

# Jennifer Stiso

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## Education

### University of Pennsylvania Perelman School of Medicine

Philadelphia, PA

PHD IN NEUROSCIENCE

2016-Present

- GPA = 3.6/4.0

### University of California Berkeley

Berkeley, CA

B.A. DOUBLE MAJOR IN MOLECULAR AND CELLULAR BIOLOGY, COGNITIVE SCIENCE

2012-2016

- Awarded high honors for thesis in Cognitive Science
- GPA = 3.6/4.0

## Skills and Coursework

**Programming** R, Python, MATLAB, Java, Latex, Javascript

**Soft Skills** Communication, time management, organization

**Biology** Genetics, biochemistry, neurobiology, neural systems, biophysics, and neuroanatomy

**Computer Science** Data structures, network neuroscience, brain computer interface, theoretical neuroscience

**Mathematics** Linear algebra, linear systems, discrete mathematics, calculus, statistics

**Social Science** Philosophy of mind, perception, neuropsychology, and linguistics

## Research Experience

### Graduate Researcher

Philadelphia, PA

COMPLEX SYSTEMS GROUP, (PI DANIELLE BASSETT)

June 2016 - Present

- 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 statistics on learning

### Rotation Student

Philadelphia, PA

UNIVERSITY OF PENNSYLVANIA, (PI SHARON THOMPSON-SCHILL & TIM LUCAS)

Aug. 2016 - June 2017

- 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

### Undergraduate Researcher

Berkeley, CA

KNIGHT LAB, (PI ROBERT KNIGHT)

Feb. 2014 - Aug. 2016

- 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)

### Undergraduate Researcher

Berkeley, CA

COGNITIVE ACTION LAB, (PI RICHARD IVRY)

Jan. 2015 - June 2015

- Mostly independent research in the effect of temporal frequency adaptation on saccades and fixation duration; experience creating visual stimuli with Psych Toolbox, and using an eye tracking system

## Publications

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### Published

#### ARTICLES

- **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, J., 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).

#### 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

### In revision

#### ARTICLES

- 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

#### ARTICLES

- **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. *Neuroimage*

## Honors & Awards

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### NATIONAL

2016 **NSF GRFP Honorable Mention**, Pre-doctoral Fellowship *Philadelphia, PA*

### INTERNAL

2019 **Blavatnik Fellowship Finalist**, Pre-doctoral Fellowship *Philadelphia, PA*  
2019 **Jameson Hurvich Travel Award**, Travel Award *Philadelphia, PA*  
2018 **Google PhD Fellowship Institutional Nominee**, Pre-doctoral Fellowship *Philadelphia, PA*  
2016 **Systems and Integrative Biology T32**, Pre-doctoral Training Grant *Philadelphia, PA*  
2015 **Robert J. Glushko Prize**, Distinguished Undergraduate Research in Cognitive Science *Berkeley, CA*  
2014 **SURF L&S**, Undergraduate Research Fellowship *Berkeley, CA*  
2013 **Goldberg Fellowship**, Undergraduate Research Fellowship *Berkeley, CA*

## Posters & Presentations

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## 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)

## INVITED TALKS

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

# Community Involvement

## Teaching

UNIVERSITY OF PENNSYLVANIA

- Teaching assistant for graduate level Python bootcamp (2019)
- Teaching assistant for introduction to the biological basis of behavior (2019)

Philadelphia

2019 - Present

## Peer Reviewer

- Reviewed papers for *Journal of Nonlinear Science*

Philadelphia

2018 - Present

## Graduate-Led Initiatives and Activities (GLIA)

MEMBER, PROFESSIONAL DEVELOPMENT CHAIR, CO-DIRECTOR

- 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

Philadelphia

2016 - Present

## Cognitive Science Student's Association

MEMBER

- 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

Berkeley

2013 - 2014

# Professional Memberships

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2018	<b>Member</b> , Society for Neuroscience	<i>International</i>
2018	<b>Co-Director</b> , Graduate-Led Initiatives and Activities	<i>Philadelphia</i>
2017	<b>Professional Development Chair</b> , Graduate-Led Initiatives and Activities	<i>Philadelphia</i>
2016	<b>Member</b> , Graduate-Led Initiatives and Activities	<i>Philadelphia</i>