

Azahara Oliva, PhD

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RESEARCH POSITIONS

07/2022-present	Assistant Professor, Department of Neurobiology and Behavior, Cornell University
09/2021-06/2022	Visiting Asst. Prof., Department of Neurobiology and Behavior, Cornell University
07/2017-08/2021	Postdoctoral Fellow, Siegelbaum Laboratory, Columbia University
01/2017-06/2017	Postdoctoral Fellow, Buzsaki Laboratory, NYU
01/2013-12/2016	PhD Student, Berenyi Laboratory, Szeged University

EDUCATION

11/2016	PhD in Neuroscience, School of Medicine, Szeged University, Hungary
07/2012	MSc, Applied Physics, School of Physics, Complutense University of Madrid
07/2012	BSc, Fundamental Physics, School of Physics, Complutense University of Madrid

HONORS AND AWARDS

2026-2028	Sloan Research Fellow, Sloan Foundation
2025-2030	Packard Fellow, The David & Lucille Packard Foundation
2025-2030	Biobehavioral Research Award for Innovative New Scientists (NIMH)
2025-2027	Whitehall Research Foundation Fellowship
2025-present	Cornell Neurotech Advisory Board Member
2025	Rising Star in Neuroscience, Mahoney Institute for Neuroscience, UPENN
2024	Suffrage Science Award for Life Sciences, University of Oxford, UK
2022	Scialog Fellow, Research Corporation for the Advancement of Science
2021	Peter and Patricia Gruber Award, Society for Neuroscience
2021-2023	NARSAD Young Investigator Award, Brain and Behavior Research Foundation
2020-2025	K99/R00 Pathway to Independence Award (NIMH)
2017-2019	European Molecular Biology Organization (EMBO) Postdoctoral Fellowship

GRANTS AND FUNDING

Active

2025-2030	Neural dynamics underlying brain state-dependent memory functions, NIMH BRAINS (PI)
2025-2030	Packard Fellowships for Science and Engineering (PI)
2023-2028	Long-range GABAergic inhibition coordinates hippocampal-subcortical circuit activity in memory formation, NIMH R01 (Co-Investigator; PI: Qian Sun, Case Western Reserve University)
2025-2028	Whitehall Foundation (PI)

2026-2028	Sloan Research Fellowship (PI)
Past	
2023-2025	Neural circuit mechanisms of social memory in a natural environment, New Frontiers Grant Program, Cornell (PI)
2022-2025	Hippocampal-subcortical interactions underlying memory processes, NIMH R00 (PI)
2021-2023	NARSAD, Brain and Behavior Research Foundation (PI)

PUBLICATIONS

Since arriving to Cornell

- Chang H#, Chen W#, Karaba LA, Mei X, Harvey RE, Tang W, Fernandez-Ruiz A, **Oliva A**. Dynamic shifts in brain criticality support cognitive processing. bioRxiv. <https://doi.org/10.64898/2026.03.12.711394>
- Tang W#, Chang H#, Liu C, Perez-Hernandez S, Zheng WY, Park J, **Oliva A***, Fernandez-Ruiz A*. Circuit mechanisms for disentangled representations of experience in the hippocampus. *Nature Neuroscience*, *In Press* (2026).
- Zhao Z*, Chang H, Paudel P, Park J, Liu C, Aurelio MQ, **Oliva A***, Fernandez-Ruiz A*. A wireless modular platform for neuro-behavioral recording and closed-loop manipulation in small animals. *Nat Methods*, *In Press* (2026).
- Tang W, Mei X, Harvey RE, Carbajal-Leon E, Netzer T, Chang H, Oliva A, Fernandez-Ruiz A*. Goal-directed hippocampal theta sweeps during memory-guided navigation. *Nat Neurosci* **29**, 2214–2224 (2026).
- Robinson HL#, Todorova R#, Nagy GA, Gruzdeva A, Paudel P, **Oliva A**, Fernandez-Ruiz A. Large sharp-wave ripples promote hippocampo-cortical memory reactivation and consolidation during sleep. *Neuron*, 114(2), 226-236.e6 (2026).
- Kinney JL, Robinson HL, Wang H, Jiang Y-Q, Zhou M, Lee DK, Li M, **Oliva A***, Sun Q*. Top-down regulation of subcortical regions by hippocampal long-range inhibition. *Current Biology*, 35, 5853-5867.e4 (2025).
- Chang H#, Tang W#, Wulf AM, Nyasulu T, Wolf ME, Fernandez-Ruiz A*, **Oliva A***. Sleep micro-structure organizes memory replay. *Nature*, 637, 1161-1169 (2025).
- Karaba LA#, Robinson HL#, Harvey RE, Fernandez-Ruiz A, **Oliva A**. A hippocampal mechanism to balance memory reactivation during sleep. *Science*, 385, 738-743 (2024).
- Liu C#, Todorova R#, Tang W, **Oliva A**, Fernandez-Ruiz A. Associative and predictive hippocampal codes support memory-guided behaviors. *Science*, 382, 6668 (2023).
- Lisgaras CP, **Oliva A**, LaFrancois J, Siegelbaum SA, Scharfman HE. Hippocampal area CA2 controls seizure dynamics, interictal EEG abnormalities and social comorbidity in mouse models of temporal lobe epilepsy. bioRxiv. doi:10.1101/2023.01.15.524149 (2023).
- Harvey RE, Robinson HL, Liu C, **Oliva A***, Fernandez-Ruiz A*. Hippocampo-cortical circuits for selective memory encoding, routing and replay. *Neuron*, 111, 2076-2090.e9 (2023).
- Fernandez-Ruiz A, **Oliva A**, Chang H. High-resolution optogenetics in space and time. *Trends in Neuroscience*, 45(11), 854-864 (2022).
- **Oliva A**, Fernandez-Ruiz A, Karaba LA. CA2 orchestrates hippocampal network dynamics. *Hippocampus*, Special Issue: New View on Hippocampal Area CA2 (2022).
- **Oliva A**. CA2 physiology underlying social memory. *Current Opinion in Neurobiology*, 77, 102642 (2022).
- **Oliva A**. Neuronal ensemble dynamics in social memory. *Current Opinion in Neurobiology*, 78, 102654 (2022).

