

CONTACT aaron.bornstein@uci.edu <http://aaron.bornstein.org/>

POSITIONS

2019- Assistant Professor, Department of Cognitive Sciences
 Fellow, Center for the Neurobiology of Learning and Memory
 Affiliate, Institute for Mathematical Behavioral Sciences
 University of California, Irvine
 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
 Thesis: “Functions of the hippocampal memory system in instrumental control.”
 2003 S.B., Mathematics (additional concentration in Economics)
 Massachusetts Institute of Technology

PUBLICATIONS (* = *Equal contribution.*)

Preprints

- PP4 **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
- PP3 Hunter LE*, **Bornstein AM***, Hartley CA. A common deliberative process underlies model-based planning and patient intertemporal choice. *bioRxiv*. doi:10.1101/499707
- PP2 Rmus M, Ritz H, Hunter LE, **Bornstein AM**, Shenhav A. Individual differences in model-based planning are linked to the ability to infer latent structure. *bioRxiv*. doi:10.1101/732072
- PP1 Rouhani N, Norman KA, Niv Y, **Bornstein AM**. Reward prediction errors create event boundaries in memory. *bioRxiv*. doi:10.1101/725440

Peer-reviewed journal articles

- JP9 **Bornstein AM***, Pickard H* (2020). Chasing the first high: Memory sampling in drug choice. *Neuropsychopharmacology*.

- JP8 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
- JP7 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
- JP6 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
- JP5 **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
- JP4 **Bornstein AM**, Norman KA (2017). Reinstated episodic context guides sampling-based decisions for reward. *Nature Neuroscience*, 20:997-1003. doi:10.1038/nn.4573
- JP3 **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
- JP2 **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
- 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

- 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

Reviews, commentaries

- RP6 **Bornstein AM***, Constantino SM* (2017). Nudge back: Towards a taxonomy of scientific rationalities. *London Conference in Critical Thought*.
- RP5 **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

- RP4 **Bornstein AM** (2014). Functions of the hippocampal memory system in instrumental control (Doctoral dissertation). Available from ProQuest Dissertations & Theses Global (3614853).
- RP3 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
- RP2 **Bornstein AM**, Nylen 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
- RP1 **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

ABSTRACTS IN
CONFERENCE
PROCEEDINGS
(SELECTED)

- CA13 **Bornstein AM**. “Chasing the First High”: Memory sampling in drug choice. Society of Biological Psychiatry Annual Meeting, New York, NY. May 2020.
- CA12 Rouhani N, Bakkour A, Boorman E, **Bornstein AM**. Don’t forget about it! Mnemonic contributions to reinforcement learning and decision making. Winter Conference on the Neurobiology of Learning and Memory, Park City, UT. Jan 2020.
- CA11 Rouhani N, Niv Y, Norman KA, **Bornstein AM**. Reward Prediction Errors Create Event Boundaries in Memory. Psychonomic Society Annual Meeting, Montreal, Quebec. November 2019.
- CA10 Rmuis M, Ritz H, Hunter LE, **Bornstein AM**, Shenhav A. Model-based decision making is associated with structure inference ability. Society for Neuroeconomics Annual Meeting, Philadelphia, PA. October 2018.
- CA9 Hunter LE*, **Bornstein AM***, Hartley CA. Two paths to patience: Individual differences in deliberate, but not automatic, intertemporal choice predict model-based planning in humans. Society for Neuroeconomics Annual Meeting, Philadelphia, PA. October 2018.
- CA8 Hoskin AN, **Bornstein AM**, Norman KA, Cohen JD. Refresh my memory: Context information from episodic memory affects working memory maintenance. Society for Neuroscience Annual Meeting. Washington, DC. November 2017.
- CA7 **Bornstein AM**, Aly M, Feng SF, Turk-Browne NB, Norman KA, Cohen JD. Memory-guided perception: Sampling from past experience during perceptual inference. Society for Neuroscience Annual Meeting. San Diego, CA. November 2016.

- CA6 Morris RW*, Shenhav A*, **Bornstein AM**, Collins AGE, Gershman SJ, Gillan CM, Liljeholm M. Minisymposium: Understanding goal-directed decision-making in humans: computations and circuits. Society for Neuroscience Annual Meeting. Chicago, IL. October 2015.
- CA5 **Bornstein AM**, Norman KA. Context of recalled choice events affects subsequent decisions for reward. Society for Neuroeconomics Annual Meeting. Miami, FL. September 2014. [Spotlight poster]
- CA4 **Bornstein AM**, Khaw MW, Daw ND. Episodic cues affect decisions for reward in humans. Society for Neuroeconomics Annual Meeting. Lausanne, Switzerland. September 2013.
- CA3 Khaw MW, **Bornstein AM**, Daw ND. Evidence for decision by sampling in reinforcement learning. COSYNE. Salt Lake City, Utah. March 2013.
- CA2 **Bornstein AM**, Geib TA, Daw ND. A hippocampal-cortical network underlies model-based planning in humans. COSYNE. Salt Lake City, Utah. February 2012.
- CA1 **Bornstein AM**, Daw ND. Computational mechanisms of transition learning in unrewarded sequences. Society for Neuroscience Annual Meeting. Chicago, IL, October 2009.

