

# IRIS STONE

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Princeton Neuroscience Institute A08

Princeton, NJ 08540

## RESEARCH INTERESTS

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

## EDUCATION

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**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

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**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 discrete structures 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 behavioral quantification.

**University of California Los Angeles**

Jun 2017 - Aug 2018

*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

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**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 Mo<sub>1-x</sub>W<sub>x</sub>Te<sub>2</sub> 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-MoTe<sub>2</sub>*. Applied Physics Letters. 109(3):031903.

*\*Indicates authors contributed equally to the work*

## PRESENTATIONS

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**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

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|  |      |
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| 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

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### Princeton Neuroscience Institute

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| 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

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| Learning Assistant: MATH 105 Pre-calculus | Aug 2015 - Dec 2015 |
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## LEADERSHIP AND OUTREACH

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| Computational Neuroscience Journal Club<br><i>Co-organizer</i>                                       | Jan 2021 - Present  |
| Inclusive Teaching Committee<br><i>Committee Member</i>  | Sep 2020 - Present  |
| BrainWAVES (Women Advocating for Visibility and Equity in Science)<br><i>Co-organizer</i>            | Aug 2020 - Present  |
| Letters to a Pre-scientist<br><i>Penpal</i>  | Aug 2019 - Present  |
| Graduate Student Government<br><i>Neuroscience representative</i>                                    | May 2019 - Present  |
| Princeton Citizen Scientists<br><i>Group Member</i>  | Aug 2018 - Present  |
| AAAS Science in the Classroom: What flies can teach us about searching the web<br><i>Contributor</i> | Jun 2018 - Sep 2018 |
| Office of Scholarship, Creative Activities, and Research<br><i>Research Fellow</i>                   | Aug 2016 - May 2017 |

## TRAINING AND WORKSHOPS

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| MIT Center for Brains, Minds, and Machines Summer Course<br><i>Marine Biology Laboratory (MBL) Woods Hole, MA</i> | Aug 2019 |
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## PROFESSIONAL EXPERIENCE

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| <b>Bloomrock Writing</b><br><i>Founder and CEO</i> | Apr 2014 - Jun 2018 |
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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 programs, and producing and editing written content.

## SOFTWARE (IN PREP)

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| glm-hmm | A latent variable model for discovering discrete states during decision-making                |
| bestLDS | A spectral learning algorithm for estimating parameters of Bernoulli linear dynamical systems |