

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

**Approved by the  
Regents  
May 21, 2015**

Donald J. Siegel, assistant professor of mechanical engineering, Department of Mechanical Engineering, College of Engineering, is recommended for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.

Academic Degrees:

Ph.D. 2001 University of Illinois, Physics, Urbana-Champaign  
B.S. 1995 Case Western Reserve University, Physics, Cleveland, OH

Professional Record:

2009 – present Assistant Professor, Department of Mechanical Engineering, University of Michigan  
2005 – 2009 Technical Expert & Group Leader, Ford Motor Company, Dearborn, MI  
2004 – 2005 Post-doctoral Fellow, U.S. Naval Research Lab, Washington, DC  
2001 – 2004 Post-doctoral Researcher, Sandia National Laboratories, Livermore, CA

Summary of Evaluation:

Teaching: Professor Siegel has demonstrated that he is an effective teacher and excellent advisor. He has taught a core sophomore level course, ME235 Thermodynamics. He has also developed and taught two new graduate classes, one in Vehicle Electrification and another in Atomistic Computer Modeling, which are important classes not only for the Department of Mechanical Engineering but for several other departments as well. He developed a new distance-learning short course and offered it to engineers from the automotive industry. He also taught high school students in the “Boot-Camp” supported by a Department of Energy (DoE) education grant and produced videos on “Batteries of the Future” to educate the general public. Professor Siegel has supervised several undergraduate projects through SURE and UROP. The students’ comments show that Professor Siegel is a caring and helpful teacher. He has advised four masters and two Ph.D. students to graduation and is currently advising one masters and seven Ph.D. students. Letters from his graduate students show that he is an excellent mentor and an inspiration to his students. His mentorship is also demonstrated through the publications with his graduate students in high quality journals. Because of these outstanding contributions in education, Professor Siegel was honored with the SAE Ralph R. Teeter Educational Award.

Research: After graduating from the University of Illinois, Professor Siegel worked at the Sandia National Lab, the U.S. Naval Research Lab, and the Ford Motor Company. Before joining U-M, he had already established himself as being at the forefront of applying computational methods to problems in energy storage materials. Since coming to U-M, he has continued to apply computational methods to problems in energy storage but with a much expanded scope including a major move into batteries. Professor Siegel is extremely productive in performing high quality scholarly research and has developed a strong program at U-M. He has received many competitive grants from a mix of government and industrial sponsors, such as NSF, DoE, Ford, and the Robert Bosch Corporation; including the NSF CAREER award. Overall, he has been actively publishing research findings in prestigious journals in his field; 37 journal papers total with 20 of them published since joining U-M. He also has been invited to give numerous presentations at conferences and institutions. His papers are very well referenced by other scholars and researchers, with high *h*-index and citation numbers. In addition, he has four patents awarded and three more pending. Because of his research visibility, Professor Siegel has been named a Frontiers

of Engineering Fellow by the NAE and a Kavli Frontiers of Science Fellow by the National Academy of Science. He was also recognized as a National Academy of Engineering Gilbreth Lecturer in 2014.

