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CURRENT
POSITION

2019- Assistant Professor, Department of Cognitive Sciences
Faculty, Institute for Mathematical Behavioral Sciences
Fellow, Center for the Neurobiology of Learning and Memory
University of California, Irvine

PREVIOUS
APPOINT-
MENTS

2018 Associate Research Scholar, Princeton Neuroscience Institute
2013-2018 Postdoctoral Research Associate, Princeton Neuroscience Institute
2007-2013 PhD candidate, Cognition & Perception, New York University
2006 Research assistant, Deicken lab, UCSF/VA
2005-2007 Research assistant, Wagner lab, Stanford

EDUCATION

2013 Ph.D., Cognition & Perception
New York University
Advisor: Nathaniel D. Daw
2003 S.B., Mathematics (additional concentration in Economics)
Massachusetts Institute of Technology

RESEARCH
FUNDING

2022-2026 NINDS R01NS119468 (Co-I; PI Chrastil)
“Cognitive graphs, active decision making, and brain network dynamics”
2021-2023 NIA R21AG072673 (PI)
“Improving multi-step planning in aging by overcoming deficits in memory encoding”
2021-2023 BBRF NARSAD Young Investigator award (PI)
“Determining the role of episodic memory in substance use disorder”
2020-2021 NIMH P50MH096889 (seed grant; PI Baram)
“Early life adversity effects on event segmentation”
2011-2013 NIMH F31MH095501 (PI)
“Computational mechanisms of goal-directed control”

To trainees

2022-2025 NIA F32AG072836 (Sharon Noh)
“Age-related changes in memory alter decision-making”
2020-2023 National Defense Science & Engineering Graduate fellowship (Nora Harhen)
2019 UCI Summer Undergraduate Research Fellowship (Brianna Sarcos)

PUBLICATIONS

Preprints

- PP3 **Bornstein AM**, Aly M, Feng SF, Turk-Browne NB, Norman KA, Cohen JD. Perceptual decisions result from the continuous accumulation of memory and sensory evidence. *bioRxiv*.
doi:10.1101/186817
doi:10.18112/openneuro.ds001614.v1.0.1
- PP2 Hunter LE*, **Bornstein AM***, Hartley CA. A common deliberative process underlies model-based planning and patient intertemporal choice. *bioRxiv*.
doi:10.1101/499707
- PP1 Otto AR, Devine S, Schultz E, **Bornstein AM***, Louie K*. Context-dependent choice and evaluation in real-world consumer behavior. *bioRxiv*.
doi:10.1101/2022.04.14.488290

Peer-reviewed journal articles

- JP13 Rmus M, Ritz H, Hunter LE, **Bornstein AM***, Shenhav A* (2022). Humans can navigate complex graph structures acquired during latent learning. *Cognition*, 225:105103.
doi:10.1016/j.cognition.2022.105103
- JP12 Wang S*, Feng SF, **Bornstein AM*** (2021). Mixing memory and desire: How decisions for reward depend on the dynamics and content of memory reinstatement. *Wiley Interdisciplinary Reviews: Cognitive Science*, e1581.
doi:10.1002/wcs.1581
- JP11 Rouhani N, Norman KA, Niv Y, **Bornstein AM** (2020). Reward prediction errors create event boundaries in memory. *Cognition*, 203:104269.
doi:10.1016/j.cognition.2020.104269
- JP10 **Bornstein AM***, Pickard H* (2020). Chasing the first high: Memory sampling in drug choice. *Neuropsychopharmacology*, 45(6):907-915.
doi:10.1038/s41386-019-0594-2
- JP9 Kane GA, **Bornstein AM**, Shenhav A, Wilson RC, Daw ND, Cohen JD (2019). Rats exhibit similar biases in foraging and intertemporal choice tasks. *eLife*, 8:e48429.
doi:10.7554/eLife.48429
- JP8 Millner AJ, den Ouden HEM, Gershman SJ, Glenn CR, Kearns J, **Bornstein AM**, Marx BP, Keane TM, Nock MK (2019). Suicidal thoughts and behaviors are associated with an increased decision-making bias for active responses to escape aversive states. *Journal of Abnormal Psychology*, 128(2):106-118.
doi:10.1037/abn0000395
- JP7 Hoskin AN, **Bornstein AM**, Norman KA, Cohen JD (2018). Refresh my memory: Episodic memory reinstatements intrude on working memory maintenance. *Cognitive, Affective, & Behavioral Neuroscience*, 19:338-354.
doi:10.3758/s13415-018-00674-z
doi:10.18112/openneuro.ds001576.v1.0.0
- JP6 **Bornstein AM**, Khaw MW, Shohamy D, Daw ND (2017). Reminders of past choices bias decisions for reward in humans. *Nature Communications*, 8:15958.
doi:10.1038/ncomms15958

