Approved by the Regents
May 16, 2013

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering

Shorya Awtar, 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.	2004	Massachusetts Institute of Technology, Mechanical Engineering, Cambridge, MA
M.S.	2000	Rensselaer Polytechnic Institute, Mechanical Engineering, Troy, NY
B.Tech	1998	Indian Institute of Technology, Mechanical Engineering, Kanpur, India

Professional Record:

2007 – present	Assistant Professor, Department of Mechanical Engineering, University of Michigan
2004 – 2006	Mechanical Engineer, General Electric – Global Research Center, Niskayuna NY

Summary of Evaluation:

Teaching: Professor Awtar has taught two undergraduate core courses in Mechanical Engineering (ME): ME 350, a junior year design/manufacturing class and ME 450, a capstone design/manufacturing class. He also has taught ME 552, a graduate level course in mechatronics. He has transformed ME350 to include mechatronics elements in the curriculum which has greatly benefitted our students. He also revamped our graduate level mechatronics course, which is again a major contribution to the curricula. Professor Awtar has led the charge to upgrade the mechatronics teaching laboratory for supporting the ME design courses (ME 250, 350 and 450). His overall student evaluations (Q1/Q2s) were generally over 4.0. The student letters are all positive, praising his teaching skills, passion, and mentorship. Professor Awtar has graduated one Ph.D. and 13 M.S.E. students and is presently advising three Ph.D. students. Letters from his graduate students show that he is a very effective advisor who is respected and well liked. His mentorship is also demonstrated through his publications with his graduate students. In addition, Professor Awtar has been actively involving undergraduate students into research with several undergraduate students gaining research experience through work in his lab.

Research: Professor Awtar is a rising star in the field of mechanical design. His technical interest is in high precision machines and mechatronics. He has developed a strong research program at Michigan, winning the prestigious NSF CAREER grant and several other internal and external grants. He has authored 17 full journal papers (published or accepted) and currently has six journal papers under review. His work is making translational impact with a large number of issued and provisional/pending U.S. patents and invention disclosures, and has co-founded two startup companies. External reviewers are very complimentary of Professor Awtar's achievement and impact. In addition, they also praise Professor Awtar's contributions to the fundamental knowledge and his efforts in combining theory and practice.

Professor Awtar has received numerous national recognitions for his research achievements. He has received the ASME Leonardo da Vinci Award. (An award which has always been given to senior faculty; Professor Awtar is the only assistant professor recipient during its 34-year history), the American Society of Mechanical Engineers (ASME) Freudenstein/GM Young Investigator Award, and the SME Outstanding Young Manufacturing Engineer Award. He is the winner of the prestigious R&D Magazine 100 Awards, which recognizes the 100 most technologically, significant new products throughout the world and provides a mark of excellence throughout industry, government and academia as the most innovative ideas of the

year. His work was also showcased at the Celebrate Invention event organized by the University of Michigan Technology Transfer Office as one of the six inventions (out of 350) with the greatest potential impact.

Recent and Significant Publications:

Hiemstra, D.B., Parmar, G. and Awtar, S., 2012, "Moving Magnet Actuator Design for Flexure-based Nanopositioning," *ASME/IEEE Transactions on Mechatronics*, accepted October 2012, in-press.

Sen, S. and Awtar, S., 2012, "A Closed-Form Non-linear Model for the Constraint Characteristics of Symmetric Spatial Beams," *ASME Journal of Mechanical Design*, accepted October 2012, in-press.

Awtar, S., Ustick, J. and Sen, S., 2012 "An XYZ Parallel Kinematic Flexure Mechanism with Geometrically Decoupled Degrees of Freedom," *ASME Journal of Mechanisms and Robotics*, in-press.

Awtar, S. and Quint, J.M., 2012, "In-Plane Flexure-based Clamp," *Precision Engineering*, 36, pp. 658-667.

Beroz, J., Bedewy, M., Reinker, M., Chhajer, V., Awtar, S. and Hart, A.J., 2012, "Four Degree of Freedom Liquid Dispenser for Direct Write Capillary Self-Assembly with Sub-Nanoliter Precision," *Review of Scientific Instruments*, 83, 015104.

Gillespie, R.B., Yu, B., Grijalva, R. and Awtar, S., 2011 "Characterizing the Feel of the Piano Action," *Computer Music Journal*, MIT Press, 35(1).

Awtar, S., Trutna, T.T., Nielsen, J.M., Abani, R. and Geiger, J.D., 2010, "FlexDex: A Minimally Invasive Surgical Tool with Enhanced Dexterity and Intuitive Control," *ASME Journal of Medical Devices*, 4(3).

Service: Professor Awtar has served on the ME Graduate Program Committee and the ME Faculty Search Committee. He is serving on working groups for the GG Brown Building major renovation and new addition. His achievement and effort in administrating the upgrade of ME design and mechatronics classes are exceptional. He is the course coordinator for ME 350, and has assumed the role of resource coordinator for ME 250/350/450, which involves overseeing the new Mechatronics Instructional Lab. Externally, Professor Awtar has been very active in the ASME, providing service and leadership in technical committees. He has organized short courses on machine and mechanism design at several major meetings and has organized symposia on compliant mechanisms. He has exceeded expectations in terms of community involvement and outreach through his interactions with the Ann Arbor Hands on Museum.

External Reviewers:

Reviewer A: "Dr. Awtar is an emerging leader and one of the top Assistant Professors in the design area."

Reviewer B: "Dr. Awtar's professional career path, in my judgment, is an indicator of a 'superstar' in the making."

Reviewer C: "I would say that he is the top researcher among his peers in this group in terms of contributions and impact."

Reviewer D: "Dr. Awtar's research is largely directed at the development of methods for analysis and synthesis of compliant mechanism, for which there is an increasing need. He manages to develop methods that are accurate as well as insightful, and thus contributes both to fundamental advancement of the field as well as extending the field to practitioning engineerings..."

Reviewer E: "One of the most impressive qualities of Dr. Awtar's research is the blend of theory and impactful applications. This promises to continue to be a great strength of his work. His ability to select

problems with the potential for significant impact is also evident and this will be a great asset in his future."

Reviewer F: "Prof. Awtar is part of a new generation of mechanisms and robotics researchers who do the hard work of combining theory and practice…Prof. Awtar is an insightful and talented researcher and is sure to be a leader in the mechanical design and robotics research community."

Reviewer G: "The quality of Shorya's work is excellent. It includes fundamental contributions to precision mechanism design… established himself as a scholar with national reputation in his peer group that far exceeds that of his contemporaries."

Summary of Recommendation: Professor Awtar is a great asset to Michigan. He has built a strong research record with outstanding potential, and his performance in teaching and service has been exceptional. It is with the support of the College of Engineering Executive Committee that I recommend Shorya Awtar for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.

David C. Munson Jr.

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

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