

PROMOTION RECOMMENDATION

University of Michigan
College of Engineering

Scott Mahlke, 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

B.S.	1988	University of Illinois, Urbana-Champaign, Computer Engineering
M.S.	1991	University of Illinois, Urbana-Champaign, Electrical and Computer Engineering
Ph.D.	1997	University of Illinois, Urbana-Champaign, Electrical and Computer Engineering

Professional Record

2001–present	Assistant Professor of Electrical Engineering and Computer Science, University of Michigan
1995–2001	Researcher Scientist, Compiler and Architecture Research Group, Hewlett-Packard Laboratories
1988-1995	Research Assistant, University of Illinois
1992-1993	Consultant, Hewlett-Packard Laboratories
1992	Research Engineering, Intel Corporation
1988	Hardware Engineer, IBM Corporation

Summary of Evaluation

Teaching: Professor Mahlke is a very good teacher, whose contributions to education both inside and outside of the classroom have been exemplary. Since joining the university five years ago, he has taught both undergraduate and graduate classes, and both large and small courses, and has done a good job in all of them. He has received strong teaching evaluations, with nearly all his Q1/Q2 scores being over 4.0, and the students in his classes provide strong positive feedback. For example, two students describe his undergraduate compilers course as one of the best courses that they'd taken at Michigan. Professor Mahlke has also made important contributions to the department's curriculum, creating a new graduate level course on compiler design, and making major modifications to the undergraduate course on compiler design to modernize it. In addition, Professor Mahlke is an excellent mentor to both undergraduate and graduate students. He has a large, active research group: he has co-supervised one completed Ph.D. and two completed M.S. degrees, he is currently supervising 11 more Ph.D. students, and he has also supervised 6 undergraduate projects. He has co-authored a number of papers with his graduate students, who describe their experiences with him as "hands-on and helpful," and "overwhelmingly positive."

Research: Professor Mahlke is an accomplished researcher in the field of computer engineering, where he works at the intersection of compilers and computer architecture. He is particularly well known for his work on instruction-set customization for application-specific processors; this work has not only been highly influential within academic computer science and engineering, but has also been transferred to industry, where it has led to prototype implementations and the filing of several patents. He has also done important work on other topics in compilers, including the design of algorithms for distributed microarchitectures. Professor Mahlke has an extremely strong publication record, with several dozen papers in the leading venues in the field, and he also holds four patents, with three others filed recently.

He has a very good funding record, serving as PI on five grants, including an NSF CAREER award, and as co-PI on three others.

Recent and Significant Publications:

- K. Fan, M. Kudlur, H. Park, and S. Mahlke, "Cost sensitive modulo scheduling in a loop accelerator synthesis system," *Proc. 38th Intl. Symposium on Microarchitecture (MICRO-38)*, Nov. 2005.
- N. Clark, H. Zhong, and S. Mahlke, "Automated custom instruction generation for domain-specific processor acceleration," *IEEE Transactions on Computers*, vol. 54, no. 10, Oct. 2005, pp. 1258-1270.
- R. Ravindran, R. Senger, E. Marsman, G. Dasika, M. Guthaus, S. Mahlke, and R. Brown, "Partitioning variables across multiple register windows to reduce spill code in a low-power processor," *IEEE Transactions on Computers*, vol. 54, no. 8, Aug. 2005, pp. 998-1012.
- N. Clark, J. Blome, M. Chu, S. Mahlke, S. Biles, and K. Flautner, "An architecture framework for transparent instruction set customization in embedded processors," *Proc. 32nd Intl. Symposium on Computer Architecture (ISCA-32)*, Jun. 2005, pp. 272-283.
- N. Clark, M. Kudlur, H. Park, S. Mahlke, and K. Flautner, "Application specific processing on a general purpose core via transparent instruction set customization," *Proc. 37th Intl. Symposium on Microarchitecture (MICRO-37)*, Dec. 2004, pp. 30-40.
- N. Clark, H. Zhong, K. Fan, S. Mahlke, K. Flautner, and K. Van Nieuwenhove, "OptimoDE: Programmable accelerator engines through retargetable customization," *Proc. Hot Chips 16*, Aug. 2004.
- M. Chu, K. Fan, R. Ravindran, and S. Mahlke, "Cost-sensitive partitioning in an architecture synthesis system for multicluster processors," *IEEE Micro*, vol. 24, no. 3, May/June. 2004, pp. 10-20.
- T. Austin, D. Blaauw, S. Mahlke, T. Mudge, C. Chakrabarti, and W. Wolf, "Mobile supercomputers," *IEEE Computer*, vol. 37, no. 5, May 2004, pp. 82-84.

Service: Professor Mahlke has done a great deal of service professionally, including serving as technical co-chair for two of the most prestigious conferences in his field. He is also an Associate Editor for two journals, has been a member of the program committee for over 30 conferences, and he is currently on the steering committee for the International Symposium on Microarchitecture. Professor Mahlke's internal service record is typical of that for an untenured faculty member: he has served as an undergraduate advisor and as a member of the committee that oversees the Department's Computing Organization.

External Reviewers:

Reviewer (A): "...a highly respected member of my research area, and a true technical leader. Scott has several key contributions in the area of compiler-driven microarchitecture and compiler code generation.... He is an extremely gifted scientist." "He is truly a star and will continue to shine as he carries out excellent research while a member of your faculty."

Reviewer (B): "...at the head of his class. Few of his colleagues, those whose degrees are within 10 years, have a work record that begins to correspond to [his]."

Reviewer (C): "Dr. Mahlke's research record is outstanding and his work has had a significant impact on the state-of-the-art of compiler and architecture technology in a number of areas."

Reviewer (D): "He is arguably the brightest rising star in the confluence of computer architecture, compiler, and CAD disciplines."

Reviewer (E): "Scott's research has focused on an important issue in the design of embedded systems: how to strike the right balance between programmability and performance.... I am impressed that Scott and his research group have developed a complete and quite creative set of solutions to this problem."

Reviewer (F): "Without doubt and substantially since he moved to the University of Michigan from HP labs, Scott's accomplishments and the concomitant impact are on par with the very best if not the best in the field of computer engineering and science, at any university that I am familiar with, when compared to faculty at a similar stage in their career." "Scott has been and I am confident will continue to be an absolute leader in his chosen area of research..."

Reviewer (G): "He is a world-class scholar who will continue to produce outstanding research and students for many years to come."

Summary of Recommendation: Professor Mahlke is a computer engineer working on cutting-edge problems, who has already obtained international recognition for his work; he is a first-rate teacher and mentor for both undergraduate and graduate students; and he has done significant service, especially for an untenured faculty member. It is with the support of the College of Engineering Executive Committee that I recommend him for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science.



Ronald Gibala
Interim Dean, College of Engineering

May 2006