Before arriving to Cornell

- Fernandez-Ruiz A, **Oliva A**, Soula M, Rocha-Almeida F, Nagy GA, Martin-Vazquez G, Buzsaki G. Selective gamma rhythm communication between entorhinal cortex and dentate gyrus neuronal assemblies supports learning. *Science*, 372(6537), eabf3119 (2021).
- **Oliva A**[#], Fernandez-Ruiz A, Leroy F, Siegelbaum S^{*}. Hippocampal CA2 ripples reactivate and promote social memory. *Nature*, 587, 264-269 (2020).
- **Oliva A**. Parallel pathways for mnemonic processing. *Trends in Neuroscience*, 44(2), 79-81 (2020).
- Fernandez-Ruiz A[#], **Oliva A**[#], Fermينو de Oliveira E, Rocha-Almeida F, Tingley D, Buzsaki G. Long-duration hippocampal sharp wave ripples improve memory. *Science*, 364(6445), 1082-1086 (2019).
- Fernandez-Lamo I, Gomez-Dominguez D, Sanchez-Aguilera A, **Oliva A**, Morales AV, Valero M, Cid E, Berenyi A, Menendez de la Prida L. Proximodistal organization of the CA2 hippocampal area. *Cell Reports*, 26(7), 1734-1746 (2019).
- **Oliva A**[#], Fernandez-Ruiz A[#], Oliveira EF, Buzsaki G. Origin of gamma frequency power during hippocampal sharp-wave ripples. *Cell Reports*, 25, 1693-1700 (2018).
- Meira T, Leroy F, Buss EW, **Oliva A**, Park J, Siegelbaum SA. A hippocampal circuit linking dorsal CA2 to ventral CA1 critical for social memory dynamics. *Nature Communications*, 9, 4163 (2018).
- Voroslakós M, Takeuchi Y, Brinyiczki K, Zombori T, **Oliva A**, Fernandez-Ruiz A, Kozak G, Kincses ZT, Ivanyi B, Buzsaki G, Berenyi A. Direct effects of transcranial electric stimulation on brain circuits in rats and humans. *Nature Communications*, 9, 483 (2018).
- Fernandez-Ruiz A, **Oliva A**, Nagy GA, Maurer AP, Berenyi A, Buzsaki G. Entorhinal-CA3 dual-input control of spike timing in the hippocampus by theta-gamma coupling. *Neuron*, 93(5), 1213-1226 (2017).
- **Oliva A**, Fernandez-Ruiz A, Buzsaki G, Berenyi A. Role of hippocampal CA2 region in triggering sharp-wave ripples. *Neuron*, 91, 1342-1355 (2016).
- **Oliva A**, Fernandez-Ruiz A, Buzsaki G, Berenyi A. Spatial coding and physiological properties in the Cornu Ammonis subregions. *Hippocampus*, doi:10.1002/hipo.22659 (2016).
- Fernandez-Ruiz A, **Oliva A**. Distributed representation of “what” and “where” information in the parahippocampal region. *Journal of Neuroscience*, 36(32), 8286-8288 (2016).
- **Oliva A**, Fernandez-Ruiz A. Incorporating single cell contribution into network models of ripple generation. *Journal of Physiology*, doi:10.1113/JP273062 (2016).

