

# Anna C. Schapiro

aschapiro@sas.upenn.edu | schapirolab.org

## Employment

2019 – Assistant Professor, Department of Psychology, University of Pennsylvania  
2015 – 2019 Postdoctoral Fellow, Center for Sleep and Cognition, Harvard Medical School

## Education

2014 Princeton University – Ph.D. in Psychology and Neuroscience  
2009 Stanford University – B.S. in Symbolic Systems, concentration in Neuroscience

## Awards and honors

2024 Outstanding Early Career Statistical Learning Researcher Award  
2023 Cognitive Neuroscience Society Young Investigator Award  
2023 Quad-L Early Career Award, University of New Mexico, for significant contributions to the field of learning, memory, and cognition  
2022 Scialog Fellow for the Molecular Basis of Cognition  
2021 Association for Psychological Science Rising Star Award  
2019 Elected to Memory Disorders Research Society  
2019 Advances in Sleep and Circadian Science Travel Award  
2018 Sleep Research Society Trainee Merit Award  
2017 Inaugural Corkin Award, Memory Disorders Research Society  
2016 Ruth L. Kirschstein National Research Service Award, Individual Postdoctoral Fellowship (NRSA F32), National Institute of Neurological Disorders and Stroke  
2013 Letter of Commendation for Outstanding Teaching, Princeton University  
2012 Rumelhart Memorial Travel Award, Neural Computation and Psychology Workshop, San Sebastian, Spain  
2012 Summer Institute in Cognitive Neuroscience Fellow, Santa Barbara, CA  
2010 National Science Foundation Graduate Research Fellowship  
2009 Firestone Medal for Excellence in Undergraduate Research, Stanford  
2009 K. Jon Barwise Award for Distinguished Contributions to the Symbolic Systems Program, Stanford University  
2009 Symbolic Systems departmental honors, with distinction, Stanford University  
2009 Phi Beta Kappa, elected to Stanford chapter

## Publications

### *Preprints*

1. Solomon, S.H., Kay, K., & **Schapiro, A.C.** Recent statistics shift object representations in parahippocampal cortex. *bioRxiv*. doi: doi.org/10.1101/2024.02.07.579310.
2. Smith, C.M., Thompson-Schill, S.L., & **Schapiro, A.C.** Rapid learning of temporal dependencies at multiple timescales. *bioRxiv*. doi: doi.org/10.1101/2024.01.15.575748.

3. Tandoc, M.C., Dong, C.V., & **Schapiro, A.C.** Object feature memory is distorted by category structure. *PsyArXiv*. doi: doi.org/10.31234/osf.io/9a24e.
4. Zhou, Z., Kahana, M.J.\*, & **Schapiro, A.C.\*** A unifying account of replay as context-driven memory reactivation. *bioRxiv*. doi: doi.org/10.1101/2023.03.22.533833.

### *Peer-Reviewed Articles*

5. Siefert, E.M., Uppuluri, S., Mu, J., Tandoc, M.C., Antony, J.W., & **Schapiro, A.C.** (in press). Memory reactivation during sleep does not act holistically on object memory. *Journal of Neuroscience*.
6. Solomon, S.H. & **Schapiro, A.C.** (2024). Structure shapes the representation of a novel category. *Journal of Experimental Psychology: Learning, Memory, and Cognition*.  
*APA Editor's Choice article.*
7. Mylonas, D., **Schapiro, A.C.**, Verfaellie, M., Baxter, B., Vangel, M., Stickgold, R., & Manoach, D.S. (2024). Maintenance of procedural motor memory across brief rest periods requires the hippocampus. *Journal of Neuroscience*.
8. Sucevic, J. & **Schapiro, A.C.** (2023). A neural network model of hippocampal contributions to category learning. *eLife*, 12, e77185.
9. Zhou, Z., Singh, D., Tandoc, M.C., **Schapiro, A.C.** (2023). Building integrated representations through interleaved learning. *Journal of Experimental Psychology: General*.
10. Larson, O., **Schapiro, A.C.**, & Gehrman, P.R. (2023). Effect of sleep manipulations on intrusive memories after exposure to an experimental analogue trauma: A meta-analytic review. *Sleep Medicine Reviews*, 69, 101768.
11. Zhou, Z., Yeung, G., & **Schapiro, A.C.** (2023). Self-recovery of memory via generative replay. *NeurIPS Workshop MemARI*. arXiv:2301.06030.
12. Singh, D., Norman, K.A., **Schapiro, A.C.** (2022). A model of autonomous interactions between hippocampus and neocortex driving sleep-dependent memory consolidation. *Proceedings of the National Academy of Sciences*. 19(44), e2123432119.
13. Plate, R. C., **Schapiro, A.C.**, & Waller, R. (2022). Emotional faces facilitate statistical learning. *Affective Science*. 3(3), 662-672.
14. Pudhiyidath, A., Morton, N.W., Viveros Duran, R., **Schapiro, A.C.**, Momennejad, I., Hinojosa-Rowland, D.M., Molitor, R.J., & Preston, A.R. (2022). Representations of temporal community structure in hippocampus and precuneus predict inductive reasoning decisions. *Journal of Cognitive Neuroscience*. 34(10), 1736-1760.
15. Zeng, T., Tompariy, A., **Schapiro, A. C.**, & Thompson-Schill, S. (2021). Tracking the relation between gist and item memory over the course of long-term memory consolidation. *eLife*. 10, e65588.
16. Cowan E.T., **Schapiro, A.C.**, Dunsmoor, J.E., & Murty, V.P. (2021). Consolidation as an adaptive process. *Psychonomic Bulletin & Review*. 28(6), 1796-1810.
17. Tandoc, M.C., Bayda, M., Poskanzer, C., Cho, E., Cox, R., Stickgold, R., & **Schapiro, A.C.** (2021). Examining the effects of time of day and sleep on generalization. *PLOS One*. 16 (8), e0255423.
18. Kumar, M., Michael Anderson, Antony, J., Baldassano, C., Brooks, P. P., Cai, M. B., ... **Schapiro, A.C.**,... Norman, K. A. (2021). BrainIAK: The Brain Imaging Analysis Kit. *Aperture*.

