

# SATRAJIT SUJIT GHOSH

## *Curriculum Vitae*

McGovern Institute for Brain Research  
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### **Degrees**

PhD, Cognitive and Neural Systems, Boston University, 2005, Prof. Frank Guenther  
B.S. (Honors), Computer Science, National University of Singapore, 1997, Prof. Lonce L. Wyse

### **Employment**

Principal Research Scientist, McGovern Institute for Brain Research, MIT, 2015 – Current  
Assistant Professor, Department of Otolaryngology, Harvard Medical School, 2014 – Current  
Research Scientist, McGovern Institute for Brain Research, MIT, 2011 – 2014  
Research Scientist, Research Laboratory of Electronics, MIT, 2007 – 2011  
Postdoctoral Associate, Research Laboratory of Electronics, MIT, 2004 – 2007, Dr. Joseph S. Perkell  
Software Engineer, Kent Ridge Digital Labs, Singapore, 1997-1998

### **External Positions held**

Massachusetts Eye and Ear, Harvard Medical School, 2014 – Current, Research Associate  
Speech and Hearing Biosciences and Technology, (now in) Division of Medical Sciences, Harvard Medical School, 2008 – Current, Member of the Faculty  
Program in Neuroscience, Division of Medical Sciences, Harvard Medical School, 2019 – Current, Member of the Faculty  
Standards for Datasharing Taskforce, International Neuroinformatics Coordinating Facilities, 2010 – 2016  
Executive board, TankThink Labs, LLC, 2011 – 2015  
Department of Cognitive and Neural Systems, Boston University, 2005-2010, Research Fellow

### **Honors**

Winner - Predictive Analytics Competition for Depression, University of Muenster, 2018  
Phase I winner for the Open Science Prize competition, NIH, HHMI, Wellcome Trust, 2016  
Educational stipend, International Society for Magnetic Resonance in Medicine, 2008  
Graduate Teaching Fellow Award, Boston University, 2000  
Presidential University Graduate Fellowship, Boston University, 1998

### **UROP Students supervised**

Alkhairy, Samiya, Fall, 2009, Spring 2010  
Zhang, Mark, Spring 2012  
Ung, William, Spring 2012  
Smith, Ashley, Spring 2015  
Biswas, Jyotishka, Spring 2016  
Suh, Michelle, Spring 2016  
Taylor, Tilly, Spring 2016  
Jackson, Blake, Spring 2016  
Batmunkh, Zulsar, Spring 2016  
Wu, David, Fall 2016

Wu, Kathy, Spring 2017  
Shumaev, Alexander, Fall 2018  
Moreno, Felipe, Fall 2018

### **Ph.D. Students Supervised**

Ciccarelli, Gregory, Characterization of Phone Rate as a Vocal Biomarker of Depression, 2017, Technical Associate MIT Lincoln Laboratory, Lexington MA  
Sitek, Kevin, Investigating the human subcortical auditory pathway with MRI, 2019, Postdoctoral Associate at Baylor College of Medicine, Houston TX  
Low, Daniel, SHBT graduate student, Harvard Medical School, In progress  
Mentch, Jeffrey, SHBT graduate student, Harvard Medical School, In progress  
Burdinski, Debbie, MD/PhD student, Harvard Medical School, In progress

### **Postdoctoral Researchers Supervised**

Ghosh, Debanjan, 2018 - 2019, Educational Testing Service, Princeton, NJ  
Padhy, Smruti, 2016 - 2018, Texas Advanced Supercomputing Center  
Jarecka, Dorota, 2016 -  
Rajaei, Hoda, 2019 -  
Kleinberger, Rebecca, 2020 –  
Rana, Aakanksha, 2020 -

### **Teaching experience**

6.541/SHBT.204, Speech Communication, Spring 2009, 2011- 2016  
6.551/SHBT.200, Acoustics of Speech and Hearing, Fall 2007- 2015  
9.S912, Quantitative Methods and Computational Models in Neuroscience, Fall 2015  
HST.583, fMRI Data Acquisition and Analysis, Fall 2015, 2017, 2019  
HST.714/SHBT.200/9.016, Introduction to Sound, Speech, and Hearing, Fall 2016 -

### **Service**

#### *Internal service:*

Admissions committee, Speech and Hearing Biosciences and Technology Program (HST), 2010 – Current  
Curriculum committee, Speech and Hearing Biosciences and Technology Program (HST), 2009 – Current  
Director, Openmind Neuroscience High Performance Computing Resource, 2014 -  
Chair, BCS Faculty Committee on Computational Infrastructure, 2019 -

#### *External service:*

##### *Executive Board*

NWB – Neurodata Without Borders (<https://nwb.org>)

##### *Scientific Advisory Board*

SINDS – Neurohackademy Training Program (<http://neurohackademy.org/>)

CONP – Canadian Open Neuroscience Platform (<http://conp.ca/>)

