

Dominic Holifield

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EDUCATION

Purdue University | West Lafayette, IN Aug 2020 - May 2024
Bachelor of Science in Mechanical Engineering, Minor in Computer Science GPA: 3.41 / 4.00
• Relevant Coursework: Measurement & Controls Systems, Finite Element Analysis, Computer Aided Design & Prototyping, Statics, Dynamics, Machine Design, Mechanics of Materials, Heat and Mass Transfer, Fluids, Thermodynamics, Linear Algebra, Differential Equations, Multivariable Calculus, Numerical Methods, Linear Circuit Analysis

SKILLS

- Programming: C, C++, Python, Matlab, Java, LabVIEW, JavaScript, CSS, HTML, GitHub, Linux
- CAD & FEA: Autodesk Inventor, Fusion 360, AutoCAD, SolidWorks, Creo, NX, Abaqus
- Manufacturing: Mill, Lathe, Casting, CNC, 3D Printing (FDM, Cura, PLA, ABS, Nylon)

EXPERIENCE

Subaru of Indiana Automotive, Inc | Lafayette, IN May 2023 - Aug 2023
Powertrain Manufacturing Engineering Intern
• Led diverse engineering projects, from assembly line jigs to custom carts, using Inventor, AutoCAD, and SolidWorks
• Completed many projects including updating powertrain floor layouts and designing various parts to improve production
• Applied problem-solving skills and critical thinking daily to overcome engineering challenges. Effectively communicated with engineers and production staff, leveraging technical insights for optimization
• Collaborated with cross-functional teams to streamline processes and enhance production efficiency. Gained a comprehensive understanding of manufacturing engineering, from materials to assembly. Adapted seamlessly between office-based tasks and hands-on production activities.

VEX & VEXU Robotics Competition | West Lafayette & Zionsville, IN Aug 2016 - Present
Mechanics, Software, and Drive Team
• **2022 VEXU Skills World Champion** on team BLRS2, defeating over 75 global university teams
• **2020 Kalahari Classic Tournament Champion** on team 7701T, competing against over 150 teams
• 5x world championship qualifiers, 3x world division finalists, 11x tournament champions, and 7x skills champions
• Work with a large group to design, build, and optimize static and dynamic systems for a competition robot through the design process, incorporating extensive CAD, prototyping, and design improvements
• Construct robots using various manufacturing processes including 3D printing, CNC, lathing, milling
• Program control algorithms including PID, pose tracking algorithms (odometry), and autonomous movement controls to follow paths, points, and poses to increase efficiency and reduce error to outscore the competition
• Develop and maintain an open-source robot chassis control library (ARMS) for ourselves and others to use
• Utilize various sensors including optical shaft encoders for precise rotation measurement, IMUs for reliable heading data, and cameras for AI vision tracking to expand the potential of the robots and gain an advantage

Purdue Aerial Robotics Team | West Lafayette, IN Aug 2023 - Present
Guidance, Navigation, and Control
• Spearheading the development of a payload drop location calculation system using numerical integration in Python
• Successfully tested and adapted a basic drop location script, contributing to the team's goal of accurate autonomy
• Integrating knowledge from coursework, such as Control Systems and Numerical Methods, to optimize GNC systems

Purdue Undergraduate Research Expo | West Lafayette, IN Aug 2020 - May 2021
Undergraduate Researcher - Autonomous Motorsports Purdue
• Worked with a team to develop a waypoint-based approach to autonomous driving and racing
• Ran simulations in Unity using a vehicle physics environment to perform tests, created a convolutional neural network for waypoint prediction, and developed control algorithms to efficiently navigate the road

PROJECTS

Anvil Arrow RC Plane | Personal Project October 2022 - Present
• Designed and built a replica of the Anvil Arrow from the video game Star Citizen out of foam board and hot glue
• Creating fully autonomous flight with waypoint following capabilities utilizing various electronics including a GPS for location data, an IMU for relative motion and orientation, and electric motors and servos for power and control
• Developing control algorithms like PID for stable flight, odometry for relative positioning between GPS updates, and custom methods for path following using a series of target poses for optimized flight trajectories

Custom Mechanical Keyboard | Personal Project June 2020 - Present
• Designed, built, and programmed a custom mechanical keyboard in the pursuit of an optimized human interface device
• Learned many aspects of end-to-end product design including research and discovery of the problem, design and prototyping of the solution, user feedback and optimization, and planning for scaling and manufacturability