

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Engineering  
Department of Materials Science and Engineering

Emmanuelle A. Marquis, associate professor of materials science and engineering, with tenure, Department of Materials Science and Engineering, College of Engineering, is recommended for promotion to professor of materials science and engineering, with tenure, Department of Materials Science and Engineering, College of Engineering.

Academic Degrees:

Ph.D.	2002	Northwestern University, Materials Science and Engineering, Evanston, IL
M.S.	1998	Ecole Nationale Supérieure des Mines de Paris, Engineering, Paris, France
B.S.	1996	Université et Marie Curie, Applied Mathematics, Paris, France

Professional Record:

2014 – present	Associate Professor (with tenure), Department of Materials Science and Engineering, University of Michigan
2011 – 2014	Assistant Professor, Department of Materials Science and Engineering, University of Michigan
2008 – 2010	Royal Society Dorothy Hodgkin Research Fellow, Department of Materials, University of Oxford, Oxford, UK
2007 – 2008	3D Atom Probe Research Manager, Department of Materials, University of Oxford, Oxford, UK
2004 – 2007	Staff Member, Materials Physics Department, Sandia National Laboratories, Livermore, CA
2002 – 2004	Post-Doctoral Appointee, Materials Physics Department, Sandia National Laboratories, Livermore, CA

Summary of Evaluation:

Teaching: Professor Marquis has taught two undergraduate classes and two graduate classes at University of Michigan. Her teaching evaluations have been uniformly high. Student reviewers report unanimously that Professor Marquis is an excellent instructor in class who takes time to explain fundamentals, give students the opportunity to work through difficult issues in class, and who is respectful of the difficulties they may encounter with challenging concepts. As an advisor to her graduate students, Professor Marquis gives them the room to grow intellectually while supporting them by pointing out avenues of investigation that they may have missed. She has graduated seven Ph.D. students at UM and Oxford University, and is advising seven more. She has advised or co-advised six M.S. students, supervised 16 undergraduate projects, and mentored seven post-doctoral scholars. Professor Marquis is an outstanding educator and was recognized by the Department of Materials Science and Engineering with the Jon R. and Beverly S. Holt Award for Excellence in Teaching in 2013.

Research: Professor Marquis is an expert in materials characterization, specifically microstructural imaging and analysis using APT and electron microscopy. She is considered a principal force behind advancing APT, coupling imaging with a detailed quantitative analysis to determine the underlying mechanism that control the relevant material properties, defining best data reporting practices, and standardizing interpretation of these data. She is recognized to have challenged her colleagues in this area of study and being on target with her assertions. Professor Marquis uses her skill set to develop new magnesium-based alloys as lightweight materials, new iron-chromium alloys as radiation resistant materials, and to improve the corrosion resistance of metallic alloys in general. She has been highly productive as a scholar, with 94 archival journal articles (half of which have been published in the last five years), 13 refereed conference proceedings papers, and one book chapter. According to ISI, Prof. Marquis's *h*-index is 29, with over 3100 citations. The Google Scholar analysis results in an *h*-index of 35 with over 5100 total citations. She publishes her work almost exclusively in highly reputed journals, including upper-echelon journals such as *Nature Materials*, with a weighted average impact factor of 16.4. By contrast, her average citation rate is 33.7, i.e., twice as high, which attests to the significant scientific impact she has in her field of study. She has raised \$7.86M to support her research in 23 past and 11 current grants. She is the lead-PI on over half of these grants, including a prestigious National Science Foundation CAREER Award in 2014.

Recent and Significant Publications:

- KB Fisher, BD Miller, EC Johns, EA Marquis, "The role of surface deformation in the oxidation response of Type 304 SS in high temperature deaerated water," *Corrosion Science*, 141 88-96 (2018).
- L Yao, T Withrow, O Restrepo, W Windl, EA Marquis, "Effects of the local structure dependence of evaporation fields on field evaporation behavior," *Applied Physics Letters*, 107, 241602 (2015).
- P-W Chu, E LeMire, EA Marquis, "Microstructure of Localized Corrosion Front on Mg Alloys and the Relationship with Anodic Hydrogen Evolution," *Corrosion Science*, 128, 253-264 (2017).
- M Bachhav, GR Odette, EA Marquis, " $\alpha$  precipitation in neutron irradiated Fe-Cr alloys," *Scripta Materialia*, 74, 48-51 (2014).
- Y Dong, A Motta, EA Marquis, "Atom Probe Tomography Study of Alloying Element Distributions in Zr Alloys and their Oxides," *Journal of Nuclear Materials*, 442(1-3), 270-281 (2013).

Service: Professor Marquis is engaged in a broad spectrum of service activities. Internally, she has performed committee work and actively contributed to diversity and climate through her involvement in programs and organizations on campus that address these issues. Externally, she has co-organized and chaired several symposia at conferences for major professional societies and organized focused topical conferences. Notably, she has been a co-chair of a Gordon Research Conference, which is a prestigious appointment and acknowledgment of her professional status. She is the Materials Science editor-in-chief for *MethodsX*, a journal focusing on measurement techniques for materials characterization. She served on the advisory board for another journal, on workshop panels for government agencies, and in various leadership

positions for professional societies. What makes her record stand out is the impact she has on the research enterprise at UM as the director of the core user facility Michigan Center for Materials Characterization, (MC)<sup>2</sup>.

External Reviewers:

Reviewer A: “Overall it’s clear to me that Dr. Marquis is working at the forefront of materials characterization and linking chemical and structural form to processing in particular. ... At [my institution], I believe her case would be successful for promotion.”

Reviewer B: “Prof. Marquis is certainly one of the most visible international experts in atom probe tomography.”

Reviewer C: “I consider Emmanuelle to be one of the top APT experts in the world.”

Reviewer D: “Technically and in terms of her impact in metallurgy, she is one of the best known and regarded faculty you have; you would do well to keep her.”

Reviewer E: “The quality of the work and its impact are borne out by the example papers provided...and by the very impressive record of invited presentations.”

Summary of Recommendation: Professor Marquis is an accomplished leader in the field of physical metallurgy and high-resolution materials characterization. It is with the support of the College of Engineering Executive Committee that I recommend Emmanuelle A. Marquis for promotion to professor of materials science and engineering, with tenure, Department of Materials Science and Engineering, College of Engineering.



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

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