IRIS STONE

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www.iris-stone.com
www.github.com/irisstone

RESEARCH INTERESTS

Statistical modeling, machine learning, generative models, latent variable models, Bayesian inference, systems neuroscience, decision-making, social cognition and behavior, biophysics, neural dynamics

EDUCATION

Princeton University Aug 2018 - Present
PhD in Neuroscience
Graduate Certificate in Statistics and Machine Learning

George Mason University Honors College Aug 2013 - Dec 2017
BS in Physics, Summa cum Laude *GPA: 3.97 out of 4.0*

RESEARCH EXPERIENCE

Princeton University Aug 2018 - Present
Advisors: Jonathan Pillow and Ilana Witten *Graduate Research Assistant*

Developed and applied latent variable models (e.g. generalized linear models, hidden Markov models, linear dynamical systems) to identify structure underlying complex cognitive processes in mice, including decision-making, exploration, and social behavior. Gained experience in statistical modeling, generative modeling, Bayesian inference, optimization, unsupervised learning, time-series data, and behavior quantification.

University of California Los Angeles Jun 2017 - Aug 2017
Advisor: Mayank Mehta *Summer Research Intern*

Analyzed the relationship between hippocampal gamma oscillations and running speed from electroencephalography (EEG) data of rats in both real world and virtual reality environments. Gained experience in local field potential (LFP) analysis, artifact reduction, signal processing, and power spectral analysis.

George Mason University Nov 2014 - Apr 2018
Advisor: Patrick Vora *Undergraduate Research Assistant*

Characterized the optoelectronic properties of low-dimensional materials for applications in biomedical devices, neurotransmitter sensors, and next-generation electronics. Gained experience in Raman spectroscopy, cryogenics, microscopy, optical physics, and atomic force microscopy.

PUBLICATIONS

Stone IR*, Sagiv Y*, Park IM, Pillow JW. *Spectral learning of Bernoulli latent dynamical system models for decision-making.* [Manuscript in preparation]

Bolkan SS*, **Stone IR***, Pinto L, Ashwood ZC, Iravedra Garcia JM, Herman AL, Singh P, Bandi A, Cox J, Zimmerman C, Cho JR, Engelhard B, Koay SA, Pillow JW, Witten IB (2021). *Strong and opponent contributions of dorsomedial striatal pathways to behavior depends on cognitive demands and task strategy.* bioRxiv.

Ashwood ZC, Roy NA, **Stone IR**, The International Brain Laboratory, Churchland AK, Pouget A, Pillow JW (2020). *Mice alternate between discrete strategies during perceptual decision-making.* bioRxiv.

Oliver S, Beams R, Kryluk S, Kalish I, Singh A, Bruma A, Tavazza F, Joshi J, **Stone IR**, Stranick S, Davydov A, Vora PM (2017). *The structural phases and vibrational properties of Mo1-xWxTe2 alloys.* 2D Materials. 4(4):045088.

Joshi J, **Stone IR**, Beams R, Krylyuk S, Kalish I, Davydov A, Vora PM (2016). *Phonon anharmonicity in bulk Td-MoTe2.* Applied Physics Letters. 109(3):031903.

**Indicates authors contributed equally to the work*

PRESENTATIONS

Stone IR, Bolkan SS, Witten IB, Pillow JW. Latent-state models reveal a state-dependent contribution of the striatum to decision-making. Poster presented: Conference on Computational and Systems Neuroscience (COSYNE). 2020 Mar; Denver, CO.

Stone IR, Safaryan K, Mehta M. Dependence of high frequency neural oscillations on running speed. Talk presented: UCLA 2017 Summer REU Symposium. 2017 Aug. 25; Los Angeles, CA.

Stone IR, Keuren E, Vora P. The effect of stoichiometry on the growth and optical properties of PTZ-TCNQ charge transfer crystals. Poster presented: OSCAR 2016 Summer Celebration of Student Scholarship.

Stone IR, Joshi J, Melis S, Smith R, Keuren E, Vora PM. The effect of morphology and stoichiometry on the photoluminescence of PTZ-TCNQ charge transfer crystals. Talk presented: American Physical Society 2016 March Meeting.

Stone IR, Vora PM. Organic electronics based on charge transfer crystals. Talk presented: Department of Physics and Astronomy 2015 Undergraduate Research Colloquium.

Stone IR, Joshi J, Keuren E, Vora PM. Optoelectronic properties of PTZ-TCNQ charge transfer crystals. Poster presented: OSCAR 2015 Summer Celebration of Student Scholarship.

AWARDS AND HONORS

COSYNE Travel Grant	2020
G. Wallace Ruckert '30 Fellowship Fund Recipient	2018
Outstanding Graduating Senior Award	2018
NSF Graduate Research Fellowship Program (GRFP) Honorable Mention	2018
Outstanding Rising Senior Award	2017
Induction into Sigma Xi: The Scientific Research Honors Society	2017
Goldwater Scholarship	2017
Induction into The Honors Society of Phi Kappa Phi	2017
Outstanding Undergraduate Research Award	2016
OSCAR Student Excellence Award for Research	2016
OSCAR URSP Intensive Research Grant	2016
Honors College Schwartzstein Summer Research Award	2016
American Physical Society Ken Haas Outstanding Student Paper Runner-Up	2016
OSCAR URSP Traditional Research Grant	2015

TEACHING EXPERIENCE

Princeton Neuroscience Institute

Co-organizer and Biophysics Lecturer: First Year Neuro Bootcamp	May 2021 - Aug 2021
Assistant in Instruction: NEU 437/537 Computational Neuroscience	Feb 2020 - May 2020
Assistant in Instruction: NEU 201 Foundations of Neuroscience	Sep 2019 - Jan 2020

George Mason University

Learning Assistant: MATH 105 Pre-calculus	Aug 2015 - Dec 2015

LEADERSHIP AND OUTREACH

Computational Neuroscience Journal Club, *Co-organizer*	Jan 2021 - Present
Inclusive Teaching Committee, *Committee Member*	Sep 2020 - Present
BrainWAVES (Women Advocating for Visibility and Equity in Science), *Co-organizer*	Aug 2020 - Present
Graduate Student Government, *Neuroscience representative*	May 2019 - Present
Princeton Citizen Scientists, *Member*	Aug 2018 - Present
Letters to a Pre-scientist, *Penpal*	Aug 2019 - May 2020
AAAS Science in the Classroom, *Contributor*	Jun 2018 - Sep 2018
Office of Scholarship, Creative Activities, and Research, *Research Fellow*	Aug 2016 - May 2017

TRAINING AND WORKSHOPS

MIT Center for Brains, Minds, and Machines Summer Course — Aug 2019
Marine Biology Laboratory (MBL) Woods Hole, MA

PROFESSIONAL EXPERIENCE

Bloomrock Writing — Apr 2014 - Jun 2018
Founder and CEO

Managed all marketing, administrative, and financial activities; oversaw a staff of up to 12 independent contractors; and worked with clients in North America, Europe, and Asia on projects that involved conducting research, writing custom data mining/web scraping pipelines, and producing and editing written content.

SOFTWARE PACKAGES

glmhmm	A latent variable model for discovering discrete states during decision-making
bestLDS	A spectral algorithm for estimating parameters of Bernoulli linear dynamical systems (in prep)

PROGAMMING EXPERIENCE

python, *proficient*	scientific computing incl. experience w/ numpy, scikit-learn, autograd, jax, pytorch
MATLAB, *proficient*	experience w/ statistics & machine learning, curve fitting, signal processing toolboxes
LabVIEW, *proficient*	experience w/ instrumentation and automation, custom package development