

May 17, 2007

PROMOTION RECOMMENDATIONThe University of Michigan
College of Engineering

Dawn M. Tilbury, associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering, is recommended for promotion to professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.

Academic Degrees:

Ph.D. 1994 University of California, Electrical Engineering and Computer Sciences, Berkeley
M.S. 1992 University of California, Electrical Engineering, Berkeley
B.S. 1989 University of Minnesota, Electrical Engineering, Twin Cities

Professional Record:

2006 Air Force Summer Faculty Fellow, Air Force Research Labs
2003 Professor Summer Intern, DaimlerChrysler
2004 Visiting Professor, Shanghai Jiao Tong University
2001 – present Associate Professor (with tenure), Department of Mechanical Engineering, University of Michigan
2001 – 2002 Visiting Professor, ITIA-CNR, Milan, Italy
2001 – 2002 Academic Visitor, IBM T.J. Watson Research Center
1995 – 2001 Assistant Professor, Department of Mechanical Engineering, University of Michigan
1994 Visiting Scholar, Harvard University

Summary of Evaluation:

Teaching: Professor Tilbury has made significant contributions to teaching, especially in the undergraduate curriculum and courses. She has developed new web-based tutorials that are used by many universities in their controls classes, as well as new experiments for an undergraduate laboratory course, ME 395. Her evaluations for the dynamics and controls classes ME 360 and ME 461 average Q1=4.25 and Q2=4.65 and are a testimony to her very strong classroom performance. Professor Tilbury pushes her students towards independent thinking which may result in immature students misinterpreting her intentions. Students who have taken her classes praise her as a caring and effective teacher/mentor who sets high standards. She has graduated a total of eight Ph.D. students with four of these graduating in the last four years. She currently advises or co-advises four Ph.D. students and five MS students. Her graduate students aspire to emulate her as a role model in terms of her intellectual skills, leadership, and mentorship.

Research: Professor Tilbury's research record is very strong. She has carved out several important manufacturing problems to which she has contributed ground-breaking results. Her scholarly solution of industry-motivated problems has brought her accolades from both industry and academia. She has made significant contributions to logic control of machinery and to control over networks. She has demonstrated an innovative method for automatically generating logic control code that meets control performance specifications and is scalable to industrial size. This work has won her much recognition and she has been invited to give lectures in the US (Stanford, Georgia Tech, Penn State, etc.) and Europe (Germany, Sweden, Italy, etc.). In addition, her graphical-based solutions to control over networks have made an impact on industry and academia. She has a well established research program as a single investigator, as well as an integral team member and Thrust Area Leader for Controls in the ERC on Reconfigurable Manufacturing Systems. Her publications include a book, a popular CD-ROM textbook

supplement with MATLAB tutorials, 27 refereed journal articles (including two accepted), five book chapters, 74 refereed conference papers, and one patent. She has significantly contributed to establishing the College of Engineering as a leading institution of research in manufacturing controls.

Recent and Significant Publications:

