

PROMOTION RECOMMENDATION

The University of Michigan
College of Engineering

Yogesh B. Gianchandani, associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science and associate professor of mechanical engineering, without tenure, Department of Mechanical Engineering, is recommended for promotion to professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science and professor of mechanical engineering, without tenure, Department of Mechanical Engineering, College of Engineering.

Academic Degrees

B.S.E.E.	1984	University of California, Irvine
M.S.E.E.	1986	University of California, Los Angeles
Ph.D.	1994	University of Michigan, Electrical Engineering

Professional Record

2004–present	Associate Professor of Mechanical Engineering, University of Michigan
2002–present	Associate Professor of Electrical Engineering and Computer Science, University of Michigan
2002–present	Director, Master of Engineering Professional Degree Program in Integrated Microsystems, University of Michigan
2001-2003	Associate Professor of Electrical and Computer Engineering, University of Wisconsin
1997-2001	Assistant Professor of Electrical and Computer Engineering, University of Wisconsin
1994-1997	Research Fellow, Center for Integrated Sensors and Circuits, University of Michigan

Summary of Evaluation:

Teaching: Professor Gianchandani has filled critical teaching voids in the EECS department. Not only has he bolstered undergraduate instruction in the critical area of electronic circuits, he has also introduced a course, that is now world-renowned, in the area of integrated microsystems. This was part of a proposed educational program development for the National Science Foundation Engineering Research Center for Wireless Integrated Microsystems. He has also voluntarily taken over teaching of the graduate course in advanced micro-electromechanical systems, modified its content and has adapted both of these courses for distance learning. It is evident that he has put enormous effort into the development and teaching of these courses and the feedback from students imply that it has been worthwhile.

Professor Gianchandani gets undergraduate students extensively involved in his research projects, providing them with valuable and meaningful research experience. The undergraduate students team up with the graduate students in specific areas of research and contribute to the outcome in a meaningful way. As a consequence, undergraduate students appear as co-authors in his research publications.

As an advisor of his graduate students in both ME and EECS, he is energetic and sets very high standards and work ethics. At the same time he is sensitive to their needs and understands what is best for them. From letters written by graduate students working in his group, it is amply evident that he works closely and intensely with them and maintains an environment of close and continuous interaction. Through it all, he has emerged as an excellent role model.

Research: Professor Gianchandani started his research career at Michigan as a graduate student working in the area of microelectromechanical systems or MEMs. After spending time at the University of Wisconsin he was recruited back to Michigan to help strengthen the microsystem effort here. It is clear that Professor Gianchandani has more than fulfilled the expectations of the department. Professor Gianchandani works in the area of microfabricated sensors, actuators and MEMs. This is an area where microfabrication technologies allow one to build systems and machines on a very small scale. These systems and machines are sources of advances in fields as diverse as medicine, manufacturing, weather predictions and environmental research.

Professor Gianchandani has established himself as one of the world's leading researchers in his field. He has done so by contributing original ideas in not only the area of applications but microfabrication as well. His work on the use of microplasmas to fabricate MEMs structures has ushered in new technology and allowed manufacture of novel systems. He has also used microplasmas for novel sensor applications where chemicals can be identified on chip. Advances by his group in fabrication techniques have also allowed the demonstration of the Knudsen vacuum pump on chip. This is expected to have significant impact on the general area of lab on a chip.

