Raaghav Thirumaligai

Mechanical Engineer

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Objective

Controls-focused mechanical engineer (BS '25, MS '25), **seeking a TA-ship in Physics**

Skills

Job Relevant – Vehicle Mechanical Experience from FSAE Accumulator Container Design (see **Controls** coursework)
Experiments – Root Cause Analysis, Setup and Automatization, Instrumentation Development
3D CAD – Solidworks & Fusion 360: GD&T, Tolerance Stack, Assemblies, Drawings, FEA Simulations
Matlab – Simulink, Data Analysis, System Modelling, ODE solver, App Builder
LabView – Data acquisition for experiments
Rapid Prototyping – Product Design, Idea Generation, Sketching, Sketch modelling, FDM and SLA design/printing
2D Design – Water Jetting, Laser Cutting and Sheet Metal
Python ML – PyTorch and TensorFlow experience
General: – Circuits, Mechatronics, Statics, Dynamics, Materials, Mechanisms, Electrical/Magnetic Physics

Education

- **University of California, Santa Barbara - B.S. Mechanical Engineering** ..... **Jun 2025**
  GPA 3.7/4.0 — Senior Capstone: 600 V Accumulator Container
- **University of California, Santa Barbara - M.S. Mechanical Engineering** ..... **Jul 2025**
  Coursework: Linear Systems, Dynamical Systems, Robust Control
- **University of California, Santa Barbara - Ph.D. Mechanical Engineering** ..... **Start Sep 2025**
  Research Interest: Control Theory

Experience - Academic

M&M Flow Lab, Sauret UCSB - *Undergraduate Researcher* **Winter 2023 - present**

- Explored cohesive forces in granular materials with two PhD student mentors to help understand inter-particle mechanics from the introduction of cohesive forces.
- Designed and constructed an annular shear cell for granular cohesion studies, involving multiple 3D-printed prototypes and custom Arduino-MATLAB strain gauge data collection application.
- Presented work at Southern California Flow Physics Symposium; research is part of upcoming master's thesis.

Fluid Energy Science Lab , Luzzatto-Fegiz UCSB - *Undergraduate Researcher* **Summer 2023**

- 3D-printed and laser-cut annuli to simulate kites for wind energy applications.
- Collected data for wake model verification in a wind tunnel; improved accuracy using diaphragm sensors with an Arduino-MATLAB data acquisition program.

Current Research, Sauret UCSB - *Master's Student* **Fall 2024 - present**

- Researching clogging dynamics in particle-laden suspensions in constricted flows, relevant to environmental, biomedical, and industrial systems.
- Built automated clog detection and reset system with Python-controlled pump using visual monitoring and feedback, providing extensive data collection for clogging probability modeling.
- Presented findings at November 2024 APS Division of Fluid Dynamics meeting; research will be incorporated into master's thesis.

Experience - Work

Course Reader - ***UCSB: Mech E Academic Student Employee*** **Spring 2024 - Fall 2024**

- Graded assignments for a Dynamics course in Spring 2024
- Provided feedback and guidance on core principles in dynamics, improving student understanding
- Assisted in grading for a Fluids course in Fall 2024, offering students insights on flow and fluid dynamics concepts
- Supported students, working with them to help improve their understanding of both topics

Resident Assistant - ***UCSB: San Rafael Residence Hall*** **Aug 2022 - Jun 2023**

- Developed excellent problem-solving and communication skills
- Attended training for conflict resolution, socialization, event planning, and emergency situations
- Worked at the front desk of our building helping residents with any issues that may arise

GameMaster - ***Diablo Escapes, Walnut Creek*** **Jul 2020 - Aug 2022**

- Worked as a Game Master, helping customers through Virtual Reality escape rooms
- Cultivated good social skills and the ability to explain how to use technologies that customers may not be familiar with
- Spent an unfortunate amount of time struggling with Windows 10 as an OS
- Helped build and design puzzles for use in their physical escape rooms that are under construction

Relevant Coursework

Linear Systems – State Estimation and Observation, LQG, Lyapunov Stability, MIMO Analysis
Applied Dynamical Systems – Nonlinear Dynamics, Stability Analysis, State Space Portraits
Robotics, Dynamics, and Control – Feedback Linearization, LQR, Simulink Modeling, Trajectory Optimization
Robust Control – System Norms, Small Gain Theorem, H^∞ Synthesis, Mixed Sensitivity Problem
Hybrid Systems – Continuous-Discrete Modeling, Hybrid Theory, Analysis & Design, Hybrid Control
Soft Robotics – Compliant Design, Bio-Inspired Robotics, Analytical Modeling, Hands-on Fabrication
BioInsp Neural Network – Hebbian Learning, Astrocyte Neuron Interaction, Transformers

Extracurricular

GauchoRacing - ***Vice President*** gauchoracing.com

GauchoRacing is the Formula SAE EV team at UCSB. I was the Internal Vice President in our club and have been a member of our club for the past 4 years. My senior capstone project was to design and build the accumulator container out of aluminium, using adhesives as the primary method of fastening. I'm also a lead of the braking system and designed and manufactured many components for this. I applied for and received an undergraduate research grant and led a project to characterize the different viscosity of brake fluids using a rheometer. We presented this work at the Undergraduate Research and Creative Activity Poster Colloquium.

Honors

- Undergraduate Engineering Honors Program **Fall 23 - Spring 24**
- Dean's Honors (ENGR) x5 per quarter
- Undergraduate Research Awards x2 ($3750 and $2500) **2024 and 2025**

Interests

Cycling I've begun cycling summer 2023 on my Specialized Allez and enjoy riding & wrenching as a hobby.
Formula 1 Following Formula 1 for a few years and my favorite team was AlphaTauri (VCARB).
Gaming Built my own PC and my favorite game is Celeste.

Last updated: August 8, 2025