VIJAY SADASHIVAIAH

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EDUCATION

Johns Hopkins University, Whiting School of Engineering — Baltimore, MD
Master of Science in Biomedical Engineering, GPA: 3.80/4.00 — May 2017
Thesis: "Towards Pain Control by Modelling the Interactions in a Mammalian Nerve Fiber"

Visvesvaraya Technological University, PES Institute of Technology — Bengaluru, India
Bachelor of Engineering in Electronics and Communication Engineering, GPA: 9.32/10.00 — May 2015
Thesis: "Transient Imaging: Seeing the unseen"

Massachusetts Institute of Technology, Media Arts and Sciences — Cambridge, MA
Visiting student at MIT Media Lab — June - September 2014

AWARDS AND FELLOWSHIPS

Biomedical Engineering Departmental Fellowship - Johns Hopkins University — 2015 - 2017
Foundation Leenaards' Summer Research Fellowship - École Polytechnique Fédérale de Lausanne — 2015
University Merit Scholarship - PES Institute of Technology — 2011 - 2015
Represented India at Vertech City Challenge - Quebec, Canada — 2015
"Code Something that Matters" Scholarship - Vecna Robotics — 2015
Best Student Project - IEEE International Conference on Impact of E-Technology on US — 2014
Represented India at Intel Global Challenge - Berkeley, CA — 2013
Best Project Award - Innovation for a Better Tomorrow (IBETO) — 2013

RESEARCH EXPERIENCE

Lieber Institute for Brain Development, *Research Associate* — August 2017 - Present
Adviser: Dr. Qiang Chen, *Data Science/Computational Biology* — Baltimore, MD

- Exploring novel data driven methods to analyze imaging genetics data from developmental brain disorders
- Building supervised learning models to identify underlying biological pathways in Schizophrenia
- Developed models are based on Deep Neural Network (CNN's) and Support Vector Machine frameworks
- Presented preliminary results at local and international scientific meetings

Johns Hopkins University, *Research Assistant* — September 2015 - May 2017
Adviser: Dr. Sridevi V. Sarma, *Neuromedical Control Systems Lab* — Baltimore, MD

- Spearheaded collaboration between 3 principal investigators for thesis work
- Quantified the interactions in a mammalian nerve fiber using mathematical models
- Constructed a probabilistic model of nerve fiber to test the performance of Electrical Nerve Stimulation
- Optimized our codebase ∼70%, which runs in under 30 minutes, against a mechanistic model which takes a week
- Amalgamated the findings into a journal article (in review)

École Polytechnique Fédérale de Lausanne, *Summer Researcher* — June 2015 - August 2015
Adviser: Dr. Carl Petersen, *Laboratory of Sensory Processing* — Lausanne, Switzerland

- Studied the neural circuits involved in sensorimotor interactions
- Analyzed over 1 Terabyte (TB) of voltage sensitive dye images across multiple trials
- Techniques involved k-means clustering, matrix manipulation, statistical testing etc
- Co-authored a peer reviewed journal article

Massachusetts Institute of Technology, *Summer Researcher* — June 2014 - September 2014
Adviser: Dr. Ramesh Raskar, *Camera Culture Lab* — Cambridge, MA

- Designed a high speed imaging system to capture light in motion (Bachelor's thesis)
- Authored a do it yourself manual for the imagaing system
- Featured on MIT website and BBC news

PES Institute of Technology, *Undergraduate Researcher* June 2012 - May 2014
Adviser: Dr. Srinivas A, *Healthcare Innovation Lab* Bengaluru, India

- Collaborated with local and international hospitals to analyze real world clinical data
- Used signal processing techniques learnt in class to analyze human physiology data
- Worked on time series analysis of EKG, Skin Conductance, ERG etc
- Presented results at international technical conferences

PUBLICATIONS

Journal Articles

J1 **Sadashivaiah, V.**, Goldman, A., Ulrich, B., Straub, R. E., Calliott, J. H., Breman, K. F., Mattay, V. S., Weinberger, D. R., Chen, Q., *Exploring Shared Brain Cognitive Networks and the Related Genetic Components using Three-way Parallel ICA*. (in preparation)

J2 **Sadashivaiah V.**, Sacre P., Guan Y., Anderson W. S., Sarma S. V.,*Modeling the interactions between stimulation and physiologically induced APs in a mammalian nerve fiber: dependence on frequency and fiber diameter*. (in review)

J3 Kyriakatos A., **Sadashivaiah V**., Zhang Y., Motta A., Auffret M., Petersen C. H.; *Voltage-sensitive dye imaging of mouse neocortex during a whisker detection task*. Neurophoton. 0001;4(3):031204.

Peer Reviewed Conferences

C1 **Sadashivaiah, V.**, Sacré, P., Guan, Y., Anderson, W. S., Sarma, S. V., *Studying the Interactions in a Mammalian Nerve Fiber: A Functional Modeling Approach*, 40th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Honalulu, Hawaii, 2018.

C2 **Sadashivaiah, V.**, Sacré, P., Guan, Y., Anderson, W. S., Sarma, S. V., *Selective Relay of Afferent Sensory Induced Action Potentials from Peripheral Nerve to Brain and the Effects of Electrical Stimulation*, 40th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Honalulu, Hawaii, 2018.

