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Matthew Whiteway

Education

University of Maryland, College Park, MD — 2012-2018
Ph.D. in Applied Mathematics and Scientific Computing
Advisor: Dr. Daniel Butts

University of Oklahoma, Norman, OK — 2006-2011
B.Sc. in Physics, B.A. in Mathematics

Research Positions

Columbia University, New York, NY — 2018-current
Postdoctoral Research Scientist
Grossman Center for the Statistics of Mind
Advisor: Dr. Liam Paninski

University of Maryland, College Park, MD — 2014-2018
Graduate Research in computational neuroscience
Advisor: Dr. Daniel Butts

University of Maryland, College Park, MD — 2010
Undergraduate Research in network science
Advisors: Drs. Michelle Girvan and Ed Ott

Honors and Awards

Center for Comparative and Evolutionary Biology of Hearing Trainee Grant — 2015-2016

Excellence in Teaching Award — 2013
University of Maryland Department of Mathematics

J. Clarence Karcher Scholarship — 2009-2011
University of Oklahoma Department of Physics and Astronomy

National Merit Scholarship — 2006-2011

Publications

Whiteway MR, Bartolo R, Averbeck BB and Butts DA (*in prep*). Decoding neural population activity within a latent variable framework.

Whiteway MR, Socha K, Bonin V and Butts DA (*submitted*). Characterizing the non-linear structure of shared variability in cortical neuron populations using neural networks.

Socha K, **Whiteway MR**, Butts DA and Bonin V (*submitted*). Behavioral response to visual motion impacts population coding in the mouse visual thalamus.

Liu J, **Whiteway MR**, Butts DA and Kanold PO (*submitted*). Parallel processing of sound dynamics across mouse auditory cortex via spatially patterned thalamic inputs and distinct areal intracortical circuits.

Whiteway MR and Butts DA (2017). Revealing unobserved factors underlying cortical activity using a rectified latent variable model applied to neural population recordings. Journal of Neurophysiology, 117(3), 919-936.

Stout J, **Whiteway M**, Ott E, Girvan M and Antonsen TM (2011). Local synchronization in complex networks of coupled oscillators. Chaos: An Interdisciplinary Journal of Nonlinear Science, 21(2), 025109.

Conference Abstracts

Butts DA, Bartsch F, **Whiteway MR** and Cumming BG (*submitted*). Characterizing hierarchical computation within V1. *Society for Neuroscience, San Diego, CA*, November 2018.

Whiteway MR, Bartolo R, Averbeck BB and Butts DA. Decoding neural population activity within a latent variable framework. *Computational and Systems Neuroscience, Denver, CO*, March 2018.

Whiteway MR, Bartolo R, Averbeck BB and Butts DA. Unsupervised nonlinear dimensionality reduction of large-scale neural recordings in prefrontal cortex. *Society for Neuroscience, Washington, D.C.*, November 2017.

Liu J, **Whiteway MR**, Butts DA and Kanold PO. Differential organization of the mouse auditory cortex to tone onset and offset revealed using automated image segmentation. *Society for Neuroscience, Washington, D.C.*, November 2017.

Whiteway MR, Socha K, Bonin V and Butts DA. Nonlinear latent variable approaches for understanding population activity in sensory cortex. *Computational and Systems Neuroscience, Salt Lake City, UT*, February 2017.

Butts DA, Perrin GE, Cui Y, **Whiteway MR**, Demb J and Singer J. Characterizing nonlinear neuronal computation within a single stage of processing. *Computational and Systems Neuroscience, Salt Lake City, UT*, February 2017.

Whiteway MR and Butts DA. Hidden sources of variability modulate populations of sensory neurons. *Society for Neuroscience, San Diego, CA*, November 2016.

Stout J, **Whiteway M**, Ott E, Girvan M and Antonsen TM. The effect of network structure on the path to synchronization in large systems of coupled oscillators. *SIAM Conference on Applications of Dynamical Systems, Snowbird, UT*, May 2011.

Teaching Experience

Lecturer
Integral Calculus - Summer 2014
Introductory Statistics - Spring 2013

Teaching Assistant
Introductory Statistics - Spring 2015
Multivariable Calculus - Spring 2014 & Fall 2014
Linear Algebra - Fall 2013
Integral Calculus - Fall 2012

Mentoring

Deep Generative Models for Understanding Natural Images
Semester project with an undergraduate student that focused on understanding and implementing variational autoencoders and generative adversarial networks, including their conditional and convolutional variants. (Spring 2017)

An Introduction to Neural Networks for Image Classification
Semester project with an undergraduate student that focused on the foundations of neural networks and their application to the problem of image classification. (Fall 2016)

Theory and Applications of the Generalized Linear Model for Regression
Summer project with an undergraduate student that focused on the theoretical foundations of the generalized linear model, including linear regression, exponential families, maximum likelihood estimation, and iteratively reweighted least squares. (Summer 2015)

Linear Programming and its Applications to Economics
Semester project with an undergraduate student that focused on how to represent a linear optimization problem in the language of linear algebra, and the fundamentals of the Simplex Algorithm. (Spring 2015)

Language Skills

Proficient: MATLAB, Python (Tensorflow, OpenCV), LaTeX

Inefficient: C++ (OpenGL), Java