

## Research positions

**2022-present** Assistant Professor, Neurobiology and Behavior Department, Cornell University  
2018-2021 Postdoctoral Fellow, Siegelbaum Laboratory, Columbia University  
2017-2018 Postdoctoral Fellow, Buzsaki Laboratory, New York University  
2012-2016 PhD Student, Berenyi Lab, Szeged University  
2011-2012 Graduate Research Fellow, Cajal Institute, Spanish Research Council (CSIC)  
2010-2011 Graduate Research Fellow, Electromagnetism Dept, Complutense University

## Academic Training

2016 PhD in Neuroscience, School of Medicine, Szeged University, Hungary  
2012 MSc, Biomedical Physics, School of Physics, Complutense University of Madrid  
2010 BSc, Fundamental Physics, School of Physics, Complutense University of Madrid

## Grants and fellowships

### Active

2023-2028 Long-range GABAergic inhibition coordinates hippocampal-subcortical circuit activity in memory formation, NIMH R01 (Co-Investigator, PI: Dr. Qian Sun)  
2023-2025 Neural circuit mechanisms of social memory in a natural environment, New Frontiers Grant Program, Cornell (PI)  
2023 Neural circuits involved in social memories: role of oxytocinergic projections from the paraventricular nucleus of the hypothalamus to the CA2 region of the hippocampus, International Brain Organization (IBRO) (Collaborator, PI: Dr. Veronica de la Fuente)  
2022-2025 Hippocampal-subcortical interactions underlying social memory, NIMH R00 (PI)

### Past

2021-2023 NARSAD Young Investigator Grant, Brain and Behavior Research Foundation (PI)  
2021-2022 NIMH K99 Pathway to Independence Award (PI)  
2019 NVIDIA Developer Grant  
2017-2018 EMBO long-term postdoctoral fellowship  
2012-2016 Pre-Doctoral Fellowship, Hungarian Academy of Sciences  
2011-2012 FPI Pre-Doctoral Fellowship, CSIC, Spanish Ministry of Competitiveness

## Honors and Awards

2024 Suffrage Science Award for Life Sciences, University of Oxford, UK  
2020 Peter and Patricia Gruber Award, Society for Neuroscience, Chicago, USA  
2016 Summa Cum Laude PhD dissertation, Szeged University Doctoral School, Hungary  
2015 Hippocampal Complexities Meeting Award, Janelia Research Campus, USA  
2010 Travel Award, Spanish Society for Neuroscience (SENC), Bilbao, Spain

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## Invited Speaker

- 2024
  - NEURO2024, The 47<sup>th</sup> Annual Meeting of the Japan Neuroscience Society (JNS), Fukuoka (Japan)
  - Annual Seminar Series, Department of Biological Structure, University of Washington, Seattle (USA)
  - International Neuroscience Winter Conference, Plasticity and Network Stability Symposium, Soelden (Austria)
- 2023
  - Timescales of Plasticity and Underlying Mechanisms, Kavli Institute for Theoretical Physics, UC Santa Barbara, (USA)
  - Department of Psychology, UW Milwaukee, (USA)
- 2022
  - Annual Seminar Series, John Hopkins, School of Medicine, Baltimore (USA)
  - Learning and Memory Conference, UC Irvine (USA)
  - Scialog: Molecular Basis of Cognition, Tucson, Arizona (USA)
- 2021
  - Memory Consolidation Symposium, Donders Institute for Neuroscience (Netherlands)
  - Neuroscience Institute, CSIC, Social Behaviors Symposium, Alicante (Spain)
  - Leibniz Institute for Neurobiology, Magdeburg (Germany)
- 2020
  - Cornell University, Department of Neurobiology and Behavior, Ithaca (USA)
  - Kavli Institute for System Neuroscience, Trondheim (Norway)
  - University of Oxford, Brain Network Dynamic Unit, Oxford (UK)
  - Weill Cornell University, School of Medicine, New York (USA)
  - University of Iowa, Department of Molecular Physiology and Biophysics, Iowa (USA)
  - Maryland University, School of Medicine, Anatomy and Neurobiology, Maryland (USA)
  - Winter Conference on Learning and Memory, Park City, (USA)
- 2019
  - Neuronexus Workshop, 49<sup>th</sup> Meeting of the Society for Neuroscience, Chicago, (USA)
  - Zuckerman Institute, Postdoctoral Seminar Series, New York, (USA)
  - Rett Syndrome Symposium, Baylor College, Huston, (USA)
  - Hippocampal Research Conference, Taormina, (Italy)
- 2016
  - New York University, Neuroscience Department, New York, (USA)
- 2015
  - Hungarian Neuroscience Society, Budapest, (Hungary)
- 2014
  - Szeged University, Department of Physiology, Szeged, (Hungary)
  - Johannes Gutenberg-University Mainz, Institute of Microscopic, Mainz, (Germany)
  - University of Tübingen, Tübingen, (Germany)

