

PROMOTION RECOMMENDATION
University of Michigan
College of Engineering
Department of Chemical Engineering
Department of Biomedical Engineering

Nina Lin, assistant professor of chemical engineering, Department of Chemical Engineering, College of Engineering, and assistant professor of biomedical engineering, Department of Biomedical Engineering, College of Engineering and Medical School, is recommended for promotion to associate professor of chemical engineering, with tenure, Department of Chemical Engineering, College of Engineering, and associate professor biomedical engineering, without tenure, Department of Biomedical Engineering, College of Engineering and Medical School.

Academic Degrees:

Ph.D.	2003	Princeton University, Chemical Engineering, Princeton, NJ
B.S.	1997	Tsinghua University, Chemical Engineering, China
B.S.	1997	Tsinghua University, (minor) Computer Science & Technology, China

Professional Record:

2006 - present	Assistant Professor, Department of Chemical Engineering, University of Michigan
2006 - present	Assistant Professor, Department of Biomedical Engineering, University of Michigan
2003 - 2006	Post-doctoral Fellow, Systems and synthetic biology, Harvard Medical School, Cambridge, MA

Summary of Evaluation:

Teaching: Students find Professor Lin a caring, organized and dedicated teacher who challenges them. Female students commented on how they relate to her as a professor and role model. She is commended for taking the initiative to improve her teaching through CRLT training and serving as a recitation leader for a course before taking on the responsibility to teach that same course. Her efforts are evident by the improved teaching scores she has received. Professor Lin has already graduated five Ph.D. students and has another five in progress. Her past and present graduate students speak very positively about her mentoring. Professor Lin's teaching activities include advising M.S. students and directing undergraduate major projects. Outside the classroom, she has been active in the WISE-GISE (Girls in Science and Engineering) Summer Camp, in which she was responsible for a focus project on biotechnology and chemical engineering. In addition, Professor Lin was involved with the University of Michigan iGEM team. She was the main faculty advisor for the team from 2009 to 2010.

Research: Professor Lin has succeeded in combining theory and experimentation to investigate microbial consortia. This area is promising and very important. Particularly, the quality of her *Proceedings of the National Academy of Sciences* (PNAS) paper was praised by external reviewers. Professor Lin has been characterized as a rising leader in investigations of microbial consortia for biofuels and microbiome related research. She is involved in a number of collaborations with faculty in and outside of her department. In terms of funding, her past and current grants total nearly \$2M to support her research group. Current grants are from the NSF, NIH, the U.S. Department of Agriculture, and others. Her curriculum vitae lists 24 publications with several more submitted. She also has been a frequent invited speaker (over 25 noted). Her work has resulted in a number of awards including an NSF CAREER Award and the University of Michigan's 2011 Elizabeth C. Crosby Research Award. She received a

REACH for Commercialization Conference Fellowship from Ohio State University in 2012. In addition, she was a NIH Director's New Innovator Award finalist in 2013.

Recent and Significant Publications:

Peter Valdez, Michael Nelson, Julia Faeth, Henry Wang, Xiaoxia Nina Lin and Phillip Savage, "Hydrothermal liquefaction of bacteria and yeast monocultures," *Energy & Fuels*, accepted, October 2013.

Fengming Lin, Yu Chen, Robert Levine, Kilho Lee, Yingjin Yuan and Xiaoxia Nina Lin, "Improving fatty acid availability for bio-hydrocarbon production in *Escherichia coli* by metabolic engineering," *PLoS One*, in press, October 2013.

Jeremy J. Minty, Marc E. Singer, Scott Scholz, Chang Hoon Bae, JungHo Ahn, Cliff E. Foster, James C. Liao and Xiaoxia Nina Lin, "Design and characterization of synthetic fungal-bacterial consortia for direct production of isobutanol from cellulosic biomass," *Proceedings of the National Academy of Sciences USA*, 110(36), 14592-14597, 2013.

Fengming Lin, Debasis Das, Xiaoxia Nina Lin and E. Neil Marsh, "Aldehyde-forming fatty acyl-coA reductase from cyanobacteria: expression, purification and characterization of the recombinant enzyme," *Federation of European Biochemical Societies Journal*, 280(19), pp. 4773-4781, 2013.

