Gonzalo E. Mena

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Current position

Data Science Initiative Postdoctoral Fellow • **Harvard** University

Areas of specialization

Data science • Statistical Machine Learning • Neural Data Analysis

Education

2014-2018 PhD. in Statistics, **Columbia University**
Advisor: Liam Paninski.
Committee: David Blei, John Cunningham, Andrew Gelman, John Paisley.
2012-2014 M.A. Statistics, **Columbia University**
2007-2011 Mathematical Engineer Certificate, **University of Chile**.
2005-2007 Bs. Engineering, **University of Chile**.

Previous Employment and Research Experience

Summer 2018 Postdoctoral Fellow
Mortimer Zuckerman Mind Brain Behavior Institute, Columbia University.
Summer 2017 Software Engineer (Research) Intern,
Google Brain. Cambridge, MA. Host: Jasper Snoek.
2014 - 2017 Visiting Student. **Stanford University**. E.J. Chichilnisky Lab.
2010 - 2011 Project Engineer,
Center for Mathematical Modeling, University of Chile
2010-2011 Research Assistant.
CIAE, University of Chile
Summer 2008 Research intern.
University of California, San Diego. Host: Rafael Nuñez

Publications

Journal articles

2017

Mena, G., Grosberg, L., Hottowy, P., Litke, A., Cunningham, J., Chichilnisky E.J. & Paninski, L. Electrical Stimulus Artifact Cancellation and Neural Spike Detection on Large Multi-Electrode Arrays. PLOS Computational Biology13: e1005842, 2017

2014 **Mena, G.** & Paninski, L. On Quadrature Methods for Refractory Point Process Likelihoods, Neural Computation, Vol. 26, No. 12, 2790-2797, 2014

Peer reviewed conference papers

2018 **Mena, G.**, Belanger, D., Linderman, S., Snoek, J. Learning Latent Permutations with Gumbel-Sinkhorn Networks. ICLR, 2018. arXiv.

2018 Linderman, S.*, **Mena, G.***, Cooper, H., Paninski, L., Cunningham, J. Reparameterizing the Birkhoff Polytope for Variational Permutation Inference. AISTATS, 2018. arXiv.

Working Papers

2018+ Shah, N., Madugula, S., Grosberg, L., **Mena, G.**, Tandon, P., Hottowy, P., Sher, Alexander., Litke, A., Mitra, Subhasish, and Chichilnisky, E.J. Optimization of Electrical Stimulation for a High-Fidelity Artificial Retina. Nishal P. Shah, Sasidhar. Submitted to IEEE EMBS Neural Engineering Conference.

2018+ Martinez, S. and **Mena, G.** A Theoretical View on Exchageability of Questions in Decision Trees. In Preparation.

Peer Reviewed conference extended abstracts and workshop papers

2017 **Mena, G.**, Belanger, D., Muñoz, G., Snoek, J. Sinkhorn Networks: Using Optimal Transport Techniques to Learn Permutations. NIPS Workshop in Optimal Transport & Machine Learning. **Selected for Spotlight presentation.**, 2017

2017 **Mena, G.***, Linderman*, S., Belanger, D., Snoek, J., Paninski, L., Cunningham, J. Toward Bayesian permutation inference for identifying neurons in C. elegans. NIPS Workshop on Worm's Neural Information Processing, 2017.

2017 Madugula, S.*, **Mena, G.***, et al.Large-scale analysis of patterned epiretinal stimulation for prosthesis design. The Eye and the Chip, 2017

2017 Shah, N., Madugula, S., Grosberg, L., **Mena, G.** et al. Greedy dictionary-based stimulation for optimization of epiretinal prosthesis. The Eye and the Chip, 2017.

2017 **Mena, G.**, Grosberg, L., Madugula, S., Hottowy, P., Litke, A., Cunningham, J., Chichilnisky E.J. & Paninski, L. Large-scale spike sorting for the analysis of electrical stimulation and a first application. COSYNE, 2017

2015 **Mena, G.**, Grosberg, L. , Kellison-Linn, F. , Chichilnisky E.J. & Paninski, LLarge-scale Multi-Electrode Array Spike Sorting Algorithm Introducing Concurrent Recording and Stimulation. NIPS Workshop on Statistical Methods for Understanding Neural Systems, 2015.

Theses

2018 **Mena, G.** Statistical Machine Learning methods for the Large Scale Analysis of Neural Data.

2011 **Mena, G.** Reflected Stochastic Differential Equations Applied to the Modeling of some Neurobiological Processes Underlying Cognitive Phenomena (Spanish), B.S. Thesis . Academic Repository of University of Chile, 2011

Other conference posters

2018

Linderman, S.*, **Mena, G.***, Cooper, H., Paninski, L., Cunningham, J. Reparameterizing the Birkhoff Polytope for Variational Permutation Inference. BAFI, 2018

2011 **Mena, G.**, Dartnell, P., Araya, R. A Computational Mechanism for Learning in Decision Making Through Changes in Cortico-Caudate Synaptic Strength. Chilean Society for Neuroscience Symposium. Santa Cruz, Chile , 2011

2011 Gomez, M., **Mena, G.**, Araya, R., Dartnell, P. Individual Differences in Inhibitory Control and Fraction Learning. IMBES Conference 2011. San Diego, CA, USA.

