

PROMOTION RECOMMENDATION

The University of Michigan
College of Engineering

Jing Sun, associate professor of naval architecture and marine engineering, without tenure, Department of Naval Architecture and Marine Engineering, College of Engineering, is recommended for the granting of tenure to be held with her title of associate professor of naval architecture and marine engineering, Department of Naval Architecture and Marine Engineering, College of Engineering. [Also holds the position of associate professor of electrical engineering and computer science, without tenure, Department of Electrical Engineering and Computer Science.]

Academic Degrees

B.A.	1982	University of Science and Technology of China, Electrical and Electronics Engineering
M.S.E.	1984	University of Science and Technology of China, Automatic Control
Ph.D.	1989	University of Southern California, Electrical Engineering Systems

Professional Record

2004-present	Associate Professor of Electrical Engineering and Computer Science, University of Michigan
2003-present	Associate Professor of Naval Architecture and Marine Engineering, University of Michigan
2001-2003	Staff Technical Specialist, Ford Research Laboratories
1996-2001	Senior Technical Specialist, Ford Research Laboratories
1993-1996	Technical Specialist, Ford Research Laboratories
1993	Visiting Scientist, University of California, Santa Barbara
1989-1993	Assistant Professor of Electrical and Computer Engineering, Wayne State University
1986-1987	Summer Intern, General Motors Corporation
1985-1989	Graduate Research Assistant, University of Southern California
1982-1984	Graduate Research Fellow, University of Science and Technology of China

Summary of Evaluation:

Teaching: Associate Professor Sun, an expert in electrical power systems and controls, fills a critical void in NA&ME. She has developed a three-credit hour undergraduate course in electrical engineering for naval architecture undergraduates and a college-wide Adaptive Controls course for NA&ME, AERO, ME and EECS graduate students. These courses address serious deficiencies that had long existed in the curriculum. Our NA&ME undergraduate students require a basic understanding of circuits, electrical machines, solid-state power conversion and control, and fuel cells. As the marine industry develops new technologies for electrically driven ships, including fuel cells, Professor Sun's background as an electrical engineer and controls engineer is perfectly suited to lead this area of curricular development.

Professor Sun's graduate teaching, both in the classroom and in one-on-one Ph.D. mentoring, has been strong. In addition to the eight doctoral students whose dissertation committees she chairs or co-chairs, she has also been asked by another eleven to serve on their respective Ph.D. committees. Many of those eleven students first took Professor Sun's adaptive control course, demonstrating that students realize the effectiveness and value of working with her.

Research: While at the University of Michigan (2.25 years since 9/2003), Associate Professor Sun, as a PD or co-PI, has made or is making significant contributions to nine research projects. The total value of the funds that she is responsible for is approximately \$1.4M. Of this total, 20% is a continuation in her traditional automotive drivetrain control area, 17% is in combined fuel cell/gas turbine systems research, and the remaining 63% is in marine/mobile platform research dealing with fuel cell control and the control of electrical systems onboard ships. This wide breadth of the funding sources is impressive, indicating that Professor Sun's research is attracting the support of more than one or two program managers. For example, Professor Sun's funding comes from government agencies such as ONR, NSF, and ARO, and industry, i.e. Ford Motor Company and Toyota. She is not tied to a single industry so that a funding slow-down in one area can be more than offset in an increase in another.

The number and quality of Professor Sun's research projects and publications are high. She is recognized as one of the nation's leading experts in the area of applied adaptive control. She has received numerous national and international honors such as being awarded the prestigious IEEE Control System Society System Technology Award (2003), being elected Fellow of IEEE (2004), or giving the plenary speech at the 24th Chinese Control Conference, Guangzhou, China (2005). Given the interdisciplinary nature, quality, and impact of her work, Professor Sun represents a significant resource for the College.

