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Matthew R Whiteway

ACADEMIC POSITIONS	The International Brain Laboratory	
	Data Scientist	2022-present
	Postdoctoral Research Scientist	2019-2022
	Columbia University , New York, NY	
	Associate Research Scientist Zuckerman Mind Brain Behavior Institute	2022-present
	Postdoctoral Research Scientist Zuckerman Mind Brain Behavior Institute Advisor: Dr. Liam Paninski	2018-2022
	University of Maryland , College Park, MD	
	PhD in Applied Mathematics Dissertation: <i>A latent variable modeling framework for analyzing neural population activity</i> Advisor: Dr. Daniel Butts	2012-2018
	Undergraduate research in network science Advisors: Drs. Michelle Girvan and Ed Ott	2010
	University of Oklahoma , Norman, OK	
B.Sc. in Physics, B.A. in Mathematics	2006-2011	
PUBLICATIONS	Partitioning variability in animal behavioral videos using semi-supervised variational autoencoders Whiteway MR , Biderman D, Friedman Y, Dipoppa M, Buchanan EK, Wu A, Zhou J, Bonacchi N, Miska NJ, Noel JP, Rodriguez E, Schartner M, Socha K, Urai AE, Salzman CD, The International Brain Laboratory, Cunningham JP & Paninski L PLOS Computational Biology	2021
	Deep Graph Pose: a semi-supervised deep graphical model for improved animal pose tracking Wu A, Buchanan K, Whiteway MR , Schartner M, Meijer G, Noel JP, Rodriguez E, Everett C, Norovich A, Schaffer E, Mishra N, Salzman CD, Angelaki D, Bendesky A, The International Brain Laboratory, Cunningham J & Paninski L Advances in Neural Information Processing Systems	2020
	Recurrent switching dynamical systems models for multiple interacting neural populations Glaser JI, Whiteway MR , Cunningham JP, Paninski L & Linderman SW Advances in Neural Information Processing Systems	2020
	BehaveNet: nonlinear embedding and Bayesian neural decoding of behavioral videos Batty E*, Whiteway MR* , Saxena S, Biderman B, Abe T, Musall S, Gillis W, Markowitz JE, Churchland AK, Cunningham J, Datta SR, Linderman S & Paninski L Advances in Neural Information Processing Systems	2019

[The quest for interpretable models of neural population activity](#)

Whiteway MR & Butts DA

Current Opinion in Neurobiology

2019

[Characterizing the nonlinear structure of shared variability in cortical neuron populations using latent variable models](#)

Whiteway MR, Socha K, Bonin V & Butts DA

Neurons, Behavior, Data analysis, and Theory

2019

[Parallel processing of sound dynamics across mouse auditory cortex via spatially patterned thalamic inputs and distinct areal intracortical circuits](#)

Liu J, **Whiteway MR**, Sheikhattar A, Butts DA, Babadi B & Kanold PO

Cell Reports

2019

[Revealing unobserved factors underlying cortical activity using a rectified latent variable model applied to neural population recordings](#)

Whiteway MR & Butts DA

Journal of Neurophysiology

2017

[Local synchronization in complex networks of coupled oscillators](#)

Stout J, **Whiteway MR**, Ott E, Girvan M & Antonsen TM

Chaos

2011

PREPRINTS

[A brain-wide map of neural activity during complex behaviour](#)

The International Brain Laboratory, Benson B, Benson J, Birman D, Bonacchi N, Carandini M, Catarino JA, Chapuis GA, Churchland AK, Dan Y, Dayan P, DeWitt EEJ, Engel TA, Fabbri M, Faulkner M, Fiete IR, Findling C, Freitas-Silva L, Gercek B, Harris KD, Hausser M, Hofer SB, Hu F, Hubert F, Huntenburg JM, Khanal A, Langdon C, Lau PYP, Meijer GT, Miska NJ, Mrsic-Flogel TD, Noel JP, Nylund K, Pan-Vazquez A, Pouget A, Rossant C, Roth N, Schaeffer R, Schartner M, Shi Y, Socha KZ, Steinmetz NA, Svoboda K, Urai AE, Wells MJ, West SJ, **Whiteway MR**, Winter O & Witten IB

bioRxiv

2023

[Brain-wide representations of prior information in mouse decision-making](#)

