

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

Ella M. Atkins, associate professor of aerospace engineering, with tenure, Department of Aerospace Engineering, and associate professor of electrical engineering and computer science, without tenure, Department of Electrical Engineering and Computer Science, College of Engineering, is recommended for promotion to professor of aerospace engineering, with tenure, Department of Aerospace Engineering, and professor of electrical engineering and computer science, without tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

Academic Degrees:

Ph.D. 1999 University of Michigan, Computer Science & Engineering  
M.S. 1995 University of Michigan, Computer Science & Engineering  
M.S. 1990 Massachusetts Institute of Technology (MIT), Aeronautics & Astronautics  
B.S. 1988 Massachusetts Institute of Technology (MIT), Aeronautics & Astronautics

Professional Record:

2006–present Associate Professor (with tenure), Department of Aerospace Engineering, University of Michigan  
2007–present Associate Professor, Department of Electrical Engineering and Computer Science, University of Michigan  
1999–2006 Assistant Professor, Department of Aerospace Engineering, University of Maryland

Summary of Evaluation:

Teaching: Professor Atkins' teaching record is strong. She has taught a broad selection of courses at both the graduate and undergraduate level and introduced a number of new courses (AE 552 - Aerospace Information Systems, ROB 550 - Robotic Systems Laboratory, AE 450 - Flight Systems Software and ENGR 151 - Accelerated Introduction to Computer Programming). Her Q1 and Q2 scores are good, often in the mid 4's and those courses with lower scores occurred earlier in her career, indicating a strong improvement. Professor Atkins' unique blend of expertise is a fortunate combination of skills that allows her to be a strong contributor to the educational mission of the department. She strongly engages students outside of class, as well as inside, and brings a dynamic enthusiasm to her teaching. Professor Atkins has graduated 12 Ph.D. students (including two at Maryland). She has another five Ph.D. students at various stages of progress.

Research: Professor Atkins' research is in a relatively new area of aerospace engineering focused on autonomous flight and embedded computing. She has several very highly cited papers (on Google, the top four have 1430/779/696/286 citations, on Scopus, the top four have 1064/546/420/100 citations). Her research involves both theoretical and computational aspects combined with experimental work facilitated by the Autonomous Aerospace Systems Lab, which she founded and directs. This lab involves the efforts of a sizable group of students ranging from undergraduates to Ph.D. students. Professor Atkins' research is leading the way in integrating computer science and aerospace engineering and is having a significant international impact.

### Recent and Significant Publications:

- J. Bradley and E. Atkins, "Optimization and Control of Cyber-Physical Vehicle Systems," *Sensors*, MDPI, September 2015, doi: 10.3390/s150923020.
- S. Balachandran and E. Atkins, "Flight Safety Assessment and Management for Takeoff using Deterministic Moore Machines," *Journal of Aerospace Information Systems*, AIAA, September 2015, doi: 10.2514/1.I010350.
- Z. Li, I. Kolmanovsky, E. M. Atkins, J. Lu, D. Filev and J. Michelini, "Road Risk Modeling and Cloud Aided Safety-based Route Planning," *IEEE Transactions on Cybernetics*, IEEE, accepted (August 2015).
- J. Rufa and E. Atkins, "UAS Navigation in an Urban Environment: A Systems Analysis," *Journal of Aerospace Information Systems*, AIAA, accepted (August 2015).
- C. McGhan, A. Nasir and E. Atkins, "Human Intent Prediction using Markov Decision Processes," *Journal of Aerospace Information Systems*, AIAA, Vol. 12, No. 5, pp. 393-397, May 2015, doi: 10.2514/1.I010090.
- J. Bradley and E. Atkins, "Coupled Cyber-Physical System Modeling and Coregulation of a CubeSat," *Transactions on Robotics*, IEEE, Vol. 31, No. 2, pp. 60-74, April 2015, doi: 10.1109/TRO.2015.2409431.
- D. Yeo, E. Atkins, L. Bernal and W. Shyy, "Fixed-Wing Unmanned Aircraft In-Flight Pitch and Yaw Control Moment Sensing," *Journal of Aircraft*, AIAA, Vol. 52, No. 2, pp. 403-420, March 2015, doi: 10.2514/1.C032682.

Service: Professor Atkins carries a heavy load in the department, college and outside U-M. Her service at the national level is exemplary. She has served on a number of important committees: National Research Council Study Committees and similar advisory groups to other organizations such as the Keck Institute for Space Studies, and the Defense Science Study Group. In several cases, she has been a co-author of reports produced by these influential committees. At the college level, she has been a leader on the Unmanned Systems Committee organized by UMOR, which is working intensely with both the State of Michigan and the FAA to set new policy for unmanned aircraft and their use by researchers, businesses and hobbyists.

### External Reviewers:

Reviewer A: "She is well respected in the field and will likely continue to have strong national impact on the direction of UAS research. In particular, I expect her to be a major player in helping to shape policy for UAS flying in the NAS."

Reviewer B: "...She is a leading voice pushing the FAA to craft rules that maintain safety and enable autonomous aircraft to be commercially deployed. Her work in this area has enormous implications and is helping to share future autonomous air vehicle development . . . she fits in well with faculty promoted to full professor in [my institution]."

Reviewer C: "Ella has been a key contributor and leader in the integration of computer science into aerospace systems both at the educational and research level. I would support this promotion . . . she has been at the forefront in developing new courses addressing the key issues in the aerospace industry."

Reviewer D: "...the future potential of the candidate is very high – it is clear that the research program is accelerating and that she is [a] well known researcher in a very active field. Furthermore, the frequent requests to be on panels and review boards indicates that her views are highly respected in the community."

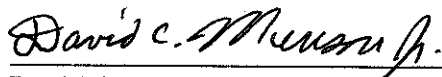
Reviewer E: "Professor Atkins is entirely qualified for promotion to the position of Professor at a major research university"

Reviewer F: "She is sought out to participate in centers and serve on committees related to autonomous systems in aerospace, indicating that her visibility in the field is at a high level."

Reviewer G: "Dr. Atkins' contributions to date are characterized by a balanced blend of innovative and relevant research, excellence in teaching, and influential service activities. She is – and I am sure she will continue to be – a real asset to your Department. . . . I have no doubt that she would be promoted if she were at [my institution] or any other top-tier institution."

Reviewer H: "...Ella has attained considerable visibility within several important communities, notably AIAA, NASA, and FAA."

Summary of Recommendation: Professor Atkins is an excellent research mentor and teacher of high quality. She has become a leader in the area of autonomous and embedded aerospace systems and is extremely well-recognized by her peers. She is an outstanding citizen and colleague with excellent service contributions. It is with the support of the College of Engineering Executive Committee that I recommend Ella M. Atkins for promotion to professor of aerospace engineering, with tenure, Department of Aerospace Engineering, and professor of electrical engineering and computer science, without tenure, Department of Electrical Engineering and Computer Science, College of Engineering.



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David C. Munson, Jr.  
Robert J. Vlasic Dean of Engineering  
College of Engineering

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