

Saurabh Vyas

Contact Information	729 Escondido Road, Apt. 402, Stanford, CA 94305 www.stanford.edu/~smvyas	301.980.2184 smvyas@stanford.edu
Education	Stanford University , Stanford, California Ph.D. in Bioengineering. Advisor: Krishna Shenoy. Johns Hopkins University , Baltimore, Maryland M.S.E. in Biomedical Engineering. B.S. in Biomedical Engineering. B.S. in Electrical Engineering. University Honors.	since 2014 2008 – 2014
Professional Experience	Stanford University , Stanford, California <i>Neural Prosthetic Systems Lab</i> Conducted research on motor learning/systems neuroscience, neural dynamics, and brain-machine interfaces. Applied Physics Laboratory , Laurel, Maryland <i>Intelligent Systems and Robotics Group</i> Systems Engineer. Developed machine learning and computer vision algorithms for applications in robotics, medical imaging, and remote sensing. Johns Hopkins University , Baltimore, Maryland <i>Neuromedical Control Systems Lab</i> Undergraduate research assistant advised by Prof. Sridevi Sarma. Conducted research on using statistical signal processing and control theory to study STN activity in Parkinsonian patients. Johns Hopkins Medicine , Baltimore, Maryland <i>Computational Sensing and Robotics Lab</i> Undergraduate research assistant advised by Profs. Russ Taylor and Emad Bector. Developed image registration techniques using Ultrasound imaging for surgical robotics.	since 2014 2011 – 2014 2012 – 2014 2012 – 2014
Publications	<p>A. J. Christensen*, S. M. Iyer*, A. Francois, S. Vyas, C. Ramakrishnan, S. Vesuna, K. Deisseroth, G. Scherrer, S. L. Delp. “In Vivo Interrogation of Spinal Mechanosensory Circuits.” <i>Cell Reports</i>. 2016 Nov 1;17(6):1699-710. (*equal contribution)</p> <p>S. Vyas, H. Huang, J. Gale, S. Sarma*, E. Montgomery*, “Complexity of Dynamics in STN Neuronal Systems is reduced in Parkinson’s Disease compared to Epilepsy,” <i>IEEE Transaction on Neural Systems and Rehabilitation Engineering</i>, 24.1 (2016): 36-45. (*equal contribution)</p> <p>A. Mendrik, K. Vincken, H. Kuijf, M. Breeuwer, W. Bouvy, J. Bresser, A. Alansary, M. Bruijne, A. Carass, A. El-Baz, A. Jog, R. Katyal, A. Khan, F. Lijn, Q. Mahmood, R. Mukherjee, A. Opbroek, S. Paneri, S. Pereira, M. Persson, M. Rajchl, D. Sarikaya, O. Smedby, C. Silva, H. Vrooman, S. Vyas, C. Wang, L. Zhao, G. Biessels, and M. Viergever, “MRBrainS Challenge: Online Evaluation Framework for Brain Image Segmentation in 3T MRI Scans,” <i>Computational Intelligence and Neuroscience</i>, 2015.</p> <p>S. Vyas, J. Meyerle, P. Burlina, “Non-Invasive Estimation of Skin Thickness from Hyperspectral Imaging and Validation using Echography,” <i>Computers in Biology and Medicine</i>, 57 (2015): 173-181.</p>	

R. Mukherjee, **S. Vyas**, R. Juang, C. Sprouse, P. Burlina, “Endocardial Surface Delineation in 3D Transesophageal Echocardiography,” *Ultrasound in Medicine and Biology*, 39(12), 2447-2462, 2013.

S. Vyas, A. Banerjee, P. Burlina, “Estimating Skin Parameters from Hyperspectral Signatures,” *Journal of Biomedical Optics*, 18(5), 057008-057008, 2013.

Referred
Conference
Papers

S. Vyas, J. Gammie, P. Burlina, “Computing Cardiac Strain from Variational Optical Flow in Four-Dimensional Echocardiography,” IEEE CBMS: Computer-based Medical Systems, 2014.
Finalist - Best Student Paper Award

S. Vyas, J. Meyerle, P. Burlina, “Cross Validating Hyperspectral with Ultrasound-based Skin Thickness Estimation,” IEEE Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (IEEE WHISPERS), 2014.

