Gerardo Berlanga Molina

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Education

Massachusetts Institute of Technology *Sept 2021 – May 2025*
SB in Mechanical Engineering

- GPA: 4.7/5.0
- **Coursework:** Optics, Measurement & Instrumentation, Mechanics & Materials, Dynamics & Control, Thermal-Fluids Engineering, Design & Manufacturing

Research Experience

Large Lenslet Array MAgellan Spectrograph (LLAMAS) *Cambridge, MA*
Astronomical Instrumentation Team *June 2023 – Present*

- Led the design and development of an auto-leveling system for a 1600kg bank assembly
- Created engineering and weldment drawings for the structural frame
- Performed FEA to ensure the Instrument's frame could withstand a major earthquake
- Coded a Python script that automated the alignment process of the Instrument's optics with micron-level precision cutting dozens of hours of labor

Innovating Machine Learning Algorithms for Electric Motors *Cambridge, MA*
Mechatronics Research Laboratory *Sept 2022 – Aug 2023*

- Developed a hardware testbed for an Internal Permanent Magnet Synchronous Motor running at over 5000 RPM
- Tested and validated novel machine learning control algorithms using Simulink
- Employed rapid prototyping techniques to validate preliminary testbed designs

Projects

Characterizing the Effects of Curing Rate on the Temperature Increase of Photopolymer Resins *MIT-2.671*

- Measured temperature increase of photopolymer resin as a function of Layer Cure Time
- Developed a predictive model that can define apt print parameters such as maximum initial temperature and maximum allowable print time for Stereolithography and Digital Light Processing 3D printers to prevent photopolymer resin from reaching its flashpoint

Design of an Atmospheric Dispersion Compensator for the 6.5m Magellan Telescope

- Performed thermal stress analysis to create an athermal kinematic mount for optical lenses
- Developed an actuation system to counter-rotate two powered optics such that they minimize the dispersive effects of the atmosphere on the scientific throughput of LLAMAS as the telescope tracks across the night sky

Work Experience

Manufacturing Mechanical Engineering Intern *Wentzville, MO*
General Motors *June 2024 – Aug 2024*

- Designed and installed alignment and protective manufacturing equipment that is saving the plant over $150,000 annually
- Lead a feasibility study with the goal of automating part of the Body Shop
- Created standardized procedures to train others to operate the plant's new 3D printer
- Audited the entire plant to ensure all conveyor belts and drives were properly guarded

Design Engineer Consultant *Cambridge, MA*
Fabri Inc. *Jan 2024 – June 2024*

- Designed and built a filtration system for an IPA wash tank for 3D printed parts
- Developed a thermal imaging system to prevent a chemical fire within the printer and save hundreds of dollars of photopolymer resin from going to waste
- Installed a remote monitoring system to track the live progress of a print job

Activities/Volunteering

MIT OpenCourseWare Faculty Advisory Committee *Cambridge, MA*
Committee Member *Sept 2024 – Present*

- Recommended ways to allocate funds for the prosperity of OWC and invented ways to increase community "in-reach" to incentivize more professors to contribute to free, open learning

MIT Faculty Subcommittee on the HASS Requirement *Cambridge, MA*
Committee Member *Sept 2024 – Present*

- Met with MIT Faculty to support and monitor the development of innovative subjects and changes to the Humanities, Arts, and Social Sciences at MIT
- Discussed the benefits and drawbacks of implementing Artificial Intelligence in the classroom, particularly in writing-intensive courses which are most impacted by Large Language Models

Compass Project *Cambridge, MA*
Student Advisory Board Member *Sept 2024 – Present*

- Designed lessons for a new MIT class: 21.01 - Love, Death, and Taxes: How to Think – and Talk with Others – about Being Human

MIT Individualized Tutoring for English and Citizenship *Cambridge, MA*
Tutor Mentor *Feb 2023 – Dec 2023*

- Tutored non-native English speaker immigrants in the Boston Area on US Civics Questions and Conversational English for their US Citizenship exams
- Planned, organized, and led weekly office hours to offer extra help for any program member looking for extra practice with spoken conversational English

Theta Tau Professional Engineering Fraternity *Cambridge, MA*
Judicial Committee Chair *Sept 2022 – Sept 2023*

- Led a group of fraternity members in reviewing disciplinary action decisions

Technical Skills

CAD: SolidWorks, Siemens NX, Fusion360, Onshape, PolyWorks CMM

Programing Languages: Python, MATLAB, Arduino, C++

Engineering Skills: FEA, DFM, GD&T, CAM, CNC Mill & Lathe, Engineering Drawing