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ACADEMIC POSITIONS

Princeton University — Princeton, NJ
Associate Research Scholar; Advisor: Carlos Brody — 2024 - present
Postdoctoral Research Fellow; Advisor: Carlos Brody — 2017 - 2023

National Eye Institute — Princeton, NJ
Postdoctoral Research Fellow; Advisor, Bruce Cumming — 2016

EDUCATION

Brown University / NIH Graduate Partnership Program — Providence, RI & Bethesda, MD
PhD, Neuroscience — 2016
Dissertation: *Decision-Related Feedback Influences the Structure of Correlated Variability in Visual Cortex*

McGill University — Montreal, Canada
B.A. and B.Sc., Cognitive Science — 2010

RESEARCH CONTRIBUTIONS

Princeton University — Princeton, NJ
Postdoctoral Research Associate; Advisor: Carlos Brody — 2017 – present
Multi-region population interactions during perceptual decision making

- I developed and characterized a system that achieves highly stable, cost-effective, and parallel recordings from chronically implanted Neuropixels probes in freely moving rats. *See Luo*, **Bondy*** et al. (2020). eLife.*
- Using these tools, I performed a large-scale survey of neuronal encoding amongst >10,000 neurons during auditory evidence accumulation across the rat striatum. This revealed a novel subcortical circuit architecture for perceptual decisions, with posterior striatum encoding the instantaneous stimulus that is accumulated over longer timescales in anterior striatum. ***Bondy** et al. In preparation.*
- Extended the tools described above to achieve the highest-yield single-neuron populations recording in a freely moving animal, including simultaneous, bilateral recording from dozens of brain regions and >3,000 units during well-trained auditory decision making behavior to study brain-wide interactions during decision making. We used this approach to demonstrate a network of fronto-cortico-striatal regions whose activity is highly coordinated during decision formation. *See **Bondy***, Charlton*, Luo* et al (2024). BiorXiv.*

National Institutes of Health — Bethesda, MD
Graduate Student; Advisor: Bruce Cumming — 2011 – 2016
Top-Down Influences on Correlated Variability in Primary Visual Cortex

- I performed a study that clarified the origin of spike-count correlations in visual cortex. I found they changed systematically with task context in a way that can only mean they arise through feedback. This demonstrates that, contrary to the conventional wisdom at the time, spike-count correlations reflect meaningful recurrent computations rather than simply “noise” that impairs the coding fidelity of sensory neurons. *See **Bondy** et al. (20218). Nat. Neuro.*

Brown University Providence, RI
Graduate Student; Advisor: Wilson Truccolo & John Donoghue 2010 – 2011
Fronto-parietal Interactions During Reach

- I developed a point-process model that allowed prediction of local field potential activity in one brain area from population spiking activity in another brain area. This was used to demonstrate functional input from monkey somatosensory area PE to primary motor cortex during reach in monkeys with multiple chronically implanted Utah arrays, demonstrating a pathway likely involved in the use of proprioceptive feedback to control arm movements. *See Menzer et al. (2014). J. Neurophys.*

SELECT PUBLICATIONS (for full list see my Google Scholar profile)

Bondy, A.G.*, Charlton, J.A.*, Luo, T.Z.*, Kopec, C.D., Stagnaro, W.M., Venditto, S.J.C., Lynch L., Janarthanan, S., Oline, S.N., Harris, T.D., Brody, C.D. (2023). Coordinated cross-brain activity during accumulation of sensory evidence and decision commitment. bioRxiv. DOI: 2024.08.21.609044

Gupta, D., Kopec, C.D., **Bondy, A.G.**, Luo, T.Z., Elliott, V.A. and Brody, C.D., 2024. A multi-region recurrent circuit for evidence accumulation in rats. bioRxiv. 2024.07.08.602544

Luo, T.Z., Kim, T.D., Gupta, D., **Bondy A.**, Kopec, C.D., Elliott, V., DePasquale, B., Brody, C.D. (2023). Transitions in dynamical regime and neural mode underlie perceptual decision-making. bioRxiv. DOI: 2023.10.15.562427

Luo, T.Z.*, **Bondy, A.***, Gupta, D., Elliott, V., Kopec, C., & Brody, C. D. (2020). An approach for long-term, multi-probe Neuropixels recordings in unrestrained rats. eLife. DOI: 10.7554/eLife.59716

Bondy, A. & Cumming, B. (2018). Decision-Related Feedback Determines the Structure of Correlated Variability in Visual Cortex. Nature Neuroscience, 21. DOI: 10.1038/s41593-018-0089-1

Bondy, A. & Cumming, B. (2015). Synchronous Spikes Are More Effective (but not for long). Neuron, 87 (4), 676-678. DOI: 10.106/j.neuron.2015.08.01

McFarland, J., **Bondy, A.**, Cumming, B., Saunders, R., & Butts, D. (2015). Saccadic modulation of stimulus processing in primary visual cortex. Nature communications, 6. DOI: 10.1038/ncomms9110

Menzer, D., Rao, N., **Bondy, A.**, Truccolo, W., & Donoghue, J. (2014). Population Interactions Between Parietal and Primary Motor Cortices During Reach. Journal of Neurophysiology, 112 (11), 2959-2984. DOI: 10.1152/jn.00851.2012

McFarland, J., **Bondy, A.**, Cumming, B., & Butts, D. (2014). High-resolution eye tracking using V1 neuron activity. Nature communications, 5. DOI: 10.1038/ncomms5605

** These authors contributed equally*

SELECTED CONFERENCE ABSTRACTS (* = invited for talk)**

Bondy, A., Charlton, J., Luo, T.Z., Venditto, S.J., Stagnaro, W., Kopec, C., Brody, C. (2024). Simultaneous brain-wide recordings reveal a cortico-striatal subnetwork mediating perceptual choice. Computation and Systems Neuroscience. Lisbon, Portugal.

