# NAGESH ERANKI

(217) 298-6635     nag.eranki@gmail.com     www.linkedin.com/in/neranki     www.github.com/NageshEranki

## Education

**MS, Aerospace Engineering**, University of Illinois at Urbana-Champaign     Jan 2022 - Dec 2024
Specialization: Controls and Dynamical Systems

**BS, Mechanical Engineering**, Mahindra University, India     Aug 2016 - Sep 2020

## Skills

- Software: Python, Linux, C/C++, embedded C, ROS2, OpenCV, Pytorch
- Design: 3D printing, AutoCAD, Solidworks
- Computational: MATLAB/Simulink, Ansys CFD/FEM, Machine Learning

## Experience

**Academic Hourly assistant** Coordinated Sciences Lab, University of Illinois at Urbana Champaign     Feb 2025 - (present)
*Ball manipulation with a monopedal hopping quadrotor*
- Augmented a quadrotor with a 3D printed ultra-lightweight (3g) spring-loaded leg
- Designed state-machine logic based on Spring-Loaded inverted pendulum model to enable hopping
- Improved tracking precision with a tuned minimum-snap controller, reaching 10 m/s peak velocity before hopping
- Enabled autonomous impact detection and recovery for continuous ball repositioning without human intervention

**Graduate Research Assistant** Coordinated Sciences Lab, University of Illinois at Urbana Champaign     Sep 2022 - Dec 2024
*Position control of a quadrotor with limited information*
- Developed a novel GNC system based on motion capture feedback that uses 50% less data-rates for position tracking
- Performed regression studies to identify system properties such as thrust profile, inertial parameters and IMU sensor noise
- Implemented model in loop simulations using Simulink and software in loop simulation using ROS for control design
- Developed embedded C firmware based on FreeRTOS for the drone's STM32 board
- Conducted drone flights to validate closed-loop controller performance against standard controls

**Graduate Teaching Assistant** University of Illinois at Urbana Champaign     Jan 2023 - Dec 2024
- Led a team of 5 to develop starter code using Git version control for a class of 150 senior undergraduate students
- Mentored 15 student robotics projects involving different sensors: LIDAR, RGB-D cameras
- Performed troubleshooting of STM32 microcontrollers with OpenOCD, GDB in Linux environment
- Calibrated IR cameras and established standard operating procedure for motion capture system for the Aerospace department
  - AE483 (Autonomous Systems Lab): Model-based control system design for quadrotors
  - ME446 (Robot Dynamics and Control): Forward/Inverse kinematics for 3-link robot, PID tuning for task-space, joint-space and feedback linearization control, path planning

**Research Assistant** Mahindra University, India     Dec 2020 - May 2021
- Derived models for ideal fluid flow generated by point vortices for mixing of fluids
- Identified ideal configurations of point vortices for maximum mixing efficiency
- Programmed efficient numerical simulation on Nvidia GPU cluster, avoiding computation-intensive CFD study

**Research Intern** IIT Madras, India     Jun 2019 - Aug 2019
- Simulated the supersonic, internal flow of a shock-tube using Ansys CFD to study temperature/pressure profiles
- Explored novel tube designs to encourage a more uniform pressure/temperature profile – a desired parameter for high temperature/pressure chemistry experiments

## Projects

**Machine Learning for Image classifcation**     Nov 2024 - Dec 2024
*Course project*
- Implemented a Convolutional Neural Network to classify handwritten digits from MNIST and CIFAR-10 datasets
- Improved test accuracy to 92% using data augmentation techniques and fine tuning hyper-parameters

**Design of gripper mechanism**     Mar 2022 - Apr 2022
- Programmed MATLAB solution for FEM-based structural design optimization problem
- Fully specified the design for a 3D printed monolithic part for maximizing stiffness with minimal material requirements
- Won 4th place in design challenge, lifting 1.125 kg before yielding

**Statistical Orbit Determination**     Mar 2023 - May 2023
- Designed an Extended Kalman filter to estimate the state of satellites from Earth-based measurements of observation angles
- Resulting algorithm is capable of real-time identification of orbiting satellites from a look-up of NORAD two-line element sets

## Achievements

- Earned scholarship of $1200 for each year during undergraduate education
- Two-time special mention in the *List of Teachers ranked excellent by their students* for AE483 and ME446