Brandon Wang

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Education

Duke University Durham, NC
Bachelor of Engineering in Mechanical Engineering *Aug. 2021 – May 2025*
GPA: 3.658

Duke University Durham, NC
Master of Science in Mechanical Engineering *Aug. 2025 – May 2026*
Certificate in Robotics & Automation

Experience

Undergraduate Research Assistant Aug. 2024 – Present
Duke University - General Robotics Lab *Durham, NC*

- Designed and prototyped robust mechanical platform for heterogeneous modular robots using Fusion 360
- Utilized Docker containers to ensure consistent and portable ROS2 environments, implementing path tracking algorithms using Vicon data
- Created comprehensive open source documentation using MkDocs Material, detailing system architecture, setup procedures, and troubleshooting guides for future researchers

Undergraduate Research Assistant Sep. 2023 – Dec. 2023
Duke University - Brinson Group *Durham, NC*

- Researched dielectric response of polymer nanocomposite systems as a function of dispersion
- Implemented physics-based computational models in COMSOL and data science methods to generate data sets for machine learning methods
- Optimized existing MATLAB machine learning scripts for 2D application

Undergraduate Teaching Assistant Aug. 2023 – Dec. 2023
Duke University - Computational Methods in Engineering *Durham, NC*

- Individually assisted students with Python assignments during lab and office hours 8 hours/week
- Graded weekly labs and provided personal feedback

Mechanical Engineering Intern Jun. 2023 – Aug. 2023
Stantec *Lexington, KY*

- Drafted hydraulic profiles for FGD wastewater treatment plants on Plant 3D
- Annotated piping isometrics by cross-referencing P&IDs on Bluebeam Revu
- Compiled plant equipment lists and data sheets for company-wide use using AutoCAD and Excel

Student Desk Assistant Aug. 2021 – May 2024
Duke University Libraries *Durham, NC*

- Assisted patrons with finding material and general information at front desk 8 hours/week
- Assess and troubleshoot computer problems brought by students and faculty
- Scanned and shelved books back into circulation

Engineering Camp Counselor Jan. 2021 – Mar. 2021
Newton's Attic *Lexington, KY*

- Engaged in hands-on technical work to construct portable restrooms for isolated communities in rural Kentucky
- Refined skills in wood/metalworking, welding, and tooling
- Independently welded platform frame of portable restroom structure

Projects

Mobile Manipulator | *ROS2, Python, Gazebo* Aug. 2024 – Dec 2024

- Implemented ROS2 navigation stack for autonomous path planning and obstacle avoidance using LIDAR and depth cameras
- Simulated A* Search and manipulation using MiR 250 mobile base and UR5e robotic arm
- Utilized OpenCV for color and object oriented manipulation tasks

Koda Robotic Bear | *Fusion 360, Raspberry Pi, Linux* Jan. 2024 – May 2024

- Individually designed an organic-looking robotic quadruped driven by Jansen linkages
- Wrote Python script to execute walking and dancing locomotion
- Animated linkage joint movement and context renderings of robot through native Fusion 360 software

Maglev | *LabVIEW* Oct. 2023 – Dec. 2023

- Designed PID controller capable of levitating a ferrous ball within a magnetic levitation apparatus
- Demonstrated controller adaptability and robustness with constant, sine, square, and random inputs

Cantilever Beam Bending and Deflection | *Solidworks, Machine Tooling, TIG Welding* Sep. 2023 – Oct. 2023

- Designed a weight-optimized cantilever beam to deflect 1 inch according to variable applied load
- Performed bending stress and factor of safety calculations to meet performance specifications
- Performed FEA in Solidworks to identify and reinforce regions of high stress concentrations

Pickleball Paddle Coach | *Solidworks, Arduino, Soldering* Sep. 2023 – Oct. 2023

- Prototyped real-time feedback device for beginnner pickleball players
- Integrated Arduino, load cells, and amplifiers into 3D printed frame and housing
- Developed user interface indicating contact points according to load cell force distribution

TicTacToe Board | *Solidworks, CNC Milling* Aug. 2023 – Sep. 2023

- Drafted assembly and technical drawings of a multi-component tic-tac-toe board in SolidWorks
- Fabricated entire assembly using a CNC milling machine on 6061 Aluminum according to technical drawings

FGD Wastewater Treatment Plants | *Plant 3D, Bluebeam Revu* Jun. 2023 – Aug. 2023

- Drafted hydraulic profiles of tanks and equipment to use in deliverable package for client
- Concurrently marked up plant piping isometrics for accuracy
- Conducted a site visit for P&ID review meeting with client and data collection

Route Finder | *Java, Git* Nov. 2022 – Dec. 2022

- Implemented a routing service to model the United States highway network
- Visualized shortest route via real-time simulation from user input
- Used Java to store a graph representation and implement Depth First Search algorithm

Amphibious Crawler | *SolidWorks, Arduino, Microcontrollers, C++* Aug. 2022 – Dec. 2022

- Designed an amphibious crawler capable of discriminating and retrieving visually identical objects of (non)ferrous properties
- Implemented and manually waterproofed motor drivers connected to Arduino to control speed and direction of motors via external joysticks
- Collaborated with team members to integrate inductive sensors and retrieval apparatus

Super Mario Bros Happy Meal Toy | *SolidWorks, Cricut* Mar. 2022 – Apr. 2022

- 3D designed Happy Meal toy to advertise and promote upcoming *Super Mario Bros* Movie
- Performed tolerance analysis for multi-component mystery box assembly and designed aesthetic stickers in Cricut
- Pitched product to department faculty by delivering a poster presentation

Sand Mousetrap Car | *Power Equipment* Feb. 2022 – Mar. 2022

- Prototyped low-fidelity vehicle powered by a single mousetrap to traverse sand terrain
- Built upon numerous iterations in rapid prototyping to maximize distance traveled

Archery II | *SolidWorks, Laser Cutting, Welding* Aug. 2021 – Dec. 2021

- Prototyped archery device for local organization *Bridge II Sports* that allowed disabled individuals with use of only one arm to mount and shoot a bow and arrow independently
- Developed rapid prototyping skills and delegated tasks to team members
- Delivered an oral presentation concluding our data and design process to department professors and fellow peers

Technical Skills

Modeling: Fusion 360, Solidworks, AutoCAD, Plant 3D, Revit, BIM 360
Electronics: Raspeberry Pi, Arduino, Soldering, Microcontrollers
Fabrication: Power Equipment, Machining, Woodworking, MIG/TIG Welding
Languages: Python, Java, C++

Activities

This Engineering Life Podcast | *Junior Sound Engineer* — Aug. 2024 – Present
Brownstone | *President* — Jan. 2023 – May 2024
Duke University Theta Tau | *VP Technology* — Jun. 2022 – May 2024
Duke Men's Club Volleyball | *Libero* — Aug. 2021 – Present
Lakewood Elementary School Tutor — Sep. 2023 – Dec. 2023