

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering

Mingyan Liu, associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering, is recommended for promotion to professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

Academic Degrees:

Ph.D.	2000	University of Maryland, Electrical and Computer Engineering, College Park, MD
M.S.	1997	University of Maryland, Systems Engineering, College Park, College Park, MD
B.S.	1995	Nanjing University of Aeronautics & Astronautics, Electrical Engineering, Nanjing, China

Professional Record:

2008	Visiting Researcher, Microsoft Research, Redmond, WA
2007 – 2008	Visiting Researcher, University of Science and Technology, Hong Kong
2006 – present	Associate Professor (with tenure), Department of Electrical Engineering and Computer Science, University of Michigan
2000 – 2006	Assistant Professor, Department of Electrical Engineering and Computer Science, University of Michigan

Summary of Evaluation:

Teaching: Professor Liu is an excellent teacher. Her teaching evaluations, over a wide range of courses covering the theory of communication networks, to the implementation of digital signal processing algorithms on hardware, have been consistently good. The comments from students reveal a competent and passionate teacher who respects students and inspires them to do their best, to think outside the box, and is always available to provide a helping hand. Professor Liu has also received high praise from former Ph.D. students and colleagues about her mentorship abilities. She has graduated nine Ph.D. students so far and currently chairs or co-chairs another seven. She has been extremely proactive in recruiting and training female graduate students and student visitors. Her dedication to teaching, mentoring, and outreach are commendable.

Research: Professor Liu has achieved an international reputation in the area of communication networks, especially wireless communication networks. This is an extremely important area of research in engineering. She has made fundamental contributions to mobility models in communication networks, and to the analysis and design of communication network policies that achieve optimal performance. Her impact on research in the areas of wireless networks is widely recognized, as evidenced by the very impressive number of citations to her work and by the praise her work has received from the very distinguished set of external evaluators consulted.

The distinguishing features of Professor Liu's research contributions can be summarized as follows: (i) her work is always well-grounded in important practical problems in communication networks; (ii) her mathematical modeling of these real-world problems is both careful and creative; and (iii) her results demonstrate a rigorous and highly competent mathematical analysis that reveals insightful properties of optimal solutions and leads to algorithmic procedures that are practical and implementable. Indeed, the body of Professor Liu's contributions is characterized as both deep and broad, with an emphasis on

choosing the “right” problems to investigate, and an interest in both the theoretical and the practical aspects of a problem domain. Her early work on mobility modeling in networks has been characterized as “pioneering.” Her recent work on opportunistic cognitive radios has been widely praised.

Professor Liu’s research talents are complemented by a great ability to form coalitions and partnerships inside and outside of her department for addressing important engineering societal problems. This includes a NASA-funded project on soil moisture and an NSF-funded “Sensing sensors” project on infrastructures health monitoring. Professor Liu’s research has had considerable impact and is very highly cited, with a count of over two thousand citations in the first displayed page by Google Scholar.

Recent and Significant Publications:

- D. I. Shuman and M. Liu, “Energy efficient transmission scheduling with strict underflow constraints,” *IEEE Transactions on Information Theory*, vol. 57, no. 3, March 2011.
- D. I. Shuman, A. Nayyar, A. Mahajan, Y. Goykhman, K. Li, M. Liu, D. Teneketzis, M. Moghaddam and D. Entekhabi, “Soil moisture sensing: closing the loop between data assimilation and optimal control,” *Proceedings of the IEEE Special Issue on Sensor Network Applications*, vol. 98, no. 11, pp. 1918-1933, November 2010.
- N. B. Chang and M. Liu, “Optimal Channel Probing and Transmission Scheduling for Opportunistic Spectrum Access,” *IEEE/ACM Transactions on Networking*, vol. 17, no. 6, pp. 1805-1818, December 2009.
- S. H. A. Ahmad, M. Liu, T. Javidi, Q. Zhao and B. Krishnamachari, “Optimality of Myopic Sensing in Multi-Channel Opportunistic Access,” *IEEE Transactions on Information Theory*, vol. 55, no. 9, pp. 4040-4050, September 2009.
- N. Ehsan and M. Liu, “Server Allocation With Delayed State Observation: Sufficient Conditions For the Optimality of an Index Policy,” *IEEE Transactions on Wireless Communication*, vol. 8, no. 4, pp. 1693-1705, April 2009.
- N. B. Chang and M. Liu, “Constrained sequential resource allocation and guessing games,” *IEEE Transactions on Information Theory*, vol. 54, no. 11, pp. 4946-4965, November 2008.

Service: Professor Liu has a very strong record of internal and external service. She has been a conscientious and effective contributor to service duties at all levels at Michigan: EECS department, College of Engineering (CoE), and University-wide committees. She is currently serving in editorial positions in the most prestigious journals in her field and is actively participating in conference organization.

Finally, Professor Liu has exhibited a strong commitment to diversity and climate in all of her activities, from undergraduate and graduate student supervision to graduate student recruiting and mentoring, faculty recruiting, and climate assessment and improvement in EECS and CoE.

External Reviewers:

Reviewer A: “...her work mobility modeling is pioneering.”

Reviewer B: “Prof. Liu is an internationally known researcher in the field of performance analysis in communication networks...The problems that she chooses are well grounded and motivated by practical applications of networking.”

Reviewer C: “Prof. Liu is a very active researcher with a strong publication record in the best journals in the area of her research...”

Reviewer D: "...That work is the first to provide a solid analytical framework for evaluating gains in throughput and spectral efficiency due to OSA [Opportunistic Spectrum Access], and provides substantial insights into good sensing strategies."

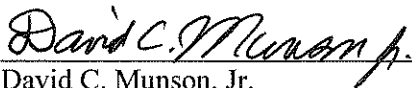
Reviewer E: "What is important to note is her adaptivity to trends in the field. This is very valuable for a healthy research career."

Reviewer F: "Dr. Liu excels at formulating good analytical problems motivated by complex engineering situations, and the record to date confirms that she has further honed this skill."

Reviewer G: "...This work constitutes the most important advance in the area of performance evaluation of MANETs [Mobile Ad hoc NETWORKs]. The importance of this work cannot be emphasized enough."

Reviewer H: "Mingyan's research shows a remarkable trajectory of growth and maturation...The former work is remarkable for solutions to some difficult theoretical problems."

Summary of Recommendation: Professor Liu is a superb researcher, inspiring teacher, and highly involved faculty in internal and external service activities. Her numerous major contributions to-date on the performance analysis of communication networks have earned her a well-deserved national and international reputation that brings great distinction to the University. Professor Liu is a critical member of the communications group in the Electrical Engineering and Computer Science department. Her collaborative activities in the Department, College, and University are a great asset. It is with the support of the College of Engineering Executive Committee that I recommend Mingyan Liu for promotion to professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.



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

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