# HANNAH S. WIRTSHAFTER, Ph.D.

## Curriculum vitae

Northwestern University
Department of Neuroscience
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847-987-2665

## EDUCATION & TRAINING

**2012–2019** **Ph.D. in Biology**
**Massachusetts Institute of Technology,** Cambridge, MA
Department of Biology
Picower Institute for Learning and Memory
Adviser: Dr. Matt Wilson
*Dissertation title:* Neural correlates of locomotion, cues, and context in the interactions between hippocampus and lateral septum.

**2014** **Center for Brains, Minds, and Machines** Summer Course
**Teaching Assistant,** Marine Biological Laboratory, Woods Hole, MA

**2008–2012** **B.S. in Biological Sciences**
**Carnegie Mellon University,** Pittsburgh, PA
Minor in Biomedical Engineering
Graduated with high honors

## PROFESSIONAL APPOINTMENTS

**2019–** **Post-Doctoral Scholar**
**Northwestern University**, Chicago, IL
Department of Neuroscience
Supervisor: Dr. John Disterhoft

**2019–2021** **NRSA** Post-doctoral fellow
Supervisor: Dr. John Disterhoft

**2023–present** **BRAIN Initiative K99/R00** Post-Doctoral Scholar
Co-mentors: Dr. John Disterhoft, Dr. Sara Solla, Dr. Daniel Dombeck

## PUBLICATIONS

### Under review

**2024** ***Wirtshafter, H. S.,** Solla S. A., Disterhoft, J.F. (2024). "A universal hippocampal memory code across animals and environments." bioRxiv: 2024.2010.2024.620127.
**corresponding author*

### Peer-reviewed

**2023** ***Wirtshafter, H. S.** & Disterhoft, J. F. Hippocampal place cells are nonrandomly clustered by field location. *Hippocampus.* 33(2):65-84, (2023).
**corresponding author*

**2022** ***Wirtshafter, H. S.** & Wilson, M. A. Artificial intelligence insights into hippocampal processing**.** *Frontiers in Computational Neuroscience***.** 07. (2022).
**corresponding author*

**2022** ***Wirtshafter, H. S.** & Disterhoft, J. F. "*In Vivo* Multi-Day Calcium Imaging of CA1 Hippocampus in Freely Moving Rats Reveals a High Preponderance of Place Cells with Consistent Place Fields." *Journal of Neuroscience*: 42(22):4538-4554, (2022).
**corresponding author*
*selected as Journal of Neuroscience Featured Research*

**2021** ***Wirtshafter, H. S.** & Wilson, M. A. "Lateral Septum as a Nexus for Mood, Motivation, and Movement." *Neuroscience & Biobehavioral Reviews*: Volume 126, 544-559, (2021).
**corresponding author*

**2021** ***Wirtshafter, H. S.** & Wilson, M. A. Bayesian Algorithmic Decoding of Acceleration and Speed Software (BADASS). *Software Impacts:* Volume 10. (2021).
**corresponding author*

**2021** ***Wirtshafter, H. S.**, Quan, M., & Wilson, M. A. "Dissociating Behavior and Spatial Working Memory Demands Using an H Maze." *Bio-protocol* 11(5): e3947, (2021).
**corresponding author*
*selected for cover image*

**2020** ***Wirtshafter, H. S.** & Wilson, M. A. "Differences in reward biased spatial representations in the lateral septum and hippocampus." *Elife.* 9. E55252, (2020).
**corresponding author*

**2019** ***Wirtshafter, H. S.** & Wilson, M. A. "Locomotor and Hippocampal Processing Converge in the Lateral Septum." *Current biology: CB* 29, 3177-3192 e3173, (2019).
**corresponding author*

**2015** Pope, W. H., […] **Phage Hunters Integrating Research and Education** […], et al. "Whole genome comparison of a large collection of mycobacteriophages reveals a continuum of phage genetic diversity." Elife. 4, e06416 (2015). (**member of the Phage Hunters team**)

**2011** Pope, W. H., […] **Wirtshafter, H. S.** […], et al. "Expanding the Diversity of Mycobacteriophages: Insights into Genome Architecture and Evolution." PLoS One. 6 (1), e16329 (2011).

