STEVEN M. KAUTZ, PH.D.

Department of Computer Science, Iowa State University • smkautz@iastate.edu • 515-294-4183

PROFILE

Computer scientist and mathematician with a track record as a versatile problem solver. Broad experience in software engineering, concurrent programming, design and analysis of algorithms, research in the theory of computation, and course development and teaching.

EDUCATION

Ph.D., Mathematics, 1991
CORNELL UNIVERSITY – Ithaca, NY

M.S., Computer Science, 1990
CORNELL UNIVERSITY – Ithaca, NY

B.A., Mathematics, 1985
CALIFORNIA STATE UNIVERSITY – Sacramento, CA

PROFESSIONAL EXPERIENCE

IOWA STATE UNIVERSITY, Ames, IA   1/08 – present
Teaching Professor[1], Member of the Graduate Faculty, Dept. of Computer Science

- Course development, teaching, and service
    - Recipient of College of Liberal Arts and Sciences *Award for Excellence in Introductory Undergraduate Teaching* in 2012.
    - Taught four/five courses per year at all levels (see last page). Course coordinator for Com S 227 (enrollment ~500). Hired and supervised teams of up to 24 teaching assistants. Developed numerous programming projects with extensive technical documentation and unit test suites. Developed new courses Com S 430, *Advanced Programming Tools* (concurrent, event-driven and message-based systems); Com S 336, *Computer Graphics*; Com S 104, *Introduction to Computers*, and its continuation, Com S 105X; Com S 127X, *Introduction to Programming for Problem-Solving*. Wrote presentations, lab activities, and textbook for an online version of 104.
    - Presented half-day workshop on Python programming at the Midwest Big Data Summer School, June 2016, July 2017, May 2018, and May 2019
    - Computer Science Learning Community coordinator, 2011-2020
    - Faculty advisor for the club *Digital Women*
    - Served on undergraduate committee, and lecturer pool search committee, assistant teaching professor search committee
    - Served on M.S. and Ph.D. committees in Computer Science, Physics, and Economics
- Research
    - Collaboration with members of the Laboratory for Software Design. Latest paper with H. Rajan and students submitted to PLDI 2014. Paper with H. Rajan and W. Rowcliffe presented at *Onward! 2010*. Supported by NSF during summer 2010 and 2011.
    - Collaboration with members of the Laboratory for Nanoscale Self-Assembly. Paper with B. Shutters presented at *COCOON '11* and published in *Algorithmica.* Paper with J. Lathrop presented at DNA 15 (2009).

---

[1] Promotion to Senior Lecturer April 2013, Associate Teaching Professor July 2019, Teaching Professor April 2021

…

AONIX NORTH AMERICA (FORMERLY NEWMONICS), Ames, IA   5/00 – 1/08
Principal Software Engineer   (except academic year 2001 – 2002)

- Served as technical lead for the design and implementation of software systems using object-oriented methodologies, tools, and design patterns in Java and C++. Participated in all aspects of software lifecycle including requirements analysis, design, development, source code management, formal code review (Fagan methodology), defect tracking, and maintenance. Wrote extensive technical documentation. Major projects include:
    - Message-based architecture for high-reliability emergency communication station.
    - OSGi-based application framework for military aircraft communication.
    - C++ libraries for vehicle routing algorithms ("Traveling Salesman Problem" with multiple vehicles and time/delivery constraints).
- Developed and taught short courses for professional engineers in concurrent programming, Java for C++ programmers, real-time development, and OSGi.
- Developed C and Java code for embedded systems including the *PERC* virtual machine and the *Pico* real-time Java microkernel.

IOWA STATE UNIVERSITY, Ames, IA   8/98 – 5/99
Visiting Associate Professor, Department of Computer Science

- Independent research and teaching.

RANDOLPH-MACON WOMAN'S COLLEGE, Lynchburg, VA   1991 – 2002
Associate Professor and Chair[2], Department of Mathematics   (on leave 1998-99 and 2000-01)

- Taught seven courses per year at all levels in computer science, mathematics, and statistics.
- Maintained independent research program in complexity theory; refereed journal and conference papers.
- Redesigned and updated computer science curriculum.
- Served as student advisor and mentor.
- Served extensively on college-wide committees.
- Interviewed and hired new and temporary faculty.