##### *Editorial board*

Frontiers in Brain Imaging Methods, 2012 – Current

Frontiers in Neuroinformatics, 2016 – Current

BMC NeuroCommons, 2018 – 2020 (co Editor-In-Chief)

Frontiers in Human Neuroscience, 2015 – 2017

##### *Member*

Organization for Human Brain Mapping (OHBM) - Best Practices Committee, 2020 - 2024  
 Alzheimer's Drug Discovery Foundation - Diagnostics Accelerator Speech Consortium, 2020  
*Ad hoc grant reviewer*  
 National Institute of Health, 2017 - (NOIT, BRAIN Initiative, EITN)  
 National Science Foundation, 2008, 2010, 2013  
 National Medical Research Council, Singapore, 2007, 2009, 2011-2012  
 Department of Defense, 2011  
 Simons Foundation, 201  
 Israel Science Foundation, 2015, 2019  
 Ad hoc editorial reviewer  
 Biological Psychiatry  
 Brain  
 Brain and Language  
 Brain Structure and Function  
 Cerebral Cortex  
 Current Biology  
 Elife  
 European Journal of Neuroscience  
 Frontiers in Computational Neuroscience  
 Frontiers in Systems Neuroscience  
 Frontiers in Neuroinformatics  
 Human Brain Mapping  
 Journal of the Acoustical Society of America  
 Journal of Machine Language Research  
 Journal of Neuroscience  
 Journal of Speech, Language and Hearing Research  
 Magnetic Resonance in Medicine  
 Nature Methods  
 Nature Translational Psychiatry  
 NeuroImage  
 Neuroinformatics  
 PLOS One  
 PLOS Computational Biology  
  
 Editorial board, Special Research Topic, Python in Neuroscience I / II, Frontiers in Neuroscience  
 Nipype teaching workshops, Edinburgh 2011, Magdeburg 2012, Boston 2017  
 Speaker, Educational workshop, Organization for Human Brain Mapping, 2013, 2018  
 Organizer, HBM Hackathon, Organization for Human Brain Mapping, Seattle, 2013  
 Local organizing committee, 4<sup>th</sup> Biennial Conference on Resting State Connectivity, Boston, 2014

## Technological and Other Scientific Innovations

Methods and Apparatus for Reducing Stuttering	US Patent application filed: 16983974 This is based on dissertation work of postdoctoral associate Rebecca Kleinberger. It involves an apparatus and a software to enable realtime vocal modification to increase fluency in individuals who stutter.
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Assessing  
Disorders Through  
Speech And A  
Computational  
Model

U.S. Patent No.: 10,127,929 – Issued November 2018

1. Williamson JR, Quatieri TF, Helfer BS, Perricone J, **Ghosh SS**, \*\*  
Ciccarelli G, Mehta DD. (2015) Segment-dependent dynamics in predicting  
Parkinson's disease. In Sixteenth Annual Conference of the International  
Speech Communication Association.
2. \*\* Ciccarelli G, Quatieri TF, **Ghosh SS** (2016) Neurophysiological Vocal  
Source Modeling for Biomarkers of Disease. In Seventeenth Annual  
Conference of the International Speech Communication Association. (\*\*  
Mr. Ciccarelli, an MIT EECS graduate student is a current mentee).

The goal of this effort is to supplement the VoiceUp platform with augmented algorithms for tracking mental health state using computational models. The model itself is based on my doctoral thesis work and I guided the team to using that framework. This came out of the MIT MINT funded collaboration with MIT Lincoln Laboratory.

Nipype: Brain  
imaging analysis  
framework  
2008-

Gorgolewski K, Burns CD, Madison C, Clark D, Halchenko YO, Waskom ML, Ghosh SS. (2011). Nipype: a flexible, lightweight and extensible neuroimaging data processing framework in Python. *Front. Neuroinform.* 5:13.

<https://github.com/nipy/nipype>

Nipype provides an open source Python library for constructing scalable, reusable, and efficient dataflows for biomedical research. Nipype provides a standard Python interface to 750+ tools and algorithms from more than 25 neuroimaging software packages written in C++, MATLAB, Java, and Python. Nipype dataflows can be executed in various HPC (high-performance computing), commercial Cloud, and local environments. Nipype forms a base software layer for some of the most popular neuroimaging workflows in use today (fMRIPrep, Mindboggle, C-PAC and others).

Over 190+ individuals have contributed to the code base and the software is used in 76 countries.

MURFI: a realtime  
MR biofeedback  
software  
2007-

Hinds, O., **Ghosh, S.**, Thompson, T.W., Yoo, J.J., Whitfield-Gabrieli, S., Triantafyllou, C., Gabrieli, J.D. (2011) Computing moment-to-moment BOLD activation for real-time neurofeedback. *Neuroimage*. 54(1):361-8. PMID: 20682350.

<https://github.com/gablab/murfi2/>

This opensource software framework allows biofeedback of activation based on the BOLD signal. I created the testing and validation framework for the software and contributed to its design and implementation. We are now using this software for ongoing projects in the treatment of schizophrenia and in the development of new paradigms. Development of this was supported by the McGovern Institute MINT program.

