IPSHITA ZUTSHI

ASSISTANT PROFESSOR • NEUROSCIENCE AND CELL BIOLOGY
ROBERT WOOD JOHNSON MEDICAL SCHOOL, RUTGERS UNIVERSITY

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RESEARCH INTERESTS

My research investigates how the brain **integrates environment cues with ongoing actions to dynamically construct internal representations** that shape planning, decision-making and memory. I have over twelve years of expertise in large-scale in-vivo electrophysiology during freely moving rodent behavior, temporally and spatially precise circuit manipulations, and advanced computational analysis of neural data.

EDUCATION

Doctor of Philosophy in Biology 2013-2019
University of California San Diego, San Diego, CA

Master of Science in Biological Sciences 2008-2013
Bachelor of Engineering in Computer Science
Birla Institute of Technology and Science, Pilani, India

RESEARCH EXPERIENCE

Assistant Professor, Neuroscience and Cell Biology 02/2026
Robert Wood Johnson Medical School, Rutgers University
Funding: Simons Collaboration on the Global Brain Transition to Independence (2026-2029)

Postdoctoral Fellow, New York University School of Medicine 03/2019-02/2026
György Buzsáki
Circuit computations in the hippocampus to represent spatial coordinates and cognitive variables.
Funding: Simons Collaboration on the Global Brain Transition to Independence (2023-2028)
NIMH K99/R00 Pathway to Independence Award (declined) (2023)
Leon Levy Fellowship in Neuroscience (2019-2021)

Doctoral Thesis, University of California, San Diego 09/2013-01/2019
Stefan Leutgeb
Circuit and oscillatory control of spike timing in the hippocampus and medial entorhinal cortex.
Funding: HHMI International Student Research Fellowship (2015-2018)

Master's Thesis, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland 08/2012-05/2013
Carmen Sandi
Impact of postnatal rearing environment on epigenetically transmitted stress-induced behavior phenotypes

Summer Research Internship, Max Planck Institute of Psychiatry, Munich 05/2012-07/2012
Osborne Almeida
Effects of neonatal glucocorticoid administration on apoptosis in the hippocampus.
Funding: DAAD, Working Internships in Science and Engineering (WISE) Scholar

Summer Research Internship, University of Wisconsin-Madison 05/2011-07/2011
Ronald E. Kalil
Expression topography of nestin positive cells in proximity to the third ventricle of the adult rat brain.
Funding: Khorana Program for Scholars, Department of Biotechnology, India

GRANTS AND AWARDS

International/National Awards

2025 **Peter and Patricia Gruber International Research Award in Neuroscience,** Society for Neuroscience
2025 Finalist, **Blavatnik Regional Award for Young Scientists**, Blavatnik Foundation
2023 – 2028 **Simons Collaboration on the Global Brain Transition to Independence Award** (SCGB TTI)
Total: ~$800,000 including $600,000 for the first three years as an independent investigator
2023 **K99/R00 Pathway to Independence Award**, NIMH (*declined to accept SCGB TTI*)
2022 Finalist, **Regeneron Prize for Creative Innovation**
2021 Associate, **Intersections Science Fellows Symposium**
2019 – 2021 **Leon Levy Fellowship in Neuroscience**
2019 Finalist, **Schmidt Science Fellows Program**
2015 - 2018 **Howard Hughes Medical Institute (HHMI) International Student Research Fellowship**
2018 Best DataBlitz presentation, 2nd Interdisciplinary Navigation Symposium, Canada
2012 **DAAD WISE Scholar**, Max Planck Institute for Psychiatry, Munich
2011 **Khorana Program for Scholars**, Indo-US Science Technology Forum, UW-Madison
2009 – 2013 Fellow, Kishore Vaigyanik Protsahan Yojana, Indian Institute of Science, Bangalore

Institutional Awards

2023 NYU **Outstanding Postdoc** Award
2019 Winner, BITS Alumni Association Global 30 Under 30 Awards
2018 **UCSD Biology Founding Faculty Award** for Graduate Excellence
2018 UCSD Award for Excellence in Graduate Research
2013 - 2014 **David Goeddel Graduate Fellowship**, University of California, San Diego
2013 Prof. SC Rastogi Merit Scholarship, BITS, Pilani, India

PUBLICATIONS

First author publications

2025 **Zutshi, I**, Apostolelli, A, Yang, Zheng, Z, Dohi T, Balzani, E, Williams, AH, Savin, C, Buzsáki, G. (2025). Hippocampal neuronal activity is aligned with action plans. Nature **639**, 153-161.