19. Denis, D., **Schapiro, A.C.**, Poskanzer, C., Bursal, V., Charron, L., Morgan, A., & Stickgold, R. (2020). Memories are selected for consolidation during sleep based on initial encoding strength: The roles of item exposure and visualization. *Learning and Memory*. 27 (11), 451-456
20. Zhou, Z., Singh, D., Tandoc, M., & **Schapiro, A.C.** (2020). Interleaving facilitates the rapid formation of distributed representations. In *Proceedings of the 42<sup>nd</sup> Annual Conference of the Cognitive Science Society*.
21. Zeng, H., Tompary, A., **Schapiro, A. C.**, & Thompson-Schill, S. L. (2020). The relation between gist and item memory over a month. In *Proceedings of the 42<sup>nd</sup> Annual Conference of the Cognitive Science Society*.
22. Ellis, C.T., Baldassano, C., **Schapiro, A.C.**, Cai, M., & Cohen, J.D. (2020). Facilitating open-science with realistic fMRI simulation: validation and application. *PeerJ*. 8:e8564, doi: 10.7717/peerj.8564.
23. Karnauskas, K.B., Miller, S.L., & **Schapiro, A.C.** (2020). Fossil fuel combustion is driving indoor CO<sub>2</sub> toward levels harmful to human cognition. *GeoHealth*, 4, e2019GH000237. <https://doi.org/10.1029/2019GH000237>.
24. Richards, B.A., ..., **Schapiro, A.C.** et al. (2019). A deep learning framework for neuroscience. *Nature Neuroscience*. 22(11), 1761-1770.
25. **Schapiro, A.C.**, Reid, A.G., Morgan, A., Manoach, D.S., Verfaellie, M., & Stickgold, R. (2019). The hippocampus is necessary for the consolidation of a task that does not require the hippocampus for initial learning. *Hippocampus*. 29(11), 1091-1100.
26. Cox, R., Van Bronkhorst, M.L.V., Bayda, M., Gomillion, H., Cho, E., Parr, E., Manickas-Hill, O.P., **Schapiro, A.C.**, & Stickgold, R. (2018). Sleep selectively stabilizes contextual aspects of negative memories. *Scientific Reports*. 8(1), 17861.
27. **Schapiro, A.C.**, McDevitt, E.A., Rogers, T.T., Mednick, S.C., & Norman, K.A. (2018). Human hippocampal replay during rest prioritizes weakly learned information and predicts memory performance. *Nature Communications*. (9) 3920-3931.
28. Cox, R., **Schapiro, A.C.**, & Stickgold, R. (2018). Variability and stability of large-scale cortical oscillation patterns. *Network Neuroscience*. 2(4), 481-512.
29. Honey, C.J., Newman, E.L., & **Schapiro, A.C.** (2017). Switching between internal and external modes: a multi-scale learning principle. *Network Neuroscience*. 1(4), 339-356.
30. **Schapiro, A.C.\***, McDevitt, E.A.\*, Chen, L., Norman, K.A., Mednick, S.C., & Rogers, T.T. (2017). Sleep benefits memory for semantic category structure while preserving exemplar-specific information. *Scientific Reports*. 7, 14869.
31. Cox, R., **Schapiro, A.C.**, Manoach, D.S., & Stickgold, R. (2017). Individual differences in frequency and topography of slow and fast sleep spindles. *Frontiers in Human Neuroscience*. 11, 433.
32. **Schapiro, A.C.**, Turk-Browne, N.B., Botvinick, M.M., & Norman, K.A. (2017). Complementary learning systems within the hippocampus: A neural network modeling approach to reconciling episodic memory with statistical learning. *Philosophical Transactions of the Royal Society B*. 372(1711), 20160049.
33. **Schapiro, A.C.**, Turk-Browne, N.B., Norman, K.A., & Botvinick, M.M. (2016). Statistical learning of temporal community structure in the hippocampus. *Hippocampus*, 26(1), 3-8.

