

Anna C. Schapiro

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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. 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.

- 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.

Peer-Reviewed Articles

- Smith, C.M., Thompson-Schill, S.L., & **Schapiro, A.C.** (in press). Rapid learning of temporal dependencies at multiple timescales. *Journal of Cognitive Neuroscience*.
- Siefert, E.M., Uppuluri, S., Mu, J., Tandoc, M.C., Antony, J.W., & **Schapiro, A.C.** (2024). Memory reactivation during sleep does not act holistically on object memory. *Journal of Neuroscience*. 44(24), e0022242024.
Featured article by J Neurosci for "This Week in The Journal"
- Solomon, S.H. & **Schapiro, A.C.** (2024). Structure shapes the representation of a novel category. *Journal of Experimental Psychology: Learning, Memory, and Cognition*. 50(3), 458-483.
APA Editor's Choice article
- 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*. 44(14), e1839232024.
- Sucevic, J. & **Schapiro, A.C.** (2023). A neural network model of hippocampal contributions to category learning. *eLife*, 12, e77185.
- Zhou, Z., Singh, D., Tandoc, M.C., **Schapiro, A.C.** (2023). Building integrated representations through interleaved learning. *Journal of Experimental Psychology: General*. 152(9), 2666–2684.
- 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.
- Zhou, Z., Yeung, G., & **Schapiro, A.C.** (2023). Self-recovery of memory via generative replay. *NeurIPS Workshop MemARI*. arXiv:2301.06030.
- 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.
- Plate, R. C., **Schapiro, A.C.**, & Waller, R. (2022). Emotional faces facilitate statistical learning. *Affective Science*. 3(3), 662-672.
- 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.
- Zeng, T., Tompary, 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.
- 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.
- 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 42nd 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 42nd 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 CO₂ 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)
+ Diversity Supplement: 3R01MH129436-02S1, 2024-2025, (\$74,346 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

- University College London, *Gatsby Computational Neuroscience Unit Seminar*, July 2024
- 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 - Interdisciplinary Intelligence Initiative* (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 – Chair Advisory Committee, U Penn Psychology Department
- 2023 – U Penn School of Arts and Sciences Curriculum Committee
- 2019 – U Penn 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

Ilena 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)
- 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)

Starting Assistant Professorship at Adelphi University, Fall 2024

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

Olivia Larson (2023- ; primary advisor: Phil Gehrman)

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

Paige Sevchik (2024-)
Claudia Gonciulea (2023-)
Siri Krishnamurthy (2022-)
Elizabeth Siefert (2019-2021)
Dhairyya Singh (2019-2021)

Undergraduates:

Qiyao Wang (Occidental College '25)
Grace Tan (U Penn '26)
Luna Sato (U Penn '25)
 Greenberg Undergraduate Research Fellowship Award
Joy Gong (U Penn '25)
Tereza Okálová (U Penn '26)
Anna Rose Hunt-Isaak (McGill '26)
Andrew Wong (U Penn '27)
 MindCORE Science Communication Contest winner
 Penn UScholars Summer Funding Award
Jeahyuk Lim (U Penn '24)
 Greenberg Undergraduate Research Fellowship Award
Sindhujá Uppuluri (U Penn '24)
Jade Nguyen (U Penn '24)
Geshi Yeung (U Penn '23)
 Research Assistant in the Stanford Social Neuroscience Laboratory
Kayla Caldwell (U Penn '23)
Anyara Rodriguez (U Penn '22)
 Research Fellow, LMU Munich
Jianing Mu (Haverford '22)
 PhD student, University of Texas Austin
Jefrey 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 meeting of the Cognitive Neuroscience Society, Toronto, Canada.*

Solomon, S.H., Kay, K., & **Schapiro, A.C.** (2024, April). Recent statistics shift object representations in parahippocampal cortex. *Data blitz delivered at the annual meeting 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 annual meeting of the Society for Neuroscience, Washington, DC.*

Zhou, Z., Kahana, M.J., & **Schapiro, A.C.** (2023, November). Replay as context-driven memory reactivation. *Talk delivered at the annual meeting of the Society for Neuroscience, Washington, DC.*

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

Solomon, S.H., Kay, K., & **Schapiro, A.C.** (2023, May). Context-dependent object representations in parahippocampal cortex. *Talk delivered at the annual meeting of the Concepts, Actions, and Objects (CAOS) Workshop, Rovereto, Italy.*

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

- Schapiro, A.C.** (2023, March). Learning representations of specifics and generalities over time. *Young Investigator Award talk delivered at the annual meeting of the Cognitive Neuroscience Society, San Francisco.*
- 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 annual meeting of the Society for Neuroscience, 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 annual Context and Episodic Memory Symposium, Philadelphia.*
- Solomon, S.H. & **Schapiro, A.C.** (2022, March). The what, why, and how of concept structure learning. *Talk delivered at the annual meeting of the Computational and Systems Neuroscience (COSYNE) Conference, Lisbon, Portugal.*
- Solomon, S.H. & **Schapiro, A.C.** (2022, March). Dynamic geometries of semantic representations. *Talk delivered at the annual meeting of the Computational and Systems Neuroscience (COSYNE) Conference, Lisbon, Portugal.*
- Schapiro, A.C.** (2021, October). Distributed representations for human inference. *Talk delivered at the annual meeting of the Memory Disorders Research Society, Virtual.*
- Solomon, S.H. & **Schapiro, A.C.** (2021, August). Humans and models leverage statistics across episodes to build structured category representations. *Talk delivered at the annual Context and Episodic Memory Symposium, Philadelphia.*
- Schapiro, A.C.** (2020, August). Interleaving facilitates the rapid formation of distributed representations. *Talk delivered at the annual Context and Episodic Memory Symposium, Virtual.*
- Zhou, Z., Tandoc, M.C., Singh, D., & **Schapiro, A.C.** (2020, May). Human inference using distributed representations. *Talk delivered at the Neuromatch Conference, Virtual.*
- Schapiro, A.C.** (2018, November). Enhancement and forgetting of semantic memories across offline periods. *Talk delivered at the annual meeting of the Society for Neuroscience 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, Huntington Beach.*
- 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 annual Context and Episodic Memory Symposium, Philadelphia.*

