

HANNAH S. WIRTSHAFTER, Ph.D.
Curriculum vitae

July 2023

Northwestern University
Department of Neuroscience
310 E. Superior St.
Morton 5-660
Chicago, IL 60611
312-503-1687

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.

2008–2012 B.S. in Biological Sciences

Carnegie Mellon University, Pittsburgh, PA
Minor in Biomedical Engineering
Graduated with high honors

PROFESSIONAL APPOINTMENTS

2021–

Post-doctoral scholar
Northwestern University, Chicago, IL
Department of Neuroscience
Supervisor: Dr. John Disterhoft

2019–2021

NRSA Post-doctoral fellow
Northwestern University, Chicago, IL
Department of Neuroscience
Supervisor: Dr. John Disterhoft

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).

In Preparation

Wirtshafter, H. S. & Disterhoft, J. F. Manifold representations of context during task learning

Wirtshafter, H. S. & Disterhoft, J. F. Single cell firing changes during conditioning

Wirtshafter, H. S. & Wilson, M. A. Coordinated replay of place and movement correlates during REM sleep

Ahmadinejad, A., Li, A., **Wirtshafter, H. S.**, Kazan, T., Prinster, R., Sesaki, T., Penagos, H., Azevedo, F. Comparing Rats with Deep Reinforcement Learning Agents to Diagnose Data Efficiency

Software and Tool Development

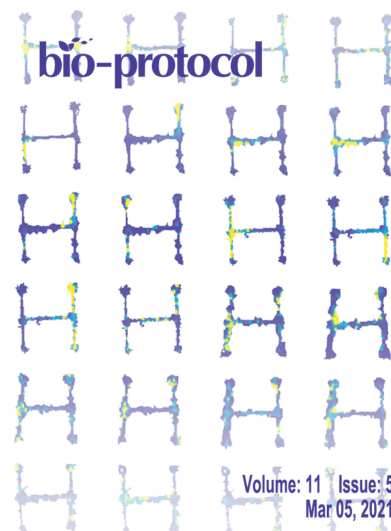
- 2021** **Wirtshafter, H.S.** & Wilson, M.A. Bayesian Algorithmic Decoding of Acceleration and Speed Software (BADASS) v1.0
<https://codeocean.com/capsule/5522897/tree/v1> (2021)
- 2020** **Wirtshafter, H.S.** Electrophysiology Analysis Library. hsw28/data_analysis: HSW Analysis code v1.0 Zenodo. <http://doi.org/10.5281/zenodo.3597777> (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** 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

- 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

- 2023** **UT Southwestern**, SiNaPS: Seminars in Neuroscience, a Postdoc Series
(*upcoming*)
- 2023** **University of Bristol**, Neural Dynamics Forum
- 2022** **Syracuse University**, Early Career Research in Neuroscience Seminar Series
- 2020** **University of New South Wales Sydney**, Neuroscience Group Meeting
- 2020** **Tufts University**, Applied Math Class (*canceled because of Covid-19*)
- 2018** **University of Chicago**, Systems Neuroscience Group Meeting
- 2018** **Northwestern University**, Behavioral Neuroscience Group Meeting
- 2018** **MIT**, Molecular & Cellular Neuroscience Student Symposium
- 2017** **MIT**, Plastic Lunch Neuroscience Meeting

POSTER PRESENTATIONS

- 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

- 2023-** Mackenzie Kneisly, Northwestern Biological Sciences Undergraduate Student
- 2020-2022** Kent Park, Northwestern Biological Sciences Undergraduate Student
- 2017-2019** Molly Quan, Wellesley Neuroscience Undergraduate Student

Currently a laboratory technician at Massachusetts General Hospital

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

Received an electrical engineering PhD from Northwestern University

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 **Mesosopic Physics Internship**, Northwestern University, Evanston, IL

2005 **Neuroscience/Biology Research Assistant**, University of IL at Chicago, Chicago, IL

PROFESSIONAL SERVICE

Invited guest editor JoVE, methods collection on spatial navigation, 2022

Preprint editor Open Biology

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

MEMBERSHIPS

American Association for the Advancement of Science (AAAS)

Society for Neuroscience

International Behavioral Neuroscience Society

MEDIA COVERAGE

- 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

REFERENCES

John F. Disterhoft, Ph.D.

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303 E Chicago Avenue
Chicago, IL 60611
312-503-7982
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Matthew A. Wilson, Ph.D.

Sherman Fairchild Professor of Neuroscience and Picower Scholar
Associate Department Head for Education, Brain & Cognitive Sciences
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Troy Littleton, Ph.D.

Menicon Professor of Biology and The Picower Institute for Learning and Memory
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