**Timothy Novak**

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**EDUCATION**

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| **Olin College of Engineering** | Needham, MA | May 2022 |

GPA: 3.76

Candidate for Bachelor of Science, Robotics Engineering

Recipient of four year 50% tuition merit scholarship

Relevant Classes: Robotics Systems Integration, A Computational Introduction to Robotics, Introduction to Sensors, Instrumentation, and Measurement, Mechanics of Solids And structures, Introduction to Mechanical Prototyping, Materials Science and Solid State Chemistry, Principles of Engineering, Design Nature, Software Design, Data Structures and Algorithms, Data Science, Modeling and Simulation in the Physical World, User Experience Design, User Oriented Collaborative Design, Products and markets, Designing Better Drugs, History of technology: A Cultural and Contextual Approach

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| **Babson College** | Needham, MA | May 2022 |

Relevant Classes: Financial Markets and Instruments

**SKILLS**

Programming: Python, Java, C++, C, C#, R, Arduino, HTML, CSS, Jekyll

Software: ROS, Gazebo, NetLogo, MATLAB, SIMULINK, OpenCV, GIT, Solidworks, Blender, Figma, MIro, Illustrator, Photoshop, Unity, Unreal Engine, Magic Leap,

Machining: 3D Printer, Drill Press, Band Saw, Belt Sander, Sheet Metal Sheer, MIG Welder, Vinyl Cutter, Mill, Forge,

Laser Cutter, Vacuum former, Laser cutter, Heat bender,

Language: English, Chinese

Other: Extensive experience with remote teamwork Extensive experience with teamwork and team leadership on teams of various sizes, Adept at rapid self directed learning of new/necessary concepts/programming languages/tools.

**EXPERIENCE**

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| **Olin College of Engineering** | January 2020 |
| *Lair Robotics Lab: OCAP Mechanical System Design* |  |

<https://pages.olin.edu/jeff-dusek/OCAP>

* Designed and implemented the mechanical systems for an underwater profiling robot designed as an affordable sensor platform for off-shore aquaculture farming
* Developed and implemented a mechanical system for attaching a robot to existing underwater infrastructure for automatic traversal
* Designed a tunnel drive propulsion system
* Worked remotely while collaborating on a seven person team
* Manufactured components for remote team members

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| **Olin College of Engineering** | November 2020 |
| *A Computational Introduction to Robotics: Final project* |  |

<https://sandermiller.github.io/CompRobo2020Swarms/>

* Collaborated remotely with one person to implement a decentralized swarm robotics simulation
* Implemented a Decentralized flocking algorithm based on past research
* Expanded upon an implementation for an existing algorithm by adding predator agents which disrupt the normal flocking behavior
* Replicated observed behavior in the natural world using robotics to further understanding of the underlying processes

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| **Olin College of Engineering** | October 2020 |
| *A Computational Introduction to Robotics: Computer Vision Project* |  |

* Remotely collaborated with one person to design a robotic algorithm capable of playing soccer
* Used OpenCV to process camera feeds for localizing a robot in its environment and to identify the position of the soccer ball, and the goals
* Developed an algorithm to localize a robot and kick a ball towards the goal using ROS and python

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| **Olin College of Engineering** | September 2020 |
| *A Computational Introduction to Robotics: Particle Filter* |  |

<https://github.com/EverardoG/robot_localization>

* Remotely collaborated with one person to implement a particle filter on a ROS robot simulation
* Implemented an algorithm which can localize a robot in its surroundings if provided a map of the environment and the robot’s current sensor readings

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| **Olin College of Engineering** | November 2018 |
| *Introduction to Sensors Instrumentation and Measurement: Color sensor* |  |

* Worked with two colleagues to design fabricate a functional color sensor
* Used electrical filtering to design a circuit which returned a voltage output whose strength was dependent on the color of an observed object

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| **Olin College of Engineering** | November 2018 |
| *Introduction to Sensors Instrumentation and Measurement: Ultrasonic Range Finder* |  |