*** **Bondy, A.**, Luo, T.Z., Gupta, D., Elliott, V., Kopec, C., Brody, C.D. (2023). Striatal Circuits for Auditory Decisions. Electronic Auditory Research Seminar Series.

*** **Bondy, A.,** Luo, T.Z., Gupta, D., Elliott, V., Kopec, C., Brody, C.D. (2022). Striatal Circuits for Auditory Decisions. Society of Neuroscience Annual Meeting. San Diego, California.

*** **Bondy, A.,** Luo, T.Z., Gupta, D., Elliott, V., Kopec, C., Brody, C.D. (2022). Striatal Circuits for Auditory

Decisions. Ascona Circuits Meeting. Ascona, Switzerland.

*** **Bondy, A.,** Luo, T.Z., Gupta, D., Elliott, V., Kopec, C., Brody, C.D. (2022). Striatal Circuits for Auditory Decisions. Neurobiology of Cognition Gordon Research Conference. Sunday River, Maine.

*** **Bondy, A.,** Luo, T.Z., Gupta, D., Elliott, V., Kopec, C., Brody, C.D. (2022). Striatal Circuits for Auditory Decisions. Neurobiology of Cognition Gordon Research Seminar. Sunday River, Maine.

*** **Bondy, A.,** Luo, T.Z., Gupta, D., Elliott, V., Kopec, C., Brody, C.D. (2022). Auditory decision making requires multiple striatal pathways. Basal Ganglia Gordon Research Seminar. Ventura, CA.

Yancy, G., Hart, E., **Bondy, A.**, Brody, C., Huk, A., Pillow, J., Keeley, S. (2022). Multi-region Poisson GPFA isolates shared and independent latent structure in sensorimotor tasks. Cosyne Abstracts 2022. Lisbon, Portugal.

Bondy, A., Luo, T.Z., Gupta, D., Brody, C.D. (2020). Anterior and posterior striatum play distinct roles in evidence accumulation. Cosyne Abstracts 2020, Denver, CO.

Bondy, A., Luo, T.Z., Brody, C.D. (2019). Anterior and posterior dorsal striatum play distinct roles in evidence accumulation. SfN Abstracts 2019.

*** **Bondy, A.**, and Cumming, B. (2016). The Impact of Noise Correlations in Visual Cortex on Perceptual Performance Depends on their Origin. VSS Abstract 2016.

Lange, R., **Bondy, A.**, Cumming, B. and Haefner, R. (2016). On the neural basis of probabilistic inference during perceptual decision making. Cosyne Abstracts 2016, Salt Lake City, Utah.

Bondy, A., and Cumming, B. (2015). Monkeys behaving badly: probing macaques' internal task strategies with psychophysical reverse correlation. SfN Abstracts 2015.

Bondy, A., and Cumming, B. (2015). Choice-Related Activity in Macaque Primary Visual Cortex Reflects Feedback. NIH Graduate Student Research Symposium.

McFarland, J., **Bondy, A.**, Cumming, B. and Butts, D (2015). Saccadic modulation of stimulus processing in primary visual cortex. Cosyne Abstracts 2015, Salt Lake City, Utah.

*** **Bondy, A.**, and Cumming, B. (2013). Top down signals influence the distribution of noise correlations amongst sensory neurons. SfN Abstracts 2013.

AWARDS & HONORS

NIMH Ruth Kirschstein Postdoctoral Individual NRSA 1F32MH123047-01A1, 2021 - 2023
Brown University International Affairs Travel Fund Award, 2011
McGill University Lorne Gales Scholar, 2003 - 2007

SOCIETY MEMBERSHIPS

Society of Neuroscience 2010 - present
Vision Sciences Society 2016

NEUROSCIENCE SUMMER SCHOOLS

Computational Neuroscience: Vision, Cold Spring Harbor Cold Spring Harbor, NY, 2014
Computational Vision, Bernstein Center for Comp. Neuro., Tubingen, Germany, 2012
Computational and Cognitive Neuroscience, Cold Spring Harbor Asia Suzhou, China, 2011
Computational Neuroscience Summer School, University of Ottawa Ottawa, Canada, 2010

SKILLS

Large-scale chronic electrophysiology recordings in rodents (7 years experience)
Development and deployment of scalable high-yield electrophysiological data acquisition, processing, and analysis pipelines (>10 years experience)

High-throughput automated rodent behavioral training systems (4 years experience)
Analysis and modeling of spike train and local field potential data (>10 years experience)
Rodent and monkey stereotactic surgical technique (>10 years experience)
Rodent and monkey behavioral design and training (>10 years experience)
Rodent optogenetics (7 years experience)
Proficiency in Matlab, Python, Julia, R, MySQL

OPEN SOURCE SOFTWARE CONTRIBUTIONS

Kilosort2
JRClust

COMMUNITY INVOLVEMENT

Cosyne Program Committee, 2024-2025

Student Coordinator, Brown-NIH Graduate Partnership Program, 2013-2015
Reviewer: Cell, Neuron, Journal of Neuroscience, PNAS, Scientific Reports, PLOS Computational Biology, Frontiers in Ecology and Evolution.