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

Youngki Kim, assistant professor of mechanical engineering, Department of Mechanical Engineering, College of Engineering and Computer Science, is recommended for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering and Computer Science.

Academic Degrees:

Ph.D.	2014	Mechanical Engineering, University of Michigan, Ann Arbor, MI
M.S.	2003	Mechanical Engineering, Seoul National University, Seoul, South Korea
B.S.	2001	Mechanical Engineering and Aerospace, Seoul National University, Seoul, South Korea

Professional Record:

2017-present	Assistant Professor, Mechanical Engineering, University of Michigan-Dearborn
2015-2017	Research Engineer, Ann Arbor Technical Center, Southwest Research Institute
2014-2015	Post-doctoral Research, Powertrain Control Lab, University of Michigan

Summary of Evaluation:

Teaching: Professor Kim has been very successful as an instructor. He has taught four different lecture courses at undergraduate and graduate levels. One was the required course of the undergraduate Mechanical Engineering program. The other three courses were on the graduate level. All three were developed and first taught by Professor Kim, which constitutes a major contribution to improvement of the department's course offering in critically important emerging technological areas. Professor Kim also developed the new course on energy management of electric vehicles, which will be offered in the Winter 2023 semester. His teaching evaluations are consistently high, with the weighted average of 4.24 on the five-point scale.

Professor Kim has served as a faculty advisor or co-advisor to four doctoral students and four master's students. He has also been active in work with undergraduate students, having supervised six senior design (capstone) projects.

Research: Professor Kim is a key member of the faculty in the automotive area. His research is in the general area of optimization and control with a focus on automotive transportation and energy storage systems. The specific research topics are in such areas as personalized eco-driving of electrified vehicles, thermal management of electrified vehicles, and control strategies for operation of lithium-ion batteries. During his time at the university, Professor Kim has received research grants and contracts for $974,000 as a principal investigator (PI) and $367,000 as a co-PI. His most significant source of funding was the Hyundai-Kia America Technical Center, with which Professor Kim has established a close and fruitful collaboration. During his academic career, Professor Kim has published at least 33 articles in peer-reviewed archived journals, 21 of them during his work at the University of Michigan-Dearborn.

Recent and Significant Publications:

Isaiah Oyewole, Abdallah Chehade and Youngki Kim, "A controllable deep transfer learning network with multiple domain adaptation for battery state-of-charge estimation," *Applied Energy*, vol. 312, p.118726, 2022.

Di Chen, Mike Huang, Anna Stefanopoulou and Youngki Kim, "A Receding-Horizon Framework for Co-Optimizing the Velocity and Power-Split of Automated Plug-In Hybrid Electric Vehicles," *ASME Letters in Dynamic Systems and Control*, vol. 1, no. 4, p.041006, 2021. (ATS Best Paper Finalist at the 2020 Dynamic Systems and Control Conference)

Olaoluwa Ojo, Haoxiang Lang, Youngki Kim, Xiaosong Hu, Bingxian Mu and Xianke Lin, "A neural network-based method for thermal fault detection in lithium-ion batteries," *IEEE Transactions on Industrial Electronics*, vol. 68, no. 5, pp. 4068-4078, 2021.

Youngki Kim, Xianke Lin, Armin Abbasalinejad, Sun Ung Kim and Seung Hyun Chung, "On state estimation of all solid-state batteries," *Electrochimica Acta*, vol. 317, pp. 663-672, 2019

Service: Professor Kim's record in the service to the university and broader community is excellent. It includes the continuing membership in the College of Engineering and Computer Science Journal/Conference ranking committee, the Mechanical Science and Engineering doctoral program committee, and the Master of Science in Engineering (automotive engineering) program committee. Professor Kim actively participated in the work on reform of the automotive engineering program and the exploration of the possibility of an aerospace engineering program in the department. He was also a member of two faculty search committees and the casebook committee on major review of a lecturer. Professor Kim has been active in service to the broader scientific community as a reviewer of research manuscripts, and organizer and chair of sessions at scientific conferences. He is an associate editor of the prestigious *IEEE Transactions on Transportation Electrification* journal.

External Reviewers:

Reviewer A: "This is an excellent level of citations, clearly showing the scientific community's growing respect for Dr. Kim's perspective, work, and voice. A much deeper examination of Dr. Kim's research record clearly shows that he is an outstanding scholar, and rising star in his field. I am impressed, for instance, by the degree to which Dr. Kim's research tackles timely and important problems in the automotive energy management domain, one example being his work on the computationally efficient management of vehicle climate control energy demands. I am also very impressed by his attention to detail in his research work…."

Reviewer B: "His papers cover a range of topics in the area of electric and hybrid vehicle modeling and control and focus on relevant issues in the field. These papers should have value to the community and examine high interest topics such as the extensions of machine learning into his field. In particular, his recent publication 'A controllable deep transfer learning network with multiple domain adaptation for battery state-of-charge estimation' gives an excellent view of how machine learning may provide advantages for battery energy management."

Reviewer C: "Dr. Kim's publications are consistently of the highest quality. In particular, the models are thoughtfully formulated and explained, they are often carefully parameterized from data…. I am particularly impressed by Dr. Kim's productivity. Since his appointment in 2017, it appears Dr. Kim has 20 journal articles and 20 refereed conference papers. Fourty [sic]…peer-reviewed papers in five years is remarkable. [Almost uniformly] these peer-reviewed papers…are published in venues with very high quality [sic] standards."

Reviewer D: "In the crowded field of energy management of hybrid electric vehicles where hundreds of papers exist, I still found many fresh and technologically relevant ideas in the paper 'real-time torque split strategy for P0+P4 hybrid vehicles with eAWD capability.' … The paper introduces a novel real-time implementable approach that handles this more complex configuration. The paper takes into account mechanical-engineering important details that are often ignored in similar papers such as the impact of load transfer on regenerative braking efficiency and nonlinear tire effects that I found to be real contributions."

Reviewer E: "In addition to having established a strong track record of scholarly results, Prof. Kim also possesses a clear and compelling future research vision. In particular, his ongoing and pending research in singlepedal [sic] vehicle operation and machine learning-based vehicle diagnostics are timely and relevant to the field."

Reviewer F: "I can see that Dr. Kim is on a steeply rising slope to soon become a leader in the field. I have every reason to believe he will sustain and rapidly grow his program further. I believe Dr. Kim's credentials and accomplishments compare favorably within his peer group in the field."

Summary of Recommendation: Professor Kim is a well-regarded engineer who has made important contributions to the field of energy management of hybrid electric vehicles. He is an excellent teacher and mentor; and he is a leader who contributes both in external and internal service. It is with the support of the College of Engineering and Computer Science Executive Committee that I recommend Youngki Kim for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering and Computer Science.

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Ghassan Kridli, Dean
College of Engineering and Computer Science

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Domenico Grasso, Chancellor
University of Michigan-Dearborn

May 2023