

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

Allen P.C. Liu, assistant professor of mechanical engineering, Department of Mechanical Engineering, College of Engineering, assistant professor of biomedical engineering, Department of Biomedical Engineering, College of Engineering and Medical School, and assistant professor of biophysics, Department of Biophysics, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering, associate professor of biomedical engineering, without tenure, Department of Biomedical Engineering, College of Engineering and Medical School, and associate professor of biophysics, without tenure, Department of Biophysics, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2007	University of California, Berkeley, Biophysics, Berkeley, CA
B.S.	2001	University of British Columbia, Biochemistry, Vancouver, BC, Canada

Professional Record:

2013 – present	Assistant Professor, Department of Biophysics, University of Michigan
2012 – present	Assistant Professor, Department of Mechanical Engineering, University of Michigan
2012 – present	Assistant Professor, Department of Biomedical Engineering, University of Michigan
2007 – 2011	Post-doctoral Researcher, Cell Biology, The Scripps Research Institute, La Jolla, CA

Summary of Evaluation:

Teaching: Professor Liu is an excellent teacher to our students. Since joining the University of Michigan, he has taught a large core undergraduate class in Solid Mechanics (ME211) and a graduate class in the specialized area of Cellular Engineering. In addition, he volunteered to teach the small class of ME211 in fall 2016 (as part of the university's small class initiative). Professor Liu is notably earnest and sincere about enhancing his teaching performance continuously. For example, he has participated in the Teaching Circle for Teaching Large Classes sponsored by CRLT to learn about different ways to promote learning in a large class setting. He was awarded a CRLT Investigating Student Learning grant to implement a concept guide and the use of a model set in ME211. His teaching evaluations are consistently very high, with many of his Q1/Q2 scores above 4.5. Almost all of his Q1/Q2 scores are much higher than his Q4 score; showing that he has been very successful in improving students' interest in learning even if they were not originally enthusiastic about the subject. Student letters are positive, testifying that Professor Liu is a knowledgeable, caring, and effective teacher.

Professor Liu has supervised many undergraduate student research projects. He graduated two Ph.D. students in 2017 and currently advises another five Ph.D. students. Letters from his graduate students indicate Professor Liu is an excellent teacher, mentor and advisor who is helpful, patient and supportive. His mentorship is also well demonstrated through the various papers that he has published with his students. His effort advising undergraduate researchers was recognized with the UROP Outstanding Research Mentor Award Honorable Mention.

Research: Professor Liu is building an outstanding reputation in the field of biosystems, with a specific interest in mechanobiology of biological membranes. He has made significant contributions in the areas of bottom-up synthetic biology, single cell biomechanics and mechanotransduction, and systems analysis of clathrin-mediated endocytosis. He has developed a strong research program at UM, with a good mix

of external research grants from NSF, NIH and the Pardee Foundation, including the prestigious NIH Director's New Innovator's Award. Professor Liu has been extremely productive in publishing research findings in high quality refereed journals in his field, with over 20 journal papers published since arriving at UM (many with his UM students) and over 30 in total. He has also been active in presenting at important conferences in his field and has been invited to give talks at many schools, nation and worldwide. In 2017, Professor Liu has received the Rising Star Award from the Biomedical Engineering Society in the category of Cellular and Molecular Bioengineering. He has developed an extraordinary research record with outstanding potential.

Recent and Significant Publications:

Ho KKY, Lee LM, Liu AP, "Mechanically activated artificial cell by using microfluidics," *Scientific Report*, 2016; 6, 32912.

Lee LM, Liu AP, "A microfluidic pipette array for mechanophenotyping of cancer cells and mechanical gating of mechanosensitive channels," *Lab on a Chip*, 2014; 15: 264-273.

Majumder S, Garamella J, Wang T.-L, DeNies M, Noireaux V, Liu AP, "Cell-sized mechanosensitive and biosensing compartment programmed by DNA," *Chemical Communications*, 2017; 52: 7349-7352.

Tan X, Heureaux J, Liu AP, "Cell spreading area regulates clathrin-coated pit dynamics on micropattern Substrate," *Integrative Biology*. 2015; 7: 1033-1043.

Heureaux J, Chen D, Murray VL, Deng CX, Liu AP, "Activation of bacterial mechanosensitive channel in mammalian cells by cytoskeletal stress," *Cellular and Molecular Bioengineering*, 2014; 7 no. 3: 307-319.

Service: Professor Liu has been a good citizen, serving on several committees, including the ME Graduate Admissions Committee, the ME Seminar Committee, and the ME Department Chair Search Committee, as well as committees at the college and university level. He also has contributed to diversity and climate by proactively attracting female (16) and underrepresented minority researchers to his lab and has been actively involved with outreach and community engagement, such as organized hands-on science activities for middle school girls through the Girls in Science and Engineering camp, and gave a public science lecture as part of the Saturday Morning Physics program. Externally, Professor Liu has also been very active in serving the technical community. He has served on multiple review panels at NSF, NIH, the Research Corporation for Science Advancement, and the National Science and Engineering Research Council of Canada. Professor Liu has been involved in many national and international meetings, reviewing abstracts for the Biomedical Engineering Society (BMES), chairing multiple sessions for BMES and the American Society of Mechanical Engineering, serving as a mentoring table leader for the American Society for Cell Biology, and acting as the conference co-chair for meetings in Berlin and future conference in Monterey, CA. Apart from being an active journal reviewer, Professor Liu is currently an associate editor for the journal *Heliyon* and a guest editor for a special issue in *Physical Biology*.

External Reviewers:

Reviewer A: "Dr. Liu has received several recognitions for his research excellence and promise ... These achievements attest to Dr. Liu's excellent scholarship, research promise, and ranking relative to his peers ... Overall, this level of service is excellent for someone at this professional stage."

Reviewer B: "...he has published 22 papers since 2012 when he started his lab. This is a very impressive output, easily in the 90th percentile of assistant professors in BME departments around the country."

Reviewer C: "Allen has the attributes that will make him a major leader in Science. He is very talented in explaining his ideas to others and to pass on his enthusiasm and love of science, along with a commitment to very hard work."

Reviewer D: "... give Allen THE HIGHEST level of support. He has already done amazing work and his trajectory is excellent. I strongly believe he will continue to excel to even greater heights although he has already shown that he is top notch in his field."

Reviewer E: "Dr. Liu has established an excellent record of accomplishment and is bringing an exciting, creative, and quantitative analysis approach to challenging problems in cellular and molecular bioengineering."

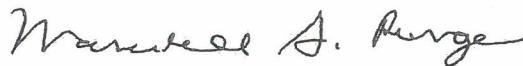
Reviewer F: "Dr. Liu has an excellent research record, as evidenced by the quality, quantity, and potential impact of his contributions, and the recognition he received as a top new innovator ..."

Reviewer G: "Prof. Liu has developed exciting new quantitative assays and has seeded and explored new original fields of research ..."

Summary of Recommendation: Professor Liu 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 Allen P.C. Liu for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering, associate professor of biomedical engineering, without tenure, Department of Biomedical Engineering, College of Engineering and Medical School, and associate professor of biophysics, without tenure, Department of Biophysics, College of Literature, Science, and the Arts.



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



Marschall S. Runge, M.D., Ph.D.
Executive Vice President for Medical Affairs
Dean, Medical School



Andrew D. Martin, Dean
Professor of Political Science and Statistics
College of Literature, Science, and the Arts

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