

Neeli Tummala

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EDUCATION

June 2024 (expected)	Ph.D. in Electrical and Computer Engineering , University of California, Santa Barbara, CA. <u>Advisor</u> : Dr. Yon Visell
June 2020	M.S. in Electrical and Computer Engineering , University of California, Santa Barbara, CA.
May 2018	B.S. in Electrical Engineering and Computer Sciences , University of California, Berkeley, CA.

HONORS AND AWARDS

Jul. 2023	Research Talk Prize at Festival of Touch, Marseille, France
Aug. 2023 – Jun. 2024	UC Santa Barbara Graduate Opportunity Fellow
Jul. 2022 – Jun. 2024	Link Foundation Modeling, Simulation, and Training Program Fellow
Jun. 2023 – Jun. 2024	Society of Women Engineers (SWE) Scholar
Jun. 2023	Women in Science and Engineering (WiSE) BD Biosciences Research Accelerator Award
Apr. 2021, 2022, 2023	P.E.O. Foundation Scholarship Recipient
Jun. 2019, 2020, 2021	UC Santa Barbara Outstanding ECE Teaching Assistant Award
Jun. 2021	Federal Employee Education & Assistance (FEEA) Scholarship Recipient
Jun. 2021 – Jun. 2022	Intel Society of Women Engineers (SWE) Scholar
Aug. 2014 – May 2018	UC Berkeley Regents and Chancellors Scholar

RESEARCH EXPERIENCE

Jan. 2020 – Present	UC Santa Barbara: RE Touch Lab , Graduate Researcher <u>Advisor</u> : Dr. Yon Visell <ul style="list-style-type: none">Characterizing biomechanical transmission in the hand through vibrometry measurements of touch-elicited skin oscillations.Understanding the complex interplay between biomechanics and tactile neuron populations by developing novel computational simulations informed by biomechanical characterization of the hand.Developing wearable tactile sensing systems for facilitating tactile communication and interaction in the digital domain with applications in accessibility for the deafblind community.
Jun. 2019 – Dec. 2019	Teledyne FLIR , Research and Development Intern <u>Advisor</u> : Stephanie Lin <ul style="list-style-type: none">Developed image and video signal processing algorithms, performed comprehensive evaluations of various denoising techniques, and assessed signal processing challenges in thermal camera systems.Delivered two company-wide presentations on the development of a new signal processing algorithm and was recognized by the global FLIR intern spotlight feature.
Dec. 2018 – Jan. 2020	UC Santa Barbara: Mostofi Lab , Graduate Researcher <u>Advisor</u> : Dr. Yasamin Mostofi <ul style="list-style-type: none">Applied belief propagation algorithms and sparse signal processing techniques to evaluate line-of-sight and Rytov wave models for reconstructing unknown areas with WiFi power measurements.
Aug. 2017 – May 2018	UC San Francisco Department of Surgery: Wang Lab , Undergraduate Researcher <u>Advisor</u> : Dr. Rong Wang <ul style="list-style-type: none">Studied the effects of genetic modifications and potential treatments on brain arteriovenous malformations (BAVMs) in mice through two-photon, brightfield, and fluorescence microscopy.
Jun. 2017 – Aug. 2017	MIT Lincoln Laboratory: Communication Systems Division , Research Intern <u>Advisor</u> : Dr. Brian Proulx <ul style="list-style-type: none">Improved a C++ simulation for MIMO communication systems by implementing routing, queue delay, and automatic re-transmission functionalities and analyzed performance via MATLAB visualization.
Jun. 2016 – Aug. 2016	Naval Postgraduate School: Space Systems Academic Group , Research Intern <u>Advisor</u> : James Horning <ul style="list-style-type: none">Led a multi-disciplinary team in an autonomous high-altitude balloon research project.

- Developed an autonomous Raspberry Pi system using Python to perform tasks such as parachute deployment and balloon release, and remotely execute commands via radio communication.

PUBLICATIONS

N. Tummala, G. Reardon, B. Dandu, Y. Shao, H. Saal, and Y. Visell. Biomechanical filtering diversifies whole-hand tactile encoding. In preparation.

N. Tummala, G. Reardon, B. Dandu, Y. Shao, H. Saal, and Y. Visell. Biomechanical filtering diversifies tactile encoding in whole-hand Pacinian corpuscle neuron populations [abstract]. Accepted at *Neuroscience 2023*.

N. Tummala, Y. Shao, and Y. Visell. Spatiotemporal Organization of Touch Information in Tactile Neuron Population Responses. To appear in *IEEE World Haptics 2023*, 2023.

