

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Electrical Engineering and Computer Science

Dmitry Berenson, assistant professor of electrical engineering and computer science, Department of Electrical Engineering and Computer Science, College of Engineering, is recommended for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

Academic Degrees:

Ph.D. 2011 Carnegie Mellon University, Robotics, Pittsburgh, PA
M.S. 2009 Carnegie Mellon University, Robotics, Pittsburgh, PA
B.S. 2005 Cornell University, Electrical and Computer Engineering, Ithaca, NY

Professional Record:

2016 – present Assistant Professor, Department of Electrical Engineering and Computer Science, University of Michigan
2012 – 2016 Assistant Professor, Department of Robotics Engineering and Computer Science, Worcester Polytechnic Institute, Worcester
2011 – 2012 Post-Doctoral Research Associate, Department of Electrical Engineering and Computer Science, University of California, Berkeley, Berkeley, CA

Summary of Evaluation:

Teaching: Professor Berenson is an outstanding educator. In his two years at Michigan, he created two courses integral to the robotics curriculum: EECS 598 (Motion Planning), a version of a graduate course he had taught at his previous institution, and EECS 498 (Intro to Algorithmic Robotics), created to address the needs of students interested in robotics but whose programming backgrounds are limited. His teaching evaluations for Q1 and Q2 average 4.4 and 4.6, respectively. He has graduated one Ph.D. student (from his previous institution) with six more in the pipeline. He has also supervised seven master's students, 19 undergraduate projects, and five post-doctoral scholars.

Research: Professor Berenson is internationally recognized as an expert in motion planning, human-robot interaction, and manipulation of deformable objects. The ultimate goal of his research is to develop algorithms that enable robots to manipulate the physical world as effectively as do humans. Currently, almost all robotic manipulators are either controlled directly by a human, repeat a sequence of user-specified commands, or perform completely pre-programmed behaviors. Professor Berenson's research goal is to make robots more versatile by developing algorithms for manipulation that generalize to more complex and less structured settings. He has already achieved significant success in this endeavor, and is considered a leader among researchers of his generation. His early work on motion planning with constraints is universally lauded for enabling motion-planning algorithms to be applied in poorly structured,

complex settings, and is widely used by others in the field. His recent work on manipulation of deformable objects is seen as addressing a highly important but poorly understood problem, namely that of enabling a robot to interact with deformable objects such as cables or cloth. This is the topic of his recent NSF CAREER award, and has already drawn praise from others in the field for its use of multiple models combined with a multi-armed bandit algorithm to determine which is most effective at a given time.

Professor Berenson is well funded and has been throughout his faculty life. He has had two awards in the NSF National Robotics Initiative program, four awards from the Office of Naval Research, two awards from the Toyota Research Institute, a number of smaller grants, and, finally, an NSF CAREER award. Currently, he has over \$2M in grants for which he is the sole PI and another \$700K from grants for which he is the co-PI. This breadth of funding, including peer-reviewed NSF, federal program manager-led ONR, and industry-led TRI demonstrates that Professor Berenson is able to target his prospective funding applications appropriately and that his work is of interest across these different audiences.

Recent and Significant Publications:

- A. Mohseni-Kabir, C. Li, V. Wu, D. Miller, Benjamin Hylak, Sonia Chernova, D. Berenson, C. Sidner, C. Rich “Simultaneous Learning of Hierarchy and Primitives for Complex Robot Tasks.” *Autonomous Robots (AuRo)*, 2018, Accepted, in press.
- D. McConachie, D. Berenson, “Estimating Model Utility for Deformable Object Manipulation Using Multi-Armed Bandit Methods,” *IEEE Transactions on Automation Science and Engineering*, 15(3), July 2018, 967-979.
- C. Phillips-Grafflin, D. Berenson, “Planning and Resilient Execution of Policies for Manipulation in Contact with Actuation Uncertainty,” *Workshop on the Algorithmic Foundations of Robotics*, 2016.
- J. Mainprice, R. Hayne, D. Berenson, “Goal Set Inverse Optimal Control and Iterative Replanning for Predicting Human Reaching Motions in Shared Workspaces,” *IEEE Transactions on Robotics*, August 2016; 32(4): 897-908.
- D. Berenson, S. Srinivasa, J. Kuffner, “Task Space Regions: A Framework for Pose-Constrained Manipulation Planning,” *International Journal of Robotics Research*, 2011; 30(12): 1435-1460.

Service: Professor Berenson has served the institution at multiple levels since joining UM. He is serving on the ECE Student Activities Committee and is an undergraduate adviser for the CE program. He has played a significant role in the College of Engineering Robotics program, as a member of the Robotics Graduate and Curriculum Committee and by contributing to the Robotics Building Committee. Professor Berenson performs extensive service to the robotics community by serving on technical committees for high profile conferences and organizing workshops at these conferences.

External Reviewers:

Reviewer A: “Compared to his peer group in the field of motion planning, I consider Dmitry Berenson as one of the two leaders of his generation Compared to his peer group in the

entire field of robotics, I consider Dmitry Berenson as a member of a select group who will shape the future of the field...”

Reviewer B: “His work on manipulation planning stands at the forefront of robotics research and has made important contributions to the field.”

Reviewer C: “His work [on manipulation of deformable objects] is novel and fresh and very promising for a problem that has remained open for decades. This is the best work I know of on the topic.”

Reviewer D: “...his research thrust on manipulation of deformable objects is one of the most important new directions for robot manipulation. This is an area that had received relatively little attention, but which is extremely important.”

Reviewer E: “...I think Dmitry is one of the top very few researchers working in robotic manipulation.”

Reviewer F: “...Dmitry’s research addresses problems that are both poorly understood and yet extremely relevant for enabling the next generation of robots. He has advanced the state of the art in motion planning in multiple ways.”

Summary of Recommendation: Professor Berenson is considered a leader in his field of motion planning, and has demonstrated excellence in teaching and service. It is with the support of the College of Engineering Executive Committee that I recommend Dmitry Berenson for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.



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

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