Approved by the Regents
May 21, 2020

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Electrical Engineering and Computer Science

Johanna Mathieu, assistant professor of electrical engineering and computer science, Department of Electrical Engineering and Computer Science, College of Engineering, is recommended for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

Academic Degrees:

Ph.D.	2012	University of California, Berkeley, Mechanical Engineering, Berkeley, CA
M.S.	2008	University of California, Berkeley, Mechanical Engineering, Berkeley, CA
B.S.	2004	Massachusetts Institute of Technology, Ocean Engineering, Cambridge, MA

Professional Record:

2014 – present	Assistant Professor, Department of Electrical Engineering and Computer Science, University of Michigan.
2012 – 2013	Post-Doctoral Fellow, Power Systems Laboratory, ETH Zurich, Zurich, Switzerland.

Summary of Evaluation:

Teaching: Professor Mathieu has compiled a strong record of teaching at the University of Michigan. She has created two graduate classes, taught two undergraduate power classes, and will teach the undergraduate control systems class in Winter 2020. She has consistently done well, with Q1 and Q2 scores ranging from 4.20 to 4.86. Comments from students in her classes are universally positive. Professor Mathieu has graduated three Ph.D. students, and is advisor or co-advisor to six current Ph.D. students. Letters from her students reflect that they are very appreciative of her support and guidance. Professor Mathieu is active in mentoring undergraduate students through the U-M SROP and SURE programs, and the NSF REU program. She has demonstrated a strong commitment to DEI, including working with numerous domestic students who satisfied Rackham Merit Fellowship criteria.

Research: Professor Mathieu's research is motivated by the sustainability of electricity generation and supply through large-scale integration of renewable resources. Within this context, her work addresses technical challenges that arise due to the variable, non-dispatchable, and highly distributed nature of renewable generation, with a primary focus on the development of load control schemes that adjust electrical demand as a means of compensating for (uncontrollable) changes in generation. Her work encompasses a number of aspects of load control, including the modeling of aggregate load (ensembles), designing control schemes, and the optimal scheduling of distributed energy resources. Professor Mathieu has a strong record of collaboration and publication with 28 journal papers (10 lead-authored by her students), three book chapters, and 70 conference papers. She has papers and/or grants with numerous ECE faculty, as well as with faculty from IOE, AERO, SEAS, the Energy Institute, and the School of Public Policy. She also collaborates widely with colleagues at universities and national labs, and

organizations including Fraunhofer, National Rural Electric Cooperative Association (NRECA), Pecan Street Inc., Detroit Edison (DTE) and Pacific Gas and Electric (PG&E). Her funding record is excellent, with grants from the NSF (including an NSF CAREER), DoE, ARPA-E, and the Sloan Foundation.

Recent and Significant Publications:

M. Vrakopoulou, B. Li and J.L. Mathieu, "Chance constrained reserve scheduling using uncertain controllable loads, Part I: Formulation and scenario-based analysis; Part II: Analytical reformulation," *IEEE Transactions on Smart Grid*, 10(2), 1608-1625, 2019.

B. Li, R. Jiang and J.L. Mathieu, "Ambiguous risk constraints with moment and unimodality information," *Mathematical Programming*, 173(1-2), 151-192, 2019.

G.S. Ledva, L. Balzano and J.L. Mathieu, "Real-time energy disaggregation of a distribution feeder's demand using online learning," *IEEE Transactions on Power Systems*, 33(5), 4730-4740, 2018.

S. Forrester, A. Zaman, J.L. Mathieu and J.X. Johnson, "Policy and market barriers to energy storage providing multiple services," *The Electricity Journal*, 30(9), 50-56, 2017.

J.L. Mathieu, S. Koch and D.S. Callaway, "State estimation and control of electric loads to manage real-time energy imbalance," *IEEE Transactions on Power Systems*, 28(1): 430-440, 2013.

Service: Professor Mathieu has developed a strong service record since her appointment. She has served ECE as the M.S. student advisor for all students in the Power/Energy area, from 2014-16 and again in 2019-20. She has also served on the ECE Faculty Search Committee since 2014. She has served on numerous other committees within ECE and across the university. Professor Mathieu spearheaded the Interdisciplinary Power Systems Seminar, a weekly seminar series inviting leading researchers from around the country. Her commitment to DEI is evident in her participation in a workshop held by ECE to encourage domestic undergraduate students, particularly under-represented students, to apply to graduate school.

Professor Mathieu's external activity is highlighted by her current role as an editor of two journals, *IEEE Transactions on Power Systems* and *IEEE Power Engineering Letters*. Beyond her editorial duties, she has taken on a significant leadership role in the IEEE Power and Energy Society's Smart Buildings, Loads, and Customer Systems (SBLC) Technical Committee. She is currently the vice chair of the committee, implying she will progress to chair over the next few years. She also serves on the Technical Program Committee for the Power Systems Computation Conference, the highest quality conference in the power systems area.

External Reviewers:

Reviewer A: "I think very highly of Dr. Mathieu's academic record and technical contributions. She has already been recognized by her professional community. She has my strongest support for the promotion. I would also say that she readily meets the tenure requirement for my university."

Reviewer B: "…I judge her published work to be of very high quality, creatively advancing practical applications in electric power systems through rigorous control system design and probabilistic analysis, balanced with an excellent understanding of the capabilities and limitations of power system, load, and communication hardware."

Reviewer C: "Dr. Johanna Mathieu has established herself as a leading academic [of her cohort] in the power systems area with her own distinctive high level approach and is developing further very strongly and in a balanced way at the highest international levels. I expect she will progress to the highest levels in academic achievement."

Reviewer D: "A striking feature of Prof. Mathieu's work is that she addresses all these issues in a systematic and rigorous, yet practical, manner. Her work has been and continues to be substantially funded by NSF and various highly competitive Department of Energy programs."

Reviewer E: "Professor Mathieu has done everything right and well. She is the top researcher in the world in demand response controls, optimization, and integration in markets. She has an excellent record of teaching and mentoring. She has awards that recognize her work."

Reviewer F: "… I have observed Johanna at an NSF panel review and her work ethic is outstanding … She also serves as an editor for the IEEE Transactions on Power Systems. This is the most prestigious journal in our area and attests to the confidence shown in Johanna's ability by the editor in chief."

Summary of Recommendation: Professor Mathieu has established herself as an outstanding researcher and inspirational teacher, and has made impressive contributions to service at the University of Michigan and in her technical community. It is with the support of the College of Engineering Executive Committee that I recommend Johanna L. Mathieu for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

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

May 2020