Rebecca McCabe

rgm222@cornell.edu ♦ (484) 895-8470 ♦ Ithaca, NY ♦ https://rebecca-mc.wixsite.com/projects ♦ github.com/rebeccamccabe

Seeking full-time role in renewable energy field. Expert in multiphysics (fluid, structural, electromagnetic) modeling and dynamic systems design.

EDUCATION

Cornell University, Ithaca, NY — Expected May 2026
- Ph.D. student in Mechanical Engineering, marine renewable energy systems design and optimization.
- Courses: Multidisciplinary Design Optimization, Dynamics, Feedback Control, Multivariable Control, Stochastic Control, Systems Architecture, Energy Systems, Energy Economics, Wind Power, Fusion, Renewable Simulation, Hydrodynamics, Math Modeling, Optimization Under Uncertainty, Leadership.

Massachusetts Institute of Technology, Cambridge, MA — June 2021
- B.S. in Mechanical Engineering with concentration in controls and systems design. GPA 4.5/5.0.
- Courses: Feedback Control, State Space (grad), Nonlinear Control (grad), Circuits, Power Electronics (grad), Robotics, Underactuated Robotics (grad), Electromagnetics (grad), Measurement, Materials, Thermo-Fluids I & II, System Design.
- Thesis: Electromagnetic & Systems Design of Permanent Magnet Synchronous Motor for an Electric Vehicle.

TECHNICAL EXPERIENCE

Cornell Symbiotic Engineering & Analysis Lab, *Graduate Researcher, Wave Energy Systems* — Aug 2021 – Present
- Developed and integrated scalable first-principles fluid, dynamic, economic, and structural models.
- Validated and benchmarked with existing numerical models: 1000x faster runtime, <10% error.
- Released models open source with version control, continuous integration, and documentation.
- Reduced cost of ocean wave energy device by 57% using multidisciplinary design optimization.
- Demonstrated new design workflow using cost-benefit analysis of grid operation and emissions.
- Led and collaborated with interdisciplinary teams, directly supervising 38 students in 5 years.

Infinite Cooling (climate-tech startup alumnus of Greentown Labs), R&D Team, *Controls Intern* — May – Aug 2023
- Built python industrial process simulation of cooling tower evaporation, fan control, & plant efficiency.
- Demonstrated optimal controller's potential to save $50k/yr in energy, water, fuel, and process value.

MIT 16.810 Engineering Design and Rapid Prototyping, *Teaching Assistant and Lecturer* — Jan 2022, 2023, 2024
- Developed and delivered lectures on heat and mass transfer. Created process modeling code.

National Renewable Energy Laboratory, Marine Energy Group, *Electric Machine Analysis Intern* — Jan – Aug 2021
- Designed wave energy electric powertrain using Simulink model. System survived ocean test.
- Computed hydrodynamic coefficients for variable-geometry wave device using a numerical solver.

Tesla Motors, *Systems Architecture and Powertrain Performance Modeling Intern* — May – Aug 2020
- Developed model and procedure to optimize high voltage system requirements for safety & feasibility.
- Implemented Simulink controller to optimally regulate battery temperatures during fast-charging.
- Generated graphical reports to communicate vehicle lap simulation results to company leadership.

MIT Formula SAE Team, *Systems Architect; Simulation Lead; Thermal Control Engineer* — Sep 2017 – June 2021
- Led 10-person subteam to select optimal vehicle architecture consistent with goals and timeline.
- Modeled transient & steady thermodynamics of battery & electric motor to inform design & control.
- Managed MATLAB simulation repository in GitHub. Authored 750+ commits and reviewed all PRs.
- Tested 100 kW electric motor to validate field-weakening model and tune field-oriented controller.

NASA Jet Propulsion Laboratory, Group 347C / 347R, *Robotic Systems Engineering Intern* — June – Aug 2019
- Analyzed heat transfer of rover vision cameras using forced convection Nusselt correlations.

SKILLS AND ACTIVITIES

- **Software**: Matlab, Simulink, Git, Python, Bash, Arduino ● **Modeling**: thermofluids, multiphysics, design optimization
- **Leadership**: MIT Gordon Engineering Leadership Program 2019-20; Cornell Engineering Leadership Certification 2022; Cornell Women Entrepreneurs 2021; Inclusive Leaders Academy 2022; Cornell Neurodiversity Club President 2023-25.
- **Cofounder & CTO**: GAIA, a national college engineering competition for impact-focused global sustainability. 2022-25.

AWARDS

- **Cornell Engineering**, *Emerging Scholar Award*, 2025; *Social Innovation Award,* 2023; *Energy & Environment Prize,* 2022.
- **US Dept. of Energy**, *Power at Sea Prize,* lead, 2025. ● **UMERC Conference**, *Best Presentation*, 2024 & 2025.
- **ASME**, *Design Engineering Diversity Fellowship*, 2022. ● **NSF**, *Graduate Research Fellowship Program* awardee, 2022.
- **MIT Mechanical Engineering**, *DeFlorez Award for Outstanding Ingenuity,* 2019 & 2021; *Best First-Time Presenter,* 2020.