Associate Professor Sun has also established a reputation for solving real world engineering problems. Through ten years of industrial research and another six years in academia (1989-1993 and 2003-2005), she has demonstrated an understanding of, and a commitment to the transfer of technology from research to application. The candidate's 34 U.S. Patents reflect this, in part.

Recent and Significant Publications:

Vasilios Tsourapas, Jing Sun, and Anna Stefanopoulou, "Modeling and Dynamics of an Integrated Fuel Cell Stack and Fuel Process System with Catalytic Burner for Marine Applications," *IASME Transactions* Vol. 2, No. 1, pp. 287-293, 2004.

Handa Xi and Jing Sun, "Dynamic Model of Planar Solid Oxide Fuel Cells for Both Steady State and Transient Performance Analysis," *Proceedings of IMECE (International Mechanical Engineering Congress and Exposition), 2005*, ASME International Mechanical Engineering Congress and Exposition, November 2005.

Vasilios Tsourapas, Anna Stefanopoulou, and Jing Sun, "Control for Fast Transient Response of a Fuel Cell Based CHP System for Shipboard Applications," *Proceedings of the 2005 American Control Conference*, Portland, OR, June 8-10, 2005.

Petros A. Ioannou and Jing Sun, *Robust Adaptive Control*, Prentice Hall, 822 pages, 1996.

Service: Associate Professor Sun has made important service and leadership contributions to both the University and to professional organizations. She introduced the area of controls to the NA&ME Ph.D. qualifying exams and chairs that particular exam committee. She is also chair of the NA&ME Awards Committee. At the College level, she serves on the College Scholastic Standing Committee and the Honors and Awards Committee. On the University level, she was a member of the Pre-Doctoral Awards Committee.

Perhaps more impressive is Professor Sun's national and international service portfolio. She was or is Subject Area Editor for the *International Journal Adaptive Control and Signal Processing*, Associate Editor for *IEEE Transactions on Automatic Control*, Associate Editor on the IEEE Controls Systems Society Conference Editorial Board, guest editor for the 2004 *Special Issue on Applications of Signal Processing and Adaptive Control to Automotive Systems*. In addition, she has served on three NSF proposal review panels, been on eight conference program committees, organized six special sessions for conferences, and been a session chair ten times.

External Reviewers:

Reviewer (A): "...I asked Professor Sun to join the Board of our journal as an editor.... This followed on a detailed discussion at one of the journal Board meetings which includes leading researchers from around the world. It was their judgment that Professor Sun would be a great asset to the journal because of her breadth of knowledge in both theoretical and control engineering..." "...a prestigious and competitive situation."

Reviewer (B): "Of these contributions, I would like to single out her work on hybrid automotive powertrain systems... for which she is the leading authority."

Reviewer (C): "Sun's papers [19,20] were particularly influential. They were the first to introduce modifications into adaptive control that solve the long-standing problem with unpredictable transient performance. These papers had a major influence on an entire group of researchers..." "It spawned dozens of papers in this direction and several books..."

Reviewer (D): "I am particularly interested in the careers of those whom I recognize as scholars and role models for others. Professor Jing Sun is one of them, in fact I place her among the top of them. She is one of the very few women who are IEEE Fellows..." "If I would try to compare her to other peers I would place her among the top in her generation but I have noticed that all others have been already tenured for some time. Among those untenured I would place her at the top of my list. Her tenure is overdue."

Summary of Recommendation: Associate Professor Jing Sun, 16 years after her Ph.D. (1989), having served 10 years in the industry as a researcher and 2.5 years at the University of Michigan, has established an outstanding record as an associate professor. She is recognized widely among the automotive, aerospace and marine industries as one of the leading experts in the country in the area of adaptive control. She has demonstrated an exceptional capacity and productivity in all areas of teaching, research and service. It is with the support of the College of Engineering Executive Committee that I recommend her the granting of tenure to be held with her title of associate professor of naval architecture and marine engineering, Department of Naval Architecture and Marine Engineering, College of Engineering.



Ronald Gibala
Interim Dean, College of Engineering

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