

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Engineering  
Department of Nuclear Engineering and Radiological Sciences

Alexander G.R. Thomas, associate professor of nuclear engineering and radiological sciences, with tenure, Department of Nuclear Engineering and Radiological Sciences, associate professor of electrical engineering and computer science, without tenure, Department of Electrical Engineering and Computer Science, College of Engineering, and associate professor of physics, without tenure, Department of Physics, College of Literature, Science, and the Arts, is recommended for promotion to professor of nuclear engineering and radiological sciences, with tenure, Department of Nuclear Engineering and Radiological Sciences, professor of electrical engineering and computer science, without tenure, Department of Electrical Engineering and Computer Science, College of Engineering, and professor of physics, without tenure, Department of Physics, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D. 2006 Imperial College, Plasma Physics, London, England

Professional Record:

2018 – present	Associate Professor (without tenure), Department of Electrical Engineering and Computer Science, University of Michigan
2015 – present	Associate Professor (without tenure), Department of Physics, University of Michigan
2014 – present	Associate Professor (with tenure), Department of Nuclear Engineering and Radiological Sciences, University of Michigan
2008 – 2014	Assistant Professor, Department of Nuclear Engineering and Radiological Sciences, University of Michigan
2006 – 2008	Research Associate, Plasma Physics Group, Imperial College, London, England

Summary of Evaluation:

**Teaching:** Professor Thomas has a strong record of teaching. He has taught eight courses, including five undergraduate classes, two of which were large enrollment freshman classes. He initiated and taught a new course: Computational Plasma Physics, NERS574. His teaching evaluations have been very good. Student letters have been uniformly positive, commending Professor Thomas for his supportive, patient interactions. He has mentored a large number of students (some 20 undergraduates), several M.S. students and 12 Ph.D. students (seven graduated, four as a co-chair) in his research. His mentoring of students has been outstanding, judging by student comments and the career success of the graduated students he has advised.

**Research:** Professor Thomas has established himself as an international leader in the areas of ultra-high-intensity laser-plasma interactions and laser-plasma based particle accelerators and their application to x-ray/gamma-ray generation. He has garnered over \$5M as the principal investigator and over \$26M as a co-principal investigator while at Michigan. Most recently, he

was awarded, as a co-investigator with Professor Karl Krushelnick, an equipment grant from the National Science Foundation for a \$16M upgrade of the ZEUS laser to establish a user facility with the nation's most powerful laser. His research productivity is strong as evidenced by his 130 peer reviewed journal publications. Other sources of funding include the Air Force Office of Scientific Research, Department of Energy, National Nuclear Security Agency, DoE Office of Fusion Energy, and Defense Advanced Research Projects Agency. His h-index (Google Scholar) is 44, a strong indication of the attention his work has received from the scientific community.

**Recent and Significant Publications:**

- M. Vargas, W. Schumaker, Z.-H. He, K. T. Behm, V. Chvykov, B. Hou, K. Krushelnick, A. Maksimchuk, J. A. Nees, V. Yanovsky, Z. Zhao, and A. G. R. Thomas, "X-ray phase contrast imaging of additive manufactured structures using a laser wakefield accelerator," *Plasma Phys. Controlled Fusion*, 61 (2019).
- Z.-H. He, B. Hou, V. Lebailly, J. A. Nees, K. Krushelnick, and A. G. R. Thomas, "Coherent control of plasma dynamics," *Nat. Comms.* 6, 7156 (2015).
- A. S. Joglekar, A. G. R. Thomas, W. Fox, and A. Bhattacharjee, "Magnetic Reconnection in Plasma under Inertial Confinement Fusion Conditions Driven by Heat Flux Effects in Ohm's Law," *Phys. Rev. Lett.*, 112, 105004 (2014).
- A. G. R. Thomas, C. P. Ridgers, S. S. Bulanov, B. J. Griffin, and S. P. D. Mangles, "Strong Radiation-Damping Effects in a Gamma-Ray Source Generated by the Interaction of a High-Intensity Laser with a Wakefield-Accelerated Electron Beam," *Phys. Rev. X* 2, 041004 (2012).
- A. G. R. Thomas, M. Tzoufras, A. P. L. Robinson, R. J. Kingham, C. P. Ridgers, M. Sherlock, and A. R. Bell, "A review of Vlasov-Fokker-Planck numerical modeling of inertial confinement fusion plasma," *J. Comput. Phys.* 231, 1051 (2012).

**Service:** Professor Thomas has served on seven departmental committees, including his role as an undergraduate program advisor, five years on the curriculum committee, and faculty search committee. For the college, he has served on five committees, including the Faculty Committee on Discipline (as co-chair) and the MIPSE Executive Committee. At the national level, he has been very active on advisory committees and professional societies. Professor Thomas's contributions to DEI are extensive. This includes supervision of many students from under-represented groups. He participated in the Computing CARES initiative, which includes a number of initiatives to improve gender diversity in the CS and CE undergraduate programs. He has also attended several workshops on DEI, and participated in an NSF funded project in collaboration with Oregon State University on women in engineering.

**External Reviewers:**

Reviewer A: "I can attest to his exemplary ability in computational and experimental plasma and laser physics, his [sic] to organize teams and projects, and his strong community leadership. He readily exceeds all of the criteria for this promotion."

Reviewer B: "He has made outstanding advances to the physics of this field, trained excellent students, and made numerous scholarly contributions. All of these accomplishments make him a deserving candidate for the promotion."

Reviewer C: "Professor Thomas is considered by his peers as [sic] star who will surely determine the direction of plasma physics for his generation as did Professors Drake and Y.Y. Lau for theirs."

Reviewer D: "...Alec is an impressively accomplished faculty member who has performed significantly beyond the threshold for promotion to Professor. With his record, a similar promotion in Physics at [my institution] would be very strongly supported by our faculty."

Reviewer E: "Prof. Thomas is a highly recognized researcher in the field of intense laser-matter interaction, in particular in electron acceleration in plasmas and its application to bright X-ray generation. His work is influential."

**Summary of Recommendation:** Professor Thomas is a productive scholar who has achieved international recognition for his contributions to experimental and computational, intense laser plasma interactions and accelerators. His teaching and student mentoring are strong. His service contributions span department, college, university and national committees. It is with the support of the College of Engineering Executive Committee that we recommend Alexander G.R. Thomas for promotion to professor of nuclear engineering and radiological sciences, with tenure, Department of Nuclear Engineering and Radiological Sciences, professor of electrical engineering and computer science, without tenure, Department of Electrical Engineering and Computer Science, College of Engineering, and professor of physics, without tenure, Department of Physics, College of Literature, Science, and the Arts.



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



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Anne Curzan, Dean  
Geneva Smitherman Collegiate Professor of  
English Language and Literature, Linguistics  
And Education  
Arthur F. Thurnau Professor  
College of Literature, Science, and the Arts

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