34. Schlichting, M.L., Guarino, K.F., **Schapiro, A.C.**, Turk-Browne, N.B., & Preston, A.R. (2016). Hippocampal structure predicts statistical learning and associative inference abilities during development. *Journal of Cognitive Neuroscience*. 29(1), 37-51.
35. **Schapiro, A.C.**, Gregory, E., Landau, B., McCloskey, M., Turk-Browne, N.B. (2014). The necessity of the medial temporal lobe for statistical learning. *Journal of Cognitive Neuroscience*, 26(8), 1736-1747.
36. **Schapiro, A.C.**, Rogers, T.T., Cordova, N.I., Turk-Browne, N.B., & Botvinick, M.M. (2013). Neural representations of events arise from temporal community structure. *Nature Neuroscience*, 16(4), 486-492.
37. **Schapiro, A.C.**, McClelland, J.L., Welbourne, S.R., Rogers, T.T., & Lambon Ralph, M.A. (2013). Why bilateral damage is worse than unilateral damage to the brain. *Journal of Cognitive Neuroscience*. 25(12), 2107-2123.
38. Gershman, S.J., **Schapiro, A.C.**, Hupbach, A., Norman, K.A. (2013). Neural context reinstatement predicts memory misattribution. *Journal of Neuroscience*. 33(20), 8590-8595.
39. **Schapiro, A.C.**, Kustner, L.V., & Turk-Browne, N.B. (2012). Shaping of object representations in the human medial temporal lobe based on temporal regularities. *Current Biology*, 22(17), 1622-1627.
40. **Schapiro, A.C.** & McClelland, J.L. (2009). A connectionist model of a continuous developmental transition in the balance scale task. *Cognition*. 110(3), 395-411.

### *Chapters and commentaries*

41. Solomon, S.H. & **Schapiro, A.C.** (2020). Semantic search as pattern completion across a concept. *Trends in Cognitive Sciences*. 24(2), 95-98.
42. Antony, J.W., & **Schapiro, A.C.** (2019). Active and effective replay: Systems consolidation reconsidered again. *Nature Reviews Neuroscience*. 20(8), 506-507.
43. **Schapiro A.C.**, & Turk-Browne N.B. (2015) Statistical Learning. In: Arthur W. Toga, editor. *Brain Mapping: An Encyclopedic Reference*. Academic Press: Elsevier. pp. 501-506.
44. Diuk, C., **Schapiro, A.C.**, Cordova, N.I., Ribas-Fernandes, J., Niv, Y., & Botvinick, M.M. (2013). Divide and conquer: Task decompositions and hierarchical reinforcement learning in humans. In *Computational and Robotic Models of the Hierarchical Organization of Behavior*. Springer Berlin Heidelberg. pp. 271-291.
45. Thomas, M.S.C., McClelland, J.L., Richardson, F.M., **Schapiro, A.C.**, & Baughman, F. (2009). Dynamical and Connectionist Approaches to Development: Toward a Future of Mutually Beneficial Co-evolution. In J.P. Spencer, M. S. C. Thomas, & J. L. McClelland, (Eds). *Toward a unified theory of development: Connectionism and dynamic systems theory re-considered*. New York: Oxford.

### **Grants**

- Scialog MBC Award, SA-MBC-2023-083, "Investigating the conscious accessibility of neural replay", 2023-2024, Principal Investigator (\$50,000 annual direct costs)
- National Institutes of Health, R01 MH129436, "Learning novel structure across time and sleep", 2023-2028, 2023-2028, Principal Investigator (\$250,00 annual direct costs)

National Institutes of Health, R21 MH128788, “The emergence of abstract structure knowledge across learning and sleep”, 2022-2024, Principal Investigator (\$150,00 annual direct costs)

National Institutes of Health, R01 RF NS127128, “Hippocampal-cortical contributions to world building in freely behaving macaques”, 2022-2027, Co-Investigator (PI: K. Hoffman) (\$76,275 annual direct costs)

National Institutes of Health, R01 DA055259, “The influence of mesolimbic-hippocampal interactions on episodic memory during active information seeking”, 2022-2027, Co-Investigator (PI: V. Murty) (\$10,903 annual direct costs)

Charles E. Kaufman Foundation, KA2020-114800, “Mechanisms of generalization: The role of neural inhibitory processes and time of day”, 2020–2022, Principal Investigator (\$68,182 annual direct costs)

National Institutes of Health, R21 DA043568-01A1, “Influence of reward on memory consolidation in adults and adolescence”, 2019–2021, Co-Investigator (PI: V. Murty) (\$13,924 annual direct costs)

University of Pennsylvania Chronobiology and Sleep Institute, “Modulation of Slow Wave Activity using Wearable Technology as a Novel Treatment for Major Depressive Disorder”, 2020, Co-Investigator