- JP5 **Bornstein AM**, Norman KA (2017). Reinstated episodic context guides sampling-based decisions for reward. *Nature Neuroscience*, 20:997-1003.
doi:10.1038/nn.4573
doi:10.18112/openneuro.ds001607.v1.0.1
- JP4 **Bornstein AM**, Daw ND (2013). Cortical and hippocampal correlates of deliberation during model-based decisions for rewards in humans. *PLoS Computational Biology*, 9(12):e1003387.
doi:10.1371/journal.pcbi.1003387
- JP3 **Bornstein AM**, Daw ND (2012). Dissociating hippocampal and striatal contributions to sequential prediction learning. *European Journal of Neuroscience*, 35:1011-1023.
doi:10.1111/j.1460-9568.2011.07920.x
- JP2 **Bornstein AM**, Daw ND (2011). Multiplicity of control in the basal ganglia: computational roles of striatal subregions. *Current Opinion in Neurobiology*, 21(3):374-380.
doi:10.1016/j.conb.2011.02.009
- JP1 Preston AR, **Bornstein AM**, Hutchinson JB, Gaare ME, Glover GH, Wagner AD (2010). High-resolution fMRI of content-sensitive subsequent memory responses in human medial temporal lobe. *Journal of Cognitive Neuroscience*, 22:156-173.
doi:10.1162/jocn.2009.21195

Peer-reviewed articles in conference proceedings

- CP10 Banavar NV+, **Bornstein AM** (2022). Response time modeling provides stable and mechanistically interpretable measures of individual differences in behavioral pattern separation. *Proceedings of the 20th International Conference on Cognitive Modeling*.
Selected for a talk.
- CP9 Harhen NC+, **Bornstein AM** (2022). Learning to expect change: Volatility during early experience alters reward expectations in a model of interval timing. *Proceedings of the 20th International Conference on Cognitive Modeling*.
Selected for a talk.
- CP8 Banavar NV+, **Bornstein AM** (2022). Decision difficulty modulates the re-use of computations across trials in non-sequential decision tasks. *Proceedings of the 5th Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM 2022)*
- CP7 Harhen NC+, **Bornstein AM** (2022). Humans adapt their foraging strategies and computations to environment complexity. *Proceedings of the 5th Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM 2022)*
- CP6 Yoo J+, **Bornstein AM** (2022). Two-stage task with increased state space complexity to assess online planning. *Proceedings of the 5th Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM 2022)*
- CP5 Banavar NV+, Lee MD, **Bornstein AM** (2021). Sequential effects in non-sequential tasks. *Proceedings of the 19th International Conference on Cognitive Modeling*.
- CP4 Harhen NC+, **Bornstein AM** (2021). Structure learning as a mechanism of overharvesting. *Proceedings of the 19th International Conference on Cognitive Modeling*.
- CP3 Harhen NC+, Hartley CA, **Bornstein AM** (2021). Model-based foraging using latent-cause inference. *Proceedings of the 43rd Annual Conference of the Cognitive Science Society*.
doi:10.31234/osf.io/dfztu
<https://github.com/uciccnl/CogSci2021-HarhenHartleyBornstein>

- CP2 Kane GA, **Bornstein AM**, Shenhav A, Wilson RC, Daw ND, Cohen JD (2017). Mechanisms of overharvesting in patch foraging. *Proceedings of the 39th Annual Conference of the Cognitive Science Society*, 637-642.
- CP1 Floares A, Jakary A, **Bornstein A**, Deicken R (2006). Neural networks and classification and regression trees are able to distinguish females with major depression from healthy controls using neuroimaging data. *Proceedings of the IEEE International Joint Conference of Neural Networks, 2006*, 4605-4611.
doi:10.1109/ijcnn.2006.247090