- E. W. Endsley, E. E. Almeida, and D. M. Tilbury, "Modular Finite State Machines: Development and Application to Reconfigurable Manufacturing Cell Controller Generation," *Control Engineering Practice*, 14(10):1127–1142, October 2006.
- F.-L. Lian, J. K. Yook, D. M. Tilbury, and J. R. Moyne, "Network Architecture and Communication Modules for Guaranteeing Acceptable Control and Communication Performance for Networked Multi-Agent Systems," *IEEE Transactions on Industrial Informatics*, 2(1):12–24, February 2006.
- S. K. Kim and D. M. Tilbury, "Mathematical Modeling and Experimental Identification of an Unmanned Helicopter Robot with Flybar Dynamics," *Journal of Robotic Systems*, 21(3):95–116, March 2004.
- M. R. Lucas and D. M. Tilbury, "A Study of Current Logic Design Practices in the Automotive Manufacturing Industry," *International Journal of Human Computer Studies*, 59(5):725–753, November 2003.
- F.-L. Lian, J. R. Moyne, and D. M. Tilbury, "Modeling and Optimal Controller Design for Networked Control Systems with Multiple Delays," *International Journal of Control*, 76(6), pp. 591–606, April 2003.
- S. Parekh, N. Gandhi, J. Hellerstein, D. Tilbury, T. Jayram, and J. Bigus, "Using Control Theory to Achieve Service Level Objectives In Performance Management," *Real-Time Systems Journal*, 23(1), pp. 127–141, July 2002.
- J. K. Yook, D. M. Tilbury, and N. R. Soparkar, "Trading Computation for Bandwidth: Reducing Communication in Distributed Control Systems using State Estimators," *IEEE Transactions on Control Systems Technology*, 10(4), pp. 503–517, July 2002.
- F.-L. Lian, J. R. Moyne, and D. M. Tilbury, "Network Design Consideration for Distributed Control Systems," *IEEE Transactions on Control Systems Technology*, 10(2), pp. 297–307, 2002.
- E. Park, D. M. Tilbury, and P. P. Khargonekar, "A Modeling and Analysis Methodology for Modular Logic Controllers of Machining Systems using Petri Net Formalism," *IEEE Transactions on Systems, Man, and Cybernetics–C*, 31(2), pp. 168–188, May 2001.
- F.-L. Lian, J. R. Moyne, and D. M. Tilbury, "Performance Evaluation of Control Networks: Ethernet, ControlNet, and DeviceNet," *IEEE Control Systems Magazine*, 21(1), pp. 66–83, February 2001.

Service: Professor Tilbury has established an outstanding record of service at the University of Michigan and to her professional community. She is a dedicated, efficient, enthusiastic and thorough volunteer at the numerous activities she has taken on. Within Mechanical Engineering, she has been active in many committees including: the advisory, undergraduate, graduate, and the faculty search committee (as a former member and now chair). She has been a member of the Dean's Advisory Committee on Women Faculty and the College of Engineering Teaching Academy, and has been heavily involved in activities directed towards increasing diversity and improving climate. At the national level, she has served as chair/co-organizer of several symposia and workshops including the WODES 2006 conference held at the University of Michigan. She has assumed editorial duties for the *IEEE Control Systems Magazine*, served as the publication chair for the 2001 American Control Conference, and coordinated publications for the 2004 CDC and several NSF workshops. She is also on the IEEE Board of Governors.

External Reviewers:

Reviewer (A): "Her work is motivated by real needs in applications and deals with very interesting and challenging research problems. Her research is careful, important and innovative."

Reviewer (B): "She is a leader of cross-disciplinary studies between control engineering and information technology. In the control community, she is the most prominent individual who has made a bridge between the two disciplinary fields."

Reviewer (C): "The control community is currently blessed by a large number of superb researchers... I would rank Tilbury in the top 10 among her peers."

Reviewer (D): "I see a well orchestrated effort to learn what the problem areas are, to understand the nature of these problems in a scientific manner, to address these problems in an engineering manner, and to verify their effectiveness in a practical manner."

Reviewer (E): "...her work seeks to develop concrete technological tools for the control of reconfigurable manufacturing systems and, more recently, computer systems and networks."

Reviewer (F): "...I appreciate the clarity with which the problems are described, the ability to arrive at the very heart of real problems, the objectivity to investigate possible solutions and the capacity to perform correct designs, engineering or even only simulation or testing."

Reviewer (G): "Her recent work on control of computing systems is a pioneering effort. Her new multi-disciplinary collaboration with psychology, medicine, and kinesiology demonstrates her ability and desire to explore and create new research directions."

Review (H): "...her research approach to the design of logical controllers for reconfigurable manufacturing cells based on modular finite state machines and on distributed controlled systems in networked environments. ...is very timely and important in view of the evolution towards distributed manufacturing environments..."

Summary of Recommendation: In summary, Professor Dawn Tilbury is a top-notch controls researcher who is internationally renowned for her impressive ability to apply ideas and paradigms from theoretical controls to timely and important problems facing the manufacturing industry. She has a strong record of contributions to teaching and curriculum development, to graduate student supervision, and to service. It is with the support of the College of Engineering Executive Committee that I recommend Dawn M. Tilbury for promotion to professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.



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

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