### **Invited colloquium and seminar talks**

New York University, *Swartz Seminar Series*, April 2024

University of Chicago, *Neuroscience Seminar*, April 2024

Air Force Research Laboratory, *Qualia Exploitation of Sensing Technology Seminar*, March 2024

Columbia University, *Cognitive and Behavioral Neuroscience Seminar*, December 2023

University of Arizona, *Neuroscience Seminar Series*, October 2023

Max Planck Institute Leipzig, *Mind Meeting Lecture Series*, September 2023

University of Massachusetts, *Cognitive Colloquium*, September 2023

University College London, *NeuroAI Seminar Series*, July 2023

Max Planck Institute for Empirical Aesthetics, May 2023

University of Bristol, *Mind & Machine Seminar*, May 2023

Harvard Medical School, *Stickgold Science of Sleep Series*, May 2023

University of New Mexico, *Quad-L Early Career Award Lecture*, April 2023

*Learning Salon*, September 2022

Intel Labs, *Neuroscience & AI Seminar*, July 2022

University of York Athena SWAN lecture, June 2022

Max Planck Institute, Berlin, *Schuck Lab*, May 2022

MRC Cognition and Brain Sciences Unit, Cambridge, *Chaucer Club*, April 2022

Washington University in St. Louis, *NeuroImaging Community seminar series*, February 2022

University of Hamburg, *Cognitive Psychology Research Colloquium*, December 2021

Princeton University, *Psychology Department Cognitive Talk Series*, November 2021

Columbia University, *Center for Theoretical Neuroscience*, June 2021  
Barcelona Computational, *Cognitive and Systems Neuroscience Seminar*, May 2021  
University of Illinois, *Cognitive Brown Bag*, April 2021  
University of California Los Angeles, *Cognitive Psychology Forum*, January 2021  
University of Zurich, *Institute of Neuroinformatics Colloquium*, December 2020  
Tel Aviv University, *School of Psychological Sciences Colloquium*, December 2020  
New York University, *Concepts and Categories Seminar*, December 2020  
University of Texas, Austin, *Cognitive Neuroscience Seminar*, November 2020  
Georgia Institute of Technology, *Psychology Department Colloquium*, November 2020  
Duke University, *Center for Cognitive Neuroscience Colloquium*, November 2020  
Temple University, *Memory Meeting*, November 2020  
Vanderbilt University, *Cognition & Cognitive Neuroscience Colloquium*, October 2020  
Johns Hopkins University, *Intelligent Systems Center seminar*, July 2020  
Brown University, *Computation Seminar Series*, May 2020  
University of Toronto, *Ebbinghaus Empire seminar*, February 2020  
Rotman Research Institute, *Rotman Research Institute Rounds*, February 2020  
University College London, *Brain Meeting seminar*, February 2020  
National Institutes of Health, *Human Cortical Physiology & Neurorehabilitation Section*, June 2019  
University of Oxford, *Cognitive & Behavioural Neuroscience*, May 2019  
Google DeepMind, *Neuroscience team*, May 2019  
Cardiff University, *School of Psychology*, May 2019  
University of Bristol, *Neural Dynamics seminar*, May 2019  
Hebrew University, *Cognitive and Social seminar*, January 2019  
Bar Ilan University, *Cognitive Neuroscience Lab*, January 2019  
Bard College, *Bard Summer Research Institute*, July 2018  
Brown University, *Providence Sleep Research Interest Group*, May 2018  
University of Iowa, *Iowa Neuroscience Institute*, April 2018  
Stanford University, *Department of Psychology*, November 2017  
Harvard University, *Cognition, Brain, and Behavior*, October 2017  
Boston University, *Brain, Behavior, and Cognition*, October 2017  
Tufts University, *Cognitive and Brain Science*, October 2017  
Brown University, *Cognition seminar*, April 2017  
UC San Diego, *Temporal Dynamics of Learning Center*, March 2017  
University College London, *Affective Brain Lab*, October 2016  
Weill Cornell Medical College, *Sackler Institute*, April 2015

### **Invited symposium and workshop talks**

EdukCircle International Convention on Psychology, September 2022  
Neurobiology of Cognition Gordon Research Conference, July 2022  
From Neuroscience to Artificially Intelligent Systems, *Cold Spring Harbor Laboratory*, April 2022

