JENNIFER STISO

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EDUCATION

University of Pennsylvania
Aug 2016 – Present
PhD Neuroscience
Philadelphia, PA

- GPA: 3.6/4.0

University of California Berkeley
Aug 2012 – June 2016
BA Molecular and Cellular Biology; Cognitive Science
Berkeley, CA

- GPA: 3.6/4.0

RESEARCH EXPERIENCE

PhD Candidate
June 2017 – Present
Complex Systems Group (Prof. Danielle Bassett)
Philadelphia, PA

- Used network control theory to build predictive models of direct electrical stimulation, and used these models to make theoretical predictions of when and where to stimulate in order to improve memory performance
- Used data-driven method of network decomposition (non-negative matrix factorization) to investigate dynamics functional networks that support brain-computer interface learning
- Designed task to probe the electrophysiological role of the hippocampus in statistical learning in humans
- Designed tasks for large scale online behavioral experiments in humans addressing the effect of higher-order statics on learning

Rotation Student
Aug 2016 - June 2017
University of Pennsylvania, (PI Sharon Thompson-Schill & Tim Lucas)
Philadelphia, PA

- Used dynamical systems theory to characterize awake vs anesthetized states in human
- Collected intra-operative ECoG data from human subjects and shadowed non-human primate training
- Explored whether across fMRI run reliability was predictive of stronger searchlight effects for a variety of parameters; performed adaptation analysis on dataset exploring the implicit value of novel 3D objects (using FSL)
- Characterization of the effects of parameter choice on preprocessing results

Under Graduate Researcher
Feb 2014 - Aug 2016
Knight Laboratory (Prof. Robert Knight)
Berkeley, CA

- Designed, collected, and analyzed EEG experiments, projects included interpersonal distance preference, action identification in frontal lobe patients, action imitation with dual EEG set-up
- Analysis and design experience with ECoG, included spatial and temporal mapping of action imitation, insula response to emotional videos, and mechanisms of interpersonal distance preference
- Trained other undergraduates on professional usage and maintenance of EEG equipment
- Extensive experience with the preprocessing of EEG and ECoG data using Matlab, including spectral and basic connectivity analysis; also, worked with Leap Motion movement tracking system, Unix, FieldTrip, E-prime, biological samples (saliva)

Jan 2015 -June 2015

Cognitive Action Laboratory (Prof. Richard Ivry) Berkeley, CA

- Designed, collected, and analyzed EEG experiments, projects included interpersonal distance preference, action identification in frontal lobe patients, action imitation with dual EEG set-up
- Analysis and design experience with ECoG, included spatial and temporal mapping of action imitation, insula response to emotional videos, and mechanisms of interpersonal distance preference
- Trained other undergraduates on professional usage and maintenance of EEG equipment
- Extensive experience with the preprocessing of EEG and ECoG data using Matlab, including spectral and basic connectivity analysis; also, worked with Leap Motion movement tracking system, Unix, FieldTrip, E-prime, biological samples (saliva)

SKILLS

- **Programming**: R, Python, MATLAB, Java, Latex, Javascript
- **Soft Skills**: communication, time management, organization

Courssework

- **Math and Computer Science**: data structures, computational models of cognition, discrete mathematics, linear algebra, statistics
- **Biology and Social Science**: organic chemistry, electricity and magnetism, genetics, biochemistry, neurobiology, biophysics, philosophy of mind, perception, neuropsychology, and linguistics