Honors and Fellowships

2018 Harvard Data Science Initiative Postdoctoral Fellows.
2018 ICLR Presenter Travel Grant.
2017 COSYNE Presenter Travel Grant
2016 Minghui Yu Teaching Assistant Award, Columbia University
2012 Dean's Fellowship GSAS, Columbia University. Full funding of the Ph.D.
2011 Fulbright Scholarship for PhD Studies in the US.
2005-2009 Outstanding Student (top 5%). University of Chile.
2004 Highest Score, PSU Mathematics (admission test for Chilean universities).
2004 Honorable Mention. XVI Chilean Mathematics Olympiad.
2004 First Place. Mathematics. *Olympiads of Knowledge.* University of Santiago

Research Talks

2018 *Statistical Machine Learning Methods for the Analysis of Neural Data.*
Vector Institute. Toronto, Canada.

2018 *Statistical Machine Learning Methods for the Analysis of Neural Data.*
IBM Research. Yorktown Heights, NY, USA.

2018 *Statistical Machine Learning Methods for the Analysis of Neural Data.*
IBM. Research. Cambridge. MA, USA.

2018 *Reparameterizing the Birkhoff Polytope for Permutation Variational Inference.*
Business Analytics in Finance and Industry, Santiago, Chile.

2018 *Optimal Transport and Applications to Data Science.*
Summer School in Probability and Stochastic Processes. CMM, University of Chile, Santiago, Chile.

2017 *Toward Bayesian Permutation Inference for Identifying Neurons in C. elegans.*
Neurotheory Seminar. Columbia University, NY, USA.

2017 *Gumbel-Sinkhorn Networks.*
Google Brain. Cambridge, MA, USA.

2017 *Recent Advances in Artificial Intelligence.*
Machine Learning Seminar, CMM, University of Chile. Santiago, Chile.

2016 *Model-based Spike Identification With Electrical Stimulation Artifacts.* Symposium on Retinal Prosthesis. Stanford University. CA, USA.

2016 *Gaussian Process for Artifact Cancellation in Neural Recordings.*
Center for Theoretical Neuroscience, Columbia University, NY, USA.

2016 *How Neuroscience Can Benefit From Machine Learning?.*
Machine Learning Seminar, CMM, University of Chile, Santiago, Chile.

2016 *Algorithmic Challenges in Retinal prosthesis.*
Institute for Complex Systems of Valparaiso, Chile.

2015 *Large-scale Multi-Electrode Array Spike Sorting Algorithm Introducing Concurrent Recording and Stimulation.* Computer Science Department, Stanford University, CA, USA.

Teaching

Instructor

2015 Introduction to Statistics with Calculus (undergraduate level).

Teaching Assistant

2017 Neural Data Analysis (PhD. level).
2017 Computational Statistics (PhD. level).
2016 Probability and Statistic Inference (M.A. level).
2016 Introduction to Statistics (without calculus) (undergrad level). Data Mining (M.A. level).
2015 Introduction to Probability and Statistics (M.A. level).
2015 Data Mining (M.A. level).
2014 Computational Statistics (PhD. level).
2014 Statistical Inference (M.A. level).
2013 Stochastic Processes and Applications (M.A. level).
2013 Probability (M.A. level).
2012 Probability and Statistics (M.A. level).
2010 Stochastic Calculus (M.Sc. level).
2009 Markov Processes (M.Sc. level).
2009 Probability and Statistics (undergrad level).
2008 Linear Algebra (undergrad level).
2008 Multivariate Calculus (undergrad level).
2007 Elementary Algebra (undergrad level).
2007 Elementary and advanced Calculus (undergrad level).
2006 Mathematics Summer School for High School Student.

Service

2018 Reviewer, Journal of Information and Inference.
2018 Reviewer, International Conference in Learning Representations (ICLR).
2018 Reviewer, Symposium on Advances on Approximate Bayesian Inference (AABI).
2018 Reviewer, Journal of Neuroscience Methods.
2018 Reviewer, International Confernece of Machine Learning (ICML).
2018,2017 Reviewer, Artificial Intelligence and Statistics (AISTATS).
2016,2017,2018 Reviewer, Neural Information Processing Systems (NIPS).

Other

Blogging

2017 The Gumbel-Softmax Trick for Inference of Discrete Variables. **Columbia Advanced Machine Learning Seminar Blog.** https://casmls.github.io +3(2017000 visits

Skills

Languages: Spanish (native), English (fluent), French (elementary)
Programming languages: Python, Matlab, R, Java
Other Computational Skills:Git,LaTeX
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