Max Planck Institute for Human Cognitive and Brain Sciences, *Cognition Academy*, January 2021  
 OBHM, *Prospects in artificial intelligence neuroscience symposium*, June 2020  
 COSYNE, '*Memory, modularity, and attention: Efficient information dispatching in neural computations*' workshop, Breckenridge, CO, March 2020  
 Bridging Replay and Reactivation, Chicago, IL, October 2019  
 Memory Disorders Research Society, New York City, October 2019  
 The Royal Society, *Memory reactivation: replaying events past, present and future*, Newport Pagnell, UK, May 2019  
 COSYNE, '*Sleep: models and experiments on replay, consolidation, and off-line processing*' workshop, Cascais, Portugal, March 2019  
 Deep Learning and the Brain, Jerusalem, Israel, January 2019  
 Cognitive Computational Neuroscience, *What is systems consolidation for? Examining the potential utility of memory transformation for humans and artificial intelligence*, Philadelphia, PA, September 2018  
 Science of Understanding Workshop, Madison, Wisconsin, July 2018  
 Hungarian Academy of Sciences, *Hippocampal Network Across the Lifespan Symposium*, Budapest, Hungary, May 2018  
 Park City Winter Conference on the Neurobiology of Learning and Memory, *Representation of Contextual Spaces by Cortico-Hippocampal Networks*, Park City, Utah, January 2018  
 Haskins Laboratories, *McDonnell Foundation Workshop: The Future of Statistical Learning*, New Haven, Connecticut, November 2017  
 COSYNE, '*Perception and Learning of Temporal Structure in Sensory Streams*' workshop, February 2017  
 UC Riverside, *Riverside Enhanced Memory & Sleep meeting*, November 2016  
 COSYNE, '*What Can Sleep Tell Us About Memory Consolidation*' workshop, March 2015

## Teaching

2022 – Instructor for *Seminar in Sleep and Memory* (PSYC 429 / 3300), U Penn  
 2020 – Instructor for *Memory* (PSYC 159 / 1530), U Penn  
 2024 Co-instructor for *Special Topics in Neuroengineering* (BE 6100), U Penn  
 2019 Instructor for *Sleep and Memory* (PSYC 541), U Penn  
 2022 – Lecturer for *Introduction to Brain and Behavior* (NRSC 1110), U Penn  
 2019 – Lecturer for *Systems Neuroscience* (NGG 573), U Penn  
 2019 Lecturer for *Intro to Experimental Psychology* (PSYC 1), U Penn  
 2016 Co-instructor for *Conscious States: Waking, Sleeping, and Dreaming* (MBB 980A), Harvard College  
 2015 Princeton Teaching Transcript Program  
<https://www.princeton.edu/mcgraw/gs/transcript/>

- 2012 Teaching Assistant for *Introduction to Connectionist Models: Bridging Between Brain and Mind* (PSY/NEU 330), Princeton.
- 2007 Student Initiated Course on philosophy of mind, Stanford

### **Professional activities and service**

#### ***At the University of Pennsylvania:***

- 2023 – University of Pennsylvania School of Arts and Sciences Curriculum Committee
- 2019 – University of Pennsylvania Psychology Department Colloquium Committee (chair 2020-2021, 2024-2025)
- 2019 – Organizer of U Penn Memory Seminar
- 2021 Career panel discussion and mock interviews for MindCORE DivE In, which brings students from underrepresented backgrounds to campus to learn about graduate school.
- 2021 Faculty mentor for the Underrepresented Minority Application Support Program through the Neuroscience Graduate Group Action Against Bias initiative

Mentor committee for MindCORE Fellows:

Sami Yousif

Thesis committees for Department of Psychology PhD students:

Olivia Larson

Long Ni (chair)

Tima Zheng

Clara Raithel

Camilla Van Geen

Thesis committees for Neuroscience Graduate Group PhD students:

Ethan Blackwood (chair)

Jacob Parker (chair)

Kara McGaughey

Catrina Hacker

Simon Bohn

Daniel Schonhaut

Ilenna Jones

Thesis committees for School of Engineering and Applied Science PhD students:

Ari Benjamin

#### ***Elsewhere:***

External thesis committee member:

Jonathan Nichols, May 2023, Columbia University

Laura Convertino, June 2024, University College London

- 2022 – Section Editor, *Open Mind*

- 2020 – Member of Board of Reviewing Editors for *eLife*
- 2020 – Affiliate faculty of bioRxiv ([www.biorxiv.org/about-biorxiv](http://www.biorxiv.org/about-biorxiv))
- 2023 Organizer of invited symposium at the Cognitive Neuroscience Society meeting on *Learning and Generalization in Humans and Machines*
- 2022 Organizer of the *Memory Disorders Research Society* meeting in Philadelphia  
School of Arts and Sciences Conference Support Grant (\$5000)
- 2022, 2023 Chair of the COSYNE workshops
- 2021 Debate panelist for *Neuromatch* conference on *Learning vs. Computation*
- 2021 Organizer of the Cognitive Science Society affinity group for Neural Network Modeling
- 2020 Awards committee for Cognitive Science Society
- 2020 Talk session chair for International Sleep Reactivation Workshop
- 2020 Talk session chair for *Neuromatch* conference
- 2020 Deep learning Q&A session for *Neuromatch Academy*
- 2020 Panelist for Cognitive Computational Neuroscience workshop, *The use of linear models in cognitive neuroscience*
- 2018 Co-chair for Society for Neuroscience nanosymposium, *Animal Cognition and Behavior: Learning and Memory: Cortical-Hippocampal Interactions*
- 2016 Postdoctoral steering committee for Harvard's Mind Brain Behavior program
- 2013 Co-organizer of the first annual Manhattan Area Memory Meeting
- 2013 Graduate student committee for the neuroscience Ph.D. track at Princeton
- 2011 Organizing committee for Department of Psychology graduate student visiting day at Princeton
- 2010 Organizing committee for Department of Psychology graduate student orientation at Princeton
- 2007 – 2009 Advising Fellow for the Symbolic Systems Program at Stanford
- 2008 Talk session chair at the PsyPAG annual conference, University of Manchester
- 2006 – 2008 Focus Assistant and Resident Assistant for the Symbolic Systems theme house at Stanford

