

Gabrielle G. Conard

PhD Student in Robotics Engineering

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SUMMARY

Robotics Engineering PhD student passionate about designing robots from top to bottom with experience in mechatronics and PCB design, classical and modern control theory, dynamic modeling, and bridging the gap between simulations and physical robots. Particular interests include the mechanical and control system designs of mobile robots for space applications.

SKILLS

Software: MATLAB, Python, ROS, Arduino, Git, LaTeX, Webots, SolidWorks, Inventor, Fusion 360, Creo, Microsoft Word, Excel, PowerPoint, Teams

Manufacturing: 3D Printing, Soldering, Laser Cutting and basic proficiency with manual and CNC mills, lathes, and other shop equipment

EDUCATION

8/2023 - Present	Doctor of Philosophy in Robotics Engineering Soft Robotics Lab, Advised by Dr. Cagdas Onal	Worcester Polytechnic Institute
8/2021 - 5/2023	Master of Science in Robotics Engineering Soft Robotics Lab, Advised by Dr. Cagdas Onal, GPA: 4.00/4.00	Worcester Polytechnic Institute
8/2017 - 6/2021	Bachelor of Science in Mechanical Engineering, Minor in Physics Summa Cum Laude (GPA: 3.96/4.00), Honors in Mechanical Engineering	Lafayette College

RESEARCH EXPERIENCE

8/2024 - Present	Graduate Researcher and Lab Administrator As a researcher, my projects include: <ul style="list-style-type: none">Investigating dynamic models for an origami-inspired continuum actuator in order to accurately predict and control the robots' behaviorDesigning and building new versions of the continuum actuator to increase operation speed and improve manufacturingDeveloping simulation of origami actuator in Webots As a lab administrator, my responsibilities include: <ul style="list-style-type: none">Organizing and running weekly meetingsManaging lab spaceOnboarding new membersCoordinating and hosting tours of the lab	WPI Soft Robotics Lab
8/2021 - 8/2024	NSF Graduate Research Fellow <ul style="list-style-type: none">Collaborated with several teams of graduate students on various soft mobile robots developed by our lab, including a flexible-spined quadruped and a continuum-spined wheeled robotExecuted mechanical design improvement to these robotsDeveloped simulation of quadruped robot in WebotsInvestigated dynamic models for the continuum spine in order to accurately predict and control the robots' behavior	WPI Soft Robotics Lab
1/2020 - 6/2021	Honors Thesis: Investigating Dynamic Stability in a Low-Cost Quadruped Robot <ul style="list-style-type: none">Designed and constructed a low-cost (\$165) quadruped robot, including custom printed circuit boards, 3D-printed parts, and force sensors in each footDeveloped Python and Arduino software to implement walking gaits, active compliance in leg joints, and basic autonomous navigation (table-edge avoidance)Implemented novel control methods for dynamic balancing and disturbance recovery both in simulation (Webots) and on the physical robot, overcoming the sim2real gapWrote honors thesis report and defended my work through a presentation to my committee and a public audience	Lafayette College
6/2019 - 8/2019	Lafayette OpenDog Quadruped Robot <ul style="list-style-type: none">Selected as a Clare Boothe Luce Research Scholar for the summer of 2019Collaborated with another student and professor to develop a quadruped robot based on the open-source project openDog by James BrutonWrote Python scripts using ROS to develop walking mechanisms that laid the groundwork for the 2019-2020 Lafayette OpenDog Senior Design TeamModified and designed various components of the hip and leg systems	Lafayette College

PROFESSIONAL EXPERIENCE

NASA Langley Research Center | LANDO Robotics Research and Development Intern (NIF/OSTEM)

Worked with the LANDO team for two consecutive summers on the Lightweight Surface Manipulation System (LSMS), a robotic crane for surface operations on the Moon or Mars.

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| 6/2023 - 8/2023 | Payload Dynamics and Control | NASA Langley Research Center |
| | <ul style="list-style-type: none">• Developed dynamic model of and began controller design for an underactuated double pendulum mounted at the end of a robot arm as an analogy for controlling a payload's oscillations at the end of the LSMS• Designed, manufactured, and assembled the double pendulum system to be mounted on a UR3 robot | |
| 6/2022 - 8/2022 | Serial Manipulator Kinematics and Dynamics | NASA Langley Research Center |
| | <ul style="list-style-type: none">• Drafted a literature review comparing the LSMS to existing robotic cranes and investigating empirical dynamic modeling and system identification techniques to support simulation and controller design• Developed Python/MATLAB scripts for deriving serial arm dynamic and energy equations• Supported hardware development | |

