

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering

Seth Pettie, 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. 2003 University of Texas, Computer Science, Austin, TX
B.A. 1998 Brandeis University, Computer Science, Waltham, MA

Professional Record:

2006 – present Assistant Professor, Department of Electrical Engineering and Computer Science,
University of Michigan
2003 – 2006 Researcher, Max Planck Institute for Informatics, Saarbrücken, Germany
1998 – 2003 Research Assistant, University of Texas, Austin, TX

Summary of Evaluation:

Teaching: Professor Pettie has established a good record in all aspects of teaching, including classroom instruction, curriculum development, and student mentorship. Students indicate that he has the reputation of an effective teacher. At the University of Michigan, Professor Pettie taught a variety of undergraduate courses and two graduate topics courses of his own design. One of the advanced undergraduate courses was also designed by Professor Pettie. Student evaluations range from good in the introductory courses to excellent in the upper division courses. Professor Pettie introduced several substantial innovations to traditional courses in which he taught. Additionally, Professor Pettie taught a summer course on introduction to algorithms. He has supervised one Ph.D. student, who graduated in August 2011 and is currently a post-doc at the Max Planck Institute for Computer Science. He also has another two graduate students under his supervision.

Research: Professor Pettie is a highly regarded researcher in the area of data structures and algorithms, which lies at the interface between computer science and applied mathematics. Professor Pettie has published at the top conferences and journals in his field, establishing an excellent record of publication in the prestigious Symposium on Foundations of Computer Science (FOCS), Symposium on Theory of Computing (STOC), and Symposium on Discrete Algorithms (SODA). Among other significant contributions, Professor Pettie's accomplishments include the design of the fastest known algorithm for the problem of computing all-pairs bottleneck paths, and the design of a nearly linear-time approximation scheme for maximum-weight matching, one of the most fundamental problems in graph algorithms. Prominent researchers in the field are unanimous in their assessment of the quality, novelty, and impact of Pettie's work and of his long-term research promise.

Recent and Significant Publications:

Seth Pettie, "Degrees of Nonlinearity in Forbidden 0-1 Matrix Problems," *Discrete Mathematics*, 311:2396–2410, 2011.

Seth Pettie, "Generalized Davenport-Schinzel sequences and their 0-1 matrix counterparts," *Journal of Combinatorial Theory Series A* 118(6):1863–1895, 2011.

- Seth Pettie, “Origins of nonlinearity in Davenport-Schinzel sequences,” *SIAM Journal of Discrete Mathematics*, 25(1):211–233, 2011.
- Ran Duan and Seth Pettie, “Approximating maximum weight matching in near-linear time,” Proceedings 51st IEEE Symposium on Foundations of Computer Science, pp. 673–682, 2010.
- Ran Duan and Seth Pettie, “Connectivity oracles for failure prone graphs,” Proceedings 42nd ACM Symposium on Theory of Computing, pp. 465–474, 2010.
- Surender Baswana, Telikepalli Kavitha, Kurt Mehlhorn, and Seth Pettie, “Additive spanners and (α, β) -spanners,” *ACM Transactions on Algorithms*, 7(1), 2010.
- Ran Duan and Seth Pettie, “Fast algorithms for (Max, Min)-matrix multiplication and bottleneck shortest paths,” Proceedings 19th ACM-SIAM Symposium on Discrete Algorithms, pp. 384–391, 2009.
- Seth Pettie and Vijaya Ramachandran, “Randomized minimum spanning tree algorithms using exponentially fewer random bits,” *ACM Transactions on Algorithms*, 4(1):1–27, 2008.
- Seth Pettie, “An inverse-Ackermann type lower bound for online minimum spanning tree verification,” *Combinatorica*, 26(2):207–230, 2006.
- Seth Pettie and Vijaya Ramachandran, “An optimal minimum spanning tree algorithm,” *Journal of the ACM*, 49(1):16–34, 2002.

Service: Professor Pettie has made significant contributions to the University of Michigan and the professional community through his service. Both his internal and external service records are exemplary. Internally, he has been serving on the Computer Science and Engineering (CSE) Graduate Committee since his arrival at Michigan in 2006, continuing on the CSE Graduate Admission Committee in 2010. Professor Pettie also served on the CSE *ad hoc* Committee for Graduate Requirement, which produced recommendations for increasing the flexibility of M.S. and Ph.D. requirements. Since 2007, he has been speaking to undergraduates at the College of Engineering Graduate Symposium on theoretical computer science, which has helped CSE recruit Ph.D. students from groups underrepresented in computer science. Professor Pettie has been the organizer or co-organizer of the CSE Theory Seminar since 2006. This seminar is a valuable forum for the theoretical computer science community at Michigan, drawing participants from Math and the School of Information, besides CSE. In external service, Professor Pettie has served on the program committees of eight conferences in theoretical computer science, including the ACM Symposium on Theory of Computing (STOC) and ACM-SIAM Symposium on Discrete Algorithms (SODA). STOC is one of two top conferences in theoretical computer science, and SODA is the main conference on discrete algorithms. Professor Pettie is currently a guest editor for the *SIAM Journal on Computing*, a top journal in theory, for the special issue of selected papers from STOC 2011. His external record is a clear indication of his stature in the theoretical computer science community.

External Reviewers

Reviewer A: “Prof. Pettie certainly ranks as one of the top researchers in data structures and algorithms today...He is also one of the few researchers who is equally adept in single-authored works, double-authored works with students, as well as joint efforts with other collaborators...I can’t think of anyone working in data structures in the US or Canada who is currently at a similar stage of career and whose quality of research is comparable to Dr. Pettie’s.”

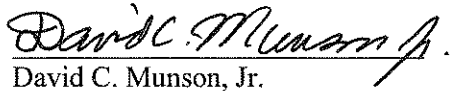
Reviewer B: “Rarely do I get to write a tenure recommendation letter for someone so well qualified for tenure as Seth Pettie. I think he’s a terrific researcher, one of the best of his generation in the field of algorithms.”

Reviewer C: “His case would qualify him for such a promotion (with tenure) at my school too, or at any other leading university.”

Reviewer D: "He has served the Theoretical Computer Science community well through editorial work and service on program committees."

Reviewer E: "Seth Pettie is an extremely gifted and talented researcher who is a credit to your institution...Seth chooses problems that are fundamental but difficult. His results are ingenious and deep."

Summary of Recommendation: Professor Pettie has established a successful record of teaching, scholarly research and service at the University of Michigan. His teaching record is excellent at both the undergraduate and graduate levels, and his students consider him a dedicated and enthusiastic teacher and mentor. He has made impressive research contributions in the area of data structures and algorithms. Through his service, he has made significant contributions to the University and the broader professional Theoretical Computer Science community. It is with the support of the College of Engineering Executive Committee that I recommend Seth Pettie for promotion to associate 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

May 2012