



Manish Saggar

Assistant Professor (Research) of Psychiatry and Behavioral Sciences (Interdisciplinary Brain Science Research)

Psychiatry and Behavioral Sciences - Center for Interdisciplinary Brain Sciences Research

Bio

BIO

I am a computational neuroscientist and currently focus on understanding brain dynamics at rest as well as during learning. The overarching goal of my research is to develop reliable computational methods that will allow for characterizing and modeling temporal dynamics of brain activity, without averaging data in either space or time. I firmly believe that the spatiotemporal richness in brain activity might hold the key to finding the person- and disorder-centric biomarkers. Funded by a career development award (K99/R00; NIMH) and a young investigator award (NARSAD; Brain & Behavior Foundation), I am currently developing methods to model the temporal dynamics of brain activity in individuals with fragile X syndrome and healthy controls. The application of computational modeling to neuroscience and psychiatry is nascent in its development but holds significant promise to affect public health positively. I have a strong interdisciplinary background in (1) computational sciences, (2) neuroscience as well as (3) psychiatry. Integrating neuroscience, psychiatry, and mathematical modeling represents the new frontier in applications and analysis of large neuroimaging datasets and has the potential to revolutionize our understanding of dynamical brain organization in healthy controls and individuals with psychiatric disorders.

ACADEMIC APPOINTMENTS

- Assistant Professor (Research), Psychiatry and Behavioral Sciences - Center for Interdisciplinary Brain Sciences Research
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Travel Fellowship Award, Society of Biological Psychiatry (SOBP) (2020)
- International Fellow, Institute for Scientific Interchange Foundation, Italy (2019-2022)
- Annual Chairman's Award for Advancing Science, Department of Psychiatry & Behavioral Sciences, Stanford University (2019)
- NIH Director's New Innovator Award (DP2), National Institute of Health (2018-2023)
- NARSAD Young Investigator Grant, Brain & Behavior Research Foundation (2016-2018)
- Innovator Grant, Department of Psychiatry & Behavioral Sciences, Stanford University (2016)
- NIH Career Development Award (K99/R00), National Institute of Mental Health (2015-2020)
- Child Health Research Institute (CHRI) Postdoctoral Grant, Lucile Packard Foundation for Children's Health (LPFCH) (2013-2014)
- Seed-grant Award, Stanford's Center for Cognitive and Neurobiological Imaging (CNI). (2012-2013)
- Francisco J. Varela Memorial Grant Award, Mind and Life Institute (2006-2011)
- Merit Scholarship, Indian Institute of Information Technology, Allahabad (IIIT-A), India (2001-2005)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Editorial Board Member, NeuroImage (Elsevier) (2020 - present)
- Mentor, Organization of Human Brain Mapping Online Mentoring Program (2020 - present)
- Editorial Board Member, Scientific Reports (Nature Research Journal) (2017 - present)
- Executive Board Member, Society for the Neuroscience of Creativity (2017 - present)

PROFESSIONAL EDUCATION

- Faculty Fellow, Stanford Byers Center for Bio Design , Bio Design (2017)
- Postdoctoral Fellowship, Stanford University School of Medicine , Psychiatry (2014)
- Doctor of Philosophy, University of Texas at Austin , Computer Science (2011)
- Master of Science, University of Texas at Austin , Computer Science (2009)
- Bachelors in Technology, Indian Institute of Information Technology , Information Technology (2005)

PATENTS

- Manish Saggar. "United States Patent 16/171,255 Systems and Methods for Mapping Neuronal Circuitry and Clinical Applications Thereof", Leland Stanford Junior University, Jan 1, 2019

LINKS

- <http://www.stanford.edu/~saggar>: <http://www.stanford.edu/~saggar>
- Brain Dynamics Lab: <http://bdl.stanford.edu>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

I am a computational neuroscientist and currently focus on understanding brain dynamics at rest as well as during learning. The overarching goal of my research is to develop reliable computational methods that will allow for characterizing and modeling temporal dynamics of brain activity, without averaging data in either space or time. I strongly believe that the spatiotemporal richness in brain activity might hold the key to finding the person- and disorder-centric biomarkers. Funded by a career development award (K99/R00; NIMH) and a young investigator award (NARSAD; Brain & Behavior Foundation), I am currently developing methods to model the temporal dynamics of brain activity in individuals with fragile X syndrome and healthy controls. The application of computational modeling to neuroscience and psychiatry is nascent in its development but holds significant promise to positively affect public health. I have a strong interdisciplinary background in (1) computational sciences, (2) neuroscience as well as (3) psychiatry. Integrating neuroscience, psychiatry, and mathematical modeling represents the new frontier in applications and analysis of large neuroimaging datasets and has the potential to revolutionize our understanding of dynamical brain organization in healthy controls and in individuals with psychiatric disorders.