Michael Nelson, Lian Zhu, Anne Thiel, Yan Wu, Mary Guan, Jeremy Minty, Henry Y. Wang and Xiaoxia Nina Lin, "Microbial utilization of aqueous co-products from hydrothermal liquefaction of microalgae *Nannochloropsis oculata*," *Bioresource Technology*, 136, pp. 522-528, 2013.

Service: Professor Lin is active in external service contributions for her profession. She has served as a panel and an ad-hoc reviewer of proposals for programs within the National Science Foundation, the National Institutes of Health, and the Department of Energy, and she regularly reviews manuscripts for a large number of journals. She has chaired sessions at the annual meetings of the American Institute of Chemical Engineers and Foundations of Systems Biology in Engineering almost every year since 2007. In addition, Professor Lin has been a member of program committees for a variety of international conferences. Such visibility at the national and international level at this stage is a testament to her scientific acumen, diligence and organizational abilities. Professor Lin is active with internal service as well. At the department level, Professor Lin has served on the seminar committee, which she chaired for a semester, awards committee, and the undergraduate program committee. She further served on an internal committee charged with reviewing the Department of Chemical Engineering, as well as on several Ph.D. dissertation committees within her department and departments across campus. Outside of the college, Professor Lin has provided service to the Center for Computational Medicine and Bioinformatics, the Bioinformatics Graduate Program, and a Rackham scholarship committee.

External Reviewers:

Reviewer A: "...Prof. Nina Lin has demonstrated her ability to identify important biochemical [engineering] problems and to tailor the tools of molecular biology to address them. She is just hitting her prime and I expect Nina to continue to develop exciting and important research for a long time."

Reviewer B: "Having had the opportunity to read her recent PNAS paper and hear this work presented at a conference, I am quite impressed with her progress towards developing a synthetic fungal/bacterial consortium for isobutanol synthesis from cellulosic feedstocks. Having worked a similar problem I can unequivocally state that this is a very challenging research problem...From my perspective, she has established a national reputation in this area."

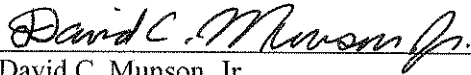
Reviewer C: "Nina has also done some nice work investigating the toxicity of isobutanol to the producing organism...Her team identified the genes that are induced when bacteria are exposed to

isobutanol, which could be important in helping to relieve the stress of biofuel toxicity. What I think was most interesting about this work was the mutations they found in pumps that can potentially relieve the biofuel toxicity. This is one of the most thoughtful and deep papers I have read about biofuel toxicity!”

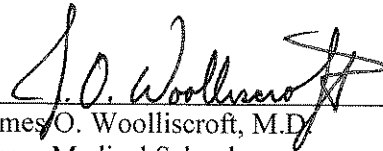
Reviewer D: “...I find her PNAS paper on the design and characterization of the fungal-bacterial consortium for biomass conversion to isobutanol to be outstanding – a very innovative, challenging idea with great practical potential. Furthermore, the breadth and depth of analysis is extraordinary, involving theoretical development; experimental physiology, enzymology and ecology; modeling; and a very nice cooperation-cheater analysis, providing a strong fundamental science framework.”

Reviewer E: “In my opinion, Nina is one of the leaders in microbial consortium engineering and has successfully established a solid research program. She is well-positioned to make significant contributions to the metabolic engineering and synthetic biology areas in the coming years.”

Summary of Recommendation: Professor Lin is working in a niche space and on topics with a strong future. She is considered a well-regarded teacher and mentor and she has provided valuable service to her department, the college, university and her profession. It is with the support of the College of Engineering Executive Committee that I recommend Nina Lin for promotion to associate professor of chemical engineering, with tenure, Department of Chemical Engineering, College of Engineering, and associate professor of biomedical engineering, without tenure, Department of Biomedical Engineering, College of Engineering and Medical School.



David C. Munson, Jr.
Robert J. Vlasic Dean of Engineering
College of Engineering



James O. Woolliscroft, M.D.
Dean, Medical School

May 2014