Adrian G Bondy, PhD

Associate Research Scholar
Princeton Neuroscience Institute

40 Woodlands Way
Princeton, NJ 08540
https://abondy.princeton.edu
abondy@princeton.edu
Google Scholar | ORCID

EDUCATION

2016 PhD in Neuroscience, Brown University / NIH Graduate Partnership Program
Providence, RI and Bethesda, MD, USA

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

RESEARCH INTERESTS

I develop and deploy state-of-the-art techniques for recording simultaneously from thousands of neurons across the rodent brain, along with computational modeling approaches, to characterize the coordinated and multi-regional internal conversation underlying cognition and learning.

POSITIONS

2017 – **Associate Research Scholar** (2024 –)
Postdoctoral Research Fellow (2017-2023)
Princeton Neuroscience Institute, Princeton University
Advisor: Carlos D. Brody, PhD

2010 – 2016 **Postdoctoral Research Fellow** (6/2016-12/2016)
Graduate Student (2010 - 2016)
Laboratory of Sensorimotor Research, National Eye Institute, NIH
Advisor: Bruce G. Cumming, PhD
Thesis: Decision-Related Feedback Influences the Structure of Correlated Variability in Visual Cortex

PUBLICATIONS AND PREPRINTS

Asterisks (*) denotes co-first authors

Bondy, A.*, 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. Brain-wide coordination of decision formation and commitment. ***bioRxiv***, 2024. ***Press: [The Transmitter]***

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

Zimmerman CA, Bolkan SS, Pan-Vazquez A, Wu B, Keppler EF, Meares-Garcia JB, Guthman EM, Fetcho RN, McMannon B, Lee J, Hoag AT, Lynch LA, Janarthanan SR, López Luna JF, **Bondy A.**, Falkner AL, Wang SS, Witten IB. A neural mechanism for learning from delayed postingestive feedback. ***bioRxiv***, 2023. ***Nature***, 2025.

Kopec, C. D., Luo, T. Z., **Bondy, A.**, Gupta, D., Elliott, V. A., Charlton, J. A., ... & Brody, C. D. To integrate or not to integrate: Testing degenerate strategies for solving an accumulation of perceptual evidence decision-making task. ***bioRxiv***, 2024.

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

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

Bondy, A., Haefner, R. & Cumming, B. Decision-Related Feedback Determines the Structure of Correlated Variability in Visual Cortex. ***bioRxiv***, 2016. ***Nature Neuroscience***, 2018.

Bondy, A. & Cumming, B. Synchronous Spikes Are More Effective (but not for long). ***Neuron***, 2015.

McFarland, J., **Bondy, A.**, Cumming, B., Saunders, R., & Butts, D.. Saccadic modulation of stimulus processing in primary visual cortex. ***Nature Communications***, 2015.

Menzer, D., Rao, N., **Bondy, A.**, Truccolo, W., & Donoghue, J. Population Interactions Between Parietal and Primary Motor Cortices During Reach. ***Journal of Neurophysiology***, 2014.

McFarland, J., **Bondy, A.**, Cumming, B., & Butts, D. High-resolution eye tracking using V1 neuron activity. ***Nature Communications***, 2014.

In Preparation

Bondy, A., Luo, T.Z., Gupta, D., Elliott, V., Charlton, J.A., Stagnaro, W.M., Kopec, C., Brody, C. Striatal circuits for auditory decisions.