S. Dinulescu, **N. Tummala**, G. Reardon, B. Dandu, D. Goetz, S. Topp, and Y. Visell. A Smart Bracelet Supporting Tactile Communication and Interaction. *IEEE Haptics Symposium 2022*, 2022. **(Runner-up for Best Technical Paper)**

RESEARCH TALKS

Sep. 2023	“Measurement-Driven Neural Simulations for Understanding the Sense of Touch,” at Graduate Student Simulation Seminar (GS ³), UC Santa Barbara.
Jul. 2023	“Spatiotemporal Organization of Touch Information in Tactile Neuron Population Responses”, at IEEE World Haptics 2023, Delft, Netherlands.
Jul. 2023	“Biomechanical Filtering Diversifies Whole-Hand Tactile Encoding,” at Festival of Touch, Marseille, France. (Talk Prize)
Apr. 2022	“Smart Bracelet Supporting Tactile Communication and Interaction”, at MRL Science Teacher Workshop, UC Santa Barbara
Feb. 2022	“Understanding Our Sense of Touch”, at Center for Controls, Dynamical-Systems, and Computation (CCDC) Seminar, UC Santa Barbara.
Jan. 2022	“Understanding Our Sense of Touch”, at Electrical & Computer Engineering Graduate Student Assembly Lightning Talks, UC Santa Barbara.
Jan. 2022	“Understanding Our Sense of Touch”, at P.E.O. Chapter QA Meeting, Santa Barbara, CA.
Jul. 2020	“Simulating Responses of Touch Receptors in the Hand”, at Graduate Student Simulation Seminar (GS ³), UC Santa Barbara.

TEACHING AND SERVICE

Summer 2023 – present	Undergraduate Mentor, Society of Women Engineers, UC Santa Barbara.
Summer 2023	Student Volunteer, IEEE World Haptics Conference 2023, Delft, Netherlands.
Summer 2022 – present	Research Mentor, RE Touch Lab, Electrical & Computer Engineering Department, UC Santa Barbara.
Summer 2021	Research Mentor, UC Leadership Excellence Through Advanced Degrees (UC LEADS), RE Touch Lab, Electrical & Computer Engineering Department, UC Santa Barbara.
Spring 2021, Fall 2021	Undergraduate Mentor, Women in Science and Engineering (WiSE), UC Santa Barbara.
Winter 2021	Computer Science Instructor, SWE++, Society of Women Engineers, UC Santa Barbara.
Fall 2018, 2019, 2020	Teaching Assistant, Feedback Control Systems: Theory and Design, Electrical & Computer Engineering Department, UC Santa Barbara.
Winter 2019, 2020	Teaching Assistant, Digital Control, Electrical & Computer Engineering Department, UC Santa Barbara.
Spring 2019, 2020, 2021	Teaching Assistant, Signal Analysis and Processing, Electrical & Computer Engineering Department, UC Santa Barbara.
Fall – Spring 2019	Research Mentor, LEGtrek Undergraduate Capstone Project, Electrical & Computer Engineering Department, UC Santa Barbara.

PROJECTS

Winter 2020	Soft Biomimetic Finger for Robotic Tactile Perception , <u>Advisor</u> : Dr. Elliot Hawkes <ul style="list-style-type: none"> • Developed a soft biomimetic finger prototype composed of silicone and gelatin, integrating an array of accelerometers to capture vibrations across the finger. • Evaluated its sensing capabilities through mechanical modeling of frequency-dependent damping and texture scanning experiments.
Winter 2019	Low-Cost Robotic Teleoperation System with Haptic Feedback , <u>Advisor</u> : Dr. Yon Visell

	<ul style="list-style-type: none"> Developed an inexpensive, customizable, and reproducible teleoperation system with haptic feedback using a Novint Falcon haptic device to control a Lynxmotion AL5D robotic arm equipped with collision detection sensors, allowing the user to feel obstacles in a remote environment.
Spring 2018	Don't Drop the Scalpel – dontdropthescalpel.wordpress.com, <u>Advisor</u> : Dr. Ruzena Bajcsy <ul style="list-style-type: none"> Implemented slip detection during grasping, adjusted grip force dynamically to minimize object deformation, and classified object rigidity using a Reflex Takkile hand mounted on a Baxter robot for applications in surgical robotics.
Fall 2017	Doctor Sawyer – doctorsawyer.wordpress.com, <u>Advisor</u> : Dr. Ruzena Bajcsy <ul style="list-style-type: none"> Programmed a 7-DOF Sawyer robot arm and microcontroller to perform medical diagnostic tasks: pulse detection, temperature measurement, and elementary tumor detection using force sensing.
Spring 2017	El Animal: Racing Car Robot , <u>Advisor</u> : Dr. Ron Fearing <ul style="list-style-type: none"> Developed control algorithms for line-following and steering, and designed PCBs for motor control, Bluetooth communication, debugging functionality, sensor integration, and power management. Successfully completed the track at the UC Davis NATCAR 2017 Race.

ACTIVITIES

Oct. 2021 – Present	Treasurer, UC Santa Barbara Horse Boarder's Association
Mar. 2019 – Present	Volunteer, Hearts Therapeutic Equestrian Center
Jan. 2015 – May 2018	President (2017-18), Industrial Relations Director (2016-17), Industrial Relations Officer (2015-16), Institute of Electrical and Electronics Engineers (IEEE), UC Berkeley

SKILLS

Advanced	Python, MATLAB/Simulink, Linux, LaTeX, Git
Intermediate	C/C++, Microcontrollers (Raspberry Pi, Arduino, etc.), Java, ROS, Fortran