

Rohit Rangwani

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EDUCATION

Doctor of Philosophy, Ph.D. | University of California, Los Angeles (UCLA), CA Sept 2021 – present
Bioengineering (Neuroengineering)

Master of Science, MS | Texas A&M University (TAMU), College Station, TX Aug 2018 - May 2020
Electrical and Computer Engineering

Bachelor of Technology, B.Tech. | National Institute of Technology, Warangal, India July 2012 - May 2016
Electronics and Communication Engineering

RESEARCH EXPERIENCE

Visting graduate student | Advisor: Dr. Tanuj Gulati Oct 2021- present

Gulati Lab, Center for Neural Science and Medicine (CNSM), Cedars-Sinai Medical Center, Los Angeles, CA

- Working on subcortical cerebellar brain-machine interfaces for neuroprosthetic control. Intracortical single units and local field data analysis from primary motor cortex and cerebellum in rats to study interactions between these regions
- Study sleep oscillation's role in motor memory consolidation in stroke state in rats
- Analyzed sleep EEG data for stroke patients to identify biomarker for stroke and motor recovery

Graduate student worker | Advisor: Dr. Hangu Park Aug 2018 - May 2020

Integrated Neuro-Prosthesis Lab, Texas A&M University, College Station, TX

- Engaged in research on developing methods of sensory modulation/augmentation for robotic-human interfaces and neuroprosthetics
- *Master thesis*: "Distributed transcutaneous electrical stimulation – novel method for inducing proprioceptive illusions" focused on development of techniques for proprioceptive sensory feedback modulation

Research intern | Advisor: Dr. Tiago Falk May 2015 - July 2015

MuSAE Lab, Institut national de la recherche scientifique (INRS)-EMT, Montreal, Canada

- Utilized NumPy, sklearn, etc. in python to design a self-paced Motor Imagery BCI system for real-time application without need of extensive training (few mins per user) or high computation power
- Hacked an Emotiv Epoc+ for EEG acquisition in sensorimotor area for easier online applications

PUBLICATIONS

Journal papers

- **Rohit Rangwani**, Aamir Abbasi, and Tanuj Gulati. "Robust neuroprosthetic control from the cerebellum in the stroke brain". (under review)
- Abbasi, Aamir, **Rohit Rangwani**, Daniel W. Bowen, Andrew W. Fealy, Nathan P. Danielsen, and Tanuj Gulati. "Cortico-cerebellar coordination facilitates neuroprosthetic control." *Science Advances* 10, no. 15 (2024): eadm8246.

- **Rohit Rangwani***, Simpson, Benjamin K.*, Aamir Abbasi, Jeffrey M. Chung, Chrystal M. Reed, and Tanuj Gulati. "Disturbed laterality of non-rapid eye movement sleep oscillations in post-stroke human sleep: a pilot study." *Frontiers in Neurology* 14 (**2023**). (*co-first authors)
- **Rohit Rangwani**, and Hangu Park. "A new approach of inducing proprioceptive illusion by transcutaneous electrical stimulation." *Journal of NeuroEngineering and Rehabilitation* 18, no. 1 (**2021**): 1-16.

Conference papers

- **Rohit Rangwani**, and Hangu Park. "Vibration Induced Proprioceptive Modulation in Surface-EMG Based Control of a Robotic Arm." In 2019 9th International IEEE/EMBS Conference on Neural Engineering (NER), pp. 1105-1108. IEEE, **2019**.

TEACHING EXPERIENCE

Teaching Assistant | University of California, Los Angeles, CA

Jan 2023 – Mar 2023

- Lead a discussion/lab section of 30 students for *Machine learning & data-driven modeling in Bioengineering* (BIOE175) - office hours, grading, lab lectures.

WORK EXPERIENCE

Engineer | Qualcomm, San Diego, CA

July 2020 – Aug 2021

- Worked on eXtended Reality (XR) software development, virtual reality controllers

Software Engineer | Canon Medical Research USA (CMRU), Cleveland, OH

June 2020 - July 2020

- Worked on the development of image reconstruction software for medical resonance imaging (MRI)

GPU Software Intern | Samsung Advanced Computing Lab (ACL), San Jose, CA

May 2019 - Aug 2019

- Built an independent library for converting internal graphical processing unit (GPU) format memory buffers to human interpretable outputs (raw/PNG) & vice-versa, for debugging/testing of GPU drivers and tools.