Accepted abstracts in conference proceedings (since 2019)

- CA15 Harhen NC+, Hartley CA*, **Bornstein AM*** (2022). Memory-guided decision-making develops alongside model-based planning. *Flux*.
- CA14 Harhen NC+, **Bornstein AM** (2022). Representation learning & adaptation in human foraging. *CNLM annual meeting*.
Selected for a short talk.
- CA13 Yoo J+, **Bornstein AM** (2022). Task complexity and experience modulate the use of online planning. *CNLM annual meeting*.
- CA12 Noh SM+, Stark CEL, **Bornstein AM** (2022). Mnemonic Discrimination Ability Predicts Optimal Training Condition for Memory-Guided Inference Decisions. *Annual meeting of the Cognitive Neuroscience Society*.
Selected for a short talk.
- CA11 Yoo J+, **Bornstein AM** (2021). Task complexity and experience dictate the use of online, versus offline, planning in humans. *Annual meeting of the Society for Neuroeconomics*.
- CA10 Noh SM+, Kerr T, Bennett IA*, **Bornstein AM*** (2021). Age-related differences in memory-guided decisions are driven by a trade-off between multiple decision systems. *Society for Neuroscience Annual Meeting*.
- CA9 Noh SM+, Kerr T, **Bornstein AM** (2021). Pattern Separation Predicts Which Memories Are Sampled During Decisions for Reward *Psychonomics*.
- CA8 Noh SM+, **Bornstein AM** (2021). Pattern separation mediates the types of memories sampled during decisions for reward. *CNLM annual meeting*.
- CA7 Banavar NV+, **Bornstein AM** (2021). Deliberative evaluation in intertemporal choice is shaped by experiment structure. *Annual meeting of the Society for Neuroeconomics*
Selected for a short talk.
- CA6 Devine SM, Otto AR, **Bornstein AM***, Louie K* (2021). Context-dependent choice and evaluation in real-world consumer behavior *Mathematical Psychology*
- CA5 Harhen NC+, Yassa MA, Baram TZ, **Bornstein AM** (2021). Exploring a latent cause model of substance use disorder symptoms. *Biological Psychiatry*
doi:10.1016/j.biopsych.2021.02.479
- CA4 Cooper KW+, Li L, Agostinelli F, Saraf M, Elias GA, Baldi P, **Bornstein AM**, Shahbaba B, Fortin N (2021). Theta-associated nonspatial sequence coding in hippocampus. *Society for Neuroscience Global Connectome*.
- CA3 Harhen NC+, Hartley CA, **Bornstein AM** (2020). Foraging behavior adjusts to multiple scales of context. *Annual meeting of the Society for Neuroeconomics*
Selected for a talk.

- CA2 Vlasceanu M, Morais MJ, Zhao Z, **Bornstein AM**, Norman KA, Coman AC (2020). Self-Other Similarity Modulates the Socially-Triggered Context-Based Prediction Error Effect on Memory. *41st Annual Conference of the Cognitive Science Society*
- CA1 Rouhani N, Norman KA, Niv Y, **Bornstein AM** (2019). Reward prediction errors create event boundaries in memory *Psychonomics*

Commentaries

- RP5 **Bornstein AM***, Constantino SM* (2017). Nudge back: Towards a taxonomy of scientific rationalities. *London Conference in Critical Thought*.
- RP4 **Bornstein AM**, Miller KJ, Shenhav A (2015). Walking bundles of habits (and Response-Outcome associations). *European Journal of Neuroscience*, 41:1356-1357.
doi:10.1111/ejn.12906
- RP3 **Bornstein AM** (2014). Functions of the hippocampal memory system in instrumental control (Doctoral dissertation).
Available from ProQuest Dissertations & Theses Global (3614853).
- RP2 Wallisch P, **Bornstein AM** (2013). Enhanced motion perception as a psychophysical marker for autism? *Journal of Neuroscience*, 33(37):14631-14632.
doi:10.1523/jneurosci.2945-13.2013
- RP1 **Bornstein AM**, Nysten EL, Steele SA (2011). Unblocking the neural substrates of model-based value. *Journal of Neuroscience*, 31(28):10117-10118.
doi:10.1523/jneurosci.1883-11.2011