S. Vyas^{*}, P. Burlina, D. Kleissas, R. Mukherjee^{*}, “Automated Walks using Machine Learning for Segmentation,” International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), Grand Challenge on MR Brain Segmentation (MRBrains13), 2013. (*equal contribution)

S. Vyas, A. Banerjee, P. Burlina, “Machine Learning Methods for In Vivo Skin Parameter Estimation,” IEEE CBMS: Computer-based Medical Systems, 2013.

S. Vyas, R. Mukherjee, F. Sosa, and P. Burlina, “Endocardium Segmentation in 3D Transesophageal Echocardiography,” IEEE ISBI: International Symposium on Biomedical Imaging: From Nano to Macro, 2013.

S. Vyas, A. Banerjee, L. Garza, S. Kang, and P. Burlina, “Hyperspectral Signature Analysis of Skin Parameters,” SPIE-MI: Proceedings of SPIE Medical Imaging, 2013.

E. Peterson, R. Mukherjee, **S. Vyas**, D. Cornish, “Galaxy: Link Space Visualization and Analysis of Network Traffic,” IEEE Visual Analytics in Science & Technology (VAST-MC3), 2013.
Honorable Mention – “Intriguing Visualization”

S. Vyas^{*}, S. Su^{*}, R. Kim^{*}, N. Kuo, R. Taylor, J. Kang, E. Boctor, “Intraoperative Ultrasound to Stereocamera Registration using Interventional Photoacoustic Imaging,” SPIE-MI: Proceedings of SPIE Medical Imaging, 2012. (*equal contribution)

Conference
Abstracts

B. Sheffer, N. Even-Chen, **S. Vyas**, S. Ryu, K. Shenoy, “Direction and distance decoding accuracy from plan activity in monkey motor cortex,” Society for Neuroscience, Washington D.C., 2017.

A. Williams, B. Poole, N. Maheswaranathan, T. H. Kim, F. Wang, **S. Vyas**, K. V. Shenoy, M. J. Schnitzer, T. G. Kolda, S. Ganguli, “Low-dimensional representations of learning in multi-trial datasets,” Society for Neuroscience, Washington D.C., 2017.

A. Williams, H. Kim, F. Wang, **S. Vyas**, K. Shenoy, M. Schnitzer, T. Kolda, S. Ganguli, “Dimension reduction of multi-trial neural data by tensor decomposition,” Computational and Systems Neuroscience (COSYNE), Salt Lake City, UT, 2017. Talk.

S. Vyas, A. Christensen, C. Mitelut, S. Iyer, S. Gratiy, S. Delp, C. Anastassiou, “A point process approach to inferring connectivity from biophysical simulations of Ca2+ fluorescence,” Computational and Systems Neuroscience (COSYNE), Salt Lake City, UT, 2016.

S. Vyas, A. Christensen, S. Iyer, C. Ramakrishnan, K. Deisseroth, S. Delp, “Optical and computational tools for analyzing somatosensory circuits,” Society for Neuroscience, Chicago, IL, 2015.

A. Christensen, S. Iyer, **S. Vyas**, A. Francois, G. Scherrer, K. Deisseroth, S. Delp, “Optogenetic tools for perturbing spinal neural circuits,” Society for Neuroscience, Chicago, IL, 2015.

S. Iyer, A. Christensen, **S. Vyas**, S. Vesuna, A. Francois, C. Ramakrishnan, K. Deisseroth, G. Scherrer, S. Delp, “Optogenetic interrogation of mammalian mechanosensory and nociceptive circuits,” Society for Neuroscience, Chicago, IL, 2015.

S. Vyas, H. V. Nguyen, P. Burlina, A. Banerjee, L. Garza, R. Chellappa, “Computational Modeling of Skin Reflectance Spectra for Biological Parameter Estimation through Machine Learning,” SPIE: Proceedings of SPIE, 2012.

Patents P. Burlina, A. Banerjee, **S. Vyas**, L. Garza, “Hyperspectral Imaging for Detection of Skin Related Conditions,” U.S. Patent No. 8,761,476. Granted on June 24, 2014.