PUBLICATIONS

Articles

Published

- **Stiso, J.**, Khambhati, A. N., Menara, T., Kahn, A. E., Stein, J. M., Das, S. R., Gorniak, R., Tracy, J., Litt, B., Davis, K.A., Pasqualetti, F., Lucas, T.H., Bassett, D. S. (2019). White Matter Network Architecture Guides Direct Electrical Stimulation Through Optimal State Transitions. *Cell Reports*
- **Stiso, J.**, Bassett, D. S. (2018). Spatial Embedding Imposes Constraints on the Network Architectures of Neural Systems.*Trends in Cognitive Science.* doi:10.1016/j.tics.2018.09.007
- Buch, V.P., Richardson, A.G., Brandon, C., **Stiso, J.**, Khattak, M.N., Bassett, D.S., Lucas, T.H. (2018) Network brain-computer interface (nBCI): An alternative approach for cognitive prosthetics. *Frontiers in Neuroscience*
- Perry, A., Saunders S., **Stiso, J.**, Dewar, C., Lubell, J., Meling ,T., Endestad, T., Solbakk, A.K., & Knight, R.T. (2017). Effects of Prefrontal Cortex Damage on Action and Emotion Understanding: EEG and behavioral evidence. *Brain*, 140(4), 1086–1099.
- Perry, A., **Stiso, J.**, Chang, E. F., Lin, J. J., Parvizi, J., & Knight, R. T. (2017). Mirroring in the Human Brain: Deciphering the Spatial-Temporal Patterns of the Human Mirror Neuron System. *Cerebral Cortex*, 1–10.
- **Stiso, J.**, & Perry, A. (2016). How Do We Understand Other People? *Frontiers for Young Minds*, 4(September).

In Revision

- Cui Z., **Stiso, J.**, Baum, G.L., Kim, J.Z., Roalf, D.R., Betzel, R.F., Gu, S., Lu, Z., Xia, C.H., Ciric, R., Moore, T.M., Shinohara, R.T., Ruparel. K., Davatzikos, C., Pasqualetti, F., Gur, R.E., Gur, R.C., Bassett, D.S., Satterthwaite, T.D. (2018). Optimization of Energy State Transition Trajectory Supports the Development

of Executive Function During Youth. *Nature Human Behavior*

Under Review

- **Stiso, J.**, Corsi, M.C., Vettel, J.M., Garcia, J.O., de Vico Fallani, F., Bassett, D. S. (2019). Learning in brain-computer interface control evidenced by joint decomposition of brain and behavior. *Nature Communications*
- Karrer, T.M., Kim, J.Z., **Stiso, J.**, Kahn, A.E., Pasqualetti, F., Habel, U. and Bassett, D.S. (2019). A practical guide to methodological considerations in the controllability of structural brain network. *Journal of Neural Engineering*

Book Chapters

- Bassett, D.S., **Stiso, J.**. Spatial Brain Networks. Invited as a chapter in the volume entitled "Spatial Networks" from Comptes-rendus Academie des sciences. doi:10.1016/j.crhy.2018.09.006

Presentations

Invited Talks

International

- **Network Models of Brain Structure, Function, and Control**. Organization for Human Brain Mapping - datascience in neuroscience symposium. Rome, Italy. 2019
- **Using Control Theory to Model Direct Electrical Brain Stimulation**. Networks in Big Data and Personalized Medicine Satellite. Paris, France. 2018

National

- **Network Science Approaches to Neural Function in Epilepsy**. American Epilepsy Society - Engineering and Neurostimulation Special Interest Group. New Orleans, LA. 2018
- **Large-scale Control of Human Brain Structural Networks: applications in direct electrical stimulation**. Society for Neuroscience Minisymposium - Exposing Neural Dynamics Using Real-Time Control: From Neurons to Human Behavior and Psychopathy. San Diego, CA. 2018
- **Towards a Mathematical Model of Direct Electrical Brain Stimulation**. Topology in Biology Seminar. Philadelphia, PA. 2018
- **Towards a Mathematical Model of Direct Electrical Brain Stimulation**. Graduate Research in Progress Presentation. Philadelphia, PA. 2018

Posters

- **Stiso, J.**, Corsi, M.C., Vettel, J.M., Garcia, J.O., de Vico Fallani, F., Bassett, D. S. Dynamic functional beta-band connectivity during BCI learning drives brain activity to support sustained attention. Presented at OHBM, Rome (2019)
- He, X., **Stiso, J.**, Kim, J.Z., Lu, Z., Cornblath, E.J., Menara, T, Pasqualetti, F., Sperling, M.R., Tracy J.I., Bassett, D.S. Characterizing the optimal control energy trajectory in temporal lobe epilepsy. Presented at OHBM, Rome (2019)
- Cui Z., **Stiso, J.**, Baum, G.L., Kim, J.Z., Roalf, D.R., Betzel, R.F., Gu, S., Lu, Z., Xia, C.H., Ciric, R., Moore, T.M., Shinohara, R.T., Ruparel. K., Davatzikos, C., Pasqualetti, F., Gur, R.E., Gur, R.C., Bassett, D.S., Satterthwaite, T.D. (2018). Optimization of Energy State Transition Trajectory Supports the Development of Executive Function During Youth. Presented at OHBM, Rome (2019)
- Buch V. P., Brandon C., Archer R., **Stiso, J.**, Rammayya A., Yang A., Richardson, A. G., Bassett, D.S., Lucas, T.H. Novel inter-trial resting state network analysis can reliably predict learning and performance of a

simple cognitive reaction time task. American Association of Neurological Surgeons. San Diego (2019)