2023 **Zutshi, I** and Buzsáki, G. (2023) Hippocampal sharp wave ripples and their spike assembly content are regulated by the medial entorhinal cortex. Current Biology. **33(17),** 3648 – 3659.e4.

2022 **Zutshi, I**, Valero, M, Fernández-Ruiz, A, Buzsáki, G. (2022). Extrinsic control and intrinsic computation in the hippocampal CA1 circuit. Neuron **110 (4)**: 658-673.e5.

2021 **Zutshi, I*#**, Gupta, S*, Zanoletti, O, Sandi, C#, Poirier, G# (2021). Early life adoption shows rearing environment supersedes transgenerational effects of paternal stress on aggressive temperament in the offspring. Translational Psychiatry **11,** 533. **Equal contribution, #co-corresponding authors*

2021 Quirk, CR*, **Zutshi, I***, Srikanth, S, Wright, MK, Parsey, DP, Fu, ML, Marciano, ND, Liu, S, Leutgeb, JK, Leutgeb, S (2021). Precisely timed theta oscillations are selectively required during memory encoding. Nature Neuroscience **24,** 1614-1627. **Equal contribution*

2018 **Zutshi, I**, Fu, ML, Lilascharoen, V, Leutgeb, JK, Lim, BK, and Leutgeb, S (2018). Recurrent circuits within medial entorhinal cortex superficial layers support grid cell firing. Nature Communications **9 (1)**, 3701.

2018 **Zutshi, I*,** Brandon, MP*, Fu, ML, Donegan, M, Leutgeb, JK, and Leutgeb, S (2018). Hippocampal neural circuits respond to optogenetic pacing of theta frequencies by generating accelerated oscillation frequencies. Current Biology **28 (8)**, 1179-1188. **Equal contribution*

2017 **Zutshi, I**, Leutgeb, JK, and Leutgeb, S (2017). Theta sequences of grid cell populations can provide a movement-direction signal. Current opinion in behavioral sciences **17**, 147-154.

Other publications

2024 Varga, V, Petersen, P, **Zutshi, I**, Huszar, R, Zhang, Y, Buzsaki, G. (2024) Working memory features are embedded in hippocampal place fields. Cell Reports **43(3)**: 113807.

2022 Valero, M, **Zutshi, I**, Yoon, E, Buzsáki, G. (2022). Probing subthreshold dynamics of hippocampal neurons by pulsed optogenetics. Science **375 (6580)**: 570-574.

2021 Valero, M, Viney, T, Machold, R, Mederos, S, **Zutshi, I**, Schuman, B, Senzai, Y, Rudy, B, and Buzsaki, G (2021). Sleep DOWN state-active Id2/Nkx2.1 interneurons in the neocortex. Nature Neuroscience **24(3)**, 401-411.

2019 De Sousa, AF, Cowansage, KK, **Zutshi, I,** Cardozo LM, Yoo, EJ, Leutgeb, S, and Mayford, M (2019). Optogenetic reactivation of memory ensembles in the retrosplenial cortex induces systems consolidation. Proceedings of the National Academy of Sciences, **116 (17)**, 8576-8581.

2018 Hendrickson, ML, **Zutshi, I**, Wield, A, and Kalil, RE (2018). Nestin expression and in vivo proliferative potential of tanycytes and ependymal cells lining the walls of the third ventricle in the adult rat brain. European Journal of Neuroscience 47 (4), 284-293.

2017 Yu, S, **Zutshi, I**, Stoffel, R, Zhang, J, Ventura-Silva, AP, Sousa, N, Costa, PS, Holsboer, F, Patchev, A, and Almeida, OFX (2017). Antidepressant responsiveness in adulthood is permanently impaired after neonatal destruction of the neurogenic pool. Translational Psychiatry 7 (1), e990.

