

Kush Hari

(614) 981-5981 | kush.j.hari@vanderbilt.edu | Columbus, Ohio

EDUCATION

Vanderbilt University | Nashville, TN

Expected May 2023

- B.Eng. in Biomedical Engineering & Electrical Engineering | Minor in Computer Science GPA: 3.99/4.00
- Relevant Coursework: Computer Vision, Intelligent Surgical Robots, Advanced Computational Modeling, Reinforcement Learning, Statistical Pattern Recognition, Algorithms of Robotics, Control Systems

EXPERIENCE

Advanced Construction Robotics

May 2022 - August 2022

Robotics Software Intern

Pittsburgh, PA

- Created Gazebo simulation using virtual cameras and CAN buses to interface with perception and control code
- Evaluated autonomous rod detection, pickup and placement code for rebar-carrying robot with the simulation
- Designed testing algorithms to optimize the relative movement between 2 robotic links during operation

Vanderbilt Biomedical Modeling Laboratory

August 2020 - Present

Undergraduate Mixed Reality Researcher

Nashville, TN

- Conference Paper *Development of a mixed reality application to simulate neurosurgical procedures* published by SPIE Medical Imaging 2023
- Conference paper *Digital application to display brain shift simulation in tumor resection procedures* published by SPIE Medical Imaging 2022
- Received Honorable Mention award at Vanderbilt Institute for Surgery and Engineering Research Symposium
- Developed an app in Unity to render brain deformation as a supplement to image guidance planning systems

Vanderbilt Robotics Team

September 2019 - Present

Vice President, Software Lead

Nashville, TN

- Placed 2nd in NASA Lunabotics Competition demo with an autonomous robot designed for Moon traversal
- Optimized SLAM methods for cameras and LiDAR to map monochrome lunar environments in real time
- Debugged PID control system in ROS for a 3 joint robotic arm to dig packed gravel and sand up to 1 foot deep
- Managed 30 people and facilitated full mechanical, electrical and programming integration and testing

Vanderbilt Aerospace Design Laboratory

June 2022 - Present

Software Integration Engineer

Nashville, TN

- Competed in NASA Student Launch Competition to build a rocket with a custom image processing payload
- Wrote software to apply computer vision filters on images captured post-landing based on digital radio signals
- Integrated takeoff, apogee, and landing detection to properly execute parachute detachment for subscale rocket

Vanderbilt Laine Lab for Quadruped Robots

October 2021 - May 2022

Undergraduate Machine Learning Researcher

Nashville, TN

- Implemented neural network in PyTorch to optimize solve time for model predictive control problems
- Developed a custom loss function to follow trajectory of nonlinear solver to reduce solve time by 90%

Upper Arlington Battlebots

September 2016 - May 2019

Team Captain

Columbus, OH

- Placed Top 32 in the National Robotics League national championship competition
- Designed and fabricated 15 pound remote-controlled combat robots from aluminum and steel in my garage

SKILLS & INTERESTS

- **Programming Languages:** C++, Python, Java, R, MATLAB, Simulink, JavaScript, Bash, C#, C, SQL, XML
- **Software:** ROS2, ROS, OpenCV, PyTorch, TensorFlow, Unity, Gazebo, OpenGL, Android Studio, PCL, Git
- **Interests:** Martial Arts, Cooking, Golf, Basketball, Guitar, Movies, Tennis, Pickleball