

# JENNIFER STISO

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## EDUCATION

### University of Pennsylvania

PhD Neuroscience

Aug 2016 – Present

Philadelphia, PA

- GPA: 3.6/4.0

### University of California Berkeley

BA Molecular and Cellular Biology; Cognitive Science

Aug 2012 – June 2016

Berkeley, CA

- GPA: 3.6/4.0

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## RESEARCH EXPERIENCE

### PhD Candidate

Complex Systems Group (Prof. Danielle Bassett)

June 2017 – Present

Philadelphia, PA

- Designed network control theoretic models to of direct electrical brain stimulation, and used these models to make theoretical predictions of when and where to stimulate in order to improve memory performance
- Implemented 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 role of the medial temporal lobe neurophysiology in relational learning in humans
- Designed tasks for large scale online behavioral experiments on Amazon's Mechanical Turk in humans to probe sensitivity to higher-order statics in sequences

### Rotation Student

University of Pennsylvania, (PI Sharon Thompson-Schill & Tim Lucas)

Aug 2016 - June 2017

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

Knight Laboratory (Prof. Robert Knight)

Feb 2014 - Aug 2016

Berkeley, CA

- Designed, collected, and analyzed EEG, ECoG and dual EEG experiments to investigate social behaviors
- 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)

Cognitive Action Laboratory (Prof. Richard Ivry)

Jan 2015 -June 2015

Berkeley, CA

- Designed psychophysics tasks to investigate the effect of flickering lights on saccades with PsychToolbox in MATLAB

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#### SKILLS

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

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#### Coursework

- **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

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#### 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

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### 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

Internal

- **Investigating the Role of the Hippocampus in Higher-order Statistical Learning.** Collaborative ECoG research protocol meeting 2019
- **Network Models of Brain Structure, Function, and Control.** Graduate Research in Progress Seminar 2019
- **Investigating the Neurophysiological Correlates of Higher-order Statistical Learning in Humans.** CNI +/- 2018
- **Towards a Mathematical Model of Direct Electrical Brain Stimulation.** Graduate Research in Progress Seminar 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)

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#### HONORS AND AWARDS

<b>Blavatnik Fellowship Finalist</b> University of Pennsylvania	2019
<b>Jameson Hurvich Travel Award</b> University of Pennsylvania	2019
<b>Google PhD Fellowship Internal Nominee</b> University of Pennsylvania	2018
<b>Systems and Integrative Biology T32</b> University of Pennsylvania	2016
<b>NSF GRFP Honorable Mention</b> National	2016
<b>Robert J. Glushko Prize</b> University of California, Berkeley	2015
<b>SURF L&amp;S Fellowship</b> University of California, Berkeley	2014
<b>Goldberg Undergraduate Research Fellowship</b> University of California Berkeley	2013

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#### Professional Memberships

<b>Society for Neuroscience</b> Member	2018 International
<b>Graduate Led Initiatives and Activities</b> Professional Development Chair (2017), Co-director (2018), Secretary (2019)	2016 University of Pennsylvania

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## 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

- *Journal of Nonlinear Science*
- *NeuroImage*

### 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

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## 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