This is now in use in two clinical trials at Northeastern University and at University of Minnesota, Minneapolis.

Audapter: A realtime vocal modification software 2005 - 2010	<p>Cai, S., <b>Ghosh, S.</b>, Guenther, F., Perkell, J. (2011). Focal manipulations of formant trajectories reveal a role of auditory feedback in the online control of both within-syllable and between-syllable speech timing. <i>J Neurosci</i> 31: 45. 16483-16490. PMID: 22072698.</p> <p><a href="https://github.com/shanqing-cai/audapter_matlab">https://github.com/shanqing-cai/audapter_matlab</a>  <a href="https://github.com/shanqing-cai/audapter_mex">https://github.com/shanqing-cai/audapter_mex</a></p> <p>This opensource framework allows modifying vocal characteristics in realtime. I established the initial framework and guided Marc Boucek and Shanqing Cai in extending the framework to perform new paradigms.</p>
Noise suppression for MRI patient microphone input 2004-2005	<p>Two provisional patents were applied for but not pursued after expiry.</p> <p>2007 Online noise suppression software for Magnetic Resonance Imaging</p> <p>2007 Bidirectional noise suppressing communication setup for Magnetic Resonance Imaging</p> <p><a href="https://arxiv.org/abs/1207.5827">https://arxiv.org/abs/1207.5827</a></p> <p>The goal of this software was to provide a mechanism to suppress MR noise. This is still being used in research projects at MIT.</p>
Carotid artery diameter estimation from ultrasound images 1999-2000	<p>Current usage status is unknown. I built the graphical interface for the software to provide a semi-automated method for artery diameter estimation that reduced human intervention significantly and validated it against manual measurements.</p>
FlexEffex: Interactive sound effects and music 1997-1998	<p>I contributed to the development of the FlexEffex architecture and rewrote the internal sound effects plugin api and hardware libraries. The software was subsequently sold to a company, MindMaker Inc.</p>

## Publications

1. Guenther, F.H., Nieto-Castanon, A., Tourville, J.A. and **Ghosh, S.S.** (2001) The effects of categorization training on auditory perception and cortical representations. *Proceedings of the Speech Recognition as Pattern Classification (SPRAAC) Workshop*, Nijmegen, The Netherlands.
2. Guenther, F.H. and **Ghosh, S.S.** (2003) A model of cortical and cerebellar function in speech. *Proceedings of the XVth International Congress of Phonetic Sciences* (pp. 169-173). Barcelona, Spain: 15th ICPhS Organizing Committee.
3. Guenther, F.H., **Ghosh, S.S.** and Nieto-Castanon, A. (2003) A neural model of speech production. *Proceedings of the 6th International Seminar on Speech Production*. Sydney, Australia
4. Nieto-Castanon, A., **Ghosh, S.S.**, Tourville, J.A., Guenther, F.H. (2003) Region of interest based analysis of functional imaging data. *Neuroimage*. 19(4):1303-16. PMID: 12948689.
5. Guenther, F.H., Nieto-Castanon, A., Ghosh, S.S., Tourville, J.A. (2004) Representation of sound categories in auditory cortical maps. *J Speech Lang Hear Res*. 47(1):46-57. PMID: 15072527.
6. Max, L., Guenther, F.H., Gracco, V.L., **Ghosh, S.S.** and Wallace, M.E. (2004) Unstable or insufficiently activated internal models and feedback-biased motor control as sources of dysfluency: A theoretical model of stuttering. *Contemporary Issues in Communication Science and Disorders*. 31.

