL techniques in the field of neuroscience

Project Coordination:

- Two group projects “Emotion Detection using DL models + Real-Time” and “Stroke Patient Motor Imagery Classification System using Transfer Learning” | Monitored project progress by ensuring project milestones were met, and timelines were adhered to | Moderated 14 presentations on the final day of the school

Data Science and AI Lab | Director: Prof. Talal Rahwan May 2022 – April 2023
Department of Computer Science, New York University Abu Dhabi | Mentored by: Dr. BalaRaju Battu

Research Engineer/Research Consultant

- Designed behavioral game theory experiments in oTree – a framework based on Python
- Investigated players' behavior in multiplayer strategy games, especially in terms of escalation and overbidding within the dollar auction framework
- Provided statistical analyses and improved the research design for multi-focused game theory-based research projects based on cooperation and escalation in strategic games

Cognitive Neurology Lab | PI: Prof. Suvarna Alladi Jan 2020 – July 2020
Department of Neurology, National Institute of Mental Health and Neurosciences, Bengaluru, India

Research Associate

- **Project:** Neural basis of cognitive reserve: Role of bilingualism and education
(Funded by: Cognitive Science Research Initiative, Department of Science & Technology, Govt. of India)
 - Administered neuropsychological test batteries, Addenbrooke's Cognitive Examination, Mindfulness & Language Use Questionnaire, Numeracy & Literacy, and Brief Resilience Scale to old-age population
 - Collected data for the following Behavioral experiments for cognitive assessment: Sustained Attention to Response Task, Attention Network Task, and Stroop Task
 - Educated research participants and their families on the advancement of Alzheimer's and other dementia

Language and Cognition Lab | PI: Prof. Ark Verma | Indian Institute of Technology Kanpur, Uttar Pradesh, India
Senior Project Associate (Mar 2018 – Jan 2020) | **Project Associate** (Feb 2017 – Feb 2018)

- **Project:** Investigating Visual Word Processing in Hindi
(Funded by: Cognitive Science Research Initiative, Department of Science & Technology, Govt. of India)
 - Collaborated and developed corpus-based measures for reading in Hindi and co-authored the paper
 - Designed Lexical Decision Task experiments to investigate the role of word frequency and word length in predicting the latencies in visual word processing; wrote an algorithm for constructing pseudo-words
 - Piloted a project that involved developing a multilingual picture database for 7 Indian languages; designed mega studies for word recognition, and word naming tasks and finished the trial phase
 - Recruited proficient Hindi readers, as a part of corpus cleaning and processing, to filter the words suitable for word recognition research (corpus size: 1.4 billion word tokens, dictionary size: 2.3 million words)

Indian Institute of Technology Kanpur | Teaching Assistant | NPTEL MOOC

- **Introduction to Advanced Cognitive Processes** (8 weeks, 559 students) Feb – Mar 2018
- **Introduction to Basic Cognitive Processes** (8 weeks, 800 students) July – Sep 2017
Co-developed the course curriculum and lecture materials; moderated discussions on the course forum. Formulated weekly assignments and quizzes, and developed two final exam question papers for two sessions

PUBLICATION

Verma, A., Sikarwar, V., Yadav, H., **Jaganathan, R.**, Kumar, P. Shabd: A psycholinguistic database for Hindi. *Behavior Research Methods* 54, 830-844 (2022)

TECHNICAL SKILLS

Programming: R, Python, C++, and MATLAB | **Libraries:** PyTorch, Keras, Tensorflow & Python generic libraries
Experiment builder, OpenSesame, PsychoPy, SPM, Simulink, Labview, oTree, version control with Git and GitHub
Functional-MRI experimental design and data analysis; EEG/ERP data analysis; designing eye-tracking experiments

DISSERTATION

Development of an Emotional Scene Classification System using Spatial Frequency June 2015 – May 2016
Master's Thesis — Advisor: Prof. Narayanan Srinivasan

Investigated the role of spatial frequency in classifying affective scenes and classified the images that belong to three categories of affectiveness (pleasant, unpleasant, and neutral). Used IAPS -International Affective Picture System database

Genetic Algorithm-Based Mental Stress Assessment from HRV Analysis Sep 2012 – April 2013
Bachelor's Thesis — Advisor: Prof. G.Ranganathan

Devised a method to assess mental stress using HRV analysis. Used fuzzy C-Means clustering to handle the uncertainties and employed a genetic algorithm for optimization. Used MIT-BIH Arrhythmia database and NASA Task Load Index

FELLOWSHIP

International Fellowship in Health Technology Assessment (HTA) Oct 2013 – Feb 2014
Healthcare Technology Innovation Centre, Indian Institute of Technology Madras, India

