

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

Xiaogan Liang, 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.	2008	Princeton University, Electrical Engineering, Princeton, NJ
M.A.	2004	Princeton University, Electrical Engineering, Princeton, NJ
M.S.	2002	Chinese Academy of Sciences, Condensed Matter Physics, Institute of Semiconductors, Beijing, China
B.S.	1999	Peking University, Physics, Beijing, China

Professional Record:

2012-present	Assistant Professor, Department of Mechanical Engineering, University of Michigan
2010-2011	Staff Scientist, The Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA
2008-2010	Post-doctoral Researcher, The Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA

Summary of Evaluation:

Teaching: Professor Liang is an exceptional teacher and excellent advisor to our students. Since joining the University of Michigan, he has taught a large core undergraduate class in Fluid Mechanics (ME320) and two graduate classes in specialized areas of Nanomanufacturing and Solid State Physics. His teaching evaluations are consistently high. For example, since winter 2012, Professor Liang has taught ME320 six times and his Q1 and Q2 have averaged 4.5 and 4.8, respectively. His Q1/Q2 score averages are around 4.9 for his graduate classes. Student letters are positive, testifying that Professor Liang is a caring, responsive, and effective teacher. He has supervised several undergraduate and M.S.E. student research projects and has graduated three Ph.D. students. He is currently advising two additional Ph.D. and two M.S.E. students. His graduate students view him as an excellent advisor who is knowledgeable, thoughtful and supportive. His mentorship is also well demonstrated through the various papers he has published with his students. Professor Liang's contribution to education was recognized by his receipt of the 2016 College of Engineering (CoE) 1938E Award, one of the college's highest honors for junior faculty.

Research: Professor Liang has been performing scholarly research and is building an outstanding reputation in the field of nanomanufacturing. His focus and vision is to develop advanced technologies that will fabricate nanoscale device structures substantially better and cheaper than state-of-the-art technology permits as well as create innovative functional devices by combining multidisciplinary knowledge and nanotechnology. He has made significant contributions in nanomanufacturing of emerging 2D nanomaterials and nanodevices, 2D layer-based functional

devices with new functionalities, and new nanoimprint lithography methods for manufacturing. He has developed a strong research program at UM, with a good mix of external research grants, including an NSF CAREER Award. Professor Liang has been extremely productive in publishing research findings in high quality refereed journals in his field, with over 20 journal papers published or accepted since arriving at UM (many with his UM students) and over 50 in total. His papers have received nearly 3,500 citations, which attests to the high visibility and impact of his work. He has also been active in presenting at important conferences in his field and has been invited to give talks at several of our top peer schools. External reviewers are supportive of his case, praising his research quality, accomplishments and potential. Overall, Professor Liang has developed an extraordinary research record with outstanding potential.

Recent and Significant Publications:

- Mikai Chen, Yifan Wang, Nathan Shepherd, Chad Huard, Jiantao Zhou, L. Jay Guo, Wei Lu, Xiaogan Liang, "Abnormal Multiple Charge Memory States in Exfoliated Few-Layer WSe₂ Transistors," *ACS Nano*, 01/2017; 11(1): 1091–1102.
- Mikai Chen, Hongsuk Nam, Hossein Rokni, Sungjin Wi, Jeong Seop Yoon, Pengyu Chen, Katsuo Kurabayashi, Wei Lu, Xiaogan Liang, "Nanoimprint-Assisted Shear Exfoliation (NASE) for Producing Multilayer MoS₂ Structures as Field-Effect Transistor Channel Arrays," *ACS Nano*, 08/2015; 9(9): 8773–8785.
- Sungjin Wi, Hyunsoo Kim, Mikai Chen, Hongsuk Nam, L. Jay Guo, Edgar Meyhofer, Xiaogan Liang, "Enhancement of Photovoltaic Response in Multilayer MoS₂ Induced by Plasma Doping," *ACS Nano*, 05/2014; 8(5): 5270–5281.
- Mikai Chen, Hongsuk Nam, Sungjin Wi, Greg Priessnitz, Ivan Manuel Gunawan, Xiaogan Liang, "Multibit Data Storage States Formed in Plasma-Treated MoS₂ Transistors." *ACS Nano*, 04/2014; 8(4): 4023–4032.
- Hongsuk Nam, Sungjin Wi, Hossein Rokni, Mikai Chen, Greg Priessnitz, Wei Lu, Xiaogan Liang, "MoS₂ Transistors Fabricated by Plasma-assisted Nanoprinting of Few-Layer-MoS₂ Patterns into Large Arrays," *ACS Nano*, 06/2013; 7(7): 5870-5881.