7. Klein, A., Mensh, B., **Ghosh, S.**, Tourville, J., Hirsch, J. (2005) Mindboggle: automated brain labeling with multiple atlases. *BMC Med Imaging*. 5:7. PMCID: PMC1283974.
8. Guenther, F.H., **Ghosh, S.S.**, Tourville, J.A. (2006) Neural modeling and imaging of the cortical interactions underlying syllable production. *Brain Lang*. 96(3):280-301. PMCID: PMC1473986.
9. Guenther, F.H., **Ghosh, S.S.**, Nieto-Castanon, A. and Tourville, J.A. (2006) A neural model of speech production. In: J. Harrington & M. Tabain (eds.), *Speech Production: Models, Phonetic Processes, and Techniques*. London: Psychology Press.
10. Tiede, M., Shattuck-Hufnagel, S., Johnson, B., **Ghosh, S.**, Matthies, M., Zandipour, M. and Perkell, J. (2007) Gestural phasing in /kt/ sequences contrasting within and cross word contexts. *Proceedings of the XVIth International Congress of Phonetic Sciences*. Saarbrücken, Germany.
11. **Ghosh, S.S.**, Tourville, J.A., Guenther, F.H. (2008) A neuroimaging study of premotor lateralization and cerebellar involvement in the production of phonemes and syllables. *J Speech Lang Hear Res*. 51(5):1183-202. PMCID: PMC2652040.
12. Cai, S, Boucek, M, **Ghosh, S.S.**, Guenther, F.H., Perkell, J.S. (2008) A System for Online Dynamic Perturbation of Formant Trajectories and Results from Perturbations of the Mandarin Triphthong /iau/. *International Seminar in Speech Production*, Strassbourg, France.
13. Balci, S.K., Sabuncu, M.R., Yoo, J., **Ghosh, S.S.**, Whitfield-Gabrieli, S., Gabrieli, J.D., Golland, P. (2008) Prediction of Successful Memory Encoding from fMRI Data. *Med Image Comput Comput Assist Interv*. 2008(11):97-104. PMCID: PMC2855196.
14. Perkell, J.S., Lane, H., **Ghosh, S.S.**, Matthies, M.L., Tiede, M., Guenther, F., Ménard, L. (2008) Mechanisms of Vowel Production: Auditory Goals and Speaker Acuity. *International Seminar in Speech Production*, Strassbourg, France.
15. Klein, A., **Ghosh, S.S.**, Avants, B., Yeo, B.T., Fischl, B., Ardekani, B., Gee, J.C., Mann, J.J., Parsey, R.V. (2010) Evaluation of volume-based and surface-based brain image registration methods. *Neuroimage*. 51(1):214-20. PMCID: PMC2862732.
16. Cai, S., **Ghosh, S.S.**, Guenther, F.H., Perkell, J.S. (2010) Adaptive auditory feedback control of the production of formant trajectories in the Mandarin triphthong /iau/ and its pattern of generalization. *J Acoust Soc Am*. 128(4):2033-48. PMCID: PMC2981117.
17. **Ghosh, S.S.**, Kakunoori, S., Augustinack, J., Nieto-Castanon, A., Kovelman, I., Gaab, N., Christodoulou, J.A., Triantafyllou, C., Gabrieli, J.D., Fischl, B. (2010) Evaluating the validity of volume-based and surface-based brain image registration for developmental cognitive neuroscience studies in children 4 to 11 years of age. *Neuroimage*. 53(1):85-93. PMCID: PMC2914629.
18. **Ghosh, S.S.**, Matthies, M.L., Maas, E., Hanson, A., Tiede, M., Ménard, L., Guenther, F.H., Lane, H., Perkell, J.S. (2010) An investigation of the relation between sibilant production and somatosensory and auditory acuity. *J Acoust Soc Am*. 128(5):3079-87. PMCID: PMC3003728.
19. Golfinopoulos, E., Tourville, J.A., Bohland, J.W., **Ghosh, S.S.**, Nieto-Castanon, A., Guenther, F.H. (2011) fMRI investigation of unexpected somatosensory feedback perturbation during speech. *Neuroimage*. 55(3):1324-38. PMCID: PMC3065208
20. Silver, A.L., Nimkin, K., Ashland, J.E., **Ghosh, S.S.**, Van der Kouwe, A.J., Brigger, M.T., Hartnick, C.J. (2011) Cine magnetic resonance imaging with simultaneous audio to evaluate pediatric velopharyngeal insufficiency. *Arch Otolaryngol Head Neck Surg*. 137(3):258-63.
21. Brunner, J., **Ghosh, S.**, Hoole, P., Matthies, M., Tiede, M., Perkell, J. (2011) The influence of auditory acuity on acoustic variability and the use of motor equivalence during adaptation to a perturbation. *J Speech Lang Hear Res*. 54(3):727-39. PMID: 20966388.
22. Cai, S., **Ghosh, S.**, Guenther, F., Perkell, J. (2011). Focal manipulations of formant trajectories reveal a role of auditory feedback in the online control of both within-syllable and between-syllable speech timing. *J Neurosci* 31: 45. 16483-16490. PMID: 22072698.

