

## CV

### Adarsh Mukesh

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Advanced Technology Development Centre

Indian Institute of Technology, Kharagpur, West Bengal, India

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### Academic positions and Education:

2018-2022: Ph.D. (Neuroscience), **Prime Minister's Research Fellow**, IIT Kharagpur

2017-2018 Master of Technology (Dual degree), Biotechnology and Biochemical Engineering, IIT Kharagpur.

2013-2017 Bachelor of Technology (Dual degree), Biotechnology and Biochemical Engineering, IIT Kharagpur.

Combined GPA (B.Tech + M.Tech, Dual degree): 8.55/10.0 (Department rank: 3)

### Doctoral project:

- *Processing of spectrally complex sounds and detection of rare auditory events in mammalian brain.*  
Sound disturbances occurring around us is collected by our ear and taken to the appropriate station in the brain for further processing. This sound stimuli are broken into smaller components and then assimilated to bring out the relevant information from it, along with reducing redundancies. My work aims to understand its mechanism using computational and theoretical tools.

### Other projects:

- Investigation of long-term changes in the mouse brain circuitry driven by the exposure to rare auditory events in early ages via computational and theoretical approach.
- Role of different inter-neurons in long time scale of adaptation in mouse brain.
- An information theoretic based framework to investigate detection of rare events in mouse brain.

### Undergraduate projects:

- Network model to demonstrate auditory cortex maturation and the role of rare auditory events in it. (Masters' thesis)
- Computational network model to demonstrate detection of low probability events in developing mammalian auditory cortex. (Bachelors' thesis)
- Computational investigation of interaction between various protein subunits in macro-molecular protein assemblies. (Summer Internship in National Center for Biological Sciences, Bangalore, India)

### Relevant courses taken:

- Linear Algebra, Probability and Statistics, Regression and Time-series analysis, Stochastic Process, Differential equations
- Signals and Systems, Estimation of signals and systems, Pattern recognition and image processing
- Computational Neuroscience, Neural coding of sensory information, Neurophysiology, Computational structural biology, Bioinformatics, Computational phylogenetics and molecular evolution.
- Fluid mechanics, Bio-medical instrumentation

For more details on my research works: <https://adarsh-mukesh.github.io/>

### Skills:

- Fluent in Matlab and Simulink for quantitative statistical analysis and neural network modelling.
- Intermediate proficiency in Python

## Awards:

- 2<sup>nd</sup> place in Biotechnology Entrepreneurship Students' Team (BEST) – 2015 conducted by the Dept. of Biotechnology, Govt. of India. Won a cash prize of INR 300,000 along with 4 other team-mates.
- 1st prize in Product design competition conducted by Kshitij -2015 at IIT Kharagpur.
- Member of the Bronze winning team in International Genetically Engineered Machines (iGEM) in 2016. Engineered a bacterial strain to produce spider silk protein Masp-2 and a mechanism to monitor the production.

## Position of responsibility:

- General Secretary of The Association of Biotechnologists for the academic year 2015 - 2016. Maintained alumni records and department website.
- Secretary of The Association of Biotechnologists for the academic year 2014 – 2015. Conducted weekly journal club sessions and panel discussions.

## Publications:

- Mehra M., Mukesh A., Bandyopadhyay S.. Earliest experience of rare but not frequent sounds cause long term changes in the adult auditory cortex, *Journal of Neuroscience*, Nov, 2021, *Accepted/In Press. Early release (Dec 23, 2021)* - [link](#)
- \*Muneshwar Mehra, \***Adarsh Mukesh** and Sharba Bandyopadhyay. Separate functional subnetworks of excitatory neurons show preference to periodic and random structures. *bioRxiv*. (\*equal contribution) - [link](#)
- **Adarsh Mukesh**, Muneshwar Mehra, and Sharba Bandyopadhyay. Spectral Contrast selectivity in Excitatory and Inhibitory neurons of mouse auditory cortex. (Manuscript in preparation).

## Conference Presentations:

- **Mukesh, A.**, Muneshwar and Bandyopadhyay, S. Model of developing auditory cortex shows low probability stimuli as drivers of cortical organization, **Association for Research in Otolaryngology, 2018**, San Diego, CA.
- Mukherjee, A., Patel, P., **Mukesh, A.**, Muneshwar and Bandyopadhyay, S. Spectral shape-based adaptation unravels mechanisms underlying spectral contrast coding in the mouse auditory cortex (ACX), **Society for Neuroscience, 2018**, San Diego, CA.
- Muneshwar, Parashar, M., Srivastava, H.K., **Mukesh, A.** and Bandyopadhyay, S. Role of inhibitory interneurons in long time scale adaptation-based changes in coding of sound sequences in the mouse auditory cortex (ACX), **Society for Neuroscience, 2018**, San Diego, CA.

## Reference:

### Supervisor:

Dr. Sharba Bandyopadhyay

Assistant Professor, Dept. Electronic and Electrical Communication Engineering, IIT Kharagpur

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