Service: Professor Liang has been a good citizen, serving on several committees, including the ME Graduate Admissions Committee, the ME Seminar Committee, and he has organized the department Monthly Junior Faculty Mentoring Lunch Meeting. He also contributed to diversity and climate initiating collaborative after-school hands-on projects for the Ecotek lab's Young Explorer program, and recruiting women and underrepresented minorities into engineering-related research projects (advised ten female undergraduate/graduate students, two female high-school students, and four K-12 students from underrepresented minority groups to perform research projects). Externally, Professor Liang has also been very active in serving the technical community. He was the Nanoelectronics topic organizer in the International Conference on Electron, Ion, Photon Beam Technology & Nanofabrication and has been serving on its program committee since 2013. He has been a program committee member of the International Conference on Nanoimprint and Nanoprint Technologies since 2009. He is also the topic organizer on M/NEMS Emerging Technology for the 13th ASME International Conference on Nanochannels, Microchannels, and Minichannels and International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems. He has been an editorial board member of Scientific Reports since 2015 and Advanced Materials Letters since 2017. Professor Liang has reviewed many technical papers for a variety of scientific journals and proposals for various funding agencies.

External Reviewers:

Reviewer A: “Professor Liang is conducting very high quality research at the intersection of 2D materials and nanofabrication and is a leader at this intersection. His work is well published, detailed, and creative. Professor Liang’s group’s productivity has been excellent.”

Reviewer B: “His placement in Mechanical Engineering attests both to the interdisciplinary nature of modern engineering and the department’s enlightened approach to reach across traditional boundaries to attract top-quality people regardless of their background ... His publication record is excellent, comparable to publication record of researchers at top universities in this country.”

Reviewer C: “Xiaogan is always one of our most prolific and successful presenters, and his work covers a wide range of nanofabrication topics ... Xiaogan’s work on templated self-assembly, plasma-assisted nanoimprint, and other creative and novel nanofabrication methods are, to my knowledge, unique in the world. I cannot think of another group that has undertaken research in this topic with this level of success, and I believe it is an extremely promising direction for the field.”

Reviewer D: “Xiaogan is extremely talented...and has made extremely important breakthroughs and contributions in the areas of nanofabrication, nanolithography, and nanoscale devices ... Xiaogan is a pioneer in developing top-down nanofabrication methods for making 2D material based devices.”

Reviewer E: “... I have no hesitation in placing Prof. Liang at par with recently-tenured engineering faculty in top-10 US universities.”

Reviewer F: “Dr. Liang is one of the best researchers in his cohort, his teaching evaluations are amazing, and his service record is very strong. He will definitely be promoted to Associate Professor with tenure in my university.”

Reviewer G: “Dr. Liang has an outstanding record in the quality, quantity, focus, and scholarly impact of his research. I would rank him as one of the best among his peers of similar stage of research careers ... He has achieved excellence in all aspects of academic life...”

Summary of Recommendation: Professor Liang is an outstanding faculty member in all aspects of teaching, research and service. He has demonstrated exceptional performance and potential, and is a valuable asset to the University of Michigan. It is with the support of the College of Engineering Executive Committee that I recommend Xiaogan Liang for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.



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

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