23. Hinds, O., **Ghosh, S.**, Thompson, T.W., Yoo, J.J., Whitfield-Gabrieli, S., Triantafyllou, C., Gabrieli, J.D. (2011) Computing moment-to-moment BOLD activation for real-time neurofeedback. *Neuroimage*. 54(1):361-8. PMID: 20682350.
24. Gorgolewski, K., Burns, C.D., Madison, C., Clark, D., Halchenko, Y.O., Waskom, M.L., **Ghosh, S.S.** (2011). Nipype: a flexible, lightweight and extensible neuroimaging data processing framework in Python. *Front. Neuroinform*. 5:13.
25. Perrachione, T.K., Del Tufo, S.N., **Ghosh, S.S.**, Gabrieli, J.D.E. (2011) "Phonetic variability in speech perception and the phonological deficit in dyslexia." 17th Meeting of the International Congress of Phonetic Sciences, (Hong Kong, August 2011).
26. Poline, J., Breeze, J.L., **Ghosh, S.S.**, Gorgolewski, K., Halchenko, Y.O., Hanke, M., Haslegrove, C., Helmer, K.G., Marcus, D.S., Poldrack, R.A., Schwartz, Y., Ashburner, J. and Kennedy, D.N. (2012). Data sharing in neuroimaging research. *Front. Neuroinform*. 6:9.
27. **Ghosh, S.S.**, Klein, A., Avants, B. and Millman, K.J. (2012). Learning from open source software projects to improve scientific review. *Front. Comput. Neurosci*. 6:18
28. Cai, S., Beal, D.S., **Ghosh, S.S.**, Tiede, M.K., Guenther, F.H., Perkell, J.S. (2012) Weak responses to auditory feedback perturbation during articulation in persons who stutter: Evidence for abnormal auditory-motor transformation. *PLoS One*.
29. \* Doehrmann, O., \* **Ghosh, S.S.**, Polli, F.P., Reynolds, G., Horn, F., Keshavan, A., Whitfield-Gabrieli, S., Hofmann, S.G., Pollack, M., Gabrieli, J.D. (2013) Predicting treatment response in social anxiety disorder from functional magnetic resonance imaging. *JAMA Psychiatry*. (\* Joint first authors)
30. Hinds, O., Thompson, T., **Ghosh, S.S.**, Yoo, J., Whitfield-Gabrieli, S., Triantafyllou, C., Gabrieli, J. (2013) Roles of Default-Mode Network and Supplementary Motor Area in Human Vigilance Performance: Evidence from Real-Time fMRI. *Journal of Neurophysiology*.
31. Tustison NJ, Johnson HJ, Rohlfing T, Klein A, **Ghosh SS**, Ibanez L and Avants B (2013). Instrumentation bias in the use and evaluation of scientific software: Recommendations for reproducible practices in the computational sciences. *Front. Neurosci*. 7:162.
32. **Ghosh, S.S.**, Keshavan, A., Langs, G (2013). Predicting Treatment Response from Resting State fMRI Data: Comparison of Parcellation Approaches. 3rd International Workshop on Pattern Recognition in NeuroImaging (Philadelphia, June 2013).
33. Perrachione, T.K. and **Ghosh, S.S.** (2013). Optimized design and analysis of sparse-sampling fMRI experiments. *Front. Neurosci*. 7:55. doi: 10.3389/fnins.2013.00055
34. Cai, S., Beal, D.S., **Ghosh, S.S.**, Guenther, F.H., Perkell, J.S. (2014) Impaired timing adjustments in response to time-varying auditory perturbation during connected speech production in persons who stutter. *Brain and Language*.
35. Cai, S., Tourville, J.A., Beal, D.S., Perkell, J.S., Guenther, F.H. and **Ghosh, S.S.** (2014). Diffusion Imaging of Cerebral White Matter in Persons Who Stutter: Evidence for Network-Level Anomalies. *Front. Hum. Neurosci*. 8:54
36. Christodoulou JA, Del Tufo SN, Lymberis J, Saxler PK, **Ghosh SS**, Triantafyllou C, Whitfield-Gabrieli S, Gabrieli JD. (2014). Brain bases of reading fluency in typical reading and impaired fluency in dyslexia. *PLoS One*. 9(7):e100552. doi: 10.1371/journal.pone.0100552. eCollection 2014.
37. Stoeckel, L.E., Garrison, K.A., **Ghosh, S.S.**, Wightton, P., Hanlon, C.A., Gilman, J.M., Greer, S., Turk-Browne, N.B., deBettencourt, M.T., Scheinost, D., Craddock, C., Thompson, T., Calderon, V., Bauer, C.C., George, M., Breiter, H.C., Whitfield-Gabrieli, S., Gabrieli, J.D., LaConte, S.M., Hirshberg, L., Brewer, J.A., Hampson, M., Van Der Kouwe, A., Mackey, S., Evins, A.E. (2014). Optimizing real time fMRI neurofeedback for therapeutic discovery and development, *NeuroImage: Clinical*