Teaching

COURSES

2019-20

- Methodology of Research in Behavioral Sciences: PSYC 250 (Win)

2018-19

- Methodology of Research in Behavioral Sciences: PSYC 250 (Win)

2017-18

- Methodology of Research in Behavioral Sciences: PSYC 250 (Win)

2016-17

- Methodology of Research in Behavioral Sciences: PSYC 250 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Grace Huckins

Postdoctoral Faculty Sponsor

Samir Chowdhury, Jing Jiang, Oliver Xie, Mengsen Zhang

Doctoral Dissertation Advisor (AC)

Rafi Ayub, Caleb Geniesse

Publications

PUBLICATIONS

- **Thalamic and prefrontal GABA concentrations but not GABAA receptor densities are altered in high-functioning adults with autism spectrum disorder.** *Molecular psychiatry*
Fung, L. K., Flores, R. E., Gu, M., Sun, K. L., James, D., Schuck, R. K., Jo, B., Park, J. H., Lee, B. C., Jung, J. H., Kim, S. E., Saggar, M., Sacchet, et al
2020
- **Pushing the boundaries of psychiatric neuroimaging to ground diagnosis in biology.** *eNeuro*
Saggar, M., Uddin, L. Q.
2019
- **Large expert-curated database for benchmarking document similarity detection in biomedical literature search** *DATABASE-THE JOURNAL OF BIOLOGICAL DATABASES AND CURATION*
Brown, P., Tan, A., El-Esawi, M. A., Liehr, T., Blanck, O., Gladue, D. P., Almeida, G. F., Cernava, T., Sorzano, C. O., Yeung, A. K., Engel, M. S., Chandrasekaran, A., Muth, et al
2019
- **Creativity slumps and bumps: Examining the neurobehavioral basis of creativity development during middle childhood** *NEUROIMAGE*
Saggar, M., Xie, H., Beaty, R. E., Stankov, A. D., Schreier, M., Reiss, A. L.
2019; 196: 94–101
- **Implementing Evolutionary Optimization to Model Neural Functional Connectivity**
Maile, K., Saggar, M., Miikkulainen, R., ACM
ASSOC COMPUTING MACHINERY.2019: 1731–33
- **Generating dynamical neuroimaging spatiotemporal representations (DyNeuSR) using topological data analysis** *NETWORK NEUROSCIENCE*
Geniesse, C., Sporns, O., Petri, G., Saggar, M.
2019; 3 (3): 763–78
- **Towards a new approach to reveal dynamical organization of the brain using topological data analysis** *NATURE COMMUNICATIONS*
Saggar, M., Sporns, O., Gonzalez-Castillo, J., Bandettini, P. A., Carlsson, G., Glover, G., Reiss, A. L.
2018; 9: 1399
- **Creativity in the Twenty-first Century: The Added Benefit of Training and Cooperation** *DESIGN THINKING RESEARCH: MAKING DISTINCTIONS: COLLABORATION VERSUS COOPERATION*
Maysless, N., Saggar, M., Hawthorne, G., Reiss, A., Plattner, H., Meinel, C., Leifer, L.
2018: 239–49
- **Altered Brain Network Segregation in Fragile X Syndrome Revealed by Structural Connectomics** *CEREBRAL CORTEX*
Bruno, J. L., Hosseini, S. M., Saggar, M., Quintin, E., Raman, M. M., Reiss, A. L.
2017; 27 (3): 2249-2259

