

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering

Robert Dick, associate professor of electrical engineering and computer science, without tenure, Department of Electrical Engineering and Computer Science, College of Engineering, is recommended for the granting of tenure to be held with his current title of associate professor of electrical engineering and computer science, Department of Electrical Engineering and Computer Science, College of Engineering.

Academic Degrees:

Ph.D. 2002 Princeton University, Computer Engineering, Princeton, New Jersey
B.S. 1995 Clarkson University, Computer Engineering, Potsdam, New York

Professional Record:

2009 – present Associate Professor, Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, MI
2008 – 2008 Associate Professor, Department of Electrical Engineering and Computer Science, Northwestern University, Evanston, IL
2003 – 2008 Assistant Professor, Department of Electrical Engineering and Computer Science, Northwestern University, Evanston, IL
2002 – 2003 Visiting Professor, Department of Electronic Engineering, Tsinghua University, Beijing, China

Summary of Evaluation:

Teaching: Professor Dick is a caring and enthusiastic teacher. After arriving at Michigan he has taught an undergraduate integrated circuit design course and a graduate course in his research field. Previously, at Northwestern, he taught a very wide range of courses including software engineering, and he won teaching awards. Students in his courses praise his organization and structured style, and customized lectures with real-life examples and projects. Professor Dick leads a research group of eight Ph.D. students and has previously graduated two Ph.D.s while at Northwestern, with two Michigan Ph.D. students expected to graduate in 2011. His Ph.D. students describe him as an incredibly committed mentor and advisor, and it is clear that he is a highly encouraging, yet demanding, advisor who brings out the best in his research students.

Research: Professor Dick is an internationally recognized researcher in the design and optimization of embedded systems. He has made several major contributions in this field, including a novel software-driven approach to increase the effective size of memory in mobile devices. This work has been commercialized and has been in use in NEC cell phones since 2007. A second key area of his work is that of thermal modeling and analysis of integrated circuits, particularly high-performance and emerging 3-dimensional chips in which significant heat removal challenges are expected. Professor Dick's work in this area is considered groundbreaking and best-in-class by external reviewers. He is also pursuing multidisciplinary work with applications researchers to build embedded systems in areas such as persistent sensing of buildings.

Professor Dick has published 83 journal and strongly refereed (acceptance rates typically 20-25%) conference papers to date, with 28 of these coming since arriving at Michigan in January 2009. His h-index is 18 with a total citation count of more than 1500. The quality of his work is evidenced by the fact

that the vast majority of his conference and journal papers are in the very best forums in their respective areas. Professor Dick has received one best paper award, three nominations, and one of his early works was cited as one of the 30 most influential for a leading conference over a 10-year period. Also notable is the breadth in research areas chosen by Professor Dick; he publishes in top venues in a wide range of fields including computer-aided design, wireless sensor networks, mobile computing, and hardware/software co-design. He has given 19 invited talks across the US, Europe, and Asia. Finally, he has a very healthy level of funding with five active NSF grants, one semiconductor industry consortium contract, and industry support from Google and Intel.

Recent and Significant Publications:

- Y. Yang, Z. P. Gu, C. Zhu, R. P. Dick, and L. Shang, "ISAC: Integrated space and time adaptive chip-package thermal analysis," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, pp. 86–99, Jan. 2007.
- L. Yang, R. P. Dick, H. Lekatsas, and S. Chakradhar, "CRAMES: Compressed RAM for embedded systems," in *Proceedings of International Conference on Hardware/Software Codesign and System Synthesis*, Sept. 2005, pp. 93–98.
- Z. Hassan, N. Allec, L. Shang, R. P. Dick, V. Venkatraman, and R. Yang, "Multi-scale thermal analysis for nanometer-scale integrated circuits," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 28, no. 6, pp. 860–873, June 2009.
- X. Chen, L. Yang, R. P. Dick, L. Shang, and H. Lekatsas, "C-Pack: a high-performance microprocessor cache compression algorithm," *IEEE Transactions on Very Large Scale Integration Systems*, vol. 18, no. 8, pp. 1196–1208, Aug. 2009.
- A. Shye, Y. Pan, B. Scholbrock, J. S. Miller, G. Memik, P. Dinda, and R. P. Dick, "Power to the people: leveraging human physiological traits to control microprocessor frequency," in *Proceedings of International Symposium on Microarchitecture*, Nov. 2008, pp. 188–199.

Service: Professor Dick has a substantial service record, both internally and externally. Externally he is recognized as a leader in his research field by being chosen to chair the technical program committee of one of the top conferences in his field in 2011. He is an associate editor for a leading IEEE journal in his area, has served as guest editor of another major ACM journal, and has served on the program committees of major conferences in his research fields. Beyond simply serving in these capacities, he brings an unusually high level of professionalism, thoroughness, and fairness to his service requirements, as pointed out by several external reviewers. Internally Professor Dick has served as an undergraduate advisor and on the undergraduate Computer Engineering program committee, with responsibility for course requirements.

External Reviewers:

Reviewer A: "Prof. Dick is recognized at the international level and he [is] very visible for his embedded systems research...."

Reviewer B: "... he has been fearless in tackling hard problems and working on high-risk research projects. He is a 'complete package'."

Reviewer C: "Prof. Dick is clearly viewed as a leader in the area of embedded system design."

Reviewer D: "This work, again, demonstrates the excellent combination of theoretical innovation and accuracy with concrete, practical applicability, that is characteristic for Robert's work."

Reviewer E: "Overall, Robert Dick's work is centered on core issues in embedded systems and is both opportunistic in terms of contributing to the latest technical trends as well as visionary..."

Reviewer F: "... I believe that Dr. Dick's scholarship has gained him an international reputation and that his work in memory compression in embedded systems, in particular, has demonstrated his ability and potential to carry out original, impactful research."

Reviewer G: "The work on memory compression in embedded systems is extremely significant..."

Reviewer H: "Prof. Dick has emerged as one of the most prolific junior faculty at the confluence of low power, computer architecture and in particular computer aided design with excellent conference and comprehensive archival journal publishing records."

Reviewer I: "He has built an impressive [sic] array of accomplishments at this early stage of his academic career, and he provides every indication of being a strong asset to Michigan in the years to come."

Summary of Recommendation: Professor Dick is a widely respected researcher in the design of embedded systems. He is a devoted and caring teacher and advisor, and he has a substantial internal and external service track record. It is with the support of the College of Engineering Executive Committee that I recommend Robert Dick for the granting of tenure to be held with his current title of associate professor of electrical engineering and computer science, 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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