

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Aerospace Engineering

Anouck R. Girard, associate professor of aerospace engineering, with tenure, Department of Aerospace Engineering, College of Engineering, is recommended for promotion to professor of aerospace engineering, with tenure, Department of Aerospace Engineering, College of Engineering.

Academic Degrees:

Ph.D.	2002	University of California at Berkeley, Ocean Engineering, Berkeley, CA
M.S.	1998	Florida Atlantic University, Ocean Engineering, Boca Raton, FL
Diploma	1997	Ecole des Mines d'Ales, Engineering (Computer Science Major), Ales, France

Professional Record:

2012 – present	Associate Professor (with tenure), Department of Aerospace Engineering, University of Michigan
2006 – 2012	Assistant Professor, Department of Aerospace Engineering, University of Michigan
2004 – 2006	Assistant Professor, Department of Mechanical Engineering, Columbia University, New York, NY
2002 – 2004	Post-Doctoral Fellow and Lecturer, Department of Mechanical Engineering, University of California at Berkeley, CA

Summary of Evaluation:

Teaching: Professor Girard's efforts as an instructor is reflected by a Silver Shaft award, course evaluations, and student letters. She has a history of strong teaching scores across both graduate and undergraduate courses. Letters from past and current students uniformly praise her effectiveness as a classroom teacher and as a research mentor. She has taught or co-taught 14 courses, an unusually large number, including four newly developed courses. Professor Girard makes a special effort to connect with every student in her classes to foster a sense of community, and she solicits regular feedback through a physical "drop box" for comments and questions. Professor Girard expands the boundaries of her courses through "Ask Me Anything" sessions as well as presentations on music, art, engineering policy, political and social aspects of the profession, and anything that can enrich the students' educational experience. She is a well-spoken and captivating instructor who is truly committed to the learning experience of her students. Professor Girard has graduated five Ph.D. students as chair and 11 as co-chair. She has also advised numerous M.S. and undergraduate students and is active in mentoring post-doctoral scholars.

Research: Professor Girard has established herself as a leading researcher in multivehicle autonomous systems. Among a diverse range of topics, her work encompasses modeling for flapping-wing aircraft, analysis of systems of autonomous and human-driven ground vehicles, pursuit and evasion problems, and robust solutions to traveling salesman problems. With papers in the top journals in her field, she has developed theory, techniques, and algorithms that guide innovative control design for addressing hard problems of practical importance. Her H-index and the rate of growth of her citation count are strong at her career stage and show that her work is having a substantive and growing impact on the field. She has given invited talks at several recent meetings, including one recently in Norway. For nine years, she served as the director of an AFRL center that

funded a team of researchers at multiple universities—a singular achievement for a faculty member at her rank. Currently, she is a PI or co-PI on grants from the US Army through the Automotive Research Center and Ford, showing the value that these organizations place on the proven and future impact of her work. As her published work demonstrates, she possesses the fortitude to attack new problems in novel and distinct directions. She has demonstrated the ability to collaborate productively with these and other colleagues, bringing complementary ideas and expertise. Her recent research on electric aircraft shows that she is continuing to pursue new and important directions and opportunities in emerging areas. She has been recognized with a number of awards, including a recent College of Engineering Ted Kennedy Family Faculty Team Excellence Award (2021) and Fulbright Scholarship (2021). She is also an associate fellow of the AIAA.

Recent and Significant Publications:

- A. Berning, A. Girard, I. Kolmanovsky, and S. D'Souza, "Rapid Uncertainty Propagation and Chance-Constrained Path Planning for Small Unmanned Aerial Vehicles," *Advanced Control for Applications*. 03/2020; 2(1).
- R. Sutherland, I. Kolmanovsky, and A. Girard, "Attitude Control of a 2U Cubesat by Magnetic and Air Drag Torques," *IEEE Transactions on Control Systems Technology*, 05/2019; 27(3): 1047-1059.
- Y. Yildiz, I. Kolmanovsky, and A. Girard, "Game-Theoretic Modeling of Driver and Vehicle Interactions for Verification and Validation of Autonomous Vehicle Control Systems," *IEEE Transactions on Control Systems Technology*. 09/2018; 26(5): 1782-1797
- M. Niendorf and A. Girard, "Exact and Approximate Stability of Solutions to Traveling Salesman Problems," *IEEE Transactions on Cybernetics*, 02/2018; 48(2): 583-595.
- G. Frey, C. Petersen, F. Leve, I. Kolmanovsky, and A. Girard, "Constrained Spacecraft Relative Motion Planning Exploiting Periodic Natural Motion Trajectories and Invariance," *AIAA Journal of Guidance, Control and Dynamics*, 12/2017; 40(12): 3100-3115.

Service: Professor Girard has served as a member of the graduate and undergraduate committees, and she led her department's faculty search committee in 2019-20. She currently serves as an associate editor of two journals, including the top controls application publication. She has mentored female high school students, contributing directly and substantially to DEI. She is also the developer of Quadcopter Quidditch, which, through a fun and challenging venue, has given hundreds of high school students the opportunity to learn about opportunities in higher education in general and aerospace engineering in particular. Professor Girard received funding for her effort from the UM Center for Educational Outreach, and she received internal recognition on outreach for STEM education with a Claudia Joan Alexander Trailblazer Award as well as a Creative, Innovative, and Daring (C/I/D) Incentive Award by the College of Engineering.

External Reviewers:

Reviewer A: "Anouck has made substantial and high-quality contributions to a top priority focus area for the Department of Defense (DOD), namely, unmanned air vehicles UAVs. ... Anouck is an exceptional researcher and teacher who has made significant technical contributions of great value to the United States Air Force (USAF) in the area of UAV cooperative control. ... She has proven herself to be an extremely important member of the guidance, control, and dynamical systems community."

Reviewer B: "My own opinion is that her articles address important problems and make solid technical contributions... Her publication record is strong, and the quality of her papers is impressive. Her funding record is solid, and she is an active member of her academic community

who enjoys a reputation as a serious scholar. She would certainly be promoted in my department at [my institution].”

Reviewer C: “I am also excited by her work in networks of interacting human and robot agents. This area is important for a number of application domains, and in particular shared traffic. Anouck’s paper ‘Game Theoretic Modeling of Driver and Vehicle Interactions for Verification and Validation of Autonomous Vehicle Control Systems’ is an exceptional examination of this problem.”

Reviewer D: “Architectures for autonomous systems with appropriate hierarchies and structures may seem like something of a dry topic but if you have ever seen one of Anouck’s presentations, you will walk out thinking it has to be the most interesting thing in the world. She brings enthusiasm and sheer joy to her work and to her presentations in a manner that is immediately contagious.”

Reviewer E: “Dr. Girard’s contributions to date are characterized by a balanced mix of innovative and relevant research, excellence in teaching, and influential service activities. She is a valuable member of your department. I am therefore pleased to recommend her for promotion to Full Professor in your department.”

Summary of Recommendation: Professor Girard has established herself as an outstanding researcher, superb instructor, and a valued colleague. Her research is innovative and impactful. As an instructor, she is dedicated, committed, and appreciated by her students. Her outreach activities in introducing young people to the opportunities of higher education and her mentoring of pre-college students set a paradigm that others throughout the university can aspire to in fulfilling the promise and goals of DEI. It is with the support of the College of Engineering Executive Committee that I recommend Anouck R. Girard for promotion to professor aerospace engineering, with tenure, Department of Aerospace Engineering, College of Engineering.



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

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