Findling C*, Hubert F*, The International Brain Laboratory, Acerbi L, Benson B, Benson J, Birman D, Bonacchi N, Carandini M, Catarino JA, Chapuis GA, Churchland AK, Dan Y, DeWitt EEJ, Engel TA, Fabbri M, Faulkner M, Fiete IR, Freitas-Silva L, Gercek B, Harris KD, Hausser M, Hofer SB, Hu F, Huntenburg JM, Khanal A, Krasniak C, Langdon C, Latham PE, Lau PYP, Meijer GT, Miska NJ, Mrsic-Flogel TD, Noel JP, Nylund K, Pan-Vazquez A, Pillow J, Rossant C, Roth N, Schaeffer R, Schartner M, Shi Y, Socha KZ, Steinmetz NA, Svoboda K, Urai AE, Wells MJ, West SJ, **Whiteway MR**, Winter O, Witten IB, Zador T, Dayan P & Pouget A

bioRxiv

2023

[Lightning Pose: improved animal pose estimation via semi-supervised learning, Bayesian ensembling, and cloud-native open-source tools](#)

Biderman D*, **Whiteway MR***, Hurwitz C, Greenspan N, Lee RS, Vishnubhotla A, Warren R, Pedraja F, Noone D, Schartner M, Huntenburg JM, Khanal A, Meijer GT, Noel JP, Pan-Vazquez A, Socha KZ, Urai AE, The International Brain Laboratory, Cunningham JP, Sawtell N & Paninski L

bioRxiv

2023

[Reproducibility of in-vivo electrophysiological measurements in mice](#)

The International Brain Laboratory, Banga K, Benson J, Bonacchi N, Bruijns S,

- Campbell R, Chapuis GA, Churchland AK, Davatolhagh MF, Lee HD, Faulkner M, Hu F, Hunterberg J, Khanal A, Krasnaik C, Meijer GT, Miska NJ, Mohammadi Z, Noel JP, Paninski L, Pan-Vazquez A, Roath N, Schartner M, Socha K, Steinmetz NA, Svoboda K, Taheri M, Urai AE, Wells M, West SJ, **Whiteway MR**, Winter O & Witten IB
 bioRxiv 2022
- [Flygenectors: The spatial and temporal structure of neural activity across the fly brain](#)
 Schaffer ES, Mishra N, **Whiteway MR**, Li W, Vancura MB, Freedman J, Patel KB, Voleti V, Paninski L, Hillman EMC, Abbott LF & Axel R
 bioRxiv 2021
- [Semi-supervised sequence modeling for improved behavioral segmentation](#)
Whiteway MR, Schaffer ES, Wu A, Buchanan EK, Onder OF, Mishra N & Paninski L
 bioRxiv 2021
- [A latent variable approach to decoding neural population activity](#)
Whiteway MR, Averbek B & Butts DA
 bioRxiv 2020
- [Behavioral response to visual motion impacts population coding in the mouse visual thalamus](#)
 Socha K, **Whiteway MR**, Butts DA & Bonin V
 bioRxiv 2018
- INVITED TALKS
- Semi-supervised learning for animal behavior analysis and understanding*
 With Anqi Wu
 Gatsby Tri-Center Meeting June 2021
- Exploiting unlabeled frames to build better models for behavioral video analysis*
 With Anqi Wu, Kelly Buchanan & Liam Paninski
 Minisymposium on “Modern computational techniques for tracking behavior”
 Neuromatch 3.0 October 2020
- BehaveNet: methods for extracting information from behavioral videos*
 Zuckerman Institute Motor Club, Columbia University May 2020
- BehaveNet: nonlinear embedding and Bayesian neural decoding of behavioral videos*
 Neurotheory Workshop Series (NeWS), Columbia University January 2020
- Latent variable decoding*
 JC++ Journal Club, National Eye Institute (NEI) April 2018
- Rectified latent variable modeling for neural population recordings*
 Horowitz Lab Meeting, NIDCD October 2016
- Revealing unobserved sources of variability in populations of sensory cortical neurons*
 CCEBH/NIDCD Joint Workshop, University of Maryland October 2016
- SELECTED CONFERENCE ABSTRACTS
- Pose estimation made better, easier, and faster with video semi-supervised learning on the cloud*
 Biderman D*, **Whiteway MR***, Hurwitz C, Greenspan N, Lee R, Vishnubhotla A, Schartner M, Huntenburg J, Warren R, Noone D, Pedraja F, The International Brain Laboratory, Sawtell N & Paninski L
 Computational and Systems Neuroscience, Montreal, Canada 2023

