

The Robotics Institute

Master of Science - Research (MSR) Program

Course Requirements

Must complete a minimum of 168 units; all with a grade of B- or better and overall QPA of a 3.3.

Core Courses

Complete one course from each of the following four areas:

Perception

16-720 Computer Vision (Fall and Spring)
16-722 Sensing and Sensors (Fall)
16-820 Advanced Computer Vision (Fall)
16-822 Geometry-based Methods in Vision (Fall)
16-823 Physics-based Methods in Vision (Spring)

Action

16-711 Kinematics, Dynamic Systems, and Control (Spring)
16-741 Mechanics of Manipulation (Fall)
16-761 Mobile Robots (Spring)

Cognition

15-780 Graduate Artificial Intelligence (Spring)
10-601 Machine Learning (MS Level –Fall and Spring)
10-701 Machine Learning (PhD Level –Fall and Spring)
16-831 Introduction to Robot Learning (Fall and Spring)

Math Foundations

16-811 Math Fundamentals for Robotics (Fall)

Elective Courses

At least 36 credits of elective courses comprised of at least 3 courses. These can be drawn from appropriate graduate courses in Robotics and in related disciplines at Carnegie Mellon. Core courses and other graduate level RI courses are pre-approved as electives. **To request elective approval, e-mail the Program Head, Dimi Apostolopoulos, and “CC” Barbara Jean (B.J.) Fecich. Once approved electives will be visible on the Stellic audit system linked through SIO.**

Research and Thesis Requirements

Research Advisor

MSR students beginning in the fall semester must have a faculty advisor by October 31st. Email Dimi, B.J. and the faculty research advisor indicating a mutually agreed-upon match has been made. The faculty research advisor must have a faculty appointment (or courtesy appointment) in the Robotics Institute. A faculty member who accepts the master’s research advisor relationship is never financially responsible for the master’s student, except in the cases when a research assistantship has been explicitly negotiated.

Thesis Committee

A signed committee form should be submitted before you register for your third semester. It must be submitted prior to registration of your fourth (or final) academic semester. Most students will have three individuals on their committee, two faculty members: your advisor and additional faculty member from a different research group or project (students who are co-advised will have three faculty members) and one RI PhD student who has successfully completed their second year in the PhD program.

Supervised Reading and Research (16-997)

The faculty advisor will assign a pass / fail grade every semester for the supervised research. A minimum of 84 units, will come from supervised *RI Reading and Research* (R&R- 16-997). MSR students will be working with a lab group on assigned projects to develop a research thesis document. Students will conduct research and create material results that will give form to the thesis document and presentation.

First Year Check-List

Oct 31st Faculty Advisor Selection Due (Via Email) (Those beginning in Spring have until by April 15th)

April- August [Master's Committee Form](#) Due (Via .pdf Form) (Those beginning in Spring have until August 31st) Confirm Summer Plans (Research or Internship) with MSR Program Manager, B.J. Fecich.

Thesis Presentation and Document

In both the presentation and document, the student should convey a mastery of a topic related to contemporary robotics research. The student should present a summary of work related to the topic from the current research literature and should clearly describe how his/her research fits into the context of that research. It is not necessary for the student to generate his/her own novel research results that go beyond the current state of art, but of course novel results are welcome and will strengthen the presentation and document.

The student is expected to give an oral thesis presentation (approximately 1hr) in a public venue at Carnegie Mellon. The presentation needs to demonstrate the student's ability to present technical material to a technical audience that is not presumed to have specific expertise in the research area. The student's thesis committee should be in attendance, but committee members may designate proxies to evaluate the presentation and complete the qualifying form.

The student is also expected to deliver a master's Thesis document describing their supervised research. This should be a document for which the student is the sole or principal author. The thesis document should demonstrate a style, organization and clarity that enable researchers in the field to comprehend the problem, method, and results of the research. The thesis should, at a minimum, contain the following sections and ingredients: Title Page (with technical report* number listed), Background, Research Question, Related Work, Methods, Results, and Conclusions. There is not a specific page-based minimum length for the thesis document, but it should follow the [RI Technical Report Format](#).

A final draft of the master's Thesis document must be provided to the committee at least two weeks prior to the scheduled oral presentation to allow for committee feedback. Approval for the oral presentation and the written thesis document are provided by the student's committee members, via the online forms in the [MS Student Review](#) site. (Hardcopies of the forms can also be found on the [MSR Policies and Forms page](#).) Once approved by the student's committee, the Thesis must be archived as a RI Technical Report and uploaded to the [RI Publication Page](#).

The student is responsible for scheduling the oral thesis presentation and advertising it, one week in advance via ri-people@cs.cmu.edu. It is recommended that students schedule their talks at least a month in advance to ensure room and committee member availability. Assistance with room scheduling may be obtained by research advisor's administrative assistant or the MSR Program Manager, B.J. Fecich.

*To obtain the technical report number contact: Victor Valle (vvalle@andrew.cmu.edu)

Second Year Check-List

November Confirm Course Requirement Completion on MS Student Review (<https://gsaudit.cs.cmu.edu>)

February Confirm graduation semester with B.J. Verify information in SIO is accurate.
(Standard graduation is August! Be sure to have research advisor's approval before planning to graduate early in May.)

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| ● Four-Six Weeks Prior to Talk | Book room (Approx 1.5 hrs to allow a half hr for set up.) |
| ● Two Weeks Prior to Thesis Talk number*. | Submit thesis to committee members and request a TR |
| ● One Week Prior to Thesis Talk list. | Advertise talk to RI Community via ri-people@cs.cmu.edu |
| ● Last Day of Semester Classes | Deadline to have oral thesis presentation. |
| ● Semester Final Grade Deadline | Committee Approval Forms and Technical Report Upload due. |

Complete the MSR Post-Graduation Survey <https://forms.gle/TEBeZficzYh2kkpF6>

Commencement Details

To be eligible to participate in the SCS Diploma Ceremony, all committee forms must be submitted, the final thesis paper must be uploaded on the RI website, and the Post-Graduation survey must be completed by the day and time of semester grades for graduating students. You will not be called to walk across the stage or receive your diploma at the SCS Diploma Ceremony if all requirements are not met.

August graduates are invited to join in the commencement activities the May following their degree completion.

Diplomas for August graduates and May graduates who do not attend the SCS Commencement Ceremony are mailed by the HUB. (<http://www.cmu.edu/hub/graduation/index.html>)

Carnegie Mellon University Commencement -

<http://www.cmu.edu/commencement/> School of Computer Science

Commencement - <http://www.cs.cmu.edu/commencement/>

Commencement Check-List

- Register for the School of Computer Science Diploma Ceremony ([RI Commencement RSVP](#))
- [Verify diploma and academic information](#) via Student Information Online (SIO).
- Attend the "[Graduation Fair](#)" to obtain necessary regalia and commencement memorabilia.
- Complete oral thesis presentation, committee approval forms and technical report upload.
- Complete the MSR Post-Graduation Survey <https://forms.gle/TEBeZfzicYh2kkpF6>

Alumni Information

- CMU Alumni Association
<http://www.alumni.cmu.edu/s/1410/alumni/start.aspx?sid=1410&gid=1&pgid=61&cid=160>
- SCS Alumni Engagement
- <http://www.cs.cmu.edu/alumni>
- Permanent Alumni Email Address
<http://www.alumni.cmu.edu/s/1410/alumni/index-social.aspx?sid=1410&gid=1&pgid=3>