Schapiro, A.C. (2017, September). Learning and consolidation of structured information. *Talk delivered at the annual meeting of the Memory Disorders Research Society, 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 15th 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 biannual meeting of the Austin Conference on Learning and Memory, 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 annual meeting of the Society for Neuroscience, 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 annual 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 annual meeting of the Cognitive Neuroscience Society, 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 annual meeting of the Society for Neuroscience, 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 annual conference on Computational Cognitive Neuroscience, 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 annual meeting of the Cognitive Neuroscience Society, Toronto, Canada.*
- Solomon, S.H., Kay, K., & **Schapiro, A.C.** (2024, April). Recent statistics shift object representations in parahippocampal cortex. *Poster presented at the annual meeting of the Cognitive Neuroscience Society, Toronto, Canada.*
- Sherman B.E., Siefert E.M., & **Schapiro, A.C.** (2023, July). Measuring the rapid acquisition and integration of structured knowledge. *Poster presented at the annual meeting of the Cognitive Science Society, Sydney, Australia.*
- 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.*
- Sherman B.E., Siefert E.M., Gonciulea C., & **Schapiro, A.C.** (2023, November). Integrating new and old memories during sleep: Testing the effects of interleaved memory reactivation. *Poster presented at the annual meeting of the Society for Neuroscience, Washington, D.C.*
- Zhou, Z., Yeung, G., & **Schapiro, A.C.** (2022, December). Self-recovery of memory via generative replay. *Poster presented at the Memory in Artificial and Real Intelligence Workshop at NeurIPS, New Orleans.*
- 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 annual meeting of the Society for Neuroscience, San Diego.*
SfN Trainee Professional Development Award to E.M.S.
- Singh, D.*, Dong, C.*, Tandoc., M. & **Schapiro, A.C.** (2022, November). Predictive shifts in object representations with statistical learning. *Poster presented at the annual meeting of the Society for Neuroscience, San Diego.*
- Solomon, S.H. & **Schapiro, A.C.** (2022, November). Predicting semantic representations over time in the medial temporal lobe. *Poster presented at the annual meeting of the Society for Neuroscience, San Diego.*
- Zhou, Z., Kahana, M.J., & **Schapiro, A.C.** (2022, August). Neural replay as context-driven memory reactivation. *Poster presented at the annual conference on Cognitive Computational Neuroscience, San Francisco.*
- 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 annual Context and Episodic Memory Symposium, Philadelphia.*
- Dong, C.*, Singh, D.*, Tandoc., M. & **Schapiro, A.C.** (2022, May). Predictive shifts in object representations with statistical learning. *Poster presented at the annual Context and Episodic Memory Symposium, Philadelphia.*

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 meeting of the Society for Neuroscience, Virtual.*

SfN Trainee Professional Development Award to D.S.

Tandoc, M.C., Dong, C.V., **Schapiro, A.C.** (2021, November). Insights into category learning through feature-level memory distortion. *Poster presented at the annual meeting of the Society for Neuroscience, Virtual.*

Zhou, Z., Kahana, M.J., & **Schapiro, A.C.** (2021, July). Hippocampal replay as context-driven memory reactivation. *Poster presented at the annual meeting of the Cognitive Science Society, Virtual.*

Solomon, S.H. & **Schapiro, A.C.** (2020, August). Learning the internal structure of novel categories. *Poster presented at the annual Context and Episodic Memory Symposium, Virtual.*

Solomon, S.H. & **Schapiro, A.C.** (2020, July). Learning the internal structure of novel categories. *Poster presented at the annual meeting of the Cognitive Science Society, Virtual.*

Zhou, Z., Tandoc, M.C., Singh, D., & **Schapiro, A.C.** (2020, July). Interleaving facilitates the rapid formation of distributed representations. *Poster presented at the annual meeting of the Cognitive Science Society, Virtual.*

Zhou, Z., Tandoc, M.C., Singh, D., & **Schapiro, A.C.** (2020, May). Behavioral evidence that the rapid formation of distributed representations benefits inference. *Poster presented at the annual meeting of the Cognitive Neuroscience Society, Virtual.*

Solomon, S.H. & **Schapiro, A.C.** (2020, May). Learning the internal structure of novel categories. *Poster presented at the annual meeting of the Cognitive Neuroscience Society, Virtual.*

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 annual meeting of the Cognitive Neuroscience Society, Virtual.*

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 annual meeting of the Cognitive Neuroscience Society, Virtual.*

Sucevic, J. & **Schapiro, A.C.** (2019, October). A hippocampal subfield model of category learning. *Poster presented at the annual meeting of the Society for Neuroscience, Chicago.*