Vijay Sadashivaiah

Ph.D. Student in Computer Science

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Education

Rensselaer Polytechnic Institute - Troy, NY January 2021 - Present
- Doctor of Philosophy in Computer Science GPA: 4.00/4.00

Johns Hopkins University - Baltimore, MD August 2015 - May 2017
- Master of Science and Engineering in Biomedical Engineering GPA: 3.87/4.00

PES Institute of Technology - Bangalore, India August 2011 - May 2015
- Bachelor of Engineering in Electrical Engineering GPA: 9.32/10.00
- Visiting student at **Massachusetts Institute of Technology** 2014

Skills

Programming: (Proficient) Python, MATLAB, R, Bash, LaTeX; (familiar) C, Java, Perl
Frameworks and tools: Pytorch, TensorFlow, Keras, CUDA, MPI, Git, NEURON, Docker
Relevant courses: Learning Theory, Information Theory, Machine Learning (ML) from Data, ML and Optimization, Deep Learning, Parallel Computing, Probability Theory, Image Processing

Research Experience

IBM Research – Remote
Summer Extern in Trustworthy AI and Reinforcement Learning May 2021 – September 2021
Mentors: Dr. Keerthiram Murugesan, Dr. Pin-Yu Chen, Dr. Ronny Luss, Dr. Karthikeyan Shanmugam, Dr. Amit Dhurandhar

- Working on multi-armed bandit and reinforcement learning based approaches to improve transfer learning
- Explored visual explanation techniques to understand transfer learning algorithms
- Amalgamating the findings into an ICLR paper
- Technical Skills: Python, Pytorch, High–Performance computing, Tensorflow

Lieber Institute for Brain Development – Baltimore, MD
Staff Scientist in Machine Learning and Data Science July 2019 - January 2021
Research Associate in Machine Learning and Data Science August 2017 - June 2019
Adviser: Dr. Qiang Chen, Dr. Keri Martinowich

- Explored novel data-driven methods on heterogeneous datasets to identify the underlying biological pathways involved in Schizophrenia and other neurodevelopmental disorders
- Applied transfer learning based methods to extract relevant biomarkers in neuroimaging data
- 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

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., 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.

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.

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*, Honalulu, 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*, Honalulu, 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.

Journal articles

J1 **Sadashivaiah, V.**, Tippani, M., Page, S. C., Kwon, SH, Bach, S. V., Bharadwaj, R. A., Hyde, T. M., Kleinman, J. E., Jaffe, A. E., Maynard, K.R.; SUFI: An automated approach to spectral unmixing of fluorescent biological images. *BioRxiv*, 2021.

J2 Tran, M. N., Maynard, K. R., Spangler, A., Torres, L. C., **Sadashivaiah, V.**, Tippani, M., ... & Jaffe, A. E.; Single-nucleus transcriptome analysis reveals cell type-specific molecular signatures across reward circuitry in the human brain. *Neuron*, 2021.

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*, 2020.

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.

Institutional & Community Experience

Center for Social Concern – Baltimore, MD
Volunteer November 2015 – September 2020
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 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

Awards and Fellowships

Distinguished Biomedical Engineering Fellowship - Johns Hopkins University	2015 - 2017
Data Incubator Challenge (Semi-finalist) - The Data Incubator	2017
Foundation Leenaards’ Summer Research Fellowship - EPFL	2015
University Merit Scholarship - PES Institute of Technology	2011 - 2015
“Code Something that Matters" Scholarship - Vecna Robotics	2015
TEQIP Travel Grant - PES Institute of Technology and Government of India	2014, 2013
Vertech City Challenge (Global finalist) - Vertech Symposium	2014
Best Student Project - IEEE International Conference on Impact of E-Technology	2014
Intel Global Challenge (Global finalist) - UC Berkeley	2013
Biotechnology Entrepreneurship Student Teams - Department of Biotechnology, India	2013
Go Green in the City (Global semi-finalist) - Schneider Electric	2013

Interests

Rock Climbing, Running, Hiking, Backpacking, Cycling, Board Games, Homelabbing