**Ad hoc reviewing for:**

*Cerebral Cortex; Cognition; Cognitive Neuropsychology; Cognitive Psychology; Cognitive Science; Cortex; Current Biology; Cognitive Neuropsychology; eLife; Experimental Brain Research; Frontiers in Psychology; Hippocampus; Human Brain Mapping; Journal of Cognitive Neuroscience; Journal of Experimental Psychology: General; Journal of Experimental Psychology: Learning, Memory, and Cognition; Journal of Neuroscience; Learning and Memory; Learning and Motivation; Memory and Cognition; Nature; Nature Communications; Nature Human Behaviour; NeurIPS, Neuropsychologia; Open Mind; PLOS Biology; PLOS Computational Biology; PLOS ONE; Proceedings of the National Academy of Sciences; Psychological Bulletin; Psychological Review; Psychological Science; Psychonomic Bulletin and Review; Royal Society Open Science; Scientific Reports; Sleep; Trends in Cognitive Science*

## **Mentoring**

### **Postdoctoral Fellows**

Ashley Smith (2023- )

Brynn Sherman (2022- )

National Science Foundation SBE Postdoctoral Research Fellowship  
Data-Driven Discovery Initiative Postdoctoral Fellow

Sarah Solomon (2019- )

Starting Assistant Professorship at Binghamton University, Fall 2024  
CAOs abstract award, 2023

Emily Cowan (2019- ; co-advisor: Vishnu Murty, Temple University)

Cybelle Smith (2019-2024; primary advisor: Sharon Thompson-Schill)

NIH Ruth L. Kirschstein National Research Service Award, Individual Postdoctoral  
Fellowship (NRSA F32)

Alexa Tompary (2021-2023; primary advisor: Sharon Thompson-Schill)

Assistant Professor, Drexel University

NIH K99 grant

Elizabeth McDevitt (2021- ; primary advisor: Kenneth Norman, Princeton University)

NIH K99 grant

### **Graduate Students**

Alex Gordienko (2023 - )

Marlie Tandoc (2019- )

Natural Sciences and Engineering Research Council of Canada Fellow

Zhenglong Zhou (2019- )

National Science Foundation Graduate Research Fellow

Elizabeth Siefert (2021- )

National Science Foundation Graduate Research Fellow

Trainee Professional Development Award from the Society for Neuroscience

Dhairyya Singh (2021- )

Trainee Professional Development Award from the Society for Neuroscience

### **Research Assistants**

Claudia Gonciulea (2023- )

Siri Krishnamurthy (2022- )

Elizabeth Siefert (2019-2021)

Dhairyya Singh (2019-2021)

### **Undergraduates:**

Luna Sato (U Penn '25)

Greenberg Undergraduate Research Fellowship Award

Tereza Okálová (U Penn '26)

Anna Rose Hunt-Isaak (McGill '26)

Andrew Wong (U Penn '27)

MindCORE Science Communication Contest winner

Jeahyuk Lim (U Penn '24)  
 Greenberg Undergraduate Research Fellowship Award  
 Sindhuja Uppuluri (U Penn '24)  
 Jade Nguyen (U Penn '24)  
 Geshi Yeung (U Penn '23)  
 Kayla Caldwell (U Penn '23)  
 Anyara Rodriguez (U Penn '22)  
 Research Fellow, LMU Munich  
 Jianing Mu (Haverford '22)  
 PhD student, University of Texas Austin  
 Jeffrey Alexander (Lafayette College '23)  
 Summer Undergraduate Internship Program  
 Cody Dong (U Penn '22)  
 PhD student, Princeton University  
 Greenberg Undergraduate Research Fellowship Award  
 Ruth Marcus Kanter College Alumni Society Undergraduate Research Grant  
 U Penn School of Arts and Sciences Undergraduate Travel Award  
 Jayme Banks (U Penn '21)  
 Ruth Marcus Kanter College Alumni Society Undergraduate Research Grant  
 Tiffany Paul (U Penn '21)  
 Adam Kirsh (U Penn '20)  
 Olivia Manickas-Hill (Harvard '18)  
 Daniel Toker (Princeton '13)  
 Kaitlin Henderson (Princeton '12)  
 Aaron Trippe (Princeton '12)  
 Omoshalewa Bamkole (Princeton '11)  
 Lauren Kustner (Princeton '11)