C3 **Sadashivaiah, V.**, Sacré, P., Guan, Y., Anderson, W. S., Sarma, S. V., *Electrical neurostimulation of a mammalian nerve fibers: A probabilistic versus mechanistic approach*, 39th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Jeju Island, South Korea, 2017.

C4 Gunnarsdottir, K., **Sadashivaiah, V.**, Kerr, M., Santaniello, S., Sarma, S. V., *Using Demographic and Time Series Physiological Features to Classify Sepsis in the Intensive Care Unit*, 38th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Florida, 2016.

C5 Das, A., Swedish, T., Wahi, A., Moufarrej, M., Noland, M., Gurry, T., Michel, E. M., Aksel, D., Wagh, S., **Sadashivaiah, V.**, Zhang, X., Raskar, R., *Mobile phone based mini-spectrometer for rapid screening of skin cancer*. Proc. SPIE 9482, Next-Generation Spectroscopic Technologies VIII, 94820M (June 3, 2015).

Conference Abstracts

CA1 **Sadashivaiah, V.**, Goldman, A., Ulrich, B., Radulescu, E., Breman, K. F., Mattay, V. S., Weinberger, D. R., Chen, Q., *Using machine learning to identify novel neuroimaging phenotypes associated with cognitive dysfunction in Schizophrenia*, 48th Annual Meeting of Society for Neuroscience, San Diego, CA, 2018 (Accepted).

CA2 **Sadashivaiah, V.**, Goldman, A., Ulrich, B., Straub, R. E., Calliott, J. H., Breman, K. F., Mattay, V. S., Weinberger, D. R., Chen, Q., *Exploring Shared Brain Cognitive Networks and the Related Genetic Components using Three-way Parallel ICA*, 73rd Annual Meeting of Society of Biological Psychiatry, New York, NY, 2018.

CA3 Ren, M., Chen, Q., **Sadashivaiah, V.**, Li, Y., Zhu, S., Mezeivtch, K., Hu, Z., Qin, LS L., Li, X., Tian, Q., Parades, D., Zhu, J., Wang, K. H., Weinberger, D. R., Yang, F., *Abnormal hippocampal-mPFC synchrony in the KCNH2-3.1 transgenic mouse model*, 47th Annual Meeting of Society for Neuroscience, Washington D.C., 2017.

CA4 Pavan, K. R., Rao, S. A., Rao, V. V., Bongale, V. A., **Sadashivaiah, V.**, *Real Time Non-Invasive Cardiac Health Monitoring System*. International Conference on Emergency Medical Service Systems - Innovation & Entrepreneurship in Healthcare, AIIMS, New Delhi, India. October 2013.

LEADERSHIP AND TEACHING

Johns Hopkins University, *Advocacy Chair* May 2016 – May 2017
Graduate Representative Organization Baltimore, MD

- Organized town halls every quarter with university administration to advocate graduate student needs and issues
- Facilitated discussion of topics including student healthcare, maternity leave and dining options on campus
- Assisted Social Chairs in organizing social and cultural events on campus

PES Institute of Technology, *Core Team* May 2013 – May 2015
IEEE Student Branch Bengaluru, India

- Organized technical workshops for student community with invited speakers from industry and academia
- Led a team of 5 to successfully organize a Spring Hackathon, "Circuitus". Over 200 students participated

Indian Institute of Technology Bombay, *Mentor* January 2014
Rethinking Engineering Design Execution (REDX) Hackathon Mumbai, India

- Guided ∼20 students in design and execution of innovative healthcare solutions
- Projects involved for e.g., design of low cost, data driven ELISA system for rural imaging laboratories
- Collaborated with doctors and researchers from MGH, Dana Faber Cancer Institute, Perkins Blind School etc.

MIT Media Lab - Camera Culture Lab, *Mentor* May 2014
Kumbathon: Smart Cities Hackathon Cambridge, MA

- Mentored a group of MIT undergraduate students to build smart city related projects
- Assisted with signal processing and big data
- Traveled to Nasik, India to mentor projects at Kumbathon workshop

SKILLS & INTERESTS

Programming

- Proficient in Python, MATLAB, R, LaTeX, SQL, HTML, CSS, JavaScript, bash scripting, parallel programming

DevOps & Libraries

- TensorFlow, Keras, NEURON, SPM, git, OpenCV, Microsoft Office

Data & Models

- Deep Learning, Statistical Learning, Stochastic Modeling, Data Visualization, Big Data

Interests

- Rock Climbing (Bouldering and Sports), Taekwondo (ITF), Backpacking, Photography, Board Games

RELEVANT COURSEWORK

Graduate Courses

- Learning Theory, Topics in Systems Neuroscience, Models of a Neuron, Systems Bioengineering II&III (*i.e.*Auditory Neurophysiology & Models and Simulations), Digital Health and Biomedical Informatics, Introduction to Computational Medicine, Neuroscience of Pain

Undergraduate Courses*

- Information Theory, Linear Algebra, Differential Equations, Calculus, Digital Signal Processing, Probability and Random Processes, Applied Mathematics, Signals and Systems, Computer Networks (*Relevant courses only. See transcript for all courses)

Online Coursework

- Machine Learning, Deep Learning, Statistical Learning, Convex Optimization, Computational Neuroscience, Cellular mechanisms of Brain function, Algorithms