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 — Bangalore, 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
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 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, *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 [P1, P2, C1, C2]
- Technical Skills: Python, R, SQL, Tensorflow, Keras, SPM, Linux

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
- 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 codebase by 70% and storage by 60% by developing efficient NEURON scripts
- Amalgamated the findings into a journal article [P4]
- Technical Skills: MATLAB, NEURON, Unix, Linux

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 goal directed sensorimotor interactions
- Analyzed over 1.5 TB of voltage sensitive dye images across multiple trials
- Developed an interactive graphical platform to visualize neuroimagaing data on MATLAB
- Co-authored a journal article [P7]
- Technical Skills: 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 imagaing 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, *NeuroImage*. (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, *Biological Psychiatry*. (in preparation)

P3 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, *Nature Medicine*. (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, *Journal of Computational Neuroscience*. (in revision)

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*, Honalulu, 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*, Honalulu, Hawaii, 2018. (in press)

P7 **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.

P8 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.

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 faculty 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 groups 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
- Supervised a team of 5 to successfully organize a Spring Hackathon, “Circuitus”. Over 200 students participated

SKILLS

Programming: Proficient in Python, MATLAB, R, LaTeX, 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