Vijay Sadashivaiah

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Education

Johns Hopkins University – Baltimore, MD
Master of Science and Engineering in Biomedical Engineering — May 2017

Visvesvaraya Technological University – Bangalore, India
Bachelor of Engineering in Electronics and Communication Engineering — May 2015
Visiting student at **Massachusetts Institute of Technology** — June - September 2014

Research Experience

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 to analyze imaging, genetics and physiological data
- Building supervised learning models to identify underlying biological pathways in Schizophrenia
- Developed models are based on Deep Neural Network (CNN's) and traditional machine learning frameworks
- Presented preliminary results at local and international scientific meetings [C1, C2, C3, C4]
- Amalgamating the findings into journal articles [J1, J2, J3]
- 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 mammalian nerve fiber to study chronic pain
- Quantified the interactions in a nerve fiber to test the performance of electrical nerve stimulation
- Optimized our code-base by 70% and storage by 60% by developing efficient NEURON scripts
- Presented results at local and international scientific meetings [PC1, PC2, PC3, PC4]
- Amalgamated the findings into a journal article [J4]
- 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

- Studied the neural circuits involved in goal-directed sensorimotor interactions
- Analyzed voltage sensitive dye images of mouse neocortex
- Developed an interactive graphical platform to visualize neuroimaging data
- Presented preliminary results at the summer research program symposium [C5]
- Co-authored a journal article [J5]
- 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 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 – 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
- 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

Journal articles

J1 **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, *NeuroImage*. (in preparation)

J2 **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)

J3 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 review)

J4 **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.

J5 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 **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.

PC2 **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.

PC3 **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 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 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 **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)

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

Skills

Programming: Python, MATLAB, R, mongo, LaTeX, HTML, CSS, Command Line
Libraries: TensorFlow, Keras, Git and Version control, OpenCV, Microsoft Office

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

Institutional & Community Experience

Bootup Baltimore Baltimore, MD
Volunteer November 2015 – Present
Center for Social Concern

- 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 trails 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

Interests

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