- **Stiso, J.**, Khambhati, A. N., Menara, T., Kahn, A. E., Stein, J. M., Das, S. R., … Bassett, D. S. White Matter Network Architecture Guides Direct Electrical Stimulation Through Optimal State Transitions. Presented at NetSci, Paris (2018), Computational Cognitive Neuroscience, Philadelphia (2018) and Society for Neuroscience, San Diego (2018)
- **Stiso, J.**, Hudgins E., Brandon C., Williams S., Richardson A., Kelz M., Proekt A., Lucas T. Intracranial Recordings Applied Towards a Better Predictor of Unconscious States. Presented at Congress of Neurological Surgeons (2017)
- Perry, A., Saunders S., **Stiso, J.**, Dewar, C., Lubell, J., Meling, T., Endestad, T., Solbakk, A.K., & Knight, R.T. Effects of prefrontal cortex damage on emotion understanding. Presented at CNS, San Francisco (2017)
- Perry, A., **Stiso, J.**, Dewar, C., Lin, J.J., Knight, R.T. The role of the orbitofrontal cortex in regulation of interpersonal space. Presented at SfN conference, San Diego (2016)
- Perry, A., **Stiso, J.**, Chang, E. F., Lin, J. J., Parvizi, J., & Knight, R. T. Perception through action: Where and When. Presented at the SfN conference (2015) and California Cognitive Science Conference (2016)
- Perry, A.,**Stiso, J.**, Chang, E.F., Schalk, G., Brunner, P., Lin, J.J., Knight, R.T. Viewing and Imitating Goal Directed Actions. Presented at the SfN (2014) and the California Cognitive Science conference (2015)

HONORS AND AWARDS

Blavatnik Fellowship Finalist 2019
University of Pennsylvania

Jameson Hurvich Travel Award 2019
University of Pennsylvania

Google PhD Fellowship Internal Nominee 2018
University of Pennsylvania

Systems and Integrative Biology T32 2016
University of Pennsylvania

NSF GRFP Honorable Mention 2016
National

Robert J. Glushko Prize 2015
University of California, Berkeley

SURF L&S Fellowship 2014
University of California, Berkeley

Goldberg Undergraduate Research Fellowship 2013
University of California Berkeley

Professional Memberships

Society for Neuroscience 2018
Member International

Graduate Led Initiatives and Activities 2016
Professional Development Chair (2017), Co-director (2018), Secretary (2019) University of Pennsylvania

Community Involvement

Teaching
2019 - Present

- Taught and developed material for graduate level Python bootcamp
- Teaching assistant for introduction to the biological basis of behavior (BBB109) at the University of Pennsylvania

Peer Reviewer
2019 - Present

- Reviewed papers for *Journal of Nonlinear Science*

Outreach
2016 - Present

Graduate Led Initiatives and Activities

- Elected secretary in 2019
- Elected co-director in 2018; negotiated funding increases from three different sources, totaling a 41% increase in funds
- Elected chair of professional development in 2017; managed several subcommittees, accountable for professional development budget and introduced a new undergraduate mentor program
- Volunteered to teach high school students neuroscience and research in general as part of Upward Bound, volunteered at the Philadelphia Science Festival

2013 - 2014

Cognitive Science Students Association

- Taught basic neuroscience to elementary schoolers; included handling human, sheep, and rat brains
- Helped plan and organize annual conference for undergraduate and graduate researchers in cognitive science

Rejections and Failures

Neuroengineering and Medicine T32
2019

University of Pennsylvania

NRSA F31
2019

National

Behavioral and Cognitive Neuroscience T32
2018

University of Pennsylvania

NRSA F31
2018

University of Pennsylvania

Google PhD Fellowship
2017

International