

# ETHAN HOLLAND

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## EDUCATION

Northeastern University, College of Engineering, Honors Program

GPA: 3.97

Degree: Bachelor of Science in Mechanical Engineering, Minors in Robotics & Mathematics

Expected Spring 2023

## ENGINEERING EXPERIENCE

### E-ROBOT Retrofit Challenge National Finalist

Boston, MA

Design Lead

May 2021 – Present

- Devised robot to navigate crawlspaces and seal uninsulated surfaces, winning \$200,000 from the U.S. D.O.E. as 1 of 10 National Finalists pioneering minimally invasive & low-cost robotic retrofitting solutions to reduce building emissions
- Developed quad-flipper mobility platform to traverse above sparse ceiling joists by unfolding and increasing span by 87%
- Engineered coaxial tread and detachable flipper assemblies to feature track tensioning, roller guides, and double-bracing while minimizing cost, weight (<1.5kg/flipper), and disassembly procedure (5 screws)

### Fulfil Solutions Co-op

Redwood City, CA

R&D Mechanical Engineering Co-op

July 2021 – December 2021

- Executed brainstorming, prototyping, & design of 5-axis universal manipulation tool for picking & transferring highly varied inventory consisting of thousands of items ranging in profile, hardness, texture, mass, & volume
- Modeled 350+ part assembly using principles of DFM, DFA, static simulation, tolerance stack-up, & kinematic constraints
- Drafted 25 drawings to ASME Y14.5 GD&T standards for manufacturing via CNC machining, turning, & sheet metal bending
- Created custom dynamometer to validate NEMA 23 stepper motor specifications by integrating mechanical design, electrical wiring, & Python scripting to plot pullout torque curve at range of operational speeds

### NASA Mars Ice Challenge National Finalist

Boston, MA

Lead Mechanical Engineer & Head CAD Designer

December 2019 – December 2021

- Directed hardware design & manufacturing of two robotic solutions to drill, heat, extract, & purify simulated Martian ice deposits, earning 2<sup>nd</sup>-Place Nationally, Best Technical Paper, and doubling all previous water collection records
- Coordinated mechanical team of 15 to develop 825-component & 1638-component assemblies within 60kg mass constraint, 150N drill force, 1m x 1m x 2m package, and \$10,000 stipend awarded by NASA as two-time National Finalists
- Composed winning technical report featuring schematics, contingencies, integration plans, & spaceflight adaptations
- Achieved top 4 standing out of 460 projects and won the RISE Innovation Award at the RISE 2022 Conference

## COMMUNITY LEADERSHIP

### President, Northeastern Robotics Club

February 2021 – Present

- Revitalized dormant club to promote robotics education, drawing 470 new members to collaborate on 10 projects in 1 year
- Conducted Eboard of 11 to maintain makerspace, budget, media, communications, and weekly Intro to Robotics course
- Awarded 2022 Phoenix Award for exceptional organizational redevelopment, leadership, & community engagement

### Vice President, American Society of Mechanical Engineers (ASME)

September 2020 – Present

- Organized weekly interactive workshops spanning the discipline of mechanical engineering, such as mechanism design, surfacing, GD&T, sheet metal, and injection molding
- Piloted Microsoft Teams meeting hub for over 440 members, increasing meeting attendance by 41% over previous years
- Achieved 2021 Arangio Memorial Scholarship, awarded to one ASME member annually for exemplary engineering leadership

### SOLIDWORKS Professional Instructor

September 2020 – July 2021

- Mentored 121 students in SolidWorks, elevating software proficiency from novice to Certified Associate in 2-month course
- Instructed weekly group lectures and 1-on-1 sessions, resulting in 92% of students achieving SolidWorks certifications

## TECHNICAL SKILLS

**CAD Software:** SOLIDWORKS Certified Professional (CSWP), Autodesk Fusion 360, Autodesk Inventor, AutoCAD, Onshape  
*Proficient in parametric modeling, assembly, drafting, stress analysis, topology optimization, thermal simulation, & rendering*

**Manufacturing:** CNC machining, FDM 3D printing, laser cutting, resin casting, drilling, sanding, tapping, soldering, crimping

**Programming:** MATLAB (Simulink & Simscape), Python, Java, Arduino, TMCL

## INTERESTS

Space, Strategy board games, Hiking, Skiing, Roller Coasters, Lego, Pinball, 3D printing, Magic: The Gathering, Nintendo