

Anubhuti Goel, Ph.D.

Assistant Professor

Department of Psychology and Graduate Neuroscience Program
University of California Riverside (UCR)
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EDUCATION

2003-2008 Ph.D. in Neuroscience and Cognitive Science, University of Maryland.
2000-2002 M.S. in Biochemistry, M.S.U, India.
1997-2000 B.S. in Chemistry, Zoology and Microbiology.

RESEARCH EXPERIENCE

2019-Current. Assistant Professor, Department of Psychology, UCR
2014-2018 Assistant Project Scientist, Department of Neurology, UCLA with Carlos Portera-Cailliau
2008-2014 Postdoctoral researcher, Department of Neurobiology, UCLA with Dean Buonomano
2002-2003 Rajiv Gandhi Science Talent Research Scholar, Jawaharlal Nehru Center for Advanced Scientific Research (JNCASR), India.
1999 (summer) Internship, Department of Biochemistry, Indian Institute of Science (IISc), India.

COMPETITIVE FUNDING

2010-2013 NINDS T32NS58280 Neural Microcircuits Training Grant.
2020 SFARI Pilot award (submitted)

TEACHING EXPERIENCE

2003-2004 Teaching Assistant for Neurophysiology, Mammalian Physiology and Cell Biology, University of Maryland.
2016 Teaching K-12 students during Neuroscience Outreach events associated with Project Synapse.
2017 Conducting review sessions and teaching student to prepare for Los Angeles/Irvine Brain Bee competition.
2019 Neural Mechanisms of Animal Behavior (Psyc 112, Undergraduate course)
2020 Topics in Cognitive Neuroscience: Clinical case studies by Oliver Sacks (Psyc 136, undergraduate Course)
2020 Time in the Brain (Psyc 263, graduate course)

MENTORING

2010-2011 Ramin Morshed, Neuroscience
Won an award for his research at UCLA Neuroscience Poster Day.
Present Position: Medical Resident at University of Chicago.
2015-2017 Aditi Newadkar, Neuroscience
Present Position: Medical student at USC.
2015-2017 Gunvant Chaudhari, Neuroscience
Present Position: Medical student at UCSF.
2020 Noorhan Rahmatullah (Neuroscience graduate student)
Sam Post (Psychology graduate student)

AWARDS/SCHOLARSHIPS

2001-2002 Jawaharlal Nehru Center for Advanced Scientific Research (JNCASR) scholarship.
2007 Awarded the College of Life Sciences Travel award
2011 BRI Fine Science Tools Postdoctoral Travel Award to attend 2011 SFN meeting.
2016 FENS Brain Prize Stipend

2017 STAT Wunderkinds Award in Biomedical Science
2017 Dr. Arnold Scheibel Postdoctoral Award

PEER-REVIEWED PUBLICATIONS

Cantu DA*, Wang B*, Gongwer MW, He CX, **Goel A**, Suresh A, Kourdougli N, Arroyo ED, Zeiger W, and Portera-Cailliau C. EZcalcium: Open Source Toolbox for Analysis of Calcium Imaging Data.

Frontiers in Neural Circuits. 2020 May 15

Karpf S, Riche C, Carlo D, **Goel A**, Zeiger W, Suresh A, Portera-Cailliau C and Jalali B. Spectro-temporal encoded Multiphoton Microscopy, *Nature Communications*, 2020, 11: 2062

Goel A, Cantu D, Guilfoyle J, Chaudhari G, Newadkar A, Todisco B, Alba D, Pedapati E, Erickson C, and Portera-Cailliau C. Impaired perceptual learning in Fragile X syndrome is mediated by parvalbumin neuron dysfunction in V1 and is reversible. *Nature Neuroscience*, 2018, 21:1404–1411

He C, Arroyo E, Cantu D, **Goel A**, Portera-Cailliau C. A versatile method for viral transfection of calcium indicators in the neonatal mouse brain. *Frontiers in Neural Circuits*, 2018, July 23

He C, Cantu D, Mantri S, Zeiger W, **Goel A**, and Portera-Cailliau C. Tactile defensiveness and impaired adaptation of neuronal activity in the *Fmr1* knockout mouse model of autism. *Journal of Neuroscience*, 2017, July 37(27) : 6475-6487

Goel A, Buonomano, DV. Temporal Interval Learning in Cortical Cultures is Encoded in Intrinsic Network Dynamics. *Neuron* 2016, 91(2): 320-327.