Engineer | Qualcomm, Hyderabad, India

July 2016 - Aug 2018

- Developed & supported NFC (Near Field Communication) on Android using C/C++/Java for support across layers (kernel driver, middleware/HAL, apps) for different Qualcomm Snapdragon platforms
- Owned and coded various test utilities (factory testing, etc.) in C and developed test automation scripts in python saving significant repetitive developer test effort and easier factory testing
- Awarded 5 *Qualstars* (internal recognition award) for critical contribution to different projects

AWARDS

- UCLA Brain Research Institute (BRI) /Semel travel award **Nov 2023**
- American Heart Association (AHA) Predoctoral Fellowship (2023-24) **Jan 2023**
- UCLA Doctoral Travel Grant (DTG) **Nov 2022**
- Team placed 3rd in UCLA Cross-campus Innovation Challenge **May 2022**
- Team placed first in Cleveland NeuroDesign Entrepreneurs Workshop pitch **Aug 2021**
- Electrical and Computer Engineering Departmental Scholarship (2019-20), TAMU **Aug 2019**
- Electrical and Computer Engineering Departmental Travel award, TAMU **Mar 2019**
- MITACS Globalink Research Internship award (for a fully funded research internship in Canada) **May 2015**

SKILLS

Programming skills - C, C++, Python, MATLAB, Java, etc.

API/Libraries - NumPy, SciPy, scikit-learn, pandas, matplotlib, TensorFlow, keras, cuda, spyking-circus etc.

Hardware skills - Analog/digital design, PCB design, MCUs/MPUs, CAD, 3D printing, etc.

Lab skills – stereotactic rodent surgery, craniotomy, durectomy, vein cannulation, etc.

PRESENTATIONS

Posters

- Vibration Induced Proprioceptive Modulation in Surface-EMG Based Control of a Robotic Arm. IEEE/EMBS Conference on Neural Engineering **Mar 2019**
- Vibration Induced Proprioceptive Modulation in Surface-EMG Based Control of a Robotic Arm. Student research week, Texas A&M University **Mar 2019**
- Vibration Induced Proprioceptive Modulation in Surface-EMG Based Control of a Robotic Arm. Society for Neuroscience chapter conference, Texas A&M University **Apr 2019**
- A Cerebellar Activity-Driven Closed-Loop Brain-Machine Interface. Bioengineering Research day, UCLA Bioengineering **Apr 2022**
- A Cerebellar Activity-Driven Closed-Loop Brain-Machine Interface. Society for Neuroscience **Nov 2022**
- A Cerebellar Activity-Driven Closed-Loop Brain-Machine Interface. Bioengineering Research day, UCLA Bioengineering **Feb 2023**
- Robust neuroprosthetic control using cerebellar activity in Stroke brain. Society for Neuroscience **Nov 2023**
- Disturbed laterality of non-rapid eye movement (NREM) sleep oscillations in post-stroke human sleep. Society for Neuroscience **Nov 2023**
- Robust neuroprosthetic control using cerebellar activity in Stroke brain. Brain Research Institute (BRI) research day, UCLA. **Dec 2023**
- Robust neuroprosthetic control using cerebellar activity in Stroke brain. Bioengineering Research day, UCLA Bioengineering **Feb 2024**
- Robust neuroprosthetic control using cerebellar activity in Stroke brain. Society for the Neural Control of Movement (NCM) **Apr 2024**

Oral presentation

- Cerebellar driven Brain-Machine Interface. Research in Progress Seminar, CNSM, Cedars-Sinai. **Aug 2022**

MENTORSHIP EXPERIENCE

National Institute of Technology, Warangal, India

Jan 2015 - June 2016

Hardware mentor, Innovation Garage, NITW

- Mentored undergraduate students; organized large scale events like workshops, hackathons with more than 300 students.

Texas A&M University (TAMU), College Station, TX

Aug 2019 - May 2020

- Mentored one undergraduate student at INPL.

CNSM, Cedars-Sinai Medical Center, Los Angeles, CA

Aug 2022 – June 2025

- Co-mentoring 2 research interns: spike sporting, Matlab, behavior experiments, etc.
- Mentored one INSPIRE research intern in summer of 2024: behavior experiment, imaging, etc.