## Teaching & Mentoring

- 2024
  - SLEEP: Evol. and Neural basis, 4750 (Instructor of upper-level class), Cornell University
- 2022-present
  - BIOG 4990 and BIOG 2990 (Instructor of undergraduate research), Cornell University
- 2022
  - BioNB 7210 Class: Bootcamp in Neurobiology and Behavior (one lecture), Cornell University

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## Thesis Committee (Neurobiology and Behavior Department, Cornell University)

2023-present (member) – Wenshuai Jiang  
2023-present (member) – Cole Roland  
2023-present (member) – Lizmarie Cirone  
2023-present (member) – Caleb Vogt  
2022-present (member) – Caleb Jones  
2022-present (member) – Anna Gruzdeva  
2022-present (co-chair) – Chelsea Strawder  
2022-present (chair) – Lindsay A Karaba  
2022-present (chair) – Praveen Paudel  
2022-present (chair) – Hongyu Chang

## Thesis Committee (External)

2022-present (member) – Michael Mariscal (Psychology Department – Cornell University)  
2022-present (member) – Abby Leung (Physics Department – Cornell University)

## Service

### Departmental Service (NBB, Cornell University)

2024-present – Senator at Large, Assemblies of the University (member)  
2022-present – Department Seminar Series, Selection Committee (member)  
2023-present – Diversity, Equity and Inclusion Committee (member)  
2023-present – Annual SciArt Contest (creator, director and coordinator)  
2023-2024 – Graduate Program Executive Committee (member)

### Other Service

(2022-present) – Abstract Reviewer for Cosyne Annual Meeting  
(2020-present) - Scientific Journal Referee (Nature, Nature Neuroscience, Science Advances, eLIFE, Cell Reports, Journal of Neuroscience, Journal of Neurophysiology, PLoS One, eNeuro, Journal of Physiology)

## Publications

- 2024 - Karaba LA\*, Robinson HL\*, Harvey RE, Fernandez-Ruiz A, Oliva A. A hippocampal mechanism to balance memory reactivation during sleep. **Science**, *In press*.
- 2023 – Liu C\*, Todorova R\*, Tang W, Oliva A, Fernandez-Ruiz A. (2023) Associative and predictive hippocampal codes support memory-guided behaviors. **Science**, 382, eadi8237(2023). DOI:[10.1126/science.adi8237](https://doi.org/10.1126/science.adi8237)
- Lisgaras CP, Oliva A, Mckenzie S, LaFrancois J, Siegelbaum SA, Scharman HE. Hippocampal area CA2 controls seizure dynamics, interictal EEG abnormalities and social comorbidity in mouse models of temporal lobe epilepsy. **bioRxiv**, [Preprint]. 2023 Jan 18:2023.01.15.524149. doi:10.1101/2023.01.15.524149