38. Gabrieli, J.D.E., **Ghosh, S.S.**, Whitfield-Gabrieli, S. (2015). Prediction as a Humanitarian and Pragmatic Contribution from Human Cognitive Neuroscience. *Neuron*.
39. Gorgolewski KJ, Varoquaux G, Rivera G, Schwartz Y, Sochat VV, **Ghosh SS**, Maumet C, Nichols TE, Poline JB, Yarkoni T, Margulies DS, Poldrack RA (2015). NeuroVault.org: A repository for sharing unthresholded statistical maps, parcellations, and atlases of the human brain. *Neuroimage*.
40. Gorgolewski KJ, Varoquaux G, Rivera G, Schwarz Y, **Ghosh SS**, Maumet C, Sochat VV, Nichols TE, Poldrack RA, Poline JB, Yarkoni T, Margulies DS. (2015). NeuroVault.org: a web-based repository for collecting and sharing unthresholded statistical maps of the human brain. *Front Neuroinform*. 10;9:8.
41. Langs G, Golland P, **Ghosh SS**. (2015) Predicting Activation Across Individuals with Resting-State Functional Connectivity Based Multi-Atlas Label Fusion. *Med Image Comput Comput Assist Interv*. 9350:313-320.
42. Williamson JR, Quatieri TF, Helfer BS, Perricone J, **Ghosh SS**, Ciccarelli G, Mehta DD. (2015) Segment-dependent dynamics in predicting Parkinson's disease. In Sixteenth Annual Conference of the International Speech Communication Association.
43. Sitek KR, Cai S, Beal DS, Perkell JS, Guenther F and **Ghosh SS** (2016). Decreased cerebellar-orbitofrontal connectivity correlates with stuttering severity: Whole-brain functional and structural connectivity associations with persistent developmental stuttering. *Front. Hum. Neurosci*. 10:190. doi: 10.3389/fnhum.2016.00190
44. Whitfield-Gabrieli S, **Ghosh SS**, Nieto-Castanon A, Saygin Z, Doehrmann O, Chai XJ, Reynolds GO, Hofmann SG, Pollack MH, Gabrieli JD. (2016) Brain connectomics predict response to treatment in social anxiety disorder. *Mol Psychiatry*.
45. Allen GI, Amoroso N, Anghel C, Balagurusamy V, Bare CJ, Beaton D, Bellotti R, Bennett DA, Boehme K, Boutros PC, Caberlotto L, Caloian C, Campbell F, Chaibub Neto E, Chang YC, Chen B, Chen CY, Chien TY, Clark T, Das S, Davatzikos C, Deng J, Dillenberger D, Dobson RJB, Dong Q, Doshi J, Duma D, Errico R, Erus G, Everett E, Fardo DW, Friend SH, Fröhlich H, Gan J, George-Hyslop P, **Ghosh SS**, Glaab E, Green RC, Guan Y, Hong MY, Huang C, Hwang J, Ibrahim J, Inglese P, Jiang Q, Katsumata Y, Kauwe JSK, Klein A, Kong D, Krause R, Lalonde E, Lauria M, Lee E, Lin X, Liu Z, Livingstone J, Logsdon BA, Lovestone S, Lyappan A, Ma M, Malhotra A, Mangravite LM, Maxwell TJ, Merrill E, Nagorski J, Namasivayam A, Narayan M, Naz M, Newhouse SJ, Norman TC, Nurtdinov RN, Oyang YJ, Pawitan Y, Peng S, Peters MA, Piccolo SR, Praveen P, Priami C, Sabelnykova VY, Senger P, Shen X, Simmons A, Sotiras A, Stolovitzky G, Tangaro S, Tateo A, Tung YA, Tustison NJ, Varol E, Vradenburg G, Weiner MW, Xiao G, Xie L, Xie Y, Xu J, Yang H, Zhan X, Zhou Y, Zhu F, Zhu H, Zhu S. (In press) Crowdsourced estimation of cognitive decline and resilience in Alzheimer's disease, *Alzheimer's & Dementia*, Available online 11 April 2016, ISSN 1552-5260, <http://dx.doi.org/10.1016/j.jalz.2016.02.006>.
46. Cameron Craddock R, S Margulies D, Bellec P, Nolan Nichols B, Alcauter S, A Barrios F, Burnod Y, J Cannistraci C, Cohen-Adad J, De Leener B, Dery S, Downar J, Dunlop K, R Franco A, Seligman Froehlich C, J Gerber A, **Ghosh SS**, J Grabowski T, Hill S, Sólón Heinsfeld A, Matthew Hutchison R, Kundu P, R Laird A, Liew SL, J Lurie D, G McLaren D, Meneguzzi F, Mennes M, Mesmoudi S, O'Connor D, H Pasaye E, Peltier S, Poline JB, Prasad G, Fraga Pereira R, Quirion PO, Rokem A, S Saad Z, Shi Y, C Strother S, Toro R, Q Uddin L, D Van Horn J, W Van Meter J, C Welsh R, Xu T (2016). Brainhack: a collaborative workshop for the open neuroscience community. *Gigascience*. 5:16. doi: 10.1186/s13742-016-0121-x. eCollection 2016. PubMed PMID: 27042293; PubMed Central PMCID: PMC4818387.
47. Gorgolewski KJ, Auer T, Calhoun VD, Craddock RC, Das S, Duff EP, Flandin G, **Ghosh SS**, Glatard T, Halchenko YO, Handwerker DA, Hanke M, Keator D, Li X, Michael Z, Maumet C, Nichols BN, Nichols TE, Pellman J, Poline JB, Rokem A, Schaefer G, Sochat V, Triplett W, Turner JA,