## Research training

2009 – 2015 Graduate Student  
 Computational Memory Lab, Princeton University, P.I. Ken Norman  
 Botvinick Lab, Princeton University, P.I. Matt Botvinick  
 Turk-Browne Lab, Princeton University, P.I. Nick Turk-Browne  
 2006 – 2009 Research Assistant  
 PDP Lab, Stanford University, P.I. Jay McClelland  
 2008 Summer Research Assistant  
 Neuroscience and Aphasia Research Unit, University of Manchester,  
 P.I. Matthew Lambon Ralph  
 2006 Summer Research Assistant  
 Computational Cognitive Science Group, MIT, P.I. Josh Tenenbaum  
 TedLab, MIT, P.I. Ted Gibson

## Conference talks

Singh, D.\*, Dong, C.\*, Tandoc, M. & **Schapiro, A.C.** (2024, April). Statistical learning drives predictive shifts in object memory. *Talk delivered at the annual conference of the Cognitive Neuroscience Society, Toronto, Canada.*

Siefert, E.M., Uppuluri, S., Mu, J., Tandoc, M.C., Antony, J.W., **Schapiro, A.C.** (2023, November). Memory reactivation during sleep does not act holistically on object memory. *Talk delivered at the Society for Neuroscience Annual Meeting, Washington, DC.*

**Schapiro, A.C.** (2023, September). Recent statistics shift object representations in parahippocampal cortex. *Talk delivered at the Memory Disorders Research Society meeting.*

**Schapiro, A.C.** (2023, April). Learning representations of specifics and generalities over time. *Talk delivered at Learning and Memory meeting, Huntington Beach.*

**Schapiro, A.C.** (2023, March). Learning representations of specifics and generalities over time. *Young Investigator Award talk delivered at the Cognitive Neuroscience Society meeting.*

Tandoc, M.C., Dong, C.V., **Schapiro, A.C.** (2022, November). Memory distortions reveal different representations for specific and general knowledge. *Talk delivered at the Society for Neuroscience annual meeting, San Diego.*

Singh, D., Norman, K.A., & **Schapiro, A.C.** (2022, May). A model of autonomous interactions between hippocampus and neocortex driving sleep-dependent memory consolidation. *Data blitz delivered at the Context and Episodic Memory Symposium, Philadelphia, PA.*

**Schapiro, A.C.** (2021, October). Distributed representations for human inference. *Talk delivered at the Memory Disorders Research Society meeting.*

**Schapiro, A.C.** (2020, August). Interleaving facilitates the rapid formation of distributed representations. *Talk delivered at the Context and Episodic Memory Symposium.*

**Schapiro, A.C.** (2018, November). Enhancement and forgetting of semantic memories across offline periods. *Talk delivered at the Society for Neuroscience Meeting minisymposium, San Diego.*

**Schapiro, A.C.** (2018, April). Enhancement and prioritization of structured information over sleep and wake. *Talk delivered at the International Conference on Learning and Memory.*

**Schapiro, A.C.,** Turk-Browne, N.B., Botvinick, M.M., & Norman, K.A. (2017, June). Complementary learning systems within the hippocampus: reconciling episodic memory with statistical learning. *Talk delivered at the BCBL Conference on Interdisciplinary Advances in Statistical Learning, Bilbao, Spain.*

**Schapiro, A.C.,** McDevitt, E.A., Mednick, S.C., Rogers, T.T., Norman, K.A. (2017, May). Enhancement and prioritization of structured information over sleep and wake. *Talk delivered at the Context and Episodic Memory Symposium, Philadelphia.*

**Schapiro, A.C.** (2017, September). Learning and consolidation of structured information. *Talk delivered at the Memory Disorders Research Society meeting, Chicago.*

**Schapiro, A.C.**, Turk-Browne, N.B., Botvinick, M.M., & Norman, K.A. (2016, August). Complementary learning systems within the hippocampus. *Talk delivered at the 15<sup>th</sup> Neural Computation and Psychology Workshop, Philadelphia.*

**Schapiro, A.C.**, Rogers, T.T., McDevitt, E.A., Mednick, S.C., & Norman, K.A. (2015, May). Human hippocampal replay prioritizes weakly-learned information and predicts memory performance. *Data blitz delivered at the Manhattan Area Memory Meeting, Princeton.*

Schlichting, M.L., Guarino, K.F., **Schapiro, A.C.**, Turk-Browne, N.B., & Preston, A.R. (2015, April). Structural development of hippocampal subfields is related to statistical learning and inference. *Talk delivered at the Austin Conference on Learning and Memory biannual meeting, Austin.*

**Schapiro, A.C.**, Norman, K.A., Turk-Browne, N.B., & Botvinick, M.M. (2014, November). Rapid learning of complex temporal regularities in the hippocampus: Evidence from fMRI and a neural network model. *Talk delivered at the Society for Neuroscience Meeting, Washington, D.C.*

**Schapiro, A.C.**, Norman, K.A., Turk-Browne, N.B., & Botvinick, M.M. (2014, June). Rapid learning of complex events in the hippocampus: Evidence from fMRI and neural network modeling. *Talk delivered at the Manhattan Area Memory Meeting, New York City.*

