**Approved by the Regents**
**May 16, 2024**

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

James W. Cutler, 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:

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| Ph.D. | 2005 | Stanford University, Electrical Engineering, Stanford, CA |
| M.S. | 1998 | Stanford University, Electrical Engineering, Stanford, CA |
| B.S. | 1996 | Purdue University, Computer and Electrical Engineering, West Lafayette, IN |

Professional Record:

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| 2014 – present | Associate Professor, Department of Aerospace Engineering, University of Michigan |
| 2014 – 2021 | Associate Professor, Climate and Space Sciences and Engineering, University of Michigan |
| 2008 – 2014 | Assistant Professor, Department of Aerospace Engineering, University of Michigan |
| 2008 – 2014 | Assistant Professor, Climate and Space Sciences and Engineering, University of Michigan |
| 2002 – 2008 | Research Scientist, Quakefinder, LLC, Palo Alto, CA |

Summary of Evaluation:

Teaching: Professor Cutler has made significant contributions to the educational goals of the department by providing immersive, experiential learning opportunities in space systems. He has upgraded a senior capstone design class to focus on real-world space mission design, emphasizing small satellites, and he has taught four other core undergraduate and graduate courses. He has advised the directed study of 67 graduate (M.S.) students and 58 undergraduate students. He has also advised 14 projects for EECS 430 and AEROSP 405 classes impacting a total of over 50 students. Professor Cutler has put in substantial effort in developing new courses in the department at both undergraduate and graduate levels. He recently developed a new course AEROSP 495 (Cubesat Flight Laboratory), in which students operate, launch, test, build, and design an industry-standard prototype spacecraft. The graduate class AEROSP 740 (Advanced Cubesat Lab) builds off of AEROSP 495 to provide experiential learning opportunities for students on space hardware. During the last two years, Professor Cutler has also created a course sequence to immerse students in the design, build, test, flight, and operation of space vehicles in collaboration with the UM Space Institute. He has graduated six Ph.D. students who have gone on to become leaders and entrepreneurs in successful companies, and faculty in academia.

Research: Professor Cutler improves space mission performance through the design, optimization, and fabrication of small, low-cost spacecraft. He leads the Michigan Exploration Laboratory (MXL), which has developed nine cubesat missions to support science and technology demonstration objectives. MXL engages graduate and undergraduate students at all levels of the cubesat missions, from design to fabrication and operation. Professor Cutler has used the cubesat platform to develop and demonstrate novel hardware and algorithms, including fault-tolerant software and interference-mitigating sensors. His research also includes ground-based systems for communication and orbit determination, an area to which he has applied optimization algorithms for maximizing space-to-ground data download bandwidth, and in which he has developed innovative tracking solutions for satellite arrays using unique light-emitting diode identifiers. Professor Cutler has published over 30 journal papers and over 70 conference proceedings, and has a total of 3,434 citations and an h-index of 29 on Google Scholar. He has funded his research through over 50 grants and contracts from JPL, the NSF, and NASA, among others. Recently, JPL has awarded Professor Cutler $1.1M to develop flight avionics for a seismic sensor to be deployed on the far side of Earth's moon. He has also co-founded two companies, Astronautical Development LLC, which develops radio telemetry components for small satellites, and Skybox Imaging, which equips small satellites with high-resolution imaging, and which was acquired by Google and subsequently Planet.

Recent and Significant Publications:


Kuevor, Prince E., Ghaffari, Maani, Atkins, Ella M., Cutler and James W., "Fast and Noise-Resilient Magnetic Field Mapping on a Low-Cost UAV Using Gaussian Process Regression," *Sensors*, 23(8), 3897, 2023.

Cutler, J and Beningo, J., "Watchdog-Based Fault Recovery on Nanosatellites," *Journal of Aerospace Information Systems*, 19(8), 522-529, 2022.

Piergentili, Fabrizio, et al., "Satellite early identification through LED observations: First in-orbit results from WildTrackCube-SIMBA," *Acta Astronautica*, 193, 163–172, 2022.

Sharma, Srinagesh and Cutler, James W., "Robust orbit determination and classification: A learning theoretic approach," *Interplanetary Network (IPN) Progress Report*, 42, 203, 2015.

Spangelo, Sara, Cutler, James, Gilson, Kyle and Cohn, Amy, "Optimization-based scheduling for the single-satellite, multi-ground station communication problem," *Computers & Operations Research*, 57, 1–16, 2015.


Service: Professor Cutler is active in service responsibilities to the department, college, university, and to his profession, through his participation in various committees and panels, through his project-based classes, and through his administrative duties. He serves on the departmental DEI and Outreach Committee, and the Instructional Lab Committee; he has advised two college-wide advisory boards, including SPRL; he reviews submissions to major journals and funding agencies in his field; and he has provided subject matter expertise at the national level. Professor Cutler also serves as the associate director of the University of Michigan Space Institute, which is the hub of space research across the university campus, and as director of the Peach Mountain Radio Astronomy Site, which Professor Cutler plans to upgrade to support his research and teaching efforts.

External Reviewers:
Reviewer A: "I find it remarkable that in addition to leading the large number of successful space missions, Prof. Cutler has also been productive in publishing papers at a rate of more typical for laboratory-based experimentalist with over 30 journal papers mostly in excellent aerospace archival journals…"

Reviewer B: "Dr. Cutler's work is a rarity, since he is not another professor adding space debris into low earth orbits, he is actually exploiting low-cost space vehicles to benefit the human quest for space exploration. In other words, Dr. Cutler's research quality represents the highest aspiration for all those involved with nano-satellite research."

Reviewer C: "By pairing fundamental research objectives with flight system development and space mission operations, Dr. Cutler offers a unique and critically important approach to training the next generation of space systems engineers."

Reviewer D: "Jamie's build-up of the Michigan Exploration Laboratory has been a success, with its many flight missions with sponsors including NASA, JPL and NSF, as well as seasoned graduates who have since become leaders in the field themselves..."

Reviewer E: "I have pursued flight projects in a way that resembles Dr. Cutler's strategy although, in all honesty, he has done it better than I … Dr. Cutler has been extraordinarily productive, acceptably so in traditional journal publications but truly world-class in his work on spaceflight missions and associated operations."

Summary of Recommendation: Professor Cutler is a prominent researcher in the field of small satellites who uniquely combines fundamental research in space science and technology with fabrication and flight experiments. He is also an excellent teacher who has incorporated timely space-relevant material into the curriculum and has developed highly popular hands-on courses in small satellite manufacturing. He is active in many forms of service from the departmental to the national level. It is with the support of the College of Engineering Executive Committee that I recommend James W. Cutler for promotion to professor of aerospace engineering, with tenure, Department of Aerospace Engineering, College of Engineering.

Steven L. Ceccio, Ph.D.
Interim Dean of Engineering
Vincent T. and Gloria M. Gorguze Professor of Engineering
College of Engineering

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