- Varoquaux G, Poldrack RA. (2016) The brain imaging data structure, a format for organizing and describing outputs of neuroimaging experiments. *Sci Data*. 3:160044. doi: 10.1038/sdata.2016.44. PubMed PMID: 27326542.
48. Ciccarelli G, Quatieri TF, **Ghosh SS** (2016) Neurophysiological Vocal Source Modeling for Biomarkers of Disease. In Seventeenth Annual Conference of the International Speech Communication Association.
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78. Charles AS, Falk B, Turner N, Pereira TD, Tward D, Pedigo BD, Chung J, Burns R, **Ghosh SS**, Kebschull JM, Silversmith W, Vogelstein JT (2020). Toward Community-Driven Big Open Brain Science: Open Big Data and Tools for Structure, Function, and Genetics. *Annu Rev Neurosci*. 2020 Apr 13;. doi: 10.1146/annurev-neuro-100119-110036. [Epub ahead of print] PubMed PMID: 32283996.
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81. Low DM, Rumker L, Talker T, Torous J, Cecchi G, **Ghosh SS** (In press). Natural Language Processing Reveals Vulnerable Mental Health Support Groups and Heightened Health Anxiety on Reddit during COVID-19: An Observational Study. *J Med Internet Res*. 2020 Sep 13;. doi: 10.2196/22635. PubMed PMID: 32936777.

## **Presentations**

*The evolution of machine learning in brain imaging*

Frontiers in Brain Imaging Symposium, University of Texas, Southwestern, 2020

*What has working with brains, voice, and infrastructure technologies taught us about open science?*

NeuroHub Seminar Series, McGill University, 2019

*Retooling Psychiatry: How will we get there?*

Computational Psychiatry Symposium, University of Iowa, 2019

*Brains, Voice, and Technology: A multifaceted approach to mental health*

Center for Depression, Anxiety, and Stress Research, McLean Hospital, 2019

*Assistive Intelligence for Brain Health*

World Medical Innovation Forum, 2019

*Modeling Noise and Individual Variation*

Organization for Human Brain Mapping, Singapore, 2018

*Tools of the trade: From Data to Results in Neuroimaging*

Neuroscience Information Framework, Online Webinar, 2018

*Speaking one's mind: Vocal biomarkers of mental health*

University of Washington, Seattle, August, 2018

*A brain cartographer's quandary*

Workshop on large-scale trends in cortical organization, Leipzig, Germany, 2017

*Speaking one's mind: Vocal biomarkers of mental health*

Technology in Psychiatry, Symposium, Boston, USA, 2017

*The emerging informatics revolution in neuroscience*

Boston Children's Hospital, Boston, USA, 2017

Center for Addiction Medicine, Massachusetts General Hospital, Boston, USA, 2017

Department of Biomedical Informatics, University of Pittsburgh, Pittsburgh, USA, 2017

*Variance is the spice of reproducible research*

Keynote: Annual Neuroinformatics Congress, Kuala Lumpur, Malaysia, 2017

*Applications of Machine Learning to Brain Imaging and Psychiatry*

Computational Psychiatry Workshop, Satellite of Biological Psychiatry, San Diego, USA, 2017

*Predicting Treatment Outcome in Social Anxiety Disorder and Tracking Major Depression and Parkinson State Using Behavioral Information*

ACNP 55<sup>th</sup> Annual Meeting, Florida, USA, 2016

*Standardized Provenance for Reproducible Dataflows in Neuroscience*  
Japan Neuroscience Society, Yokohama, Japan, 2016

*Speaking one's mind: Vocal biomarkers of depression and Parkinson disease*  
Acoustical Society of America, Salt Lake City, USA, 2016

*Predicting Treatment Outcome in Anxiety and Depression*  
McLean Hospital, Belmont, USA, 2015  
Organization for Human Brain Mapping, Hawaii, USA, 2015

*Linking Knowledge and Reproducible Research Via Standardized Provenance Models*  
Workshop at the Bernstein Computational Neuroscience conference, Heidelberg, Germany, 2015  
Tools for Integrating and Planning Research in Neuroscience, UCLA, Los Angeles, USA, 2014

*A Neuroinformatics Bridge to Personalized Healthcare*  
Boston University, Hearing research seminar, Boston, USA, 2014  
Vanderbilt University, Nashville, USA, 2014

*Enabling knowledge generation and reproducible research by embedding provenance models in metadata stores*  
Neuroinformatics Congress, Stockholm, Sweden, 2013

*Python Tools for Reproducible Research in Brain Imaging*  
PyData conference, Boston, USA, 2013

*Nipype: Opensource platform for unified and replicable interaction with existing neuroimaging tools*  
Brigham and Womens Hospital, Boston, USA, 2009  
Massachusetts General Hospital, Boston, USA, 2010, 2012, 2013  
Radiology, U of Washington, Seattle, USA, 2011,  
PICSU, U of Pennsylvania, Philadelphia, USA, 2011  
Scientific Python Conference in India, Hyderabad, India, 2010  
INCF Datasharing Workshop, Quebec, Canada, 2011  
Python in Neuroscience Workshop, Paris, France, 2011