AWARDS

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| 2020 | Association for Psychological Science “Rising Star” Award |
| 2020 | Brain and Behavior Research Foundation NARSAD Young Investigator Award |
| 2014 | Spotlight poster, Society for Neuroeconomics annual meeting |
| 2005,6,8 | Honorable mention, NSF Graduate Research Fellowship |
| 2000 | Runner up, MIT \$50k Business Plan competition |

TALKS

Invited

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| May 2022 | Center for the Neurobiology of Learning and Memory |
| Feb 2021 | University of California Los Angeles |
| Feb 2021 | Context and Affective Memory meeting |
| Aug 2020 | University of California Los Angeles |
| Mar 2020 | Claremont Colleges |
| Feb 2020 | University of California Riverside |
| Jan 2020 | Winter Conference on Learning and Memory |
| Sep 2019 | Facebook Research Labs |
| May 2019 | University of California Los Angeles |

Apr 2019	Brown University
Jan 2019	National Institute of Drug Abuse
Dec 2017	Cognition and Brain Sciences Unit, Cambridge University
Oct 2017	Johns Hopkins University
Feb 2015	Mount Sinai School of Medicine
Jun 2014	Weill-Cornell Medical College
Mar 2014 University	Workshop on the Neurobiology of Prediction and Surprise, Rutgers
Jan 2011	Parallel Distributed Processing meeting, Princeton University
Jan 2011	Kavli Institute, Harvard University

Contributed

Apr 2021	Society of Biological Psychiatry symposium “Advancing Treatment of Substance Use Disorders Through Computational Modeling”
Jan 2020	Winter Conference on the Neurobiology of Learning and Memory symposium “Mnemonic contributions to reinforcement learning and decision making”
Mar 2018	Cosyne workshop “Hippocampal computations and interactions supporting statistical learning and decision-making”
Nov 2015	SFN symposium “Understanding Goal-Directed Decision-Making in Humans: Computations and Circuits”

TEACHING/SERVICE

UC Irvine

Spring 2021	Decision making & Problem solving (Graduate; with Prof. Zygmunt Pizlo)
Spring 2020	Topics in Reinforcement Learning (Graduate; with Prof. Mimi Liljeholm)
Spring 2019-21	Research in Exp Psych (Undergraduate; with Prof. Nadia Chernyak)
Winter 2019-21	Advanced Experimental Psychology (Undergraduate)

Other teaching/mentorship

Fall 2020	Neuromatch academy mentor
Summer 2020	Neuromatch academy group leader
Summer 2020	GSMI Cientifico Latino
2019	MEET alumni mentor
Summer 2018	Computational & Cognitive Neuroscience Summer School, Suzhou, China
2016-2018	Princeton Prison Teaching Initiative
Summer 2007,08	MIT Middle East Education through Technology (MEET), Jerusalem

University service

2021- Irvine Faculty Association, executive board member
2021 CNLM Spring meeting program co-chair
2021 CogSci Undergraduate Association interview
2020 CNLM “Evening to Remember” organizational committee
2020- UCI End Racism Initiative, Outreach to Black students working group
2020 Campuswide honors program coffee hour
2019- First generation First quarter program, Faculty ally
2019- UCI Prison Bachelor’s program, advisory board, curriculum committee
2019 Cognitive Sciences faculty search committee
2019 KUCI Public Affairs interview
2018,20 Cognitive Sciences PhD admissions committee

Organizational service

2021 Center for Neurobiology of Learning and Memory Spring Meeting Co-organizer
(with Lulu Chen)
2018 Princeton Neuroscience Institute “Inside-Out” seminar series Co-organizer (with
Ahmed El Hady)
2018 “Goal-Directed Decision Making: Computations and Circuits” *Elsevier* Co-editor
(with Richard Morris & Amitai Shenhav)
2015 COSYNE Workshop “Memory in action: The role(s) of the hippocampus in
decisions for reward” Co-organizer (with G. Elliott Wimmer)