AWARDS & HONORS

2021 – 2023	NIMH Ruth Kirschstein Postdoctoral Individual NRSA (F32; $230K USD total)
2016	Brown University International Affairs Travel Fund Award
2003 – 2007	McGill University Lorne Gales Academic Scholarship

INVITED TALKS

Meetings

2025	Lipschultz Center Symposium, Mount Sinai, New York, NY, USA
2025	Sensation and Action, Thun, Switzerland
2022	Society of Neuroscience Annual Meeting, San Diego, CA, USA
2022	The Assembly and Function of Neuronal Circuits, Ascona, Switzerland
2022	Neurobiology of Cognition GRC and GRS, Sunday River, Maine, USA
2022	Basal Ganglia Gordon Research Seminar, Ventura, CA, USA
2016	Vision Sciences Society Annual Meeting, St. Pete Beach, FL, USA
2013	Society for Neuroscience Annual Meeting, San Diego, CA, USA

Department Seminars

2025	Princeton Neuroscience In-House Seminar Series, Princeton, NJ, USA
2024	Allen Institute for Neural Dynamics, Seattle, WA USA
2023	Electronic Auditory Research Seminar Series, University of Pennsylvania, Virtual
2016	Columbia University Department of Neuroscience, New York City, NY, USA
2015	New York University Center for Neural Science, New York City, NY, USA
2015	University of Pennsylvania, Department of Psychology, Philadelphia, PA, USA
2015	Rochester University, Brain and Cognitive Sciences, Rochester, NY, USA
2015	Harvard Medical School Systems Neuro. Journal Club, Cambridge, MA, USA
2014	New York University Center for Neural Science, Noise Workshop, New York, NY, USA

RESEARCH EXPERIENCES

2017 – **Associate Research Scholar** (2024 –)
Postdoctoral Research Fellow (2017-2023)
Princeton Neuroscience Institute
Advisor: Carlos D. Brody, PhD
Research Summary:

- I developed state-of-the-art approaches to record spikes from >3,000 neurons simultaneously across dozens of brain regions in rats performing an auditory decision making task (see Bondy et al. bioRxiv, 2024 and Luo*, Bondy* et al. eLife, 2020).
- I demonstrated that the unfolding of a perceptual decision across the brain on single trials is highly unified across brain regions and hemispheres, and is led by a subset of frontal cortical and striatal regions. This dramatically clarifies the brain-wide circuit architecture underlying perceptual decision making (see Bondy et al. bioRxiv, 2024)
- I performed a large-scale survey of neuronal encoding across the rat striatum, revealing a hierarchy of evidence accumulation timescales across its antero-posterior axis. *(Bondy et al. In preparation)*

2011 – 2016 **Graduate Student**
Laboratory of Sensorimotor Research, National Eye Institute, NIH
Advisor: Bruce G. Cumming, PhD
Research Summary: Using population recordings in monkey primary visual cortex, I showed that spike-count correlations change systematically with task context in a way that can only mean they arise through feedback. This demonstrated that, contrary to the conventional wisdom at the time, correlated variability reflects meaningful recurrent computations rather than simply "noise". *See Bondy et al. (20218). Nat. Neuro.*

2010 – 2011 **Rotating Graduate Student**
Brown University
Advisor: Wilson Truccolo, PhD and John Donoghue, PhD
Research Summary: I developed a point-process model to successfully predict local field potential activity in monkey motor cortex from population spiking activity in a somatosensory area during arm reaches, demonstrating a functional input likely involved in the use of proprioceptive feedback for motor control. *See Menzer et al. J. Neurophys. 2014.*

TEACHING AND MENTORING

2023 **Teaching Assistan**t, "Computational Neuroscience", Princeton University

- Lectured on neural population coding and generalized linear models
- Devised Python-based problem sets using real neural data, e.g. "Low-Dimensional Neural Dynamics During Decision Making"
- Led weekly labs to support student work on problem sets

2019 **Organizer**, Neuroscience Outreach at Sankofa Freedom Academy Public Charter High School, Philadelphia, PA

- Developed hands-on neuroscience lab activities
- Recruited and trained graduate student volunteers to work effectively with high school students

