Himanshu Aggarwal *August 30, 1997*

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Education

Indian Institute of Science Education and Research (IISER) Mohali — Punjab, India

Bachelors & Masters of Science (Mathematical Biology), Dual Degree — *2015 – 2020*

Thesis: Statistical modeling and analyses of epidemiological data of malaria in India

- Performance index during thesis year: **10/10**
- Cumulative performance index: **8.4/10**

M.G.N. Public School, Adarsh Nagar, Jalandhar — Punjab, India

Higher Secondary School — *2013 – 2015*

Scored 96% in final exams – among the 1% of highest scoring students all over India.

Skills

Programming: Python, MATLAB, C, JavaScript, R, LaTeX

Experiment Design: Psychopy, expyriment, Psychtoolbox, Presentation

Neuroimaging and Preprocessing: 3T MRI acquisition, nilearn, FSL, SPM, MNE

Machine Learning and Statistics: scikit-learn, numpy, scipy, pandas

Spoken Languages: English, Hindi, Punjabi (*fluent*), French (*beginner*).

Research Experience

Team MIND (ex-Parietal) INRIA Saclay / Neurospin, CEA Saclay — Ile-de-France, France

Research Engineer — *Currently, since Dec 2020*

I am working on the Individual Brain Charting (IBC) project, a part of the Human Brain Project, that aims at repeatedly scanning a cohort of 12 subjects with a large and varied set of functional protocols to provide an objective basis to inform the definition of brain regions. Towards that regard, apart from carrying out the acquisitions, I have been developing a lot of task-based fMRI experiments spanning across several different target cognitive domains (GitHub repo). In addition, I have also been working on preprocessing all kinds of brain MRI data including structural, functional, quantitative as well as diffusion MRI (GitHub repo).

Sinha Lab, IISER Mohali — Punjab, India

Masters' thesis — *Aug 2019 – Aug 2020*

Provided statistical evidence for the shift of malarial incidence distribution towards higher altitides as a consequence of temperature increase (due to global warming) in high-altitude regions of India. In addition, I also used multiple linear regression to explore the dependance of malaria incidence on temperature and rainfall in a highly humid city of India.

Summer Intern — *May 2019 – July 2019*

Explored climatic spatial patterns in India using K-Means and principal component analysis (PCA).

Volunteer — *Jan 2019 – May 2019*

Volunteered to help another masters' thesis student in the lab with decoding analyses of fMRI data. We compared two supervised machine learning algorithms - SVM and LDA using cross-validation for classifying trials when the subjects were viewing colors vs. faces.

Summer Intern — *June 2017 – July 2017*

Coded difference-equation models to simulate host-parasite metapopulation dynamics and differential-equation models to simulate protein molecular dynamics.

Raman Lab, IIT Madras — Chennai, India

Summer Intern — *May 2018 – July 2018*

Developed a Flask based web-interface for a graph-theoretic algorithm that could identify all possible pathways between given metabolites (GitHub repo). Further added a feature that could perform reaction knock-outs in-silico.

Bhattacharyya Lab, IISER Mohali — Punjab, India

Summer Intern — *May 2016 – July 2016*

Volunteered in helping with multiple experiments that investigated the trafficking and signaling through metabotropic glutamate receptors (mGluRs) in mice neuronal populations.

Other activities

Neuromatch Academy (2022): Interactive coursework in computational neuroscience and project-work on decoding motor behaviour from ECoG neural activity using nilearn, MNE and scikit-learn.

Organization for Human Brain Mapping (OHBM) BrainHack 2022: Contributed to nilearn

Society for Mathematical Biology 2020 Annual Meeting: Presented a poster on "Impact of temperature change on Malaria incidence in high altitude regions of India".

Web Development Team, INSOMNIA 2018: Developed website for annual cultural and science festival of IISER Mohali

Web Development Team, Student Representative Council 2016-17, IISER Mohali: Developed and maintained the website for the student body of IISER Mohali

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Awards / Achievements

Graduate Aptitude Test 2020: All India Rank 80

INSPIRE Fellow 2015-2020: Received scholarship awarded by Government of India for Innovation in Science Pursuit for Inspired Research (INSPIRE)

IIT Madras Summer Fellow 2018: Received scholarship awarded by Indian Institute of Technology (IIT) Madras for summer research internship

Problem Solving Assessment (PSA) 2013: Scored over 95 percentile in language convention, quantitative and qualitative reasoning of PSA conducted by Govt. of India.

Relevant coursework

Mathematics: Group Theory and Linear Algebra, Real Analysis, Curves and Surfaces, Probability and Statistics

Interdisciplinary Courses: Introduction to Computers (Python), Hands-On Electronics, Network Science, Theoretical Biology, Numerical methods, Nonlinear Dynamics, Chaos and Complex Systems, Machine Learning

MOOCs: Coursera: Fundamental Neuroscience for Neuroimaging and Principles of fMRI 1 & 2, Harvard MOOC: CS50's Introduction to Computer Science, MIT OCW: Single Variable Calculus

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