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- 2022 - Harvey RE, Robinson HL, Liu C, Oliva A\*, Fernandez-Ruiz A\*. (2023) Hippocampal-cortical circuits for selective memory encoding, routing and replay. **Neuron**, ISSN 0896-6273, <https://doi.org/10.1016/j.neuron.2023.04.015>.
- 2022 - Oliva A, Fernandez-Ruiz A, Karaba LA. (2022) CA2 orchestrate hippocampal network dynamics. **Hippocampus**, (Special Issue: *New View on Hippocampal Area CA2*), Hippocampus
- Oliva A. (2022) CA2 physiology underlying social memory. **Current Opinion in Neurobiology**, 77, 102642
- Oliva A. (2022) Neuronal ensemble dynamics in social memory. **Current Opinion in Neurobiology**, 78, 102654
- Fernandez-Ruiz A, Oliva A, Chang H. (2022) High-resolution optogenetics in space and time, **Trends in Neuroscience**, 45-11, 854-864
- 2021 - Fernández-Ruiz A, Oliva A, Soula M, Rocha-Almeida F, Nagy GA, Martin-Vazquez G, Buzsáki G. (2021) Selective gamma rhythm communication between entorhinal cortex and dentate gyrus neuronal assemblies supports learning. **Science**, 372(6537): eabf3119.
- 2020 - Oliva A\*, Fernández-Ruiz A, Leroy F, Siegelbaum S\*. (2020) Hippocampal CA2 ripples reactivate and promote social memory. **Nature**, 587, 264-269,
- Oliva A. (2020) Parallel pathways for mnemonic processing. **Trends in Neuroscience**, 44(2):79-81
- 2019 - Fernández-Ruiz A\*, Oliva A\*, Fermino de Oliveira E, Rocha-Almeida F, Tingley D, Buzsáki G. Long-duration Hippocampal Sharp Wave Ripples Improve Memory. **Science**, 364(6445),1082-1086.
- Fernandez-Lamo I, Gomez-Dominguez D, Sanchez-Aguilera A, Oliva A, Morales AV, Valero M, Cid E, Berényi A and Menendez de la Prida L. (2019) Proximodistal organization of the CA2 hippocampal area. **Cell Reports**, 26,7 1734-1746
- 2018 - Oliva A\*, Fernandez-Ruiz A\*, Oliveira EF, Buzsáki G. (2018) Origin of gamma frequency power during hippocampal sharp-wave ripples. **Cell Reports**, 25,1693-1700
- Meira T, Leroy F, Buss EW, Oliva A, Park J, Siegelbaum SA. (2018) A hippocampal circuit linking dorsal CA2 to ventral CA1 critical for social memory dynamics. **Nat Commun**, 9:4163
- Vöröslakos M, Takeuchi Y, Brinyiczki K, Zombori T, Oliva A, Fernandez-Ruiz A, Kozak G, Kincses ZT, Ivanyi B, Buzsáki G, Berényi A. Direct effects of transcranial electric stimulation on brain circuits in rats and humans. **Nat Commun**, 9, 483 (2018). <https://doi.org/10.1038/s41467-018-02928-3>
- 2017 - Fernández-Ruiz A, Oliva A, Nagy GA, Maurer AP, Berényi A, Buzsáki G. (2017) Entorhinal-CA3 dual-input control of spike timing in the hippocampus by theta-gamma coupling. **Neuron**, 93(5):1213-1226
- 2016 - Oliva A, Fernández-Ruiz A, Buzsáki G, Berényi A. (2016) Role of hippocampal CA2 region in triggering sharp-wave ripples. **Neuron**, 91,1342-1355.
- Oliva A, Fernández-Ruiz A, Buzsáki G, Berényi A. (2016) Spatial coding and physiological properties in the Cornu Ammonis subregions. **Hippocampus**, doi:10.1002/hipo.22659.
- Fernández-Ruiz A, Oliva A. (2016) Distributed representation of “what” and “where” information in the parahippocampal region. **Journal of Neuroscience**, 36(32):8286-8288.
- Oliva A, Fernández-Ruiz A. (2016) Incorporating single cell contribution into network models of ripple generation. **Journal of Physiology**, doi:10.1113/JP273062