Nishanth Rajkumar

Email: nishanthrajkumar1@gmail.com
Mobile: +1-438-778-5745

[Portfolio](#)
[LinkedIn](#)

EDUCATION

Concordia University — Canada
M.A.Sc - Mechanical Engineering specialized Industrial Control Systems with CGPA of 4.15/4.30   Sep 2022 - Present

Vellore Institute of Technology — India
B.Tech - Mechanical Engineering with CGPA of 8.59/10   July 2018 - June 2022

RESEARCH AND INDUSTRIAL EXPERIENCE

Concordia University — Canada
Research Assistant at Centre of Mechatronics and Automation   Jan'23 - Present
- Development of an Autonomous Stack for a Mobile Robot for Domestic Lawn Weed Retrieval using ROS2 framework with different control algorithms and sensor fusion techniques
- Emerging researcher in mobile robotics through NSERC CREATE SMART-ART Program with a passion for delivering impactful research to advance the field.
- Supervised by Dr. Wen-Fang Xie and Dr. Abolfazl Mohebbi

Combat Vehicles Research and Development Establishment, DRDO — India
Research Intern in the field of Mechatronics   Nov'22 - Apr'22
- Designed a mechanical and a mathematical model for a Robotic Arm that follows a set of sequential operations to retrieve a Jammed Ammunition from a Machine Gun

MITACS - University of Alberta — Alberta, Canada
Research Intern in the field of Robotics and Rehabilitation   Jul'21 - Sep'21
- Implemented a drone technology using specialized mathematical models to aid in the rehabilitation of patients with special abilities

Professional Inspection Consultancy, ASME Authorized — India
Research Intern in the field of Computational Mechanics   Apr'21 - Jun'21
- Performed FE analysis for API 653 above-ground storage tank and analyzed the impact of wind and seismic activity

HI-Tech Industries — India
Industrial Intern in the field of Machining Processes   Jun'20 – Jul'20
- Undergone a technical internship on various machining processes using different milling center's and also gained detailed knowledge of designing and analysis.

Precimech Components and Company — India
Industrial Intern in the field of Design, Materials and Manufacturing   Aug'19 - Feb'20
- Different parts of a stair-climbing robot were designed, engineered, manufactured and assembled with its required electronic sensors.

Atom Robotics — India
Co-Founder and Team Leader   Oct 18' - Feb'22
- Team Website: ATOM Robotics
- An official team of VIT Chennai which conducts workshops, events and symposiums and an Enthusiastic University chapter on intelligent robotics and satellite exploration focusing on intelligent ground vehicle targeting IGVC, USA, planetary Ariel systems

PATENTS AND PUBLICATIONS

- **Robotic Arm System for Retrieval of Ammunition from Machine Gun**: IPO, Office of the controller general of patents designs and trademarks (Pending)
- **Generative Design Optimization and Analysis of Connecting Rod for Weight Reduction and Performance Enhancement**: R Nishanth et al 2021 J. Phys.: Conf. Ser. 1969 012022
- **Numerical Analysis of above ground storage tanks with different settlement conditions**: R Nishanth et al 2021 IOP Conf. Ser.: Earth Environ. Sci. 850 012019
- **Development and Testing of a Method Intended for Children with Disabilities to Control a Semi-Autonomous Drone**: Under Review
- **Fault Diagnosis of an All Terrain Vehicle Gearbox System using Statistical Features and Advanced Classifier Methods**: Under Review

Teaching Assistantship Experience

- **MECH-368 - Electronics for Mechanical Engineers**: Course Tutor: Fall 2023, Winter 2024
- **MECH-368 - Electronics for Mechanical Engineers**: Lab Demonstrator: Fall 2023, Winter 2024
- **MECH-490 - Capstone Project**: Mentor for a Capstone Team - Urban Ecology Rover: Fall 2023 - Winter2024

Honors and Awards

- NSERC Funded Research Master's Program in Science and Engineering: 10,500 CADs/Year
- Concordia Split Merit Scholarship Holder of 3334 CADs
- Concordia Special Entrance Award Holder of 6000 CADs
- Mitacs Globalink Graduate Award Holder of 15000 CADs
- Co-Founder and Team-Lead — Atom Robotics — VIT, Chennai
- Certified SOLIDWORKS Professional in Mechanical Design, Dassault Systèmes
- Certified SOLIDWORKS Associate in Additive Manufacturing, Dassault Systèmes
- Secured 1st place in multiple Robotic Competitions held Nationwide and every detail is included in the Portfolio

Skills Summary

- **Software**: : Catia, Solidworks, Adams, Fusion 360, Hypermesh, Ansys, Matlab and Simulink
- **Programming**: : Robot Operating System(ROS), Python, C, C++
- **Hardware**: : Rasberry Pi, STM32, Arduino, CNC's–VMC, Lathe; PLC's and SCADA; 3D - Printers

Projects

- **Torque Test Module for Brushless Drives**: Developed an advanced torque testing module for robotic applications, utilizing a 44.4V, 13Ah power system with an integrated Emergency Stop safety mechanism. Implemented intelligent temperature management through PWM fans and anticipatory thermistor readings, optimizing the ODrive D6374 150KV brushless motor's performance via the ODrive V3.6 controller.

- **Robotic Duel: Computer Vision-Based Target Tracking and Laser Attack System**: Engineered a mobile robot with computer vision-based target tracking capabilities, utilizing a mounted camera and colored circle markers, enabling precise positioning and successful laser-based attacks on opponent robots

- **Optimized Control Architecture for a High-Performance Robotic Car Prototype**: Developed a prototype model of a four-wheeled robotic car with Ackermann steering mechanism, implementing optimized control algorithms using register-level programming. Designed and integrated advanced functionalities such as launch control, speed control, traction control, braking control, and line following control, resulting in superior performance and efficient program execution

- **Design and Optimization of a Prosthetic Lower Limb**: Obtained an optimized design and a stability analysis of prosthetic lower limb had been performed that consists are four different parts namely, socket, a 4 bar optimized prosthetic knee, pylon and foot for weight reduction and performance enhancement

- **Design and Simulation of a Robotic Arm for Safe Retrieval of Ammunition from a Jammed Machine Gun**: Designed a mechanical, a mathematical model for a robotic arm that follows a set of sequential operations and validated the Kinematics and Dynamic Properties of the Model

- **Stress Linearization of a Pressure Vessel and CFD Study Due To External Wind Conditions**: Analysis was done on the stress variation across the thickness of the wall close to the nozzles and supports. To avoid unnecessary complexities, various solutions were offered for the setup

- **Ablution Assist for Elderly and Differently-abled**: Designed and manufactured an advanced manual Rollator for elderly and people with disabilities, equipped with Arm Rests and Cutouts, which will help them in their morning ablutions

- **Computational Fluid Dynamic Study of Omega VTOL UAV Atom Robotics**: A CFD study was done in order to find the critical or stalling angle of attack with the structural study to check the maximum stresses across different regions of the frame

Volunteer Experience

- **Member of National Service Scheme** — India
  As a team, I had participated in and coordinated several social service activities benefiting the environment

- **President of ATOM Robotics, VIT Chennai** — India
  An official team of VIT Chennai which conducts workshops, events and symposiums

- **Core Committee of team Vibrance'20** — India
  Worked as part of a team in-charge of Hospitality Management