

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Mechanical Engineering

Yue Fan, assistant professor of mechanical engineering, Department of Mechanical Engineering, College of Engineering, is recommended for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.

Academic Degrees:

Ph.D. 2013 Massachusetts Institute of Technology, Nuclear Science and Engineering,
Cambridge, MA
B.S. 2008 Peking University, Physics, Beijing, China

Professional Record:

2017 – present Assistant Professor, Department of Mechanical Engineering, University of
Michigan
2013 – 2016 Eugene P. Wigner Fellow/Staff Scientist, Materials Science & Technology
Division, Oak Ridge National Lab, Oak Ridge, TN

Summary of Evaluation:

Teaching: Professor Fan is an outstanding classroom teacher at both the undergraduate and graduate levels. He has a reputation for developing an excellent rapport with the students in his classroom. Students emphasize that he is diligent in reaching out to them and creates a welcoming and inclusive atmosphere in his classes. Professor Fan works well with his graduate students, and has graduated two Ph.D.s, each having several first-author papers by the time they graduated. The next student in line to graduate has a similar productivity. He is actively recruiting two additional Ph.D. students. Professor Fan is clearly well-regarded as a mentor by students in his class and his research group. His average Q1 scores for ME 382 are about 4.6, and average Q2 scores are about 4.9 for both classes.

Research: Professor Fan's research centers on the use of computational models to predict the mechanical behavior of materials. Molecular Dynamics (MD) models provide a good description of atomistic behavior at the time scale of atomic vibration, but this is many orders of magnitude shorter than the time scale associated with typical deformation mechanisms. Professor Fan has applied his methodology to predict the deformation behavior of disordered or amorphous solids such as glasses, and his results have great potential for the design of such materials to optimize appropriate strength properties. He has published full articles in prominent journals including *Nature Communications*, *Physical Review B*, *Acta Materialia*, and *Scripta Materialia*. He has also demonstrated his ability to attract funding from diverse sponsors, with ~\$1M in current funding including an NSF CAREER Award.

Professor Fan's research is considered impactful with an h-index of 13 [per ISI], 689 citations, and has published 25 journals. His funding sources include the National Science Foundation (NSF), Army Research Office (ARO), the Ford Motor Company, and the ACS-Petroleum

Research Fund. He is the recipient of many distinctive and prestigious awards including a Doctoral New Investigator (DNI) Award by the American Chemistry Society-Petroleum Research Fund, Haythornthwaite Research Initiation Award by the American Society of Engineers (ASME), Applied Mechanics Division, and the Ralph E. Powe Junior Faculty Enhancement Award by Oak Ridge Associated Universities (ORAU).

Recent and Significant Publications:

Fan, Yue, Takuya Iwashita, and Takeshi Egami, "Energy landscape-driven non-equilibrium evolution of inherent structure in disordered material," *Nature communications* 8.1 (2017): 1-7.

Liu, Chaoyi, and Yue Fan, "Emergent Fractal Energy Landscape as the Origin of Stress-Accelerated Dynamics in Amorphous Solids," *Physical Review Letters* 127.21 (2021): 215502.

Bai, Zhitong, and Yue Fan, "Abnormal strain rate sensitivity driven by a unit dislocation-obstacle interaction in bcc Fe," *Physical Review Letters* 120.12 (2018): 125504.

Bai, Zhitong, et al, "Mapping the kinetic evolution of metastable grain boundaries under non-equilibrium processing," *Acta Materialia* 200 (2020): 328-337.

Fan, Yue, Takuya Iwashita, and Takeshi Egami, "How thermally activated deformation starts in metallic glass," *Nature communications* 5.1 (2014): 1-7.

Service: Professor Fan is a good citizen for the UM, the college and his department serving on various internal committees including the Seminar Committee, Graduate Admissions Committee, and the Faculty Search Committee. Externally, Professor Fan has been very active in service to the research community. He is active with The Minerals, Metals & Materials Society (TMS) and the Society of Engineering Science (SES) professional societies including four TMS standing committees including the DEI committee and co-founder of the Asian/Pacific Islanders (API) working group.

External Reviewers:

Reviewer A: "I believe there is no doubt that he is in the top echelon of his peer group working in similar fields.... He is nationally visible in his field and his work is highly regarded."

Reviewer B: "Dr. Fan is becoming a leading authority of the basic theories and analysis of metallic materials, especially metallic glasses."

Reviewer C: "...he is above the bar for promotion to Associate Professor with tenure. He has published work that has added substantially to the literature in the field theoretical glass science. He has been an energetic proponent of the energy landscape picture of glass structural evolution. I am intensely intrigued by the possibility that with additional development of the fundamental statistical mechanics of this theory, Dr. Fan's work could result in groundbreaking advances."

Reviewer D: "Professor Fan is well known in the area [of] disorder of materials, publishes in the field in high level journals which documents his success. He is meticulous and detailed orientated which led him to his high impact papers. His teaching is excellent, and he clearly demonstrated that he is a great teacher for decades to come. Also, his service and DEI efforts are most certainly exceeding most standards at other universities."

Reviewer E: “Yue Fan is unequivocally among the top of his peer group. Period.... I can confidently say that Yue Fan is among the top few in generation of scientists. He has already emerged as a leader in his field, and I fully expect him to be *the* leading figure in this area in the near future.”

Reviewer F: “YF holds great promise for further development and for achieving a leadership role in computational materials modelling at both the national and the international level.... I estimate Yue Fan’s standing in comparison with his peers in the same field to be in the top 2%.”

Summary of Recommendation: Professor Yue Fan is quickly becoming the leading authority on the field theoretical glass science and has made a significant impact. He is an outstanding classroom teacher and mentor and engages in DEI activities in a meaningful fashion through teaching, research, and service activities. It is with the support of the College of Engineering Executive Committee that I recommend Yue Fan for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.



Alec D. Gallimore, Ph.D.
Robert J. Vlastic Dean of Engineering
College of Engineering

May 2023