#### Recent and Significant Publications:

- G. Vardar, A. Sleightholme, J. Naruse, H. Hiramatsu, D. J. Siegel, and C. W. Monroe, Electrochemistry of Magnesium Electrolytes in Ionic Liquids for Secondary Batteries, *ACS Applied Materials & Interfaces*, accepted (2014), DOI: 10.1021/am5049064.
- A. Biswas, D. J. Siegel, and D. N. Seidman, Compositional Evolution of Q-Phase Precipitates in an Aluminum Alloy, *Acta Materialia* 75, 322 (2014). DOI: 10.1016/j.actamat.2014.05.001.
- F. Tian, M. D. Radin, and D. J. Siegel, Enhanced Charge Transport in Amorphous Li<sub>2</sub>O<sub>2</sub>, *Chemistry of Materials* 26, 2952 (2014). DOI: 10.1021/cm5007372.
- N. Kumar, K. Leung, and D. J. Siegel, Crystal Surface and State of Charge Dependencies of Electrolyte Decomposition on LiMn<sub>2</sub>O<sub>4</sub> Cathode, *Journal of the Electrochemical Society* 161, E3059 (2014). DOI: 10.1149/2.009408jes.
- M. K. Rana, H. S. Koh, H. Zuberi, and D. J. Siegel, Methane Storage in Metal Substituted MOFs: Thermodynamics, Usable Capacity, and the Impact of Enhanced Binding Sites, *Journal of Physical Chemistry C* 118, 2929 (2014). DOI: 10.1021/jp4104273.
- J. Nanda, S. K. Martha, W. D. Porter, H. Wang, N. J. Dudney, M. D. Radin, and D. J. Siegel, Thermophysical Properties of LiFePO<sub>4</sub> Cathodes with Carbonized Pitch Coatings and Organic Binders: Experiments and First-Principles Modeling, *Journal of Power Sources* 251, 8 (2014). DOI: 10.1016/j.jpowsour.2013.11.022.
- Y. Ming, J. Purewal, D. Liu, A. Sudik, C. Xu, J. Yang, M. Veenstra, K. Rodes, R. Soltis, J. Warner, M. Gaab, U. Muller, and D. J. Siegel, Thermophysical Properties of MOF-5 Powders, *Microporous and Mesoporous Materials* 185, 235 (2014). DOI:10.1016/j.micromeso.2013.11.015.
- J. Goldsmith, A. G. Wong-Foy, M. J. Cafarella, and D. J. Siegel, Theoretical Limits of Hydrogen Storage in Metal-Organic Frameworks: Opportunities and Challenges, *Chemistry of Materials* 25, 3373 (2013). DOI: 10.1021/cm401978e.
- M. D. Radin and D. J. Siegel, Charge Transport in Lithium Peroxide: Relevance for Rechargeable Metal-Air Batteries, *Energy & Environmental Science* 6, 2370 (2013). DOI: 10.1039/C3EE41632A.
- H. S. Koh, M. K. Rana, J. Hwang, and D. J. Siegel, Thermodynamic Screening of Metal-Substituted MOFs for Carbon Capture, *Physical Chemistry Chemical Physics* 15, 4573 (2013). DOI: 10.1039/C3CP50622C.

Service: Professor Siegel has an overall record of service that exceeds expectations for faculty members at this stage in their career. Within the department, Professor Siegel has been a great citizen, serving on the Seminar Committee, Honors and Awards Committee, Lay Auto Lab Renovation Planning Committee, Faculty Search Committee, Graduate Program Committee, and Graduate Admissions Committee. He is the faculty advisor to our Society of Automotive Engineers students. Professor Siegel is a project director for the National Center for Energy Storage Research, and a technical area leader for the U.S.-China Clean Energy Research Center for Clean Vehicles. Externally, Professor Siegel has been very active serving the professional community. He has been elected to be on the Executive Committees for American Physical Society (APS) Group on Energy Research & Applications and for APS Forum on Industrial & Applied Physics. He is a member and co-chair of the DoE FreedomCAR Hydrogen Storage Technical Team. He has been an organizer for various conference symposia and has served as a reviewer to many journals and to DoE and NSF.

#### External Reviewers:

Reviewer A: "I believe that in his time at the University of Michigan Professor Siegel has developed one of the leading computational efforts related to energy-storage materials in the country."

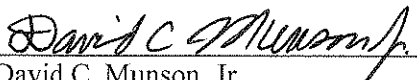
Reviewer B: "In comparison with several other cases at the same career stage that I have evaluated, his package is at the top. Moreover, given his outstanding research activities, his already established national and international reputation is expected to be on the rise."

Reviewer C: "Because of his work, Dr. Siegel is a nationally awarded and internationally known figure in his area. Some of the best theoreticians seek him out for collaboration and he is well known and respected at international conference...Overall, I would put Dr. Siegel well ahead of the norm and in the front rank of his peer group, assistant professors at major Universities. I say this in part because of his contributions and in part because of his recognition, but perhaps most of all because of his success in doing work that opens up new approaches."

Reviewer D: "Dr. Siegel's research spans an impressive breadth (and depth), and addresses critical scientific and technological problem...His recent work on identifying the theoretical limits of the hydrogen storage capability of metal-organic-frameworks (MOFs) will be important for years to come, and can be regarded as a benchmark both from the point of view of applications as well as from the point of view of high-throughput computing (a rapidly rising field). This work is an example of one of his many truly remarkable, high-impact contributions."

Reviewer E: "Computational materials science has undergone considerable growth in recent years, and Don is among a significant cohort of [junior] faculty helping to define and grow the area. Don has the interpersonal and leadership skills to grow into a leading force in the field."

Summary of Recommendation: Professor Siegel has established an outstanding research program at the University of Michigan. Moreover, he is considered to be a highly effective teacher, an excellent advisor, and a great citizen in service. It is with the support of the College of Engineering Executive Committee that I recommend Donald J. Siegel be promoted to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering.

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

May 2015