2013 Mehrotra, R, Sethi, S*, **Zutshi, I***, Bhalothia, P and Mehrotra, S (2013). Patterns and evolution of ACGT repeat cis-landscape across four plant genomes. BMC Genomics 14 (1), 203. **Equal contribution*

SELECTED INVITED PRESENTATIONS

2025 **Icahn School of Medicine at Mount Sinai** (Mount Sinai Neuroscience Seminars)
Hippocampal neuronal activity is aligned with action plans

2024 **Simons Collaboration on the Global Brain, New York**
Hippocampal neuronal activity is aligned with action plans

2024 **University of California, Los Angeles** (SYNCS Seminar Series)
Representing space and beyond: circuit computations within the hippocampus

2023 **Yale University** (SYNAPSES Seminar Series)
Representing space and beyond: circuit computations within the hippocampus

2023 **Princeton University** (Tiger Brain Scholars Symposium)
Hippocampal tuning to task-relevant features in acoustic-cue guided navigation task

2023 **University of Rochester** (Neuroscience Young Investigator Extramural Seminar)
Extrinsic and Intrinsic Control of the Hippocampal CA1 Network

2022 **Ascona Neural Circuits Meeting**, Ascona, Switzerland
Extrinsic and Intrinsic Control of the Hippocampal CA1 Network

2022 **University of Florida, Gainesville** (Department of Neuroscience Seminar)
Extrinsic and Intrinsic Control of the Hippocampal CA1 Network

2022 **World Wide NeuRise**
Extrinsic and Intrinsic Control of the Hippocampal CA1 Network

2022 **University of Chicago** (Biological Sciences Division Rising Stars Symposium)
Extrinsic and Intrinsic Control of the Hippocampal CA1 Network

2022 **Harvard University** (INCEPT Extramural Postdoc Symposium)
Extrinsic and Intrinsic Control of the Hippocampal CA1 Network

2020 **Leon Levy Fellows in Neuroscience Virtual Series**, New York
Dissecting local and afferent contributions to hippocampal field potentials

LEADERSHIP, DEI INITIATIVES, OTHER ACTIVITIES

2024	CAJAL Computational Neuroscience Course
2023-2025	**Early Career Researcher Editorial Board Fellow, Current Research in Neurobiology**
2020-Present	**Selections Committee Member**, Seminars by Postdocs in Neuroscience: Extramural Series (SPiNES), NYU School of Medicine
2020-2023	**Postdoctoral Elected Representative,** Neuroscience Institute Diversity and Inclusion Committee, (NICDI), NYU School of Medicine
2021-2023	**Committee Member, CoNNExINS Colloquium Planning Committee,** NYUSOM
2021-2022	**Selections Committee Member**, Summer Undergraduate Research Program, NYUSOM
2019-2020	**Blog Writer**, INet NYC

Review editor: Frontiers in Computational Neuroscience, Frontiers in Behavioral Neuroscience

Ad-hoc reviewer: Computational and Systems Neuroscience (COSYNE) 2025, eLife, Nature Communications, PLOS Computational Biology, Journal of Neuroscience, Communications Biology**,** Learning and Motivation, Behavioral Neurology, Cerebral Cortex, Advanced Science.

Ad-hoc reviewer with Prof. Gyorgy Buzsaki: Cell, Neuron, Nature Neuroscience

TEACHING EXPERIENCE AND STUDENT MENTORSHIP

Teaching Assistantship, UCSD

Neurosciences Graduate Program Bootcamp	2015, 2016, 2017, 2018
Systems Neurobiology	01/2017-03/2017
Cellular Basis of Learning and Memory	01/2016-03/2016
Recombinant DNA Techniques	04/2015-06/2015

Student mentorship: Over the past 10 years I have mentored 10 undergraduate students, 1 master's student, and 1 PhD student

Laura Ribalta Vilella	10/2024 – 12/2024	Visiting PhD Student, Universitat Pompeu Fabra
Athina Apostolelli	03/2023-09/2023	Master's thesis, ETH Zurich
Tora Antonio Dohi	09/2021- Present	New York University
Lucy Anderson	08/24 – Present	Brown University, Summer Undergraduate Program
Renida Kasa	06/22 – 09/22	Queen's College, Summer Undergraduate Program
Abhi Deverakonda	02/2021-10/2021	New York University
Maylin L. Fu	04/2015-01/2019	UCSD
Stanley Liu	06/2017-01/2019	UCSD
Alan Hilares	06/2017-08/2017	ENLACE Student Exchange Program, UCSD
Rodrigo Chavez Morales	06/2017-08/2017	ENLACE Student Exchange Program, UCSD
Gecelle De Guia	05/2014-05/2016	UCSD