- Analysed and synthesized evidence for the HTA assessment on neonatal hearing screening for cochlear implants
- Carried out systematic review and quality appraisal using the CASP (Critical Appraisal Skill Programme) tool

Technology-based Entrepreneurship Development Programme in Embedded Systems June – July 2013
Department of Biomedical Engineering, PSG College of Technology, Coimbatore, Tamil Nadu, India

- Worked on interfacing LCD, seven Segment Display, Keyboard, Switches, Buzzer, and Stepper Motor. Programmed EEPROM, UART, A/D, and D/A Converters

PROJECTS

Assessing Agency Measurement and Temporal Changes: A Cross-Country Analysis of India and Vietnam

Young Lives Longitudinal Study | Presented to: Prof. Antje Von Suchodoletz, NYU Abu Dhabi Nov 2022

- Conducted exploratory data analysis and Confirmatory Factor Analyses to examine the factor structure of the agency measure. Analyzed changes in the agency over time and visualized patterns of change in India and Vietnam

CNN with Primary Visual Cortex front-end: Activations in Clean and Perturbed Images

Neuromatch Academy Project (3-week online course)

Aug 2021

- Examined the robustness of the VoneBlock (a hybrid neural network that shares the properties of primary visual cortex V1) in handling perturbed images and performed Representational Similarity Analysis (RSA)

Correspondence between CNN and Human Visual Areas for Categorical Representation

Neuromatch Academy Project (3-week online course) — Mentor: Prof. Jing Xu, University of Georgia

July 2021

- Evaluated the effectiveness of CNN-AlexNet in reflecting the fMRI activity in the visual cortex (V1-LOC) for natural and artificial scene stimuli.
- Analyzed the differences using Representational Dissimilarity Matrices (RDM) and permutation testing

fMRI Data Analysis of Auditory Perception Task with Bi-Syllabic Words

April 2016

Brain Imaging Course Project | Supervisor: Prof. Chandrasekhar Pammi

- Detection, Estimation, and Brain Connectivity – fMRI model setup, parameter estimation, and inference in SPM 12, including construction of the design matrix in the GLM, linear and non-linear methods to detect activity maps
- Estimation of the hemodynamic response (HDR), functional connectivity of the brain structures by using nonlinear cross-correlation analysis, and effective connectivity by Granger causality approach

Integration of HRV, Wavelet transforms & Neural Network for ECG Arrhythmias Classification

July–Nov 2012

Supervisor: Prof. G. Ranganathan

- Developed a cardiac arrhythmia classifier based on the statistical analysis of the ECG signals of normal and abnormal heart rhythm.
- Extracted features for classifying arrhythmias from the wavelet decomposition technique. Compared the classifier using multilayer perceptron (MLP) and radial basis function (RBF) neural networks

Development of E-Passport scheme using Fingerprint Biometrics

Mar-Apr 2013

- Developed a biometric e-passport system with a fingerprint scanner using embedded technology to match individual fingerprints with the database for more accurate verification and identification of an individual.
- Designed using micro-controller (PIC), LCD, matrix keyboard, EEPROM, USART, and Visual Basic 6.0

PRESENTATIONS AND CONFERENCES

- Rise of AI Conference 2024, hosted by AI for Humans GmbH | Berlin (Remote) May 2024
- Year of Open Science Culminating Conference | Centre for open Science & NASA (Remote) March 2024
- AI and Society Confest | Panelist: AI and Psychology | Alliance University, Bengaluru March 2024
- Verma, A., Sikarwar, V., J. **Ranjith.**, Kumar, P., “*Shabd: A Hindi Words Database*” Oct 2018
5th Annual Conference of Cognitive Science, Indian Institute of Technology Guwahati. Assam, India
- AMLap (Architectures and Mechanisms of Language Processing) Asia conference Feb 2018
Centre for Neural and Cognitive Sciences, University of Hyderabad, Telangana, India
- Statistical Learning Using Real-World Scenes | Journal Club Presentation | CBCS Allahabad Aug 2015
- International conference on “Emotion and Cognition”, CBCS, University of Allahabad Dec 2014
- **Ranjith. J.**, Anil. E., “*Application of Neuro-fuzzy Expert System for the Probe and Prognosis of Thyroid Disorder*”
Dept. of Biomedical Engineering, Jerusalem College of Engineering, Chennai Sep 2012

COURSE PROJECTS & PRESENTATIONS

- **Perception:** Threshold determination task using 2 AFC paradigm | Reaction-time measurement task using cueing paradigm | Sound wave generation and frequency discrimination – pure tone and harmonics
- **Principles of Neuroscience:** Long-Term Potentiation – Physiological evidence of the Hebbian learning
- **Computational models of cognition:** Choosing a model
- **Cognitive Neuroscience & Neuropsychology:** Mechanisms of face perception
- **Computational Neuroscience:** Neural Decoding
- **Action:** Central Pattern Generators