**Schapiro, A.C.**, Gregory, E., Landau, B., McCloskey, M., Turk-Browne, N.B. (2013, May). The necessity of the medial temporal lobe for statistical learning. *Data blitz delivered at the Context and Episodic Memory Symposium, Philadelphia.*

**Schapiro, A.C.**, Rogers, T.T, Cordova, N.I., Turk-Browne, N.B., & Botvinick, M.M. (2012, July). Neural representations of events arise from temporal 'community' structure. *Talk delivered at the Neural Computation and Psychology Workshop, San Sebastian, Spain.*

Botvinick, M.M, **Schapiro, A.C.**, Cordova, N.I., Turk-Browne, N.B., & Rogers, T.T. (2012, April). Events as categories. *Talk delivered at the Cognitive Neuroscience Society Meeting, Chicago.*

**Schapiro, A.C.**, Kustner, L.V., & Turk-Browne, N.B. (2011, November). Multi-voxel object representations in the human medial temporal lobe are shaped by incidental learning of temporal regularities. *Talk delivered at the Society for Neuroscience meeting, Washington, D.C.*

**Schapiro, A.C.**, McClelland, J.L., Welbourne, S.R., Rogers, T.T., & Lambon Ralph, M.A. (2009, November). A computational account of the differences between unilateral and bilateral damage. *Talk delivered and poster presented at the Computational Cognitive Neuroscience Conference, Boston.*

## Recent conference posters

Tandoc, M.C., Solomon, S.H., Parker, J.A., Gordienko, A., **Schapiro, A.C.** (2024, April). The representation and retrieval of general versus specific category knowledge. *Poster presented at the Cognitive Neuroscience Society annual meeting, Toronto, Canada.*

Sherman B.E., Siefert E.M., and **Schapiro, A.C.** (2023, July). Measuring the rapid acquisition and integration of structured knowledge. *Poster presented at the Cognitive Science Society Meeting, Sydney, NSW.*

- Siefert, E.M., Mu, J., Tandoc, M.C., Uppuluri, S., Antony, J.W., **Schapiro, A.C.** (2023, April). Reactivation order during sleep differentially impacts structured and idiosyncratic knowledge. *Poster presented at the International Conference on Learning and Memory, Huntington Beach, CA.*
- Sherman B.E., Siefert E.M., Gonciulea C., and **Schapiro, A.C.** (2023, November). Integrating new and old memories during sleep: Testing the effects of interleaved memory reactivation. *Poster presented at the Society for Neuroscience Meeting, Washington, D.C.*
- Siefert, E.M., Mu, J., Tandoc, M.C., Uppuluri, S., Antony, J.W., **Schapiro, A.C.** (2022, November). Effects of the order of reactivation during sleep on memory and generalization. *Poster presented at the Society for Neuroscience Annual Meeting, San Diego, CA.*  
*SfN Trainee Professional Development Award to E.M.S.*
- Siefert, E.M., Mu, J., Uppuluri, S., Antony, J.W., **Schapiro, A.C.** (2022, May). Effects of Interleaved versus blocked memory reactivation during sleep. *Poster presented at the Context and Episodic Memory Symposium, Philadelphia, PA.*
- Singh, D.\*, Dong, C.\*, Tandoc., M. & **Schapiro, A.C.** (2022, November). Predictive shifts in object representations with statistical learning. *Poster presented at the annual conference of the Society for Neuroscience, San Diego, CA.*
- Dong, C.\*, Singh, D.\*, Tandoc., M. & **Schapiro, A.C.** (2022, May). Predictive shifts in object representations with statistical learning. *Poster presented at the Context and Episodic Memory Symposium, Philadelphia, PA.*
- Singh, D., Norman, K.A., & **Schapiro, A.C.** (2021, November). A neural network model of sleep-dependent consolidation via autonomous hippocampal-cortical replay. *Poster presented at the annual conference of the Society for Neuroscience, Online.*
- Tandoc, M.C., Dong, C.V., **Schapiro, A.C.** (2021, November). Insights into category learning through feature-level memory distortion. *Poster presented at the Society for Neuroscience annual meeting, Online.*
- Solomon, S.H., & **Schapiro, A.C.** (2020, May). Learning the internal structure of novel categories. *Poster presented at the Cognitive Neuroscience Society meeting.*
- Zhou, Z., Tandoc, M., Singh, D., & **Schapiro, A.C.** (2020, May). Behavioral evidence that the rapid formation of distributed representations benefits inference. *Poster presented at the Cognitive Neuroscience Society meeting.*
- Smith, C., Thompson-Schill, S., & **Schapiro, A.C.** (2020, May). Hierarchical statistical learning: Behavioral, neuroimaging, and neural network modeling investigations. *Data blitz and poster presented at the Cognitive Neuroscience Society meeting.*
- Sucevic, J. & **Schapiro, A.C.** (2019, October). A hippocampal subfield model of category learning. *Poster presented at the Society for Neuroscience Meeting, Chicago.*