Approved by the Regents
May 16, 2013

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

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

Academic Degrees:

Ph.D.	2000	Mechanical Engineering, University of California, Davis, CA
M.S.	1997	Mechanical Engineering, University of California, Davis, CA
B.S.	1992	Mechanical Engineering, Hankuk Aviation University, Korea

Professional Record:

2007 – Present	Associate Professor, Department of Mechanical Engineering, the University of Michigan-Dearborn, Dearborn, Michigan
2001 – 2007	Assistant Professor, Department of Mechanical Engineering, the University of Michigan-Dearborn, Dearborn, Michigan

Summary of Evaluation:

Teaching: Professor Shim's teaching is rated excellent. He is an effective teacher, as evidenced by teaching evaluations from both his students and his peers. His average effectiveness from the student evaluations over the past five years was above 3.7 out of 4.0. This places him among the top 15% of the faculty members in his department. Comments by students interviewed as part of this review were consistent with their written evaluations. Professor Shim has updated two graduate courses in his specialty (AE 502 and AE 555) and supervised 16 capstone design projects. In 2008, he received the Society of Automotive Engineers (SAE) Ralph R. Teetor Educational Award.

Research: Professor Shim's research is rated significantly capable. He focuses on the subject areas of vehicle dynamics and vehicle systems, which are traditional disciplines in automotive engineering. He has 10 papers published or accepted for publication in refereed journals since his last promotion. In addition, Professor Shim has published 20 conference papers, most of which were peer-reviewed. His papers were judged by the external reviewers as being of good quality. His research also generated three patents, one of which has been licensed by Ford Motor Company. He has supervised eight M.S. theses and published research papers with these students in open literature. Professor Shim has obtained $497,000 research funding from external resources over the last five years.

Recent and Significant Publications:

Adireddy, G., Shim, T., Rhode, D., and Asgari, G., Combined wheel torque and steering control based on model predictive controller using a simplified tire model, *International Journal of Vehicle Design* (Accepted).

Yuan, H., and Shim, T., Model based real-time collision free motion planning for mobile robots in unknown dynamic environments, *International Journal of Precision Engineering and Manufacturing* (to appear on October 2012).

Shim, T., Adireddy, G., and Yuan. H., Autonomous vehicle collision avoidance based on path planning and MPC, *Proceedings of the Institution of Mechanical Engineers, Part D, Journal of Automobile Engineering*, Vol. 226, No. 6, 2012, pp. 767-778.

Zhao, Y., Chen, S., and Shim, T., Investigation of trailer yaw motion control using active front steering and differential braking, *SAE International Journal of Materials and Manufacturing*, Vol. 4, No. 1, 2011, pp. 1057-1067.

Bhide, S., and Shim, T., Novel predictive electric Li-ion battery model incorporating thermal and rate factor effects, *IEEE Transactions on Vehicular Technology*, Vol. 60, No.3, 2011, pp.819-829.

Shim, T., and Velusamy, P., Improvement of vehicle roll stability by varying suspension properties, *Vehicle System Dynamics-International Journal of Vehicle Mechanics and Mobility*, Vol. 49, Nos.1-2, 2011, pp.129-152.

Jung, J., Shim, T., and Gertsch, J., A vehicle roll stability indicator incorporating roll center movements, *IEEE Transactions on Vehicular Technology*, Vol. 58, No. 8, 2009, pp.4078-4087.

Service: Professor Shim is rated excellent in service. He has served on several department and college committees. He has been a referee for several journals and conference proceedings, and also chaired sessions in conferences. Professor Shim is an associate editor of the *IEEE Transactions on Vehicle Dynamics* and a member of the Technical Committee on Vehicle Design of ASME. He is an advisor to the Mini Baja project and the UM-Dearborn Formula SAE team. Students he advised participated in national competitions and won top awards in several categories.

External Reviewers:

Reviewer A: "Dr. Shim has a strong track record of research publications over a 10 year time period with continuous contributions. His contributions to the field of vehicle dynamics and chassis control should offer greater vehicle and occupant safety which will ultimately lead to reduced crashes and fatalities. These professional activities demonstrate his national involvement in the automotive engineering community. His record of service is consistent with that to be expected for promotion to a full professor."

Reviewer B: "…I have found the quality of his works to be consistent and pretty good. Dr. Taeyun Shim has significant amount of research and the quality of his work is very good. He stays connected to automotive industry and is able to secure funding from several of them. He continues to do research on his core vehicle dynamics area and is expanding into new and trendy areas."

Reviewer C: "I particularly liked the paper 'Understanding the limitations of different vehicle models for roll dynamics studies in Vehicle Systems Dynamics.' This paper is both academic in the best sense as well as practical. I would rank Professor Shim's standing among mid-career academics in the field of vehicle dynamics, system dynamics and control as very high."

Reviewer D: "His research outputs have been most consistent over the years. These show excellent directions and significance in the field and depth and breadth. His research works address the important and practical concerns on active safety controls in commercial vehicles such as rollover and jackknife control of tractor-semitrailer combinations. Dr. Shim has established himself as a leader in the field …"

Reviewer E: "These papers demonstrate Dr. Shim's strength as an expert in vehicle dynamics and especially in the particular problem of roll dynamics and stability. I would not hesitate to offer these papers to my students as examples of scholarly work having practical value, which is important from my perspective."

Reviewer F: "Dr. Shim is well known in the automotive control community due to his significant role as an organizer of invited sessions on automotive topics at many conferences. Dr. Shim has a respectable record in terms of research publications, research funding and graduate student advising."

Summary of Recommendation:
Professor Shim is an excellent teacher at both undergraduate and graduate levels. His teaching effectiveness ranks among the top 15% of the faculty in his department and he has earned the SAE Outstanding Teaching Award. Professor Shim is a significantly capable researcher as is evidenced by his funding and publication records. His research work is judged to be of good quality by his peers both in his department and outside the University. He has filed for three U.S. patents, and has obtained $497,000 research funding from external resources over the last five years. Professor Shim has contributed his time and efforts to a variety of department and college committees, and to national professional societies. He has demonstrated excellence in teaching, research, and service commensurate with the highest academic standards. We are pleased to recommend, with the strong support of the College of Engineering and Computer Science Executive Committee, Taehyun Shim for promotion to professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering and Computer Science.

Anthony W. England
Interim Dean
College of Engineering and Computer Science

Daniel Little
Chancellor
University of Michigan-Dearborn

May 2013