## Open Source Software and Tool Development

**2021** **Wirtshafter, H.S.** & Wilson, M.A. Bayesian Algorithmic Decoding of Acceleration and Speed Software (BADASS) v1.0
https://codeocean.com/capsule/5522897/tree/v1 (2021)

**2020** **Wirtshafter, H.S.** Electrophysiology Analysis Library. hsw28/data_analysis: HSW Analysis code v1.0 Zenedo. http://doi.org/10.5281/zenodo.3597777 (2020).

**2020** Hale, G. & **Wirtshafter, H. S.** ARTE (Almost Real Time Electrophysiology) Hardware. hsw28/arte-hardware: Arte Hardware. Zenodo. http://doi.org/10.5281/zenodo.3596963 (2020).

**2019** Hale, G. & **Wirtshafter, H. S.** ARTE (Almost Real Time Electrophysiology) Backend Software. wilsonlab/arte-backend v1.0 Zenodo. http://doi.org/10.5281/zenodo.3262886 (2019).

## Other Contributions

**2020** **Wirtshafter, H. S.** & Wilson, M. A. Tetrode recordings of hippocampus CA1 and dorsal lateral septum in rat. CRCNS.org. http://dx.doi.org/10.6080/K0NG4NV8 (2020).

**2011** **Wirtshafter, H. S**. "Triplodon corrugatus Lamarck, 1819." Encyclopedia of Life. National Museum of Natural History, Smithsonian. (2011).

**2010** **Wirtshafter, H. S**. "Mycobacterium Phage Island 3 Complete Genome." GenBank. Aug. 18 (2010).

## HONORS & AWARDS

**2023** BRAIN INITIATIVE K99/R00
**2023** Grass Foundation Achievement Award
**2022** Selected as *Journal of Neuroscience* Featured Research
**2022** Grass Foundation Achievement Award
**2021** Selected for *bio-protocol* cover image, March 2021
**2019** Society for Neuroscience 'Hot Topic'
**2017** AAAS/*Science* Program for Excellence in Science
**2012** Phi Beta Kappa Honor Society
**2012** Phi Kappa Phi Honor Society
**2012** Graduated with College and University Honors
**2006** National Merit Scholarship

## GRANTS, FELLOWSHIPS, & FUNDING

**2024** Office of Postdoctoral Affairs Conference Travel Grant
**2023-2028** BRAIN INITIATIVE K99/R00
**2023** Grass Foundation Achievement Award
**2022** Grass Foundation Achievement Award
**2019-2021** NRSA Training Grant
**2014-2017** National Defense Science & Engineering Graduate Fellowship (NDSEG), *Three-year full graduate fellowship*
**2012** Howard Hughes Medical Institute (HHMI) Undergraduate Research Award
**2011** Howard Hughes Medical Institute (HHMI) Undergraduate Research Award

**2011** NSF Research Experience for Undergraduates (REU) Recipient
**2010** NSF Research Experience for Undergraduates (REU) Recipient
**2008-2012** Judith Resnik-Challenger Merit Scholarship
*Four year half tuition merit scholarship for women in STEM*

## INVITED TALKS

**2025** Mount Sinai Neuroscience Seminars, Friedman Brain Institute at Mount Sinai, New York, New York *(upcoming)*
**2024** Center for Neurocognitive Outcomes Improvement Research, University of Chicago, Chicago, IL
**2023** Open Data in Neurophysiology Symposium (ODIN), MIT, Cambridge, MA
**2023** Midway Meeting of the Memory Minds, University of Chicago, Chicago, IL
**2023** SiNaPS: Seminars in Neuroscience, UT Southwestern, Dallas, TX
**2023** Neural Dynamics Forum**,** University of Bristol, Bristol, UK
**2022** Early Career Research in Neuroscience Seminar Series, Syracuse University, Syracuse, NY
**2020** Neuroscience Group Meeting, University of New South Wales Sydney, Sydney, AU
**2020** Applied Math Class, Tufts University**,** Medford, MA *(canceled because of Covid-19)*
**2018** Systems Neuroscience Group Meeting, University of Chicago, Chicago, IL
**2018** Behavioral Neuroscience Group Meeting, Northwestern University, Chicago, IL
**2018** Molecular & Cellular Neuroscience Student Symposium, MIT, Cambridge, MA
**2017** Plastic Lunch Neuroscience Meeting, MIT, Cambridge, MA

## POSTER PRESENTATIONS

**2024** **Wirtshafter, H.S.,** Solla, S.A., Disterhoft, J.F. “A universal hippocampal memory code across animals and environments.” Poster, Interdisciplinary Navigation Symposium (iNav), Merano, Italy (2024).

