

William F. Broderick

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William Broderick
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Education

- 2016 – **Ph.D.**, *New York University*, New York, NY.
present Center for Neural Science
- 2009–2013 **B.A.**, *Oberlin College*, Oberlin, OH, *GPA: 3.94.*
Majors: Neuroscience, Mathematics; Minor: Computer Science
- Spring 2012 **Budapest Semester in Mathematics**, Budapest, Hungary, *GPA: 4.07.*
High Honors

Research Experience

- 2016 – **Ph.D. Student**, *New York University Center for Neural Science*, New York, NY.
present Prof. Eero Simoncelli, Ph.D. and Prof. Jonathan Winawer, Ph.D.
 - Collected data on the spatial frequency preferences of voxels in the human visual cortex
 - Built computational models to predict the BOLD signal in the early visual cortex.
- 2014 – 2016 **Research Assistant**, *Duke University Center for Cognitive Neuroscience*, Durham, NC.
Prof. Scott Huettel, Ph.D. and Prof. Guillermo Sapiro, Ph.D.
 - Created a pre-processing pipeline for fMRI data in Python, making lab methods simpler and more user-friendly
 - Performed multi-variate pattern analysis (MVPA) on fMRI data in a social, competitive game in order to investigate the neural correlates of social decision making and deception (Python)
 - Analyzed behavioral data of participant behavior in a social, competitive game, making use of k-means clustering and principal components analysis (PCA) to define a trial-wise metric of strategic behavior for use in MVPA regression
 - Collected behavioral and functional imaging data from adult and adolescent participants in a study to investigate the effects of social signals and peer influence on risk-taking and reward processing
 - Supervised undergraduate research assistants for the collection of the above data

2013–2014 **Luce Scholar**, *South China Normal University School of Psychology*, Guangzhou, China.

Prof. Wang Suiping, Ph.D.

- Selected by the Luce Scholars Program, a nationally competitive fellowship program launched by the Henry Luce Foundation in 1974 to enhance the understanding of Asia among potential leaders in American society. The program selects 18 scholars annually and arranges individualized language training and professional placement for one year
- Managed two independent research projects as a full-time visiting scholar
- Extended a computational model of numerosity using deep learning in an artificial neural network (MATLAB/Octave). Modified earlier study's code to allow for training on different tasks to compare the encoding strategy employed by the network
- Analyzed fMRI data comparing the network properties of human brain functional networks during bilingual readings. Preprocessed and analyzed data in MATLAB, using original code, DPARSF, and functions from GRETNA and Brain Connectivity Toolboxes

2011–2013 **Undergraduate Research Assistant**, *Oberlin College Neuroscience Department*, Oberlin, OH.

Prof. Patrick Simen, Ph.D.

- Enhanced previously-developed model explaining reaction time in a two-alternative forced choice task in response to varying response-stimulus intervals and probability of the two choices (MATLAB)
- Updated model code in MATLAB to explain recently-gathered experimental data with model

Skills

Programming languages Python, MATLAB, R, Java

fMRI analysis Pre-processing, Graph theoretical analysis, Multi-variate pattern analysis, Permutation testing, Forward models

Python Nipype, Nibabel, PyMVPA, Pandas, NumPy, SciPy, Scikit-learn, Seaborn, Matplotlib

Misc. skills Computational modeling, Data analysis pipelines

Languages

Mandarin Highly Proficient

French Proficient

Cantonese Basic

Hungarian Rudimentary

Awards and Scholarships

2016 NSF Graduate Research Fellow

National Science Foundation

2013 – 2014 Luce Scholar

Henry Luce Foundation

2013 Phi Beta Kappa

Phi Beta Kappa Society

2012 Nu Rho Psi

National Honor Society in Neuroscience

2009 – 2013 John N. Stern Merit Scholarship in the Natural Sciences

Oberlin College

2009 National Merit Scholar

National Merit Scholarship Program

Presentations

- Benson, Noah C. et al. *An anatomically-defined template of BOLD response in V1-V3*. St Pete Beach, FL: Vision Sciences Society, May 2017.
- Benson, Noah C. et al. *Towards a standard cortical observer model in human V1-V3*. San Diego, CA: Society for Neuroscience, Nov. 2016.
- Broderick, W. F. et al. *A multi-variate pattern analysis investigation of strategic thinking and deception in a dynamic, competitive game*. Chicago, IL: Society for Neuroscience, Oct. 2015.
- Broderick, W. F. *To Do or Not to Do: A Computer Model of Simple Decision Making*. Oberlin College: Sigma Xi Brown Bag Lunch Series, Nov. 2012.