Goel A, Buonomano DV. Chronic electrical activity homeostatically decreases spontaneous activity but paradoxically increases evoked network activity. *Journal of Neurophysiology*, 2013, Apr 109(7): 1824-1836.

He K, **Goel A**, Ciarkowski CE, Song L, Lee HK. Brain area specific regulation of synaptic AMPA receptors by phosphorylation. *Commun Integr Biol*. 2011 Sep; 4(5):569-72.

Goel A, Xu LW, Snyder K, Song L, Goenaga-Vazquez Y, Megill A, Takamiya K, Hagan RL, Lee HK. Phosphorylation of AMPA receptors is required for sensory deprivation-induced homeostatic plasticity. *PLoS ONE*, 2011, 6(3): e18264.

Johnson HA, **Goel A**, Buonomano DV. Neural Dynamics of in vitro cortical networks reflects experienced temporal patterns. *Nature Neuroscience*, 2010, 13: 917-919.

Kreczko A, **Goel A**, Song L and Lee HK. Visual deprivation decreases somatic GAD65 puncta number on layer 2/3 pyramidal neurons in mouse visual cortex. *Neural Plasticity*, 2009, 415135.

Goel A and Lee HK. Persistence of experience induced homeostatic synaptic plasticity through adulthood in superficial layers of mouse visual cortex. *Journal of Neuroscience*, 2007, 27(25): 6692-6700.

Goel A*, Jiang B*, Xu LW, Song L, Kirkwood A, and Lee HK. Cross-modal regulation of synaptic AMPA receptors in primary sensory cortices by visual experience. *Nature Neuroscience*, 2006, 9 (8): 1001-1003.

Sharma VK, Lone SR, **Goel A**, Chandrashekar MK. Circadian consequences of social organisation in the ant species *Camponotus compressus*. *Naturwissenschaften*, 2004, 91(8):386-90.

Sharma VK, Lone SR, **Goel A**. Clocks for sex: loss of circadian rhythms in ants after mating? *Naturwissenschaften*,

2004, 91(7):334.

Sharma VK, Lone SR, Mathew D, **Goel A**, Chandrashekar MK. Possible evidence for shift work schedules in the Media Workers of the ant species *Camponotus compressus*. *Chronobiol Int.*, 2004, Mar 21(2): 297-308.

REVIEWS

Goel A, Buonomano DV. Timing as an intrinsic property of neural networks: Evidence from *in vitro* and *in vivo* experiments. *Phil.Trans.R.Soc.B*, 369 (1637), Jan 2014.

PREVIEWS

Goel A, Portera-Cailliau C. Autism in the Balance: Elevated E-I ratio as a Homeostatic Stabilization of Synaptic Drive. *Neuron*, 2019, 101(4): 543-545.

ABSTRACTS

Goel A, Lauren Schmidt, Chaudhari G, Daniel C, Cohen S, Newadkar A, Todisco B, Ahmed N, Pedapati E, Erickson C, Portera-Cailliau C. Dissecting Circuit Dynamics underlying impaired perceptual learning in a mouse model of autism. 2019 SFN Abstract Viewer/Itinerary planner

Goel A, Daniel C, Cohen S, Newadkar A, Chaudhari G, Todisco B, Portera-Cailliau C. Impaired sensory discrimination in Fragile X Syndrome mice is mediated by abnormal interneuron dynamics. 2018 SFN Abstract Viewer/Itinerary planner (725.02/A21)

Goel A, Cantu D, Guilfoyle J, Chaudhari G, Newadkar A, Todisco B, Alba D, Pedapati E, Erickson C, and Portera-Cailliau C. Perceptual learning deficits in Fragile X Syndrome. 2018. Optogenetic approaches to understanding Neural circuits and Behavior GRC.

