

RRG Research Impact and Group Values

The Robust Robotics Group (RRG) is led by Nick Roy and composed of graduate, post-doctoral, and undergraduate researchers in addition to engineering staff. The mission of RRG is to develop software that enables unmanned vehicles to operate with a very high degree of autonomy in the air, on the ground, in the water, and alongside human collaborators. We believe that robots should be able to operate independently over long distances and long time periods in order to carry out complex missions, and that robots should be able to work with human partners as easily as people work with each other. Key questions that drive our research include:

- What do we want the robot to do that it cannot do right now? Why can't it?
- What is the underlying principle to a proposed solution that others can use?
- What was previously unknown prior to our research?
- What is learned from field applications of our research?
- What are the implications of our findings and the broader contexts for our work?

Doing Good Research

RRG is affiliated with the Embodied Intelligence research community in the Computer Science and Artificial Intelligence Laboratory (CSAIL) at MIT. Research topics that might best capture the breadth of our work include: robotic navigation, representation and model learning, reinforcement learning, decision-theoretic planning, statistical inference, and artificial intelligence.

A premium is placed on field demonstrations of proposed solutions to technical questions, software quality and maintenance, reproducibility, rigorous comparison to prior work, and communicating results. To these ends, we maintain centralized software repositories and periodically discuss best software practices, share our code with collaborators, post results to our website and media channels, and as individual research teams aim to publish regularly.

Evaluating Broader Impacts of Our Research

By nature of our research process, we release our ideas, tools, and findings for anyone to use. While we recognize that not all potential uses of research can be known, we will ensure that the proposed benefits of our research will not perpetuate systems of or be tools for inequality. Further, we will not work on projects designed to directly inflict harm onto others or explicitly enable other systems to do so. Datasets featuring people used in our work will be appropriately handled.

Actively Creating an Inclusive Community

Autonomous robotics is viewed as a team sport in the group, and collaborative activities are welcome and supported both within and outside of the group. To be effective robotics researchers, we must foster a welcoming, inclusive, and equitable community. Senior graduate students are expected to mentor junior graduate students, and all members regardless of seniority are encouraged to ask questions, participate in research discussions, and share in

group responsibilities from day one. Weekly group meetings are scheduled to engage with each others' research, offer advice or feedback, and discuss current events and the impact of robotics research across many disciplines. Undergraduate students are paired with graduate and post-doctoral mentors to scope and execute on projects that are designed with their learning goals in mind and within the expertise of their mentor. We compensate our undergraduate members for their work in the lab.

Members of the lab group are encouraged to engage with the MIT and broader research communities, and efforts outside of the lab are recognized and valued. We affirm that RRG must acknowledge, discuss, learn about, and react to the contexts which affect our members individually and our research as a whole. To this end, we reserve specific times each year to reflect on the state of the group and efficacy of group processes, read literature that examines ethical and moral questions for engineering research, and establish further actions that need to be taken to address diversity, equity, and inclusion.