Approved by the Regents
May 21, 2020

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Electrical Engineering and Computer Science

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

Academic Degrees:

Ph.D.	2012	University of Virginia, Computer Science, Charlottesville, VA
B.S.	2003	Zhejiang University, Computer Science, Hangzhou, China

Professional Record:

2013 – present	Assistant Professor, Department of Electrical Engineering and Computer Science, University of Michigan
2012 – 2013	Research Professor, Computer Science and Engineering, University of California, San Diego, San Diego, CA

Summary of Evaluation:

Teaching: Professor Tang has taught the undergraduate and graduate compilers course (EECS 483 and 583) and a special topics class in specialized architectures. She significantly revised the undergraduate offering. Student evaluations of her quality as an instructor are typically very near or above 4.0. She has co-advised ten Ph.D. students to completion, and co-mentored seven post-doctoral scholars. Professor Tang's students have high praise for her classroom teaching, describing her as a passionate, approachable instructor. They particularly note her importance as a role model for other under-represented students. Her research mentees are similarly positive, describing a patient, passionate, and dedicated advisor.

Research: Professor Tang's research program while at UM has focused on data center architectural designs for emerging classes of applications, in part through advances in benchmark design. Then-current benchmarks did not reflect the workloads that are currently consuming the bulk of data center resources. Additionally, data centers suffer from poor energy efficiency and long-tailed latency. Professor Tang has actively addressed these problems in a series of works focused on fine-grained dynamic frequency and voltage scaling (DFVS) combined with improved performance modeling and prediction. These were guided by an open-source intelligent software assistant that accurately reproduced the workload and flow of a typical artificial intelligence application. These workloads led to significant departures in data center and architectural designs. This has enabled many new initiatives, including a successful startup venture in conversational assistant technology co-founded by Professor Tang. She has developed a reputation as a leader in this space, reframing much of how data centers are built and run. Her publication record is prolific, with over 40 publications in top-tier forums. She has secured more than $1.3M of external funding (her share). Reviewers are universally positive in

their assessment of her research impact and visibility, and refer to her as one of the top few early-career computer architects in the world.

Recent and Significant Publications:

S. Lin, C. Hsu, W. Talamonti, Y. Zhang, S. Oney, J. Mars, L. Tang, "Adasa: In-Vehicle Digital Assistant for Advanced Driver Assistance Features," *The 31st ACM Symposium on User Interface Software and Technology*, 531-542, 2018.

Y. Kang, J. Hauswald, C. Gao, A. Rovinski, T. Mudge, J. Mars, L. Tang, "Neurosurgeon: Collaborative Intelligence Between Cloud and the Mobile Edge," *Proceedings of the 22nd International Conference on Architectural Support for Programming Language and Operating Systems*, 615-629, 2017.

J. Hauswald, Y. Kang, M. A. Laurenzano, Q. Chen, C. Li, R. Dreslinski, T. Mudge, J. Mars, L. Tang, "Djinn: DNN as a Service and Its Implications for Future Warehouse Scale Computers," *Proceedings of the 42nd Annual International Symposium on Computer Architecture*, 27-40, 2015.

Q. Chen, H. Yang, M. Guo, R. S. Kannan, J. Mars, L. Tang, "Prophet: Precise QoS Prediction on Non-Preemptive Accelerators to Improve Utilization in Warehouse-Scale Computers," *Proceedings of the 22nd International Conference on Architectural Support for Programming Language and Operating Systems*, 17-32, 2017.

Y. Zhang, D. Meisner, J. Mars, L. Tang, "Treadmill: Attributing the Source of Tail Latency through Precise Load Testing and Statistical Inference," *Proceedings of the 43rd Annual International Symposium on Computer Architecture*, 456-468, 2016.

Service: Professor Tang has an accomplished record of service to her community. Internally, she has served on committees for graduate admissions, the graduate program, and undergraduate advising. She also served on the Division Chair Search Committee. Her external service has been prolific, including program committee assignments in a wide variety of top-tier conferences in her field. She has twice served as a conference program chair and is now serving as a general chair of a set of venues being co-located for the first time. She has twice served as a panelist for the CRA-W career workshop panel at an annual event for female graduate students. Her casebook also speaks to her commitment to the participation of women in the discipline in the classroom and with her mentees.

External Reviewers:

Reviewer A: "…not only has Prof. Tang amassed a stellar publication record by all measures, she has also released widely used software artifacts and co-founded an impressive startup company based on her research."

Reviewer B: "…Dr. Tang has shown unusual breadth by producing impactful work in areas such as energy efficiency, applications of deep learning, mobile assistants, and the emerging area of latency tail tolerance."

Reviewer C: "Dr. Tang is clearly a superstar researcher."

Reviewer D: "Prof. Tang is a leading [junior] researcher in the architecture community and has made several important contributions to the design of power-efficient computing servers for

cloud services in data centers."

Reviewer E: "Professor Tang has in the few short years established herself as a leader in cloud computing."

Reviewer F: "Lingjia's research is *timely and relevant*. She is well on her way to being the top computer architect working on end-to-end datacenter services and cloud…"

Summary of Recommendation: Professor Tang is an established leader in computer architecture and data center design. It is with the support of the College of Engineering Executive Committee that I recommend Lingjia Tang for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

Alec Gallimore

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

May 2020