

# VIJAY SADASHIVAIAH

4002 B Linkwood Road, Baltimore, MD 21210  
+1 443 447 3694 | vjs@jhu.edu | <https://vjysd.github.io>

## EDUCATION

<b>Johns Hopkins University, Whiting School of Engineering</b>	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"	
<b>Visvesvaraya Technological University, PES Institute of Technology</b>	Bengaluru, India
Bachelor of Engineering in Electronics and Communication Engineering, GPA: 9.32/10.00	May 2015
Visiting student at <b>Massachusetts Institute of Technology</b> , Cambridge, MA	June - September 2014
Thesis: "Transient Imaging: Seeing the unseen"	

## AWARDS AND FELLOWSHIPS

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

## RESEARCH EXPERIENCE

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

**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
- Technical Skills: Verilog, MATLAB, Rapid prototyping, Circuit design, Arduino, Raspberry Pi, Sensors

**PUBLICATIONS**

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- 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**

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- 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

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**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

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**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

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**Programming:** Proficient in Python, MATLAB, R, L<sup>A</sup>T<sub>E</sub>X, 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

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