**2024** **Wirtshafter, H.S.,** Solla, S.A., Disterhoft, J.F. “Decoding Stable Hippocampal Tasks in Contextual Learning via Dimensionality Reduction”. Poster, Computational and Systems Neuroscience (COSYNE) Meeting, Lisbon, Portugal (2024).

**2023** **Wirtshafter, H.S.** & Disterhoft, J.F. “Place Cells are Clustered by Field Location in CA1 Hippocampus.” Poster, Computational and Systems Neuroscience (COSYNE) Meeting, Montreal, Canada (2023).

**2022** **Wirtshafter, H.S.** & Disterhoft, J.F. “Imaging of calcium transients in rat reveals place cells clustered by field location.” Poster, Society for Neuroscience Annual Meeting, San Diego, CA (2022).

**2022** **Wirtshafter, H.S.** & Disterhoft, J.F. “Imaging of calcium transients in rat hippocampus reveals stable place cells clustered by field location.” Poster,

International Behavioral Neuroscience Society Annual Meeting, Glasgow, Scotland (2022).

**2022** **Wirtshafter, H.S.** & Disterhoft, J.F. “Imaging of calcium transients in rat hippocampus reveals stable place cells clustered by field location.” Poster, Cold Spring Harbor Laboratory, Neuronal Circuits Meeting Cold Spring Harbor, NY (2022).

**2022** **Wirtshafter, H.S.** & Disterhoft, J.F. “Imaging of calcium transients in rat hippocampus reveals stable place cells clustered by field location.” Poster, Chicago Society for Neuroscience Annual Meeting. Chicago, IL. (2022).

**2021** **Wirtshafter, H.S.** & Disterhoft, J.F. “*In vivo* multi-day calcium imaging of hippocampus in freely moving rats.” Poster, Society for Neuroscience Annual Meeting (2021).

**2021** Song E., Alpers A., Warner, K. Schatza M., **Wirtshafter H.S.**, Weiss C., Disterhoft J., Voss J., Widge A. “Effects of closed-loop phase-locked stimulation on cortico-hippocampal connectivity in rats.” Poster, Society for Neuroscience Annual Meeting (2021).

**2020** **Wirtshafter, H.S.** & Wilson M.A. “Differences in reward biased spatial representations in the lateral septum and hippocampus.” Poster, Society for Neuroscience Annual Meeting (2020).

**2019** **Wirtshafter, H.S.** & Wilson M.A. “Neural correlates of locomotion, cues, and context in the interactions between hippocampus and lateral septum.” Poster, Society for Neuroscience Annual Meeting. Chicago, IL. (2019).
***Selected as SfN ‘Hot Topic’***

**2015** **Wirtshafter, H. S.** & Wirtshafter, D. “Conditioning and sensitization of dopamine antagonist effects on open field activity.” Poster, Society for Neuroscience Annual Meeting. Chicago, IL. (2015).

**2012** **Wirtshafter, H. S.** "Cortical Response to Cold and Menthol Stimulation in Mouse." Carnegie Mellon University. Pittsburgh, PA. (2012).

**2011** **Wirtshafter, H. S.** “Flexing our Mussels: Comparative Bivalve Gill Morphology.” The Field Museum of Natural History. Chicago, IL. (2011).

**2010** **Wirtshafter, H. S.** “Effect of Fabricated Microscale Features on Human Mesenchymal Stem Cell Behavior.” University of IL at Chicago. Chicago, IL (2010).