Awards Ruth L. Kirschstein National Research Service Award, NIH F31 2017
National Science Foundation IGERT trainee in Mind, Brain, and Computation 2015
Biosciences Travel Grant, Stanford University 2015
National Science Foundation Graduate Research Fellowship 2014
Ric Weiland Graduate Fellowship, Stanford University 2014
Masters Tuition Scholarship, Johns Hopkins University 2012
Graduated with University Honors, Johns Hopkins University 2012
Team Process Award, Design Day 2012, Johns Hopkins University 2012
People’s Choice Award, Medical Device Competition, Rice University 2012
Finalist, Invention of the Year , Johns Hopkins Office of Tech Transfer 2011
Project Award, Computer Integrated Surgery, Johns Hopkins University 2011
Robert C. Byrd Scholarship, State of Maryland 2008
Dorr Family Foundation Scholar, Scholarship for Academic Excellence 2008
Merit Scholastic Award, State of Maryland 2008
Distinguished Scholars, State of Maryland 2008
Advanced Placement Scholar with Distinction, CollegeBoard 2008
Science, Engineering, Apprentice Program Fellow, United States Naval Academy 2008
Science, Engineering, Apprentice Program Fellow, United States Naval Academy 2007

Talks Society for Neuroscience, Nanosymposium on Motor Control and Internal Representations, Washington D.C., “Brain-machine interface guided movements share a common neural substrate with overt movements,” 2017.

Bioengineering Retreat, Stanford University, Chaminade Resort and Spa, Santa Cruz CA. “Neural population dynamics underlying motor learning transfer,” 2017. **1st Place - Best Talk**

Invited talk to Neurosciences Ph.D. program interview candidates, Stanford University. “Neural Dynamics and Adaptation for Brain-Machine Interface Control.” 2017

Bioengineering Retreat, Stanford University, Chaminade Resort and Spa Santa Cruz CA. “Towards a freely moving macaque model for motor neuroscience and brain-machine interfaces,” 2016

Invited talk at Google, Mountain View, CA, hosted by Dr. Thomas Dean. “Estimating Neuronal Connectivity from Calcium Imaging Data,” 2015

IEEE CBMS conference in New York, NY. “Computing Cardiac Strain from Variational Optical Flow in Four-Dimensional Echocardiography,” 2014.

MICCAI workshop in Nagoya, Japan. “Automated Walks using Machine Learning for Segmentation,” 2013.

ISBI conference in San Francisco, CA. “Endocardium Segmentation in 3D Transesophageal Echocardiography,” 2013.

SPIE Medical Imaging conference in Orlando, FL. “Hyperspectral Signature Analysis of Skin Parameters,” 2013.

SPIE conference in Baltimore, MD. “Computational Modeling of Skin Reflectance Spectra for Biological Parameter Estimation through Machine Learning,” 2012.

SPIE Medical Imaging conference in San Diego, CA. “Intraoperative Ultrasound to Stereocamera Registration using Interventional Photoacoustic Imaging,” 2012.

Teaching/ Grading	EE 364a: Convex Optimization, Stanford University <i>Grader for Prof. Stephen Boyd</i>	Spring 2017
	EE 376a: Information Theory, Stanford University <i>Grader for Prof. David Tse</i>	Winter 2017
	BioE 281: Biomechanics of Movement, Stanford University <i>Teaching Assistant for Prof. Scott Delp</i>	Winter 2016
	CS 229: Machine Learning, Stanford University <i>Teaching Assistant for Prof. Andrew Ng</i>	Autumn 2015
	BIOS 230: Biomedical Data Analysis in Matlab, Stanford University <i>Co-Developed and co-instructed 3-week mini course (with Nimit Jain)</i>	Spring 2015
	580.421: Systems Bioengineering Laboratory, Johns Hopkins University <i>Assistant for Prof. Eileen Haase</i>	Fall 2012 <i>Teaching</i>
Outreach	Stanford Biosciences Students Association, Stanford University <i>Mentored first-year bioengineering graduate students.</i>	since 2015
	Biomedical Engineering Society, Stanford University <i>Mentored undergraduate students interested in bioengineering careers.</i>	2015
	Boys and Girls Club, Palo Alto, CA <i>SAT tutoring for high school students in the east Palo Alto area.</i>	2015
	ASPIRE Program, Applied Physics Laboratory <i>Mentored high school students in robotics, and computer vision.</i>	2013 – 2014
	College Prep Program, Johns Hopkins University <i>Developed an SAT curriculum; lectured a classroom of 20 students.</i>	2013 – 2014
	Johns Hopkins Tutorial Project <i>Tutored math and reading to Baltimore City Elementary school students.</i>	2012