* Designed and fabricated an Ultrasonic Range finder which performed in accordance with design specifications
* Used a combination of WaveGen, Matlab, and logic gates to perform signal processing and generate an ultrasonic signal
* Used active and passive filtering to process an ultrasonic return signal and record a distance based on the

sensor reading

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| **Olin College of Engineering** | April 2020 |
| *Materials science and Solid State Chemistry:*  *Material Properties of Steel Project* |  |

* Worked remotely with one person to perform experiments analyzing the material properties of steel through the hardening and tempering processes
* Designed and tested a cheap method of material hardness testing
* Confirmed research about steel properties through ought the process of heat treatment and tempering
* Learned how the microstructures of steel affect the properties and how to create the different steel microstructures

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| **Olin College of Engineering** | April 2020 |
| *Introduction to Mechanical Prototyping: Sculpture Project* |  |

* Designed and implemented a mechanical sculpture to tell a story through the medium of Lego
* Used Solidworks to design linkages for a tripodial walking mechanism and to create a transmission system to power the moving components of the sculpture
* Physically constructed the design to display it as a sculpture

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| **Olin College of Engineering** | April 2020 |
| *Principles of Engineering: Design project* |  |

<http://poe.olin.edu/2019/poetal-turret/>

* Collaborated with three colleagues to design and implement an autonomous sentry turret capable of following a target and accurately launching nerf projectiles at them when in range.
* Designed the mechanical flywheel system for launching, storing and reloading nerf projectiles
* Designed and fabricated the casing for the robot
* Collaborated on the design and implementation of the electrical systems to meet the requirements for the projectile launching mechanism
* Used HTML and CSS to design a website to showcase the project
* Served the role of project manager aiding communication between team members and handeling teaming issues when they arose.

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| **Olin College of Engineering** | Oct 2018 |
| *Design Nature: Play Project* |  |

* Worked with three colleagues to design and fabricate a bio-inspired play experience for fourth graders
* Utilized User oriented design to revise the play experience based on user feedback
* Designed the experience to replicate the natural behaviors of Sea turtles to serve as both an educational and enjoyable experience

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| **Olin College of Engineering Machine Shop** | September 2018 |
| *Blacksmithing Mentor* |  |

* Received funding and educational credit to maintain the Olin College Blacksmithing equipment
* Mentored other students on the proper safety procedures when blacksmithing
* Mentored students on the blacksmithing trade processes of upsetting, drawing out, heat treating, folding Damascus steel, and beveling.

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| **FIRST Young Robotics Engineers** | May 2018 |
| *Head Mechanical Director and Head Machinist* |  |

* Mentored team members on proper machining techniques and safety
* Directed a team of 24 in the construction and design of robotic systems to meet specifications
* Used Solidworks to design robotic systems
* Organized fundraising and fund management
* Used a wide variety of machine shop tools to fabricate robotic components
* Designed and fabricated a rigid chain actuator for lifting containers
* Designed and fabricated a ratchet mechanism for a winch drive to protect against backdriving mechanical components

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| **Olin College of Engineering** | November 2019 |
| *Software Design: Final Project* |  |

<https://sd19fall.github.io/Sound-Labyrinth/>

* Collaborated with two colleagues to design and implement an accessible adventure videogame
* Utilized design standards, user interviews, and testing/iteration loops to assure that the game was accessible to people with audio or visual impairments.
* Used Jekyll and HTML to create an easily editable website where pages could be written in markdown

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| **Olin College of Engineering** | November 2020 |
| *Data Science: Final Project* |  |

* Collaborated remotely with two colleagues to analyze formula 1 racing data to answer whether the performance of the car or the skill of the driver is more important for race results.
* Used the R programming language to process formula racing data, create predictive models modeling final race position based on driver and car constructor normalized for course, and compare models to determine which aspect is more significant.
* Used the R programming language to generate compelling visuals to convey the conclusion that the driver and the constructor are of similar importance in determining race results.