INVITED TALKS
(SELECTED)

- | | |
|---------------|---|
| IT13 Sep 2019 | Facebook Research Labs, Seattle |
| IT12 May 2019 | University of California, Los Angeles |
| IT11 Apr 2019 | Brown University |
| IT10 Jan 2019 | National Institute of Drug Abuse Extramural, Behavioral and Cognitive Neuroscience |
| IT9 Jan 2019 | National Institute of Drug Abuse Intramural, Behavioral Neuroscience Research Branch |
| IT8 Mar 2018 | Cosyne workshop “Hippocampal computations and interactions supporting statistical learning and decision-making” |
| IT7 Dec 2017 | Cognition and Brain Sciences Unit, Cambridge University |
| IT6 Oct 2017 | Johns Hopkins University |
| IT5 Feb 2015 | Mount Sinai School of Medicine |
| IT4 Jun 2014 | Sackler Institute, Weill-Cornell Medical College |
| IT3 Mar 2014 | Workshop on the Neurobiology of Prediction and Surprise, Rutgers University |
| IT2 Jan 2011 | Parallel Distributed Processing meeting, Princeton University |
| IT1 Jan 2011 | Kavli Institute, Harvard University |

AWARDS &
HONORS
(SELECTED)

2019 UC Irvine School of Social Sciences Research & Travel award
2011-2013 NIH/NIMH Predoctoral fellowship (NRSA)
2007-2012 NYU Opportunity fellowship
2005,6,8 Honorable mention, NSF Graduate Research Fellowship

TEACHING

University of California, Irvine Irvine, CA USA

Spring 2020 Topics in Reinforcement Learning (Graduate; with Prof. Mimi Liljeholm)

Spring 2019, 2020 Research in Exp Psych (Undergraduate; with Prof. Nadia Chernyak)

Winter 2019, 2020 Advanced Experimental Psychology (Undergraduate)

New York University New York, NY USA

Fall 2011 Machine Learning (Graduate), TA (Prof. Yann Lecun)

Fall 2009 Cognitive Neuroscience, TA (Prof. Nathaniel D. Daw)

Fall 2008 Lab in Perception, TA (Dr. Shani Offen, Prof. David J. Heeger)

Spring 2008 Cognition, TA (Prof. Robert E. Rehder)

Massachusetts Institute of Technology Cambridge, MA

Fall 1999 Introduction to Computers and Engineering Problem Solving, LA

Spr 1999 Computer System Architecture (Graduate), TA (Prof. Arvind)

OTHER
TEACHING

July 2018 Cold Spring Harbor Computational & Cognitive Neuroscience Summer School, Suzhou, China (Faculty, reinforcement learning module)

Fall 2016 – Fall 2018 Princeton Prison Teaching Initiative (Instructor, co-organizer; Highschool & College Algebra, Statistics, Composition)f

Summer 2007, 2008 MIT Middle East Education through Technology (MEET), Jerusalem. (Lead instructor)

PROFESSIONAL
ACTIVITIES

- 2020 Co-organizer (with Lulu Chen) Center for Neurobiology of Learning and Memory Spring Meeting.
- 2018 Co-organizer (with Ahmed El Hady) Princeton Neuroscience Institute “Inside-Out” seminar series.
- 2018 Co-editor (with Richard Morris & Amitai Shenhav), “Goal-Directed Decision Making: Computations and Circuits” *Elsevier*.
- 2015 Co-organizer (with G. Elliott Wimmer), COSYNE Workshop “Memory in action: The role(s) of the hippocampus in decisions for reward.”
- 2010-Present Ad-hoc reviewer: Acta Psychologica; Attention, Perception, & Psychophysics; Biological Cybernetics; Biological Psychiatry; BMC Neuroscience; Cerebral Cortex; Cognition; Cognitive, Affective, and Behavioral Neuroscience; Cognitive Science; Cortex; COSYNE; European Journal of Neuroscience; European Neuropsychopharmacology; Frontiers in Behavioral Neuroscience; Human Brain Mapping; ICDL; Journal of Cognitive Neuroscience; Journal of Memory & Language; Journal of Neuroscience; Nature Communications; Nature Human Behavior; Neuroimage: Clinical; PLoS Computational Biology; PLoS ONE; PNAS; Reinforcement Learning & Decision-Making; Topics in Cognitive Science; Visual Cognition

OTHER
ACTIVITIES

- 2011-2012 New York University Graduate Forum (Moderator)
- Spr 2012 Advanced science writing workshop, Prof. Stephen Hall
- 2009-2011 New York University Graduate Forum (Member)
- Fall 2010 Science writing workshop, Prof. Stephen Hall
- Jul 2010 CEU Summer School on “Probabilistic models of cognitive systems.”
Budapest, Hungary
- Aug 2009 Advanced Course in Computational Neuroscience.
Freiburg, Germany