Goel A, Daniel C, Cohen S, Newadkar A, Chaudhari G, Todisco B, Portera-Cailliau C. Network level deficits in primary visual cortex underlie perceptual learning deficits in Fragile X mice. 2017 SFN Abstract Viewer/Itinerary planner

Goel A, Daniel C, Cohen S, Newadkar A, Chaudhari G, Todisco B, Portera-Cailliau C. Network level deficits in primary visual cortex underlie perceptual learning deficits in Fragile X mice. 2017 Excitatory Synapses and Brain Function Gordon Research Conference.

Goel A, Cohen S, Cohan K, Cantu D, Portera-Cailliau C. Role of Vasoactive Intestinal Peptide (VIP) interneurons in perceptual learning deficits of Fragile X mice. 2016 FENS Brain Conference.

Goel A, Buonomano DVB. Interval-Induced plasticity of Neural Dynamics in cortical networks *in vitro* 2013 SFN Abstract Viewer/Itinerary planner.

Goel A, Buonomano DVB. Interval learning in cortical networks *in vitro*. 2011 SFN Abstract Viewer/Itinerary planner.

Goel A, Buonomano DVB. Parallel homeostatic changes in evoked and spontaneous activity in cortical organotypic slice cultures. 2010 SFN Abstract Viewer/Itinerary planner.

Goel A, Xu L, Snyder K, Song L, Lee HK. Experience- induced homeostatic synaptic plasticity in visual cortex requires AMPA Receptor phosphorylation .2007 SFN Abstract Viewer/Itinerary planner.

Goel A, Jiang B, Xu L, Song L, Kirkwood A and Lee HK. Cross-modal regulation of synaptic AMPA receptors in primary sensory cortices by visual experience. FENS 2006.

Lee HK, Jiang B, Xu L, **Goel A**, Haganir RL, Kirkwood A. Changes in Synaptic AMPA Receptors mediate homeostatic synaptic Plasticity in the visual cortex. 2005 Abstract Viewer/ Itinerary planner. Washington, DC: Society for Neuroscience, 2005. Online.

Goel A, Lee HK. Developmental Profile of Homeostatic synaptic plasticity in the Visual Cortex by Brief periods of Visual Deprivation. 2005 Abstract Viewer/ Itinerary planner. Washington, DC: Society for Neuroscience, 2005. Online.

INVITED TALKS

- 2020 Seminar Series at College of Biomedical Sciences at Western University of Health Sciences, Pomona, CA
Talk Title: *Dysfunctional Interneuron Dynamics underlying impaired perceptual learning Fragile X Syndrome*
- 2019 Co-chair and speaker at SFN Nanosymposium “Genetic Models for Autism Spectrum Disorders”.
Talk Title: *Dissecting Circuit Dynamics underlying impaired perceptual learning in a mouse model of Autism.*
- 2017 Dr. Arnold Scheibel Postdoctoral Lecture
Title: *Network level deficits in primary visual cortex underlie perceptual learning deficits in Fragile X mice.*
- 2016 Synapse to Circuits, UCLA.
Title: *Deficits in visual discrimination task in Fmr1^{-/-} mice and the underlying network dynamics.*
- 2014 Nerd Nite, The Mint, Los Angeles.
Title: *Can brain cells grown in a petri dish learn to tell time?*
- 2013 ICLM Junior Scientist Lecture Series, UCLA.
Title: *Experience-dependent plasticity of Network Dynamics*
- 2012 Dynamics of Neural Microcircuits, UCLA.
Title: *Temporal Interval learning in cortical networks.*
- 2012 Neural Coding of the 4th Dimension: Circuits for Time and Timing, SFN Nanosymposium, New Orleans.
Title: *Interval Learning in cortical networks in vitro*

PROFESSIONAL MEMBERSHIPS

- 2009-2013 Member of Postdoctoral Scholars Union
2009-2011 Organizer in Postdoctoral Scholars Union
2004-2019 Member of Society For Neuroscience

COLLABORATIONS

- 2016-current Dr. Craig A. Erickson,
Associate Professor of Psychiatry
Director, Fragile X Research and Treatment Center
Medical Director, P3SW Developmental Disabilities Inpatient Unit
Director of Research, The Kelly O'Leary Center for Autism Spectrum Disorders
Cincinnati Children's Hospital Medical Center

University of Cincinnati College of Medicine -Affiliated

- *Implementation of visual discrimination task (that I developed for mice) in Fragile X Syndrome (FXS) patients.*