

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Engineering

John A. Shaw, associate professor of aerospace engineering, with tenure, Department of Aerospace Engineering, College of Engineering, is recommended for promotion to professor of aerospace engineering, with tenure, Department of Aerospace Engineering, College of Engineering.

Academic Degrees:

Ph.D.	1997	University of Texas at Austin, Engineering Mechanics
M.S.	1989	Virginia Polytechnic Institute and State University, Computer Science,
B.S.	1985	University of Michigan, Aerospace Engineering

Professional Record:

2003–present	Associate Professor (with tenure), Department of Aerospace Engineering, University of Michigan
1997-2003	Assistant Professor, Department of Aerospace Engineering, University of Michigan
1996-1997	Postdoctoral Research Fellow and Assistant Instructor, University of Texas at Austin

Summary of Evaluation:

Teaching: Professor Shaw has earned an outstanding reputation as an educator among students and colleagues. He has taught undergraduate lecture and laboratory courses, as well as graduate courses in his field, including two courses that he introduced to the curriculum. His course evaluations are consistently high, with Q1 scores ranging from 4.02 to 4.89, and Q2 scores ranging from 4.27 to 5.0. Students praise his use of different interactive techniques in the classroom, his use of practical problems and problems from his own research to put the material in context, and his availability to meet with them outside of class hours. Professor Shaw has also been an active mentor to graduate students, graduating six Ph.D. and four M.S.E. students; he is currently working with three Ph.D. students and one postdoctoral fellow. In addition, he has directed several major undergraduate projects. Professor Shaw's effectiveness in teaching has been recognized by the American Society of Engineering Education with the Beer/Johnston Outstanding New Mechanics Educator Award in 2002. He was also recently recognized with the College of Engineering Education Excellence Award.

Research: Professor Shaw has established himself as an internationally renowned scholar in the mechanics of adaptive materials and structures. He has been successful in bringing his theoretical, computational and experimental talents to bear on raising the level of understanding of the unique properties of these materials, so that they can be exploited effectively in engineering applications. He has worked on understanding the fundamental behavior of shape-memory alloys, developing new structural forms of shape-memory alloys, and characterizing the high-temperature degradation of polymeric components. The unifying theme of his work is the strong coupling between mechanical behavior and thermal/electrical/chemical aspects of the materials that he studies. His work is highly regarded for its creativity and precision, and is heavily cited. Professor Shaw has published 34 articles in referred journals, three book chapters and four patent applications. He is the recipient of the National Science Foundation CAREER award (2000) and the Office of Naval Research Young Investigator Award (2001).

### Recent and Significant Publications:

- Sondergaard, C. S., Hodonsky, C. J., Khait, L., Shaw, J. A., Sarkar, B., Birla, R., Bove, E., Nolte, J., and Si, M.-S. "Human Thymus Mesenchymal Stromal Cells Augment Force Production in Self-Organized Cardiac Tissue." *The Annals of Thoracic Surgery*, 90:796-804, 2010.
- Churchill, C. B., Shaw, J. A., and Iadicola, M. A. "Tips and Tricks for Characterizing Shape Memory Alloy Wire: Part 4 - Thermo-mechanical Coupling." *Experimental Techniques*, 34(2):63-80, Mar/Apr, 2010.
- Grummon, D. S., Shaw, J. A., and Foltz, J. "Fabrication of Cellular Shape Memory Alloy Materials by Reactive Eutectic Brazing Using Niobium." *Materials Science and Engineering, A*, 438-440:1113-1118, Nov. 2006.
- Elliott, R. S., Shaw, J. A., and Triantafyllidis, N. "Stability of Crystalline Solids, II: Application to temperature-induced martensitic phase transformations in a bi-atomic crystal." *Journal of the Mechanics and Physics of Solids*, 54:193-232, 2006.
- Chang, B.-C., Shaw, J. A., and Iadicola, M. A. "Thermodynamics of Shape Memory Alloy Wire: Modeling, Experiments, and Application." *Continuum Mechanics and Thermodynamics*, 18(1-2):83-118, 2006.
- Iadicola, M. A. and Shaw, J. A. "The Effect of Uniaxial Cyclic Deformation on the Evolution of Phase Transformation Fronts in Pseudoelastic NiTi Wire." *Journal of Intelligent Material Systems and Structures*, 13(2):143-156, 2002.

Service: Professor Shaw's contributions to service have been excellent at both the departmental and the national level. At the departmental level, he has played a crucial role as the coordinator of our accreditation effort since 2004. He has also taken an active role in upgrading the undergraduate curriculum, while serving on the Aerospace Engineering Undergraduate Curriculum Committee. At the national level, he has served as an associate editor of a major journal, and has been active in organizing national symposia for the American Institute of Aeronautics and Astronautics and the American Society of Mechanical Engineers. His service to the American Institute of Aeronautics and Astronautics has been recognized with a Distinguished Service Certificate.

### External Reviewers:

Reviewer A: "...I regard John to be among the most significant researchers in solid mechanics at a comparable career stage."

Reviewer B: "...His 'tips and tricks' series of papers in *Experimental Techniques* is outstanding – I have made them must-read papers for students in my group working on SMAs."

Reviewer C: "It is my opinion that Professor Shaw is one of the few individual [sic] who has a firm grasp on both understanding the materials [sic] complicated response as well as being able to experimentally evaluate this complex material."

Reviewer D: "His work in NiTi shape memory alloys was, and continues to be, pioneering in fundamental understanding and application...Dr. Shaw is one of the most innovative researchers that I have ever encountered."

Reviewer E: "I simply cannot think of anyone who has a comparable reputation and global visibility in experimental research of my area."

Reviewer F: "John is a meticulous experimentalist, and brings to his research a level of precision that is quite rare; he is also very innovative both in designing the experiments and in diagnosing the response."

Reviewer G: “He has clearly established himself as a world leader in the area of thermomechanical problems...I would certainly place him at the top of his peer group in the area of active materials, which is a vibrant area of research...”

Summary of Recommendation: Professor Shaw is a prominent and productive researcher in mechanics of materials and structures. He is a dedicated and highly effective teacher and mentor. He contributes to his department and his field in service leadership roles. It is with the unanimous support of the College of Engineering Executive Committee that I recommend John A. Shaw for promotion to professor of aerospace engineering, with tenure, Department of Aerospace Engineering, College of Engineering.

*David C. Munson Jr.*

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Robert J. Vlasic Dean of Engineering

College of Engineering

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