## TEACHING EXPERIENCE

**2017** **Disorders & Diseases of the Nervous System, Teaching Assistant,** MIT. Faculty Instructor: Dr. Mriganka Sur

**2016** **Graduate Molecular & Cellular Neuroscience I, Teaching Assistant,** MIT. Faculty Instructor: Dr. Troy Littleton

**2014** **Center for Brains, Minds, and Machines Summer Course, Teaching Assistant,** Marine Biological Laboratory, Woods Hole, MA
**2014** **"Deep Dive into Biology" Virtual Course Instructor,** MIT
**2013** **Introductory Biology Teaching Assistant,** MIT
Faculty Instructors: Dr. David Page, Dr. Angelika Amon, Dr. Barbara Imperiali
**2011** **Genetics Teaching Assistant,** Carnegie Mellon University.
Faculty Instructors: Dr. Aaron Mitchell, Dr. Javier Lopez

## ACADEMIC MENTORING

**2024–** Gabi Camacho, Northwestern Neuroscience Undergraduate Student
**2024** Megan Wong, Northwestern Neuroscience Undergraduate Student
**2022–2024** Mackenzie Kneisly, Northwestern Biological Sciences Undergraduate Student
**2020–2022** Kent Park, Northwestern Biological Sciences Undergraduate Student
**2017–2019** Molly Quan, Wellesley Neuroscience Undergraduate Student
**2017** Nathan Huffman, MIT Mechanical Engineering Undergraduate Student
**2016** Yoon Ji Lee, Wellesley Neuroscience Undergraduate Student
**2015–2017** Israel Ridgley, MIT Electrical Engineering Undergraduate Student

## ADDITIONAL RESEARCH EXPERIENCE

**2009–2012** **Howard Hughes Medical Institute (HHMI) Biology Research Assistant,** Dr. Alison Barth, Carnegie Mellon University, Pittsburgh, PA
*(Supported by Howard Hughes Medical Institute research award)*
**2011** **Research Experience for Undergraduates (REU) Zoology Research Assistant,** Dr. Rüdiger Bieler, The Field Museum of Natural History, Chicago, IL
**2009–2010** **Research Experience for Undergraduates (REU) Biomedical Engineering Research Assistant,** Dr. Michael Cho, University of IL at Chicago, Chicago, IL
**2008–2009** **Howard Hughes Medical Institute (HHMI) Phage Genomics Research Program,** Carnegie Mellon University, Pittsburgh, PA
**2005–2006** **Mesoscopic Physics Internship,** Northwestern University, Evanston, IL
**2005** **Neuroscience/Biology Research Assistant,** University of IL at Chicago, Chicago, IL

## COMMUNITY VOLUNTEER SERVICE

**2023** **COSYNE Conference Abstract Mentor**
**2014-2019** **High School Science Outreach Program**, MIT, Cambridge, MA
**2014** **LGBTQ Panel for Prospective Students,** MIT, Cambridge, MA
**2014** **"Deep Dive into Biology" Virtual Course Instructor,** MIT
**2012-2014** **Recruitment Weekend LGBTQ Host,** MIT, Cambridge, MA
**2010-2012** **Treasurer,** ALLIES LGBTQ student group, Carnegie Mellon, Pittsburgh, PA
**2009-2012** **Strong Women Strong Girls Mentor**, Pittsburgh, PA

## PROFESSIONAL SERVICE

***Post doc member*** Neurobiology faculty search committee, Northwestern University, 2022
***Preprint editor*** Open Biology
***Invited guest editor*** JoVE, methods collection on spatial navigation, 2022
***Reviewer for*** Behavioural Brain Research, Bio-protocol, eLife, Journal of Neuroscience Research, Nature Communications, Neuroscience and Biobehavioral Reviews, Open Biology, Physiology and Behavior, PLOS Computation Biology Progress in Neurobiology

## MEMBERSHIPS

American Association for the Advancement of Science (AAAS)
American Psychological Association (APA)
Society for Neuroscience
International Behavioral Neuroscience Society

## MEDIA COVERAGE

**2024** Interviewed for *"Penn Demoted Her. Then She Won the Nobel Prize"* by Megan Zahneis for the Chronical of Higher Education

**2021** "'What were you thinking?': How brain circuits integrate many sources of context to flexibly guide behavior," Neuroscience News at The Picower Institute for Learning and Memory

**2020** "Like a treasure map, brain region emphasizes reward location," MIT News, *picked up by many additional news outlets including MedicalXpress.com, ScienceDaily.com, and more*

**2019** "Study finds hub linking movement and motivation in the brain," MIT News, *picked up by many additional news outlets including NeuroscienceNews.com, MedicalXpress.com, and more*

**2018** Profiled in the book *Why We Dream: The Transformative Power of Our Nightly Journey* by Alice Robb, published by Eamon Dolan/Houghton Mifflin Harcourt, 2018