TEACHING AND ADVISING

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| 8/2024 - Present | Graduate Teaching Assistant | Worcester Polytechnic Institute |
| | <ul style="list-style-type: none">• Working as a teaching assistant (TA) for RBE 501: Robot Dynamics. Responsibilities include holding office hours to answer students' questions and grading assignments. | |
| 8/2024 - Present
8/2022 - 5/2023
8/2021 - 5/2022 | Co-Advisor for Major Qualifying Project (MQP) Teams | WPI Soft Robotics Lab |
| | <ul style="list-style-type: none">• Mentored three teams of undergraduate students (one team each year), two working on a continuum mobile robot for pipe inspection and one working on a flexible-spined legged robot for their senior capstone projects• Guided students by helping them define the scope of their projects, meeting with them weekly to ensure they were on schedule, answering questions, and aiding with documentation | |
| 1/2018 - 5/2021 | CRLA Level I Certified Physics/Engineering Peer Tutor | Lafayette College Academic Resource Hub |
| | <ul style="list-style-type: none">• Provided one-on-one tutoring for students in PHYS 111: General Physics – Mechanics and Thermodynamics, PHYS 131: Physics I – Mechanics, PHYS 133: Physics II – Electricity, Magnetism, and Waves, ES 226: Statics, and ME 240: Dynamics• Completed CRLA Level 1 Tutor Certification by participating in regular training sessions | |
| 1/2020 - 5/2020 | Supplemental Instructor for PHYS 131: Physics I – Mechanics | Lafayette College Academic Resource Hub |
| | <ul style="list-style-type: none">• Led and prepared material for group sessions to reinforce concepts and applications of course content, including review worksheets in preparation for exams• Held drop-in sessions to work individually with students• Successfully transitioned from in-person to online sessions in compliance with Lafayette's shift to remote learning in March 2020 due to the pandemic | |

PUBLICATIONS

- T. V. Jones, **G. G. Conard**, A. G. Sanchez, Y. Sun, and C. D. Onal, "Lizard: A Novel Origami Continuum Mobile Robot for Complex and Unstructured Environments," *Robotics Reports*, 2024.
- G. G. Conard**, S.-S. Chiang, and C. D. Onal, "Towards Rapid Mobility with a Servo-Controlled Cable-Driven Continuum Actuator Employing Antagonistic Control," *IEEE-RAS International Conference on Soft Robotics (RoboSoft 2025)*, 2024 (Under Review).
- D. V. Moyer, D. Ji, Y. Hua, Z. Li, C. Guan, J. Du, **G. G. Conard**, R. Hall, and C. D. Onal, "HexaFlex: Design and Testing of an Origami Spine Hexapod," *IEEE-RAS International Conference on Soft Robotics (RoboSoft 2025)*, 2024 (Under Review).

HONORS AND AWARDS

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| 8/2021 - 8/2024 | 2021 National Science Foundation Graduate Research Fellowship Program (NSF GRFP) | |
| | I received this fellowship as an undergraduate senior to pursue graduate studies at Worcester Polytechnic Institute. The NSF GRFP supports graduate students in NSF-supported STEM disciplines who are pursuing research-based master's and doctoral degrees at accredited US institutions. | |
| 5/2021 | Karl J. Ammerman Prize | Lafayette College |
| | Awarded annually to the "most deserving student" in the Department of Mechanical Engineering, selected by the faculty of the department. | |

11/2019	Tau Beta Pi Engineering Honors Society Admitted into Lafayette College's chapter of Tau Beta Pi, Pennsylvania Epsilon, as a junior.	Lafayette College
4/2019	William G. McLean Tau Beta Pi Prize Awarded annually to 1-3 sophomore engineering students based on academic performance, campus citizenship, and professional orientation.	Lafayette College
8/2017 - 6/2021	Dean's List Placed on the Dean's List every semester, which recognizes students achieving a cumulative semester GPA of 3.60 or higher.	Lafayette College
8/2017 - 6/2021	Marquis Scholarship As Lafayette's second highest academic scholarship, this grant is awarded to incoming students who demonstrate global citizenship, scholarly pursuits, leadership, and concern for others.	Lafayette College
5/2015	Laramore Service Award This award recognizes two George School students who are "quiet givers." Recipients have assisted others on a one-to-one basis, quietly demonstrating leadership through acts of kindness, generosity of spirit, and service to the community. Each recipient receives a cash award that they may spend on projects that will directly benefit the school, or up to half on their own personal service projects or enrichment experiences.	George School