

## PROMOTION RECOMMENDATION

The University of Michigan  
College of Engineering

Michael Lawrence Falk, assistant professor of materials science and engineering, Department of Materials Science and Engineering, College of Engineering, is recommended for promotion to associate professor of materials science and engineering, with tenure, Department of Materials Science and Engineering, College of Engineering

### Academic Degrees

B.A. 1990 Johns Hopkins University, Physics  
M.S.E. 1991 Johns Hopkins University, Computer Science  
Ph.D. 1998 University of California, Santa Barbara, Physics

### Professional Record

2000-present Assistant Professor of Materials Science and Engineering, University of Michigan  
2000-present Assistant Professor of Applied Physics, University of Michigan  
1999 Visiting Scholar, National Institute of Standards and Technology  
1998-2000 Postdoctoral Fellow, Harvard University

### Summary of Evaluation:

Teaching: Professor Falk, by all indicators, has demonstrated that he is an outstanding educator. He is one of the best teachers of Materials Science and Engineering, consistently earning outstanding teaching evaluations each semester. This year Assistant Professor Falk won three major teaching awards from the College of Engineering, the Jon R. and Beverly Holt Award for Excellence in Teaching; the 1938E Award and the outstanding Student Group Advisor Award of the Epeians Engineering Leadership Honor Society. By any measure, this is an outstanding accomplishment!

Research: Professor Falk uses computational and theoretical techniques to solve problems in the areas of mechanical properties of materials and of materials processing. The problems he chooses are intellectually deep and his work demonstrates intellectual breadth and creativity. He is one of the first to use atomistic simulations for understanding mechanisms of deformation in metallic glasses. His discovery of the connection between physical mechanical behavior and processing has had a significant impact on the field and, as indicated by External Reviewers A and C, led to new excitement in the mechanical properties of these technologically important materials. His publications are insightful and written with great clarity. Professor Falk, it appears, will have a significant and unique impact on the field in the future.

### Recent and Significant Publications:

Shi, Y. and M.L. Falk, "Strain localization and percolation of stable structure in amorphous solids," *Physical Review Letters*, Vol. 95, pp. 095502 (2005).  
Albano, F. and M.L. Falk, "Shear softening and structure in a simulated three-dimensional binary glass," *Journal of Chemical Physics*, Vol. 122, pp. 154508 (2005).  
Shi, Y. and M.L. Falk, "Structural transformation and localization during simulated nanoindentation of a non-crystalline metal film," *Applied Physics Letters*, Vol. 86, pp. 011914 (2005).  
Falk, M.L., "AtomLab: A tool for teaching materials science and simulation on the atomic scale," *Journal of Materials Education*, Vol 26, No. 3-4, pp. 225-232 (2004).

- Wu, J.H., S. Karthikeyan, M.L. Falk and D.A. Rigney, "Tribological characteristics of diamond-like-carbon (DLC) based nanocomposite coatings," *Wear*, Vol. 259, pp. 744-751 (2004).
- Bouville, M., J. Mirecki-Millunchick, M.L. Falk, "Pit nucleation in the presence of 3D islands during heteroepitaxial growth," *Physical Review B*, Vol. 70, pp. 235312 (2004).
- Falk, M.L., J.S. Langer, L. Pechenik, "Thermal Effects in the Shear-Transformation-Zone Theory of Amorphous Plasticity: Comparison to Metallic Glass Data," *Physical Review E*, Vol. 70, pp. 011507 (2004).
- Riposan, A., G.K.M. Martin, M. Bouville, M.L. Falk, J. Mirecki Millunchick, "The effect of island density on pit nucleation in  $\text{In}_{0.27}\text{Ga}_{0.73}\text{As}$  / GaAs films," *Surface Science*, Vol. 525, pp. 222-228 (2003).

Service: Assistant Professor Falk has an outstanding service record. He has organized scientific symposia and sessions at the American Physical Society, Society of Engineering Sciences and the Materials Research Society national meetings. He is one of the organizers of a 5 month long international workshop at the Kavli Institute for Theoretical Physics on Friction, Fracture and Earthquake physics, bringing together researchers from diverse disciplines that include physics, mathematics and geology. Moreover, through his teaching and participation in workshops on campus, Professor Falk has demonstrated a commitment to diversity on campus. Finally, through various outreach activities, he has attracted students to the field of MS&E.

External Reviewers:

Reviewer (A): "[referring to several papers] I can tell you that these are brilliant pieces of work that will stand the test of time." "...Falk is one of the best....He has the maturity and confidence that one usually finds in only more senior people."

Reviewer (B): "His papers are well-written and among the most readable in any journal, and his conference talks are presented with unusual clarity in thought and expression. These same skill have also brought him success in teaching ..."

Reviewer (C): "...he has brought mathematical rigor as well as new physical insights to the problem [in reference to plastic deformation of amorphous metals]... he continues to find new and interesting ways to shed light on the problem.... Michael's work has been well received by the community, and he is establishing himself as one of the leading glass theorists."

Reviewer (D): "His recent work on methods for accelerated Monte Carlo simulations has the potential to be very important....His idea of using a multiscale diffusion-based algorithm is clever and clearly advantageous. His productivity has been increasing steadily since he joined the faculty, with 2005 being the best year to date both in terms of number of publications and the quality of the journals ..."

Reviewer (E): "[Michael's publications] constitute evidence of a broad range of scholarly work in materials science, with emphasis on condensed matter and statistical physics." "Professor Falk is highly regarded in the community of theoretical and computational materials research.... he more than holds his own in discussions with colleagues who are more senior and experienced."

Summary of Recommendation: With three major teaching awards from the College of Engineering for innovation, mentoring and course development, Professor Michael L. Falk is considered one of the most dedicated and successful educators in the CoE. Leaders within his field comment on his unusual ability to identify and address very tricky and intellectually challenging problems with creative strategies. A comparison of his accomplishments with those of his peers within his chosen field, Computational and Theoretical Materials Science, ranks him at the top. He is well recognized for his research here in the US

and abroad. He is considered one of the most important contributors within the Materials Science and Engineering department for his overall service to the department and to the college. It is with the support of the Executive Committee that I recommend him for promotion to associate professor of materials science and engineering, with tenure, Department of Materials Science and Engineering, College of Engineering.

A handwritten signature in cursive script that reads "Ronald Gibala". The signature is written in black ink and is positioned above a horizontal line.

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Ronald Gibala  
Interim Dean, College of Engineering

May 2006