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| **Olin College of Engineering** | November 2018 |
| *Modeling and Simulation of the Physical World: mechanics project* |  |

* Worked with one colleague to design and simulate a model of a large mass driver.
* Used python to model the design requirements for a mass driver used to accelerate the earth

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| **Olin College of Engineering** | October 2018 |
| *Modeling and Simulation of the Physical World: thermodynamic project* |  |

* Worked with one colleague to create a simulation of the cooling of a white dwarf star
* Used python to model the thermal properties of a white dwarf star cooling via radiative cooling

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| **Olin College of Engineering** | September 2018 |
| *Modeling and Simulation of the Physical World: population project* |  |

* Worked with one colleague to design and simulate genetic disorder spread through growing populations
* Used python to model type 1 diabetes transmission in human populations and compare with data to confirm that type 1 diabetes is not exclusively propagated through genetics

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| **Olin College of Engineering** | January 2019 |
| *Quantitative engineering and analysis: Faces Project* |  |

* Designed and implemented a facial recognition algorithm using principle component analysis and eigenvector decomposition
* Designed an algorithm to detect whether or not a face was smiling.

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| **Olin College of Engineering** | February 2019 |
| *Quantitative engineering and analysis: Robot Obstacle course Project* |  |

* Designed and implemented a gradient assent path planning algorithm to navigate a robot through an obstacle course towards a goal.
* Designed an algorithm to identify obstacles in the robot’s environment by identifying features from a point cloud.

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| **Olin College of Engineering** | September 2019 |
| *Quantitative engineering and analysis: Passive Solar House Project* |  |

* Designed a model of the thermodynamic heat transfer of the Olin College Miller Academic Center building based on the solar radiation entering the building over the course of the day.
* Used the model to simulate possible modifications which could be made to make the building more energy efficient by using the energy of the sun to heat and cool the building.
* Tested model predictions with experimental measurements from experiments testing the proposed changes on a section of the building.

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| **Olin College of Engineering** | September 2020 |
| *Quantitative engineering and analysis: Course Assistant* |  |

* Worked remotely to mentor students in the concepts of MATLAB, differential equations, multivariable calculus, thermodynamics, fourier transforms, and signal processing

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| **Olin College of Engineering** | September 2020 |
| *User experience design: Online Store Interface Redesign* |  |

<https://tnovak-olin.github.io/GroceryStoreUXDesignProject/>

* Collaborated remotely with three colleagues to redesign the user interface and experience for online grocery store shopping.
* Remotely Performed User Oriented Design to determine what aspects of traditional experiences needed to be revised
* Performed remote codesign sessions to revise prototypes to reflect user’ desires
* Revised designs using traditional design metrics to refine the user experience
* Used HTML and CSS to design a website to present the project in and display a functional figma prototype

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| **Olin College of Engineering** | January 2020 |
| *User Oriented Collaborative Design: User Group Collaborative Design Project* |  |

* Collaborated with three colleagues and the Needham, MA Firefighters to design a robotic companion which could assist with extremely dangerous environments difficult for fire fighters, i.e. building collapses.
* Performed extensive collaboration with users to target the most significant painpoints/dangers/challenges of their jobs.
* Worked with users to design a solution which serviced multiple user needs

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| **Olin College of Engineering** | June 2019 |
| *OCCAM Lab: CLEW User Interface and user Experience design* |  |

* Worked with two colleagues to overhaul the user experience and user inter face design of an navigational app designed for people with moderate to severe visual impairment.
* Conducted user experience interviews and user research with the visually impaired community around Boston MA
* Redesigned the user experience and navigation flow to provide proper signifiers and assistance for users of many different ability levels ranging from low vision to completely blind

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| **Olin College of Engineering** | September 2019 |
| *AR/VR Lab: Augmented reality Assembly Visualizer User Interface Design* |  |

* Designed the user interface for an augmented reality CAD Assembly visualizer for the magic leap platform

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| **Washoe County School District, NV** | June 2018 |
| *Volunteer Program director and Robotics Teacher* |  |

* Taught at-risk populations of elementary school students around Reno NV programming and engineering skills through hands-on project-based learning
* Collaborated with local organizations, TEAM UP and the Boys and Girls Clubs, to provide materials and space for after school robotics programming classes for at-risk students
* Exposed at-risk students to programming, robotics, and STEM at a young age, in a fun way, to increase awareness of STEM as a viable career pathway regardless of socioeconomic status at birth.