Approved by the Regents
May 16, 2024

PROMOTION RECOMMENDATION
The University of Michigan-Dearborn
College of Engineering and Computer Science

Cheol Won Lee, associate professor of industrial and manufacturing systems engineering, with tenure, Department of Industrial and Manufacturing Systems Engineering, College of Engineering and Computer Science is recommended for promotion to professor of industrial and manufacturing systems engineering, with tenure, Department of Industrial and Manufacturing Systems Engineering, College of Engineering and Computer Science.

Academic Degrees:

Ph.D.	2000	Mechanical Engineering, Purdue University, West Lafayette, IN
M.S.	1994	Precision Engineering and Mechatronics, Korea Advanced Institute of Science and Technology, Daejeon, Korea
B.S.	1992	Precision Engineering and Mechatronics, Korea Advanced Institute of Science and Technology, Daejeon, Korea

Professional Record:

2010-present	Associate Professor, University of Michigan-Dearborn, Dearborn, MI
2004-2010	Assistant Professor, University of Michigan-Dearborn, Dearborn, MI
2000-2004	Senior Research Engineer, Northboro R&D Center, Saint-Gobain Ceramics & Plastics, Northborough, MA

Summary of Evaluation:

Teaching: Professor Lee is rated significantly capable in teaching. Professor Lee has taught three undergraduate industrial and manufacturing systems engineering (IMSE) courses, including IMSE 4835: Computer-Aided Process Design and Manufacturing, IMSE 4825: Industrial Controls, and IMSE 381: Industrial Robots, which he revised significantly. He also has taught undergraduate and graduate engineering probability and statistics courses. Professor Lee co-advised two students in their Ph.D. research and advised two students in their master's thesis. Students consider Professor Lee to be an effective and knowledgeable instructor who is always prepared for class.

Research: Professor Lee is rated excellent in research. Professor Lee's research primarily focuses on making fundamental advances in reduced-order modeling of distributed-parameter systems, estimation, control, and optimization techniques and their applications to modeling, design, and control of manufacturing processes and energy storage systems. He consistently published peer-reviewed papers in highly respected scholarly journals. Many of these papers he published with his students or as a sole author. As a principal investigator (PI), since 2018 he secured research funding of $1,058,326. He is also a co-PI on the $432,400 National Science Foundation (NSF) Major Research Instrumentation award.

Recent and Significant Publications:

Xiang, L., Lee, C.W., Zikanov, O., Abuhegazy, M., and Poroseva, S., 2023, "Reduced Order Modeling of Transport of Infectious Aerosols in Ventilated Rooms," *Physics of Fluids*, Vol. 35, Issue 7, 077122, Impact Factor: 4.6, H5-Index: 64.

Makki, M., Ayoub, G., Lee, C.W., Bae, C., and Colin, X., 2023, "Effect of Battery Fast Cyclic Charging on the Mechanical and Fracture Behavior of the Lithium-Ion Battery Separator," *Polymer Degradation and Stability*, Vol. 216, 110469, Impact Factor: 5.9, H5-Index: 53.

Makki, M., Ayoub, G., and Lee, C.W., 2023, "Modeling the Anisotropic Behavior of Highly Orthotropic Lithium-Ion Batteries Polymer Separators," *International Journal of Solids and Structures*, Vol. 264, 1121021, Impact Factor: 3.667, H5-Index: 49.

Xiang, L., Lee, C.W., Zikanov, O., and Hsu, C-C, 2022, "Efficient Reduced Order Model for Heat Transfer in a Battery Pack of an Electric Vehicle," *Applied Thermal Engineering*, Vol. 201, Part A, 117641, Impact Factor: 6.465, H5-Index: 102.

Lee, C.W., 2020, "On-Line Model Identification for the Machining Process Based on Multirate Process Data," *Journal of Manufacturing Systems*, Vol. 56, pp. 622-630, Impact Factor: 9.498, H-5 Index: 67.

Lee, C.W., Hong, Y., Hayrapetyan, M., Yang, X.G., and Xi, Z., 2018, "Derivation and Tuning of a Solvable and Compact Differential-Algebraic Equations Model for $LiFePO_4$-Graphite Li-Ion Batteries," *Journal of Applied Electrochemistry*, Vol. 48, No. 3, pp. 365-377, Impact Factor: 2.925, H-5 Index: 28.

Hong, Y., and Lee, C.W., 2018, "Pareto Fronts for Multiobjective Optimal Design of the Lithium-Ion Battery Cell," *Journal of Energy Storage*, Vol. 17, pp. 507-514, Impact Factor: 8.907, H-5 Index: 75.

Service: Professor Lee is rated excellent in service. Professor Lee served on several departmental committees, including as the chair of the Master of Science in Engineering (MSE) in manufacturing systems engineering program review committee. He is also an Accreditation Board for Engineering and Technology assessment coordinator for the Bachelor of Science in engineering (manufacturing engineering) program. At the college level, Professor Lee is serving on the College of Engineering and Computer Science Executive Committee, the Interdisciplinary Programs Committee, and MSE in Automotive Systems Engineering Reform Committee. He was a United States Air Force Summer Faculty at the Air Force Research Lab in the summer of 2019. He serves as a reviewer for top-tier journals in his field.

External Reviewers:

Reviewer A: "Professor Lee's main research area focuses on the design and control of batteries although he is working on thermal control for food processing. Both topics are promising in that the more population calls for more efficient food production and the transition to EV requires a breakthrough in battery research and technology. Professor Lee has a good working relationship with the automobile industry as shown in his various funded projects."

Reviewer B: "Based on my observation, all articles by Professor Lee are very carefully crafted and all reported works are very high quality. Professor Lee's scholarly work on incorporating reduced-order modeling into distributed systems and cyber-physical systems is particularly

impressive and noble… Professor Lee has continuously published articles in the leading peer review journal related to the reduced-order modeling. This publication endeavor of Professor Lee made him a renowned researcher and shows demonstrable impacts in the area identified… I was very impressed by seeing his funding record and especially his funding portfolio including competitive federal and industry research grants from NSF (USDA-NIFA/Cyber-Physical Systems and MRI), General Motors, Ford Motor Company, Detroit Diesel, and some other industry and internal funding."

Reviewer C: "His research is focused on cyber-physical systems applied in food processing. His research has been well received by the manufacturing community."

Reviewer D: "Professor Lee is a leader in the education of highly qualified personnel in areas of thermal food processing and battery research and he has demonstrated his leadership and research excellence through his publications and involvements in conferences, and close collaboration with automotive companies. He possesses tremendous dedication to the training of students at the University where he translates his experience and knowledge to young minds of the future."

Reviewer E: "…he successfully procured about $1.5 M research funding, majority of those were from external sources. The most impressive funding was the federal funding from USDA-NIFA, which was very competitive. Professor Lee is the lead PI of the 1.2 M grant. A federal funding of this magnitude can be considered a major achievement even in a R1 research institution."

Summary of Recommendation: Professor Lee has established an excellent record of teaching, research, and service at the University of Michigan-Dearborn. We are very pleased to recommend, with the support of the College of Engineering and Computer Science Executive Committee, Cheol Won Lee for promotion to professor of industrial and manufacturing systems engineering, with tenure, Department of Industrial and Manufacturing Systems Engineering, College of Engineering and Computer Science.

Ghassan Kridli, Dean
College of Engineering and Computer Science

Domenico Grasso, Chancellor
University of Michigan-Dearborn

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