*# denotes co-first author; * denotes co-last author*

INVITED TALKS

- 2027**
 - Sleep Research Society Annual Meeting, Austin, TX (scheduled)
 - GRC Neuromodulation, Barcelona (Spain) (scheduled)
 - McGill University, Montreal Neurological Institute – The Neuro, Montreal, QC (scheduled)
 - McGill University, Neurology Grand Rounds –Montreal, QC (scheduled)
- 2026**
 - IN-CODE Forum Seminar Series, Berlin (Germany) (scheduled)
 - Mini Symposium, Society for Neuroscience, Washington, DC (scheduled)
 - Lake Conference, Comparative and Evolutionary Biology, Seattle, WA (scheduled)
 - Duke University, Dept. of Neurobiology, Durham, NC (scheduled)
 - International Congress for Neuroethology (ICN), Vancouver (Canada)
 - Forum of the European Neuroscience Society (FENS), Barcelona (Spain)
 - GRC Sleep, Texas
- 2025**
 - Stanford University, Center for Sleep and Circadian Sciences, CA
 - Memory Hub Conference, Icahn School of Medicine at Mount Sinai, New York, NY
 - University of Colorado Anschutz, Dept. of Pharmacology, Physiology & Biophysics, Aurora, CO
 - Spanish Society for Neuroscience (SENC), Canary Islands (Spain)
 - UPENN, Mahoney Institute for Neurosciences, Philadelphia, PA

- 2024**
 - Japan Neuroscience Society (JNS), Fukuoka (Japan)
 - University of Washington, Department of Biological Structure, Washington
 - International Neuroscience Winter Conference, Sölden (Austria)
- 2023**
 - UC Santa Barbara, Kavli Institute for Theoretical Physics, Santa Barbara, CA
 - University of Wisconsin Milwaukee, Department of Psychology, Milwaukee, WI
- 2022**
 - John Hopkins, School of Medicine, Baltimore, MD
 - UC Irvine, Irvine, CA

TEACHING AND MENTORING

Courses

2025	Neurobiology of Conscious Brain States, 4200 (1 credit)
2023-present	SLEEP: Evolution and Neural Basis, 4750 (2-3 credits), Cornell University
2023-present	Introduction to Neuroscience, 2220 (Co-Instructor, 3-4 credits), Cornell University
2023-present	Independent Undergraduate Research, 4990 (3-4 credits), Cornell University
2023-present	Introduction to Research Methods in Biology, 2990 (2-3 credits), Cornell University

Doctoral Thesis Committee

Chair: Lindsay Karaba (2022-present, expected graduation Spring 2027)
Hongyu Chang (2022-present, expected graduation Spring 2027)
Praveen Paudel (2022-present, expected graduation Spring 2027)
Andres Cadena Parra (2026-present)

Member: Can Liu (2022-present)
Anna Gruzdeva (2022-present)
Chelsea Strawder (2022-present)
Cole Roland (2022-present)
Aby Leung (2023-present, Applied Physics)
Lizemarie Cirone (2024-present)
Jaehyo Park (2025-present)
Wenshuai Jiang (2025-present)
Erin Kempkes (2025-present)
Kushan Gupta (2025-present)
Amelia Gilbert (2025-present, Biomedical Engineering)
Arina Zadvornaya (2025-present, Biomedical Engineering)
Caleb Jones (2022-2026, Biomedical Engineering)
Caleb Vogt (2024-2025, Add-hoc member)
Michael Mariscal (2022-2024, Psychology)

Undergraduate Mentoring

2025-2026	Rawlings Cornell Presidential Research Scholars
2025	McNair Scholars Program Summer Research Experience
2023-2025	NEXUS Scholar Program, Cornell University
2022-present	Independent Undergraduate Research, BIOG4990, Cornell University
2022-present	Independent Undergraduate Research, BIOG2990, Cornell University

SERVICE

Department of Neurobiology and Behavior

2023-present	Neurobiology and Behavior Diversity, Equity and Inclusion Committee (member)
2023-present	Annual SciArt Contest (creator and coordinator)
2023-2024	Graduate Program Executive Committee (member)
2022-2024	Department Seminar Series, Selection Committee (member)
2022-2024	Consider Cornell Program (participant)

Cornell University

2026-present	Scholars Under Threat (mentor)
2024-present	Senator at Large, Assemblies of the University (member)
2024-present	Klarman Postdoctoral Fellowships (reviewer)
2024-present	NEXUS Scholar Program (reviewer)
2024-present	Honors Thesis Program, Biology Major (reviewer)

Other Service

Ad-hoc grant reviewer: National Institute of Health (NIMH), National Science Foundation (NSF), European Research Council (ERC), UK Research and Innovation (UKRI), French National Research Agency (ANR), Deutsche Forschungsgemeinschaft (DFG).

Ad-hoc journal reviewer: Nature, Science, Nature Neuroscience, Cell, Science Advances, eLife, SLEEP, Cell Reports, Journal of Neuroscience, Journal of Neurophysiology, PLoS One, Journal of Physiology, Current Biology.

Ad-hoc conference reviewer: Cosyne Annual Meeting.

Symposium organizer: Japan Neuroscience Society (JNS) 2025, Fukuoka.

Professional membership: Society for Neuroscience (SfN, 2016-present), Sleep Research Society (SRS, 2026-present)