- Semi-supervised sequence modeling for improved behavioral segmentation*
Whiteway MR, Schaffer ES, Wu A, Buchanan EK, Onder OF, Mishra N & Paninski L
 Computational and Systems Neuroscience, Lisbon, Portugal 2022
- Semi-supervised sequence modeling for improved behavioral segmentation*
Whiteway MR, Schaffer ES, Wu A, Buchanan EK, Onder OF, Mishra N & Paninski L
 Computer Vision and Pattern Recognition CV4animals Workshop 2021
- Coupled state space models of multi-population recordings*
 Kashalikar A*, Glaser J*, **Whiteway MR*** & Paninski L
 Computational and Systems Neuroscience (virtual) 2021
- BehaveNet: behavioral video embedding and neural analysis toolbox*
Whiteway MR*, Batty E*, Saxena S, Biderman B, Abe T, Musall S, Gillis W,
 Markowitz JE, Churchland AK, Datta SR, Linderman S & Paninski L.
 Computational and Systems Neuroscience, Denver, CO 2020
- BehaveNet: behavioral video embedding and neural analysis toolbox*
Whiteway MR*, Batty E*, Saxena S, Biderman B, Abe T, Musall S, Gillis W,
 Markowitz JE, Churchland AK, Datta SR, Linderman S & Paninski L.
 Society for Neuroscience, Chicago, IL 2019
- State space models for multiple interacting neural populations*
 Glaser J, Linderman S, **Whiteway MR**, Perich M, Dekleva B, Miller L, Paninski L
 & Cunningham J
 Computational and Systems Neuroscience, Lisbon, Portugal 2019
- Decoding neural population activity within a latent variable framework*
Whiteway MR, Bartolo R, Averbeck BB & Butts DA
 Computational and Systems Neuroscience, Denver, CO 2018
- Unsupervised nonlinear dimensionality reduction of large-scale neural recordings in
 prefrontal cortex*
Whiteway MR, Bartolo R, Averbeck BB & Butts DA
 Society for Neuroscience, Washington, DC 2017
- Nonlinear latent variable approaches for understanding population activity in sensory cortex*
Whiteway MR, Socha K, Bonin V & Butts DA
 Computational and Systems Neuroscience, Salt Lake City, UT 2017
- Hidden sources of variability modulate populations of sensory neurons*
Whiteway MR & Butts DA
 Society for Neuroscience, San Diego, CA 2016
- The effect of network structure on the path to synchronization in large systems of
 coupled oscillators*
 Stout J, **Whiteway MR**, Ott E, Girvan M & Antonsen TM
 SIAM Conference on Applications of Dynamical Systems, Snowbird, UT 2011

TEACHING
 EXPERIENCE

Columbia University

Guest Lecturer, Advanced Topics in Theoretical Neuroscience
 Methods for Static and Sequential Clustering Spring 2020

Guest Lecturer, Advanced Topics in Theoretical Neuroscience
 Static Dimensionality Reduction Methods Spring 2019

University of Maryland

Teaching Assistant, Introductory Statistics	Spring 2015
Teaching Assistant, Multivariable Calculus	Fall 2014
Lecturer, Integral Calculus	Summer 2014
Teaching Assistant, Multivariable Calculus	Spring 2014
Teaching Assistant, Linear Algebra	Fall 2013
Lecturer, Introductory Statistics	Spring 2013
Teaching Assistant, Integral Calculus	Fall 2012

REVIEWING
AND SERVICE

Computational and Systems Neuroscience (Cosyne) workshop co-organizer	2020
Workshop on Interpretable Computational Neuroscience	
Reviewer	2019-present
Neural Information Processing Systems (NeurIPS); NeurIPS Workshops;	
International Conference on Machine Learning (ICML);	
International Conference on Learning Representations (ICLR);	
PLOS Computational Biology;	
Neurons, Behavior, Data Analysis, and Theory (NBDAT); Cosyne	

HONORS AND
AWARDS

Center for Comparative and Evolutionary Biology of Hearing Trainee Grant	2015-2016
University of Maryland Department of Mathematics Excellence in Teaching Award	2013
University of Oklahoma Department of Physics and Astronomy J. Clarence Karcher Scholarship	2009-2011
National Merit Scholarship	2006-2011