SHASHANK RAMESH

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EDUCATION

UNIVERSITY OF NOTRE DAME — Notre Dame, IN
PhD Aerospace and Mechanical Engineering | CGPA: 3.95/4 — May 2027 (Expected)

INDIAN INSTITUTE OF TECHNOLOGY (IIT) MADRAS — Chennai, India
Masters in Robotics and B. Tech in Mechanical Engineering | CGPA: 9.49/10 — July 2021

TECHNICAL SKILLS

CAD Tools: SolidWorks, Autodesk Fusion 360, Autodesk Eagle, OnShape
Programming Tools: MATLAB, Simulink, Wolfram Mathematica, PyTorch, Scipy, GitHub
Programming Languages: C/C++, Python, Robot Operating System (ROS), STM32Cube IDE

RESEARCH EXPERIENCE

UNIVERSITY OF NOTRE DAME — Notre Dame, IN
Graduate Research Assistant in Robotics & Control, Aerospace and Mechanical Engineering — July 2022 – Present

- Collaborated with fellow researchers to develop a novel six-bar compliant robotic gripper in SolidWorks CAD for fruit picking that estimated ripeness with up to ~90% accuracy solely from motor current feedback
- Solved the challenge of achieving up to 3 kg grip force and at least 100 g force sensing using direct-drive brushless DC motors by sizing the links of robotic gripper mechanism using interior point optimization method in Python
- Invented a novel five-bar manipulator by optimizing its link lengths and using double shear joints to carry up to 3 kg payload using brushless DC motors with 1 Nm peak torque
- Built a C++ package for trajectory control of a five-bar manipulator with a Python GUI for dynamic visualization of feedback data
- Programmed an STM32 microcontroller in Embedded C to achieve PD position control of a sub-micro brushed motor at 5 kHz frequency using timer interrupts while receiving position commands over CAN bus

GENERAL MOTORS — Warren, MI
Research Intern, Energy Propulsion Systems Research Lab — May 2024 – Aug 2024

- Collaborated with researchers at General Motors to devise a novel mechanism that improves EV battery life by 6%, currently filed for a U.S. patent
- Developed a MATLAB framework for simulating battery packs with approximate cell models and used it to optimize the arrangement of cells leading to 7% improvement in energy efficiency

INDIAN INSTITUTE OF SCIENCE — Bangalore, India
Project Assistant, Robert Bosch Center for Cyber Physical Systems — Aug 2021 – June 2022

- Programmed a C++ ROS node for trajectory planning of quadruped feet to control body pose while standing
- Collaborated with the electrical and mechanical team to deploy and test a body pose controller on the quadruped robot

INDIAN INSTITUTE OF TECHNOLOGY MADRAS — Chennai, India
Master's Thesis Researcher, Department of Mechanical Engineering — May 2020 – Aug 2021

- Analyzed the kinematics and identified singularities of a hybrid 6-axis robot for medical and surgical operations

- Performed singularity-free path planning for a Stewart platform manipulator using NSGA-II genetic algorithm in C++

Undergraduate Researcher, Department of Engineering Design Oct 2018 – Jul 2020

- Computed motor trajectories for a brachiator robot using direct collocation in MATLAB OptimTraj library
- Designed a novel cam-based variable stiffness actuator that can quickly change compliance during collaborative manipulation

SELECTED PUBLICATIONS

- **S. Ramesh**, T. Girard and M. Plecnik, "A Simple Compliant Gripper That Reconfigures Between Sensing and Grasping Modes," in IEEE Robotics and Automation Letters (RAL), Jan 2026, doi: 10.1109/LRA.2026.3662656
- **S. Ramesh** and M. Plecnik, "A Direct-Drive Gripper Designed by Ellipse Synthesis Across Two Output Modes," 2025 IEEE International Conference on Robotics and Automation (ICRA), Atlanta, GA, USA, 2025, pp. 16478-16484, doi: 10.1109/ICRA55743.2025.11127705
- **S. Ramesh** and M. Plecnik, "A Direct-drive Five-bar Manipulator with Tuned Directional First-order Kinematics for Low Energy Consumption in Vertical Loading," International Journal for Robotics Research (IJRR), vol. 44, no. 2, pp. 317-338, Aug 2024, doi:10.1177/02783649241266852

CERTIFICATES

- Advanced Learning Algorithms, DeepLearning.AI, Stanford University, Dec 2023
- Supervised Machine Learning: Regression and Classification, DeepLearning.AI, Stanford University, Nov 2023
- Workshop instructor for CAD Modelling in Fusion 360, Mechanica, IIT Madras, Mar 2019

LEADERSHIP & SERVICE

2025 INDIANA VEX ROBOTICS CHAMPIONSHIP, MIDDLE SCHOOL IQ JUDGE Mar 2025

- Collaborated with fellow judges to select best teams with high performing robots to compete at the national level
- Evaluated over 10 teams and awarded accolades based on robot design, creativity, teamwork and professionalism

NORTHERN INDIANA REGIONAL SCIENCE & ENGINEERING FAIR (NIRSEF), SENIOR JUDGE Feb 2024

- Provided constructive feedback to students to help them gain more knowledge and guide their future work
- Collaborated actively with fellow judges to determine awards for outstanding projects in robotics and engineering

INTERNATIONAL CONFERENCE ON INTELLIGENT ROBOTS AND SYSTEMS (IROS), VOLUNTEER Oct 2023

- Assisted the registration desk by issuing ID cards and providing guidance on conference procedures to 100+ attendees
- Facilitated seamless interaction between the plenary speaker and audience by streamlining the questions and comments

TEACHING EXPERIENCE

UNIVERSITY OF NOTRE DAME Notre Dame, IN

Teaching Assistant, Aerospace and Mechanical Engineering Jul 2022 – May 2025

- Guided 5+ students per shift at the machine shop on machining precise workpieces using lathe, mill, and drill press
- Taught the concept of degrees of freedom to a class of 81 senior undergraduate students spanned for 50 minutes
- Conducted office hours for undergraduates discussing linear system analysis and resolving queries on assignments

FELLOWSHIPS & AWARDS

- Notre Dame Scientific Artificial Intelligence (SAI) Graduate Fellow, Fall 2025
- Dr. Susan Calvin award for securing 1st rank in Robotics Masters 2020-21 cohort at IIT Madras
- Ms. Pattamal Viswanathan award for securing the highest CGPA as an undergraduate senior at IIT Madras