COURSES AND WORKSHOPS

- **Brain-Computer Interface (BCI) & Neurotechnology** Spring School 2024 | 140 hours April – May 2024
- **Do we need a humanitarian manifesto for AI?** | Alan Turing Institute’s AI UK Fringe March 2024
- **AI – The Emerging Regulatory Landscape** (Masterclass) | O.P Jindal Global University Feb 2024

- **Operationalizing Ethics in AI** - Intermediate | 20 hours | The Alan Turing Institute Jan 2024
- **Relational Autonomy in the Age of AI Health Monitoring** | UCSF Bioethics Sept 2023
- **Electrocorticography (ECoG) Masterclass** | 11-hour online class | G.TEC, Austria Sept 2023
- **NeuroTech Justice Summit** | Center for Bioethics, Harvard Medical School Jan 2023
- **Attention, Perception, and Temporal Context** | 3-day online workshop | EPFL Switzerland Jan 2021
- **Computational Psychiatry** | 5-day online course | University of Zurich & ETH Zurich Sep 2020
- **Neuronal Dynamics for Embodied Cognition** | 5-day online summer school | Ruhr-University Bochum Sep 2020
- **Telluride Neuromorphic Cognition Engineering** | 5-day online workshop Aug 2020
- **Brain, Computation, and Learning** | 5-day workshop | Indian Institute of Science, Bangalore June 2019
- **Natural Language Processing & Big data for Psycholinguistics** | 5-day course | IIT Kanpur Dec 2018
- **Eye-tracking workshop - Practical Considerations & Techniques for Psycholinguistic Experiments** Feb 2018
Centre for Neural and Cognitive Sciences, University of Hyderabad
- **Experimental and Empirical Methods in Linguistics** | 7-day workshop | IIT Delhi July 2017

OTHER COURSES

- **Imagining India in the Era of Climate Change** | 8-week Online Course | Socratus Foundation Nov – Dec 2020
- **Course: Nine Dimensions of The Lockdown Experience** (Three credits) June 8 – 24, 2020
NIAS Consciousness Studies programme, National Institute of Advanced Studies, IISc Bangalore, India
- **Courses** (audited at IIT Kanpur): **Responsible Dissent** (2018 and 2019), **Literature and Censorship** (2019),
Feminist Theory and Literature (2019)

MANAGEMENT COURSES

Principles of Management | Professional Ethics and Human Values | Disaster Management

OUTREACH INITIATIVES AND SOCIAL MEDIA MANAGEMENT

- Resource Person** | CognEx 2.0, IIT Kanpur July 2017
- Acted as a mentor and evaluated the participants' research proposals for the workshop on Experimental Methods in Cognitive Science. Supported in planning and execution of events, campaigns, and other initiatives
- Team Member** | Unmukt, Gender and Sexual Diversity Forum, IIT Kanpur April 2017 – Dec 2019
- Collaborated on 32 events and projects including interviews, group discussion series, and movie screenings
 - Led weekly meetings; Involved in organizing a theatrical performance; Executed a 30-day online campaign on gender-sexuality awareness and sensitization; covered by media houses like The India Express and The Quint
- Volunteer** | Red Ribbon Club, Coimbatore Sep 2010 – Apr 2013
- Coordinated blood donation camps and AIDS awareness programs and rally
 - Activities includes interaction with resource persons, peer education programme, essay and drawing competition
 - Carried out the recruitment drive of the club by vetting 15+ candidates pre and post interviews

COMMUNITY SERVICE & VOLUNTEERING

- Member- Scientific Committee | 25th NAOP Annual Convention Feb 2016
- Coordinator, Placement & Training Cell, Dept. of Electronics & Communication Engineering Apr 2012 – Mar 2013
- Organizing Secretary, ADVIKA'12 (Technical Festival) - Introduced new technical events and systematized various Committees. Raised Sponsorship of Rs.20 k.
- Member, Red Ribbon Club - Coordinated blood donation camps; AIDS awareness Programs Sep 2010 – Apr 2013
- Secretary, Electronics Club (Aug 2011 – Nov 2012) | Class Representative – Semester IV (Dec 2010 – June 2011)
- Class Committee Member (July 2010 – Nov 2010)

REFERENCES

Dr. BalaRaju Battu, Postdoctoral Associate, New York University Abu Dhabi | E-mail: bb3404@nyu.edu
 Dr. Ark Verma, Associate Professor, Department of Cognitive Science, IIT Kanpur | E-mail: arkverma@iitk.ac.in
 Prof. Narayanan Srinivasan, Professor, Department of Cognitive Science, IIT Kanpur | E-mail: nsrini@iitk.ac.in