

VIJAY SADASHIVAIAH

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EDUCATION

Johns Hopkins University, Whiting School of Engineering	Baltimore, MD
Master of Science in Biomedical Engineering, GPA: 3.87/4.00	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
Visiting student at Massachusetts Institute of Technology , Cambridge, MA	June - September 2014
Thesis: "Transient Imaging: Seeing the unseen"	

AWARDS AND FELLOWSHIPS

Recipient , Biomedical Engineering Departmental Fellowship - Johns Hopkins University	2015 - 2017
Semi-finalist , Data Incubator Challenge - The Data Incubator	2017
Recipient , Foundation Leenaards' Summer Research Fellowship - EPFL	2015
Recipient , University Merit Scholarship - PES Institute of Technology	2011 - 2015
Recipient , "Code Something that Matters" Scholarship - Vecna Robotics	2015
Global Finalist , Vertech City Challenge - Vertech Symposium	2014
Winner , Best Student Project - IEEE International Conference on Impact of E-Technology on US	2014
Global Finalist , Intel Global Challenge - UC Berkeley	2013
Finalist , Biotechnology Entrepreneurship Student Teams (BEST) - Department of Biotechnology, India	2013
Global Semi-finalist , Go Green in the City - Schneider Electric	2013
Winner , Best Project Award - Innovation for a Better Tomorrow (IBETO)	2013

RESEARCH EXPERIENCE

Lieber Institute for Brain Development, <i>Research Associate</i>	August 2017 - Present
Adviser: Dr. Qiang Chen, <i>Data Science/Computational Biology</i> Baltimore, MD	
<ul style="list-style-type: none">Exploring novel data driven methods to analyze imaging genetics data from developmental brain disordersBuilding supervised learning models to identify underlying biological pathways in SchizophreniaDeveloped models are based on Deep Neural Network (CNN's) and Support Vector Machine frameworksPresented preliminary results at local and international scientific meetings [P1, P2, C1, C2]<u>Technical Skills</u>: Python, R, SQL, Tensorflow, Keras, SPM, Linux	
Johns Hopkins University, <i>Research Assistant</i>	September 2015 - May 2017
Adviser: Dr. Sridevi V. Sarma, <i>Neuromedical Control Systems Lab</i> Baltimore, MD	
<ul style="list-style-type: none">Spearheaded collaboration between 3 principal investigators for thesis workConstructed probabilistic, functional & mechanistic models of mammalian nerve fiber using mathematical modelsQuantified the interactions in a nerve fiber to test the performance of electrical nerve stimulationOptimized our codebase by 70% and storage by 60% by developing efficient NEURON scriptsAmalgamated the findings into a journal article [P4]<u>Technical Skills</u>: MATLAB, NEURON, Unix, Linux	
École Polytechnique Fédérale de Lausanne, <i>Summer Researcher</i>	June 2015 - August 2015
Adviser: Dr. Carl Petersen, <i>Laboratory of Sensory Processing</i> Lausanne, Switzerland	
<ul style="list-style-type: none">Studied the neural circuits involved in goal directed sensorimotor interactionsAnalyzed over 1.5 TB of voltage sensitive dye images across multiple trialsDeveloped an interactive graphical platform to visualize neuroimaging data on MATLABCo-authored a peer reviewed journal article [P7]<u>Technical Skills</u>: MATLAB, Python, Igor Pro, Linux	

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)
- Improved the depth resolution of conventional imaging system using multi-frequency light sources
- Authored a do it yourself manual for the imaging system
- Featured on MIT website and BBC news
- Technical Skills: Verilog, MATLAB, C, Linux, Circuit design, Optics

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 and competitions [C6]
- Technical Skills: Verilog, MATLAB, Rapid prototyping, Circuit design, Arduino, Raspberry Pi, Sensors

PUBLICATIONS

- P1 **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. (in preparation)
- P2 **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)
- P3 Ren, M., Chen, Q., **Sadashivaiah, V.**, Li, Y., Zhu, S., Mezeivtch, K., Hu, Z., Qin, L. S., 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. (in preparation)
- P4 **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)
- P5 **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, Honolulu, Hawaii, 2018. (in press)
- P6 **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, Honolulu, Hawaii, 2018. (in press)
- P7 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, Neurophotonics.
- P8 **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.
- P9 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.
- P10 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).

PRESENTATIONS

- C1 **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. (Oral)

- C2 **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. (Poster)
- C3 Chen, Q., Ursini, G., **Sadashivaiah, V.**, Radulescu, B., Straub, R. E., Breman, K. F., Mattay, V. S., Weinberger, D. R., Deciphering the association between polygenic risk for schizophrenia and hippocampal function, XXVth World Congress of Psychiatric Genetics, Orlando, FL, 2017. (Poster)
- C4 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. (Poster)
- C5 **Sadashivaiah V.**, Kyriakatos A., Zhang Y., Motta A., Auffret M., Petersen C. H.; Neural Circuits for goal-directed Sensorimotor Transformations, SRP and SUR Summer Research Symposium, EPFL School of Life Sciences, Lausanne, Switzerland, 2015. (Poster)
- C6 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. (Oral)

TEACHING EXPERIENCE

Johns Hopkins University, Graduate Teaching Assistant September 2015 - May 2017
Models and Simulations, Statistical Mechanics and Thermodynamics, Systems Bioengineering III Baltimore, MD

- Assisted the Professors in designing and proof-reading assignments
- Evaluated student assignments and quizzes, attended faculty led meetings

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

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

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.

LEADERSHIP EXPERIENCE

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

SKILLS

Programming: Proficient in Python, MATLAB, R, L^AT_EX, SQL, HTML, CSS, JavaScript, bash scripting

Libraries: TensorFlow, Keras, NEURON, SPM, git, OpenCV, Microsoft Office

Data & Models: Deep Learning, Statistical Learning, Stochastic Modeling, Data Visualization, Big Data

INTERESTS

Rock Climbing, Taekwondo (ITF), Backpacking, Photography, Board Games, House Projects