Recent and significant Publications:

McNamara, S. and Y.B. Gianchandani, "On-Chip Vacuum Generated by a Micromachined Knudsen Pump," *IEEE/ASME Journal of Microelectromechanical Systems*, 14(4), pp. 741-746, August 2005

Wilson, C.G., Y.B. Gianchandani, R.R. Arslanbekov, V. Kolobov, and A.E. Wendt, "Profiling and Modeling of DC Nitrogen Microplasmas," *Journal of Applied Physics*, 94(5), pp. 2845-2851, Sept. 2003

Li, M.-H. and Y.B. Gianchandani, "Applications of a Low Contact Force Polyimide Shank Bolometer Probe for Chemical and Biological Diagnostics," *Sensors and Actuators, A (Physical)*, 104, pp. 236-245, April 2003

Park, J.-S. and Y.B. Gianchandani, "A Servo-Controlled Capacitive Pressure Sensor Using a Capped-Cylinder Structure Microfabricated by a Three-Mask Process," *IEEE/ASME Journal of Microelectromechanical Systems*, 12(2), pp. 209-220, April 2003

Takahata, K. and Y.B. Gianchandani, "Batch Mode Micro-Electro-Discharge Machining" *IEEE/ASME Journal of Microelectromechanical Systems*, 11(2), pp. 102-110, April 2002

Service: Professor Gianchandani's service to his professional community has brought distinction to the University of Michigan and is commensurate with his promotion to Professor. At the International/National level, he serves on the editorial boards of three major journals including *Sensors and Actuators*, *Journal of Micromechanics and Microengineering*, and *Journal of Semiconductor Technology and Science*. Professor Gianchandani is an extremely active organizer for the major international MEMS conference, the IEEE International Conference on Micro Electro Mechanical Systems, for which he has previously served as the conference co-chair, as a member and co-chair of the conference steering committee, and as a member of the conference technical committee. Within the University of Michigan, Professor Gianchandani has offered unselfish service to the EECS Department and to the College as a whole. He is the director of the MEng program in Microsystems as offered through InterPro, is co-organizing (with K. Najafi) the strategic educational alliance between the University of Michigan, the University of Freiburg and Kyoto University, and serves as the Research Thrust Leader for Micropackaging and Microfabrication for the WIMS ERC. He has also served on a number of CoE and EEC committees including serving as the EECS representative on the CoE Faculty

Committee on Discipline, as Chair of the CoE Task Force on Distance Learning, and as a member of the Solid-State Electronics Laboratory Operations Committee, among others.

External Reviewers:

Reviewer (A): "This silicon machining process is considered as a major achievement and shows his sense of inventiveness and originality. More recently, he realized the first micro-machined Knudsen pump on-chip, which is another demonstration of his talents."

Reviewer (B): "The diversity and achievement that his research has shown are indeed impressive."

Reviewer (C): "His selection of problems is also creative as they have some level of uniqueness in relation to the mainstream problems pursued in the field."

Reviewer (D): "MEMS are diverse in general but his work has been focused mainly on two topics. One is the discharge in manufacturing and sensing and the other is the thermal actuators and sensors. I evaluate his high ability to select important subjects and his work made large impact to MEMS community[sic]."

Reviewer (E): "He is one of the few in the MEMS field who leads activities and creates excellent results which span over a very broad range of aspects of the MEMS field, including; fabrication, optical, medical, bio, electrical, fluidics, sensors and actuators."

Reviewer (F): "The area of microplasmas is one in which Yogesh, although not a plasma physicist by training, recognized how he could utilize MEMS technology to develop a technique whereby microplasmas could be utilized as an on-chip technology for processing localized areas of a microfabrication system. This alone, in my opinion, is a demonstration of Yogesh's outstanding creativity and his ability to make something tangible happen with a concept."

Summary of Recommendation:

Professor Yogesh B. Gianchandani has established himself as a world class researcher in the area of microelectromechanical systems (MEMS). He has done pioneering work in manufacturing of small devices as well as in applications of novel devices. His work has brought prestige to the University of Michigan. Professor Gianchandani is also an excellent teacher and mentor and has introduced an important new course on MEMS. He has also provided valuable service to the University and to the outside scientific community. It is with the support of the College of Engineering Executive Committee that I recommend him for promotion to professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science and professor of mechanical engineering, without tenure, Department of Mechanical Engineering, College of Engineering.



Ronald Gibala
Interim Dean, College of Engineering

May 2006