- **Compensatory Hyperconnectivity in Developing Brains of Young Children With Type 1 Diabetes** *DIABETES*
Sagar, M., Tsalikian, E., Mauras, N., Mazaika, P., White, N. H., Weinzimer, S., Buckingham, B., Hershey, T., Reiss, A. L.
2017; 66 (3): 754-762
- **X-Chromosome Effects on Attention Networks: Insights from Imaging Resting-State Networks in Turner Syndrome.** *Cerebral cortex (New York, N.Y. : 1991)*
Green, T., Sagar, M., Ishak, A., Hong, D. S., Reiss, A. L.
2017: 1-8
- **Changes in Brain Activation Associated with Spontaneous Improvization and Figural Creativity After Design-Thinking-Based Training: A Longitudinal fMRI Study.** *Cerebral cortex*
Sagar, M., Quintin, E., Bott, N. T., Kienitz, E., Chien, Y., Hong, D. W., Liu, N., Royalty, A., Hawthorne, G., Reiss, A. L.
2016
- **Sex differences in neural and behavioral signatures of cooperation revealed by fNIRS hyperscanning** *SCIENTIFIC REPORTS*
Baker, J. M., Liu, N., Cui, X., Vrticka, P., Sagar, M., Hosseini, S. M., Reiss, A. L.
2016; 6
- **Surface-based morphometry reveals distinct cortical thickness and surface area profiles in Williams syndrome** *AMERICAN JOURNAL OF MEDICAL GENETICS PART B-NEUROPSYCHIATRIC GENETICS*
Green, T., Fierro, K. C., Raman, M. M., Sagar, M., Sheau, K. E., Reiss, A. L.
2016; 171 (3): 402-413
- **Understanding the influence of personality on dynamic social gesture processing: An fMRI study.** *Neuropsychologia*
Sagar, M., Vrticka, P., Reiss, A. L.
2016; 80: 71-78
- **Estimating individual contribution from group-based structural correlation networks.** *NeuroImage*
Sagar, M., Hosseini, S. M., Bruno, J. L., Quintin, E., Raman, M. M., Kesler, S. R., Reiss, A. L.
2015; 120: 274-284
- **Neural Correlates of Self-Injurious Behavior in Prader-Willi Syndrome** *HUMAN BRAIN MAPPING*
Klabunde, M., Sagar, M., Hustyi, K. M., Hammond, J. L., Reiss, A. L., Hall, S. S.
2015; 36 (10): 4135-4143
- **Examining the neural correlates of emergent equivalence relations in fragile X syndrome** *PSYCHIATRY RESEARCH-NEUROIMAGING*
Klabunde, M., Sagar, M., Hustyi, K. M., Kelley, R. G., Reiss, A. L., Hall, S. S.
2015; 233 (3): 373-379
- **Mean-field thalamocortical modeling of longitudinal EEG acquired during intensive meditation training** *NEUROIMAGE*
Sagar, M., Zanesco, A. P., King, B. G., Bridwell, D. A., MacLean, K. A., Aichele, S. R., Jacobs, T. L., Wallace, B. A., Saron, C. D., Miiikkulainen, R.
2015; 114: 88-104
- **Pictionary-based fMRI paradigm to study the neural correlates of spontaneous improvisation and figural creativity** *SCIENTIFIC REPORTS*
Sagar, M., Quintin, E., Kienitz, E., Bott, N. T., Sun, Z., Hong, W., Chien, Y., Liu, N., Dougherty, R. F., Royalty, A., Hawthorne, G., Reiss, A. L.
2015; 5
- **Early signs of anomalous neural functional connectivity in healthy offspring of parents with bipolar disorder** *BIPOLAR DISORDERS*
Singh, M. K., Chang, K. D., Kelley, R. G., Sagar, M., Reiss, A. L., Gotlib, I. H.
2014; 16 (7): 678-689
- **Revealing the neural networks associated with processing of natural social interaction and the related effects of actor-orientation and face-visibility** *NEUROIMAGE*
Sagar, M., Shelly, E. W., Lepage, J., Hoeft, F., Reiss, A. L.
2014; 84: 648-656
- **Creativity training enhances goal-directed attention and information processing** *THINKING SKILLS AND CREATIVITY*
Bott, N., Quintin, E., Sagar, M., Kienitz, E., Royalty, A., Hong, D. W., Liu, N., Chien, Y., Hawthorne, G., Reiss, A. L.
2014; 13: 120-128

- **Targeted intervention to increase creative capacity and performance: A randomized controlled pilot study** *THINKING SKILLS AND CREATIVITY*
Kienitz, E., Quintin, E., Saggar, M., Bott, N. T., Royalty, A., Hong, D. W., Liu, N., Chien, Y., Hawthorne, G., Reiss, A. L.
2014; 13: 57-66
- **Intensive training induces longitudinal changes in meditation state-related EEG oscillatory activity** *FRONTIERS IN HUMAN NEUROSCIENCE*
Saggar, M., King, B. G., Zanesco, A. P., MacLean, K. A., Aichele, S. R., Jacobs, T. L., Bridwell, D. A., Shaver, P. R., Rosenberg, E. L., Sahdra, B. K., Ferrer, E., Tang, A. C., Mangun, et al
2012; 6
- **Behavioral, neuroimaging, and computational evidence for perceptual caching in repetition priming** *BRAIN RESEARCH*
Saggar, M., Miikkulainen, R., Schnyer, D. M.
2010; 1315: 75-91
- **Memory Processes in Perceptual Decision Making** *Proceedings of the 30th Annual Conference of the Cognitive Science Society, Nashville, TN*
Saggar M., Miikkulainen R., Schnyer D. M.
2008
- **A computational model of the motivation-learning interface** *Proceedings of the 29th Annual Conference of the Cognitive Science Society, Nashville, TN*
Saggar M., Markman A.B., Maddox W.T., Miikkulainen R.
2007
- **Autonomous learning of stable quadruped locomotion** *ROBOCUP 2006: ROBOT SOCCER WORLD CUP X*
Saggar, M., D'Silva, T., Kohl, N., Stone, P.
2007; 4434: 98-109
- **System identification for the Hodgkin-Huxley model using artificial neural networks** *2007 IEEE INTERNATIONAL JOINT CONFERENCE ON NEURAL NETWORKS, VOLS 1-6*
Saggar, M., Mericli, T., Andoni, S., Miikkulainen, R.
2007: 2239-2244
- **Optimization of association rule mining using improved genetic algorithms** *IEEE International Conference on Systems, Man and Cybernetics*
Saggar M, Agrawal, A.K. , Lad, A.
2004; 4434/2007: 3725 - 3729