*Leveraging scientific computation to bridge neuroimaging and clinical applications*  
Radiology, U of Pennsylvania, Philadelphia, USA, 2011  
Haskins Laboratories, New Haven, Connecticut, USA 2012

*Datasharing and reproducible research: Barriers and solutions*  
Janelia Farm Bioimage Informatics II Conference, Washington DC, USA, 2011  
University de Montreal, Montreal, Canada, 2013

*Using high-resolution fMRI to identify individual-specific speech motor regions*  
Surgical Brain-Mapping laboratory, Brigham and Womens Hospital, Boston, USA, 2010

*Region of interest analysis of functional Magnetic Resonance Imaging data*

New York State Psychiatric Institute, Columbia University, New York, USA, 2007  
Singapore General Hospital, Singapore, Singapore, 2007

*Exploring speech motor control through computational modeling and neuroimaging*  
Center for Life Sciences, National University of Singapore, Singapore, 2007

## Research contracts and grants

### Current

- 2020 – 2023 Nobrainer: A robust and validated neural network tool suite for imagers  
NIH/NIMH/RF1 MH121885  
PI
- 2019 – 2024 DANDI: Distributed Archives for Neurophysiology Data Integration  
NIH/NIMH/R24 MH117295  
PI (co-PI - Yaroslav Halchenko, Dartmouth College)
- 2020 – 2021 Mumble Melody: A real-time speech modification system to enhance fluency in people who stutter  
MIT Deshpande Center for Technological Innovation  
PI (co-PI Tod Machover, Media Arts and Sciences)
- 2020 – 2021 Realtime speech modification apparatus for enhancing fluency in people that stutter.  
McGovern Institute Neurotechnology Program  
PI (co-PI Tod Machover, Media Arts and Sciences)
- 2019 - 2021 The Neuroimaging Data Model: FAIR descriptors of Brain Initiative Imaging Experiments  
(PI: David Keator, University of California, Irvine)  
National Institute of Mental Health, R01  
Site PI
- 2020 – 2021 Realtime speech modification apparatus for enhancing fluency in people who stutter  
MIT McGovern Institute Neurotechnology Program  
Co-PI with Tod Machover, Media Lab, MIT
- 2016 – 2020 Nipype: Dataflows for Reproducible Biomedical Research  
NIH/NIBIB/R01 EB020740  
PI
- 2016 – 2021 ReproNim: Center for Reproducible Neuroimaging Computation  
NIH/NIBIB/P41 EB019936 (PI: David Kennedy, UMass Medical School)  
Director: Technology, Research and Development Project 2  
Member of administrative and training cores  
Site PI
- 2016 – 2021 NeuroScout: A cloud-based platform for rapid re-analysis of naturalistic fMRI datasets  
NIH/NIMH/R01 MH109682 (PI: Tal Yarkoni, UTexas, Austin)  
Site PI

### Past

- 2008 – 2010 Dissemination of cross-platform software for artifact detection and region of interest analysis of fMRI data  
NIH/NIBIB/R03 EB008673  
Co-PI with Susan Whitfield-Gabrieli, McGovern Institute for Brain Research, MIT
- 2012 – 2014 Learned regulation of the limbic network via combined EEG and fMRI (PI: John Gabrieli)

NIH/NIMH/R21 MH092564  
Investigator

2012 – 2015 MURFI: An Optimized Platform for Realtime fMRI Neurofeedback  
MIT McGovern Institute Neurotechnology Program  
Co-PI with John Gabrieli (MIT), Eden Evins (MGH)

2011 – 2016 Using Real-Time Functional Brain Imaging and Computer Training To Enhance Recovery  
from Traumatic Brain Injury (TBI) (PI: John Gabrieli)  
DOD/Clinical trial award PT100120  
Investigator

2015 – 2017 Genetic Determinants of Schizophrenia Intermediate Phenotypes  
NIH/NIMH/R01 (Supplement) MH092380 (PI: Tracey Petryshen, MGH)  
Site PI

2012 – 2017 A randomized controlled trial of intranasal oxytocin as an adjunct to behavioral therapy for  
autism spectrum disorder (PI: John Gabrieli, MGH)  
DOD/Clinical Trial Award AR110329  
Site PI

2014 – 2017 Brain basis for voice-based tracking of neurological disorders  
MIT McGovern Institute Neurotechnology Program  
MIT Lincoln Lab Funds  
Co-PI with Tom Quatieri, MIT Lincoln Laboratory, MIT

2012 – 2018 Blast Induced Traumatic Brain Injury  
DOD/Institute for Soldier Nanotechnologies  
Investigator

2015 – 2020 Connectomes related to anxiety and depression in adolescents.  
NIH/NIMH/U01 MH108168 (PI: Susan Whitfield-Gabrieli, John Gabrieli, MIT)  
Informatics Lead

2019 – 2020 Tracking Alzheimer's Disease from Retinal OCT Images using Deep Learning  
Foundation for Ophthalmology Research and Education International, Inc.  
PI