

THE UNIVERSITY OF MICHIGAN
REGENTS COMMUNICATION

SUBJECT: Department of Robotics, College of Engineering

ACTION REQUEST: Approval to Establish an Academic Department

EFFECTIVE DATE: December 1, 2021

The College of Engineering requests approval to establish a Department of Robotics. This proposal is the result of extensive discussions between the dean, the College of Engineering Executive Committee, and the faculty of the College of Engineering.

The national and global technology landscape is shifting, and the UM is poised to meet this challenge. The US Bureau of Labor Statistics recently reported that the annual demand for qualified robotics professionals grew by over 13% in 2018 alone. In addition, up to 80% of US industrial employers are facing difficulties filling vacancies for highly skilled technical professionals, including robotics, computer vision, artificial intelligence, and motion control. These statistics are underscored by a growing market. The global industrial and service robotics markets are expected to grow by over 20% year over year (CAGR), reaching a total market of \$310B by 2025. The confluence of a gap in skilled workers and a growing market demonstrates the need to rethink technical higher education. A new program is needed that: i) provides interdisciplinary training in robotics curated to meet current and future technology demands of the robotics workplace; and ii) provides a college major, a clear designation of skills that will enable graduates to compete for the most promising and highly skilled jobs.

The Michigan Robotics Institute was established in 2018 and currently comprises an interdisciplinary group of 27 core faculty members that span 12 departments, coupled with 42 affiliate faculty members that contribute to the breadth and excellence of research. Robotics faculty research expenditures continue to show significant growth, outpacing the addition of new faculty members. Indeed, over the past five years, research expenditures have increased from \$5.6M to \$16.0M, nearly tripling despite the addition of only five faculty members (~20% new faculty). The Institute emphasizes ‘Full Spectrum Robotics,’ with a broad array of faculty research interests, including human-robot interaction, legged and rehab robotics, artificial intelligence, autonomous and connected vehicles, dexterous manipulation, among many other areas. The Institute offers a graduate program in robotics with both M.S. and Ph.D. degrees. Graduate students first matriculated in Fall 2014, and the program currently includes 158 students (87 M.S. and 71 Ph.D.). Since its inception, annual applications have risen to over 1,000 in 2020. The rapid success of the Robotics Institute provides UM with the opportunity for further leadership through the creation of an academic department focused on the discipline of robotics.

Creation of a Department of Robotics will allow our faculty members to continue to lead in robotics education through the development and implementation of an undergraduate degree

program in robotics that would lead to a major in robotics. Market research shows that as many as 40% of current College of Engineering undergraduates expressed interest in a Michigan Robotics major or minor, while 25% of students who were accepted to Michigan but ultimately enrolled elsewhere indicated they might have decided differently if UM currently offered a Robotics degree program. This underscores the need, even the urgency, for launching a full undergraduate Robotics curriculum that will be made possible by the creation of a new Department of Robotics. While the Robotics Institute will continue as a resource to all roboticists across campus, the Department of Robotics will become the home for the robotics undergraduate and graduate degrees that will be offered by the College of Engineering. Any new degrees will be brought forward to the Regents as appropriate.

UM will serve an important long-term need by creating the department, which will focus on teaching and conducting research within the discipline of robotics. Moving now will allow UM to seize national leadership in the field, bringing significant advantages in recruiting outstanding faculty and students, and attracting significant external research support. The College of Engineering Executive Committee unanimously supports the creation of the department, and the Members of the College governing faculty have both concurred with this through an affirmative vote of the faculty.

The dean and Executive Committee of the College of Engineering respectfully request that the Regents endorse this request by the College of Engineering to establish the Department of Robotics, effective December 1, 2021.

RECOMMENDED BY:



Alec D. Gallimore, Ph.D.
Robert J. Vlasic Dean of Engineering
College of Engineering

RECOMMENDATION ENDORSED BY:



Susan M. Collins
Provost and Executive Vice
President for Academic Affairs

December 2021