

# Vijay Sadashivaiah

**Staff Scientist in Computational Biology**

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## Education

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### **Johns Hopkins University – Baltimore, MD**

Master of Science and Engineering in Biomedical Engineering

May 2017

### **PES Institute of Technology – Bangalore, India**

Bachelor of Engineering in Electronics and Communication Engineering

May 2015

Visiting student at **Massachusetts Institute of Technology**

June - September 2014

## Research Experience

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### **Lieber Institute for Brain Development – Baltimore, MD**

**Staff Scientist in Data Science and Computational Biology**

July 2019 - Present

Research Associate in Data Science and Computational Biology

August 2017 - June 2019

Adviser: Dr. Qiang Chen

- Exploring novel data-driven methods on imaging, genetics and physiological data to identify the underlying biological pathways involved in Schizophrenia and other neurodevelopmental disorders
- Integrating large-scale, heterogeneous datasets to extract relevant biomarkers
- Technical Skills: Python, MATLAB, R, SQL, Signal Processing, Tensorflow, Keras, Mongo, SPM, Linux

### **Johns Hopkins University – Baltimore, MD**

**Research Assistant in Neuromedical Control Systems Lab**

September 2015 – May 2017

Adviser: Dr. Sridevi V. Sarma

- Spearheaded collaboration between 3 principal investigators for masters thesis
- Constructed probabilistic, functional & mechanistic models of a mammalian nerve fiber and quantified different interactions to test the performance of electrical nerve stimulation in treating chronic pain
- Technical Skills: MATLAB, NEURON, High-Performance Cluster, Linux

### **École Polytechnique Fédérale de Lausanne – Lausanne, Switzerland**

**Summer Researcher in Laboratory of Sensory Processing**

June 2015 - August 2015

Adviser: Dr. Carl Petersen

- Accepted into a highly competitive international research program (5% acceptance rate).
- Analyzed voltage-sensitive dye images of mouse neocortex to unravel the neural circuits involved in goal-directed sensorimotor interactions
- Technical Skills: MATLAB, Python, Experimental design, Linux

### **Massachusetts Institute of Technology – Cambridge, MA**

**Visiting Student Researcher in Camera Culture Lab**

June 2014 - September 2014

Adviser: Dr. Ramesh Raskar

- Designed a high-speed imaging system to capture light in motion (Bachelor's thesis)
- Improved the depth resolution of the conventional imaging system using multi-frequency light sources
- Technical Skills: Verilog, MATLAB, C, Linux, Circuit design, Optics

## PES Institute of Technology – Bangalore, India

### Undergraduate Researcher in Healthcare Innovation Lab

June 2012 - May 2014

Adviser: Dr. Srinivas A

- Collaborated with local and international hospitals to analyze real-world clinical data
- Integrated large scale human physiology data (like EKG, Skin Conductance, ERG) to predict medically relevant parameters (like Cardiac Output, Emotion, Retinal Response time)
- Technical Skills: Verilog, MATLAB, Rapid prototyping, Circuit design, Arduino, Raspberry Pi, Sensors

## Publications

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### 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, *Biological Psychiatry*. (in preparation)
- J2 Ren, M., Hu, Z., Chen, Q., Jaffe, A., Li, Y., **Sadashivaiah, V.**, Li, Y., Zhu, S., Rajpurohit, N., Shin, J. H., Xia, W., Jia, Y., Wu, J., Qin, S. L., Li, X., Zhu, J., Tian, Q., Parades, D., Zhang, F., Wang, K. H., Mattay, V. S., Callicott, J. H., Berman, K. F., Weinberger, D. R., Yang, F.; KCNH2-3.1 mediates aberrant complement activation to impair hippocampal-medial prefrontal circuitry associated with working memory deficits, *Molecular Psychiatry*. (in press)
- J3 **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, *Journal of Computational Neuroscience*, 2018.
- J4 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*, 2016.

### Peer reviewed conference proceedings

- PC1 **[Oral] 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.
- PC2 **[Oral] 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.
- PC3 **[Oral] 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.
- PC4 **[Poster] 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.
- PC5 **[Oral] 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. *Proceedings of SPIE, Next-Generation Spectroscopic Technologies VIII*, 2015.

## Conference presentations

- C1 **[Oral] 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.
- C2 **[Poster] 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.
- C3 **[Poster] 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.
- C4 **[Poster] Ren, M.**, Chen, Q., **Sadashivaiah, V.**, Li, Y., Zhu, S., Mezeivitch, 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, 47th Annual Meeting of *Society for Neuroscience*, Washington D.C., 2017.
- C5 **[Poster] 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.
- C6 **[Oral] 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.

## Institutional & Community Experience

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### Center for Social Concern – Baltimore, MD

#### Volunteer

November 2015 – Present

#### Bootup Baltimore

- Refurbishing and repairing old computer systems before donating them to local schools in Baltimore
- Teaching basic computer skills like programming and word processing to students in 3rd through 5th grade

### Graduate Representative Organization – Baltimore, MD

#### Advocacy Chair

May 2016 – May 2017

#### Johns Hopkins University

- 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

### Varsity Field Hockey – Bangalore, India

#### Goal-Keeper

May 2012 – May 2014

#### PES Institute of Technology

- Participated in practices, weekly drills, competitions, and community service events
- Drafted for state team trials at 2013 inter-collegiate tournament

## IEEE Student Branch – Bangalore, India

### Core Team

May 2013 – May 2015

PES Institute of Technology

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

## Awards and Fellowships

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<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>Recipient</b> , TEQIP travel grant - PES Institute of Technology and Government of India	2014, 2013
<b>Global finalist</b> , Vertech City Challenge - Vertech Symposium	2014
<b>Winner</b> , Best student project - IEEE International Conference on Impact of E-Technology	2014
<b>Global finalist</b> , Intel Global Challenge - UC Berkeley	2013
<b>Finalist</b> , Biotechnology Entrepreneurship Student Teams - 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

## Skills

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**Programming:** Python, MATLAB, R, mongo, L<sup>A</sup>T<sub>E</sub>X, HTML, CSS, Bash, HPC

**Libraries:** TensorFlow, Keras, Git and Version control, OpenCV, Microsoft Office

**Data & Models:** Signal Processing, Machine Learning, Data Visualization, Big Data, Probability and Statistics

## Interests

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Rock Climbing, Running, Backpacking, Cycling, Photography, Board Games, DIY Projects