2015 – **Mentor**

- Diksha Gupta (graduate student, now postdoc at Sainsbury Wellcome

Center): mentored project elucidating a corticostriatal circuit for evidence accumulation
- Sarah Jo Venditto (graduate student, now scientist at Flatiron Institute): mentored project using chronically-implanted Neuropixels probes to examine hippocampal population activity during planning
- Wynne Stagnaro (graduate student): supervised projects using retrograde tracing, brain clearing and volumetric imaging to identify inputs to striatal subregions and register probe tracks to atlases
- Jorge Yanar (graduate student): supervised rotation project on neural decoding of task variables during decision making
- Verity Elliott (technician, now graduate student at Wake Forest): trained to run rat behavioral, optogenetic, and electrophysiology experiments
- Aidan Pillard (high school student, now researcher at Mount Sinai): trained to perform spike sorting of non-human primate electrophysiology data

PROFESSIONAL SERVICE

2024 – 2026	COSYNE Program Committee
2023	Volunteer Participant, Chronic Neuropixels System Optimization Workshop, HHMI Janelia Research Campus
2022	Chair and Organizer, SfN Nanosymposium “Neuronal mechanisms of decision-making”
2020 –	Volunteer expert on chronic Neuropixels methods for the neuroscience community, including repeated attendance at the “Meet the Expert” SfN Neuropixels Booth
2017 –	Journal Reviewer: *Cell, Neuron, Journal of Neuroscience, PNAS, Scientific Reports, PLOS Computational Biology, Frontiers in Ecology and Evolution*
2013 – 2015	Student Coordinator, Brown-NIH Graduate Partnership Program

MEETING ABSTRACTS

Asterisks (*) denotes co-first authors

Bondy, A.*, Charlton, J.*, Luo, T.Z.*, Venditto, S.J., Stagnaro, W., Kopec, C., Brody, C. Coordinated evolution and end of a decision across the brain. ***Grounding Cognition in Mechanistic Insight***, HHMI Janelia, 2025.

Bondy, A.*, Charlton, J.*, Luo, T.Z.*, Venditto, S.J., Stagnaro, W., Kopec, C., Brody, C. Coordinated evolution and end of a decision across the brain. ***Sensation and Action***, Thun, Switzerland, 2025.

Bondy, A.*, Charlton, J.*, Luo, T.Z.*, Venditto, S.J., Stagnaro, W., Kopec, C., Brody, C. Simultaneous brain-wide recordings reveal a cortico-striatal subnetwork mediating perceptual choice. ***Society for Neuroscience Annual Meeting***, 2024.

Bondy, A.*, Charlton, J.*, Luo, T.Z.*, Venditto, S.J., Stagnaro, W., Kopec, C., Brody, C. Simultaneous brain-wide recordings reveal a cortico-striatal subnetwork mediating perceptual choice. ***COSYNE***, 2024.

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

Bondy, A., Luo, T.Z., Gupta, D., Elliott, V., Kopec, C., Brody, C. Striatal Circuits for Auditory Decisions. ***The Assembly and Function of Neuronal Circuits,*** Ascona, Switzerland, 2022.

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

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

Bondy, A., Luo, T.Z., Gupta, D., Brody, C. Anterior and posterior striatum play distinct roles in evidence accumulation. ***COSYNE***, 2020.

Bondy, A., Luo, T.Z., Brody, C. Anterior and posterior dorsal striatum play distinct roles in evidence accumulation. ***Society for Neuroscience Annual Meeting***, 2019.

Bondy, A., and Cumming, B. The Impact of Noise Correlations in Visual Cortex on Perceptual Performance Depends on their Origin. ***Vision Science Society Annual Meeting***, 2016.

Bondy, A., and Cumming, B. Monkeys behaving badly: probing macaques' internal task strategies with psychophysical reverse correlation. ***Society for Neuroscience Annual Meeting***, 2015.

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

Bondy, A., and Cumming, B. Top down signals influence the distribution of noise correlations amongst sensory neurons. ***Society for Neuroscience Annual Meeting***, 2013.

EXTRACURRICULAR TRAINING

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

LANGUAGES

English (native), French (fluent), Italian (proficient), Chinese (basic)

CITIZENSHIP

USA, Canada