CORNELL UNIVERSITY, Ithaca, NY   Summer 1994
Visiting Assistant Professor, Department of Mathematics

- Independent research and teaching.

IOWA STATE UNIVERSITY, Ames, IA   Summer 1993
Visiting Assistant Professor, Department of Computer Science

- Independent research and seminar presentations.

RESEARCH INTERESTS

Concurrency; languages and patterns for concurrent programming; nanoscale self-assembly; algorithmic randomness.

---

[2] Held associate rank since 1997; served as department chair 1999-2000 and 2001-2002

PUBLICATIONS

Hridesh Rajan, Steven M. Kautz, Eric Lin, Sean L. Mooney, Yuheng Long, and Ganesha Upadhyaya, "Capsule-oriented programming in the Panini language," Technical Report 14-08, Computer Science, Iowa State University, August 2014.

Steven M. Kautz and Brad Shutters, "Self-assembling rulers for approximating generalized Sierpinski carpets," *Algorithmica*, 67:207-233, 2013. Also in Bin Fu and Ding-Zhu Du (eds.), *Computing and Combinatorics – 17th Annual International Conference (COCOON '11), Springer Lecture Notes in Computer Science 6842,* pages 284-296, 2011.

Hridesh Rajan, Steven M. Kautz, and Wayne Rowcliffe, "Concurrency by modularity: design patterns, a case in point," in *Proceedings of Onward! 2010,* ACM, 2010.

Steven M. Kautz and James I. Lathrop, "Self-assembly of the discrete Sierpinski carpet and related fractals," in R. Deaton and A. Suyama (eds.), *DNA Computing and Molecular Programming, 15th International Conference*, *Springer Lecture Notes in Computer Science 5877,* pages 78-87, 2009

Steven M. Kautz, "Resource-bounded randomness and compressibility with respect to nonuniform measures," in J. Rolim (ed.), *Randomization and Approximation Techniques in Computer Science, Springer Lecture Notes in Computer Science 1269*, pages 197-211, 1997.

Steven M. Kautz, "An improved zero-one law for algorithmically random sequences," *Theoretical Computer Science,* 191:185-192, 1998.

Steven M. Kautz, "Independence properties of algorithmically random sequences," arXiv:cs/0301013v1 [cs.CC].

Steven M. Kautz and Peter Bro Miltersen, "Relative to a random oracle, NP is not small," *Journal of Computer and System Sciences* 53:235-250, 1996.

Martha E. Dasef and Steven M. Kautz, "Some sums of some significance," *The College Mathematics Journal* 28, 1997.

Steven M. Kautz, "Degrees of random sets," doctoral dissertation, Cornell University, 1991. (Much of the content of this work appears in Rodney G. Downey and Denis R. Hirschfeldt, *Algorithmic Randomness and Complexity*, Springer 2010.)

TEACHING EXPERIENCE

Courses for professional engineers
- Concurrent programming for the Java platform (5-day course)
- Java for C++ programmers (5-day course)
- OSGi and dynamic services (2-day course)
- Real-time development with the PERC(tm) virtual machine (2-day course)
- Concurrent programming using C++ and C# (5 afternoon sessions)

Courses at Iowa State University
- Introductory programming (ISU Com S 104, 105X, 127X, and 207)
- Object-Oriented Programming (ISU Com S 227)
- Discrete Computational Structures (ISU Com S 330)
- Data Structures and Algorithms (ISU Com S 228 and 208)
- Advanced Programming Tools (ISU Com S 430)
- Software Construction and User Interfaces (ISU Com S 319)
- Computer Graphics (ISU Com S 336)
- Design and Analysis of Algorithms (ISU Com S 311)

Other college and university courses
- Principles of Programming Languages, Computer Organization, Operating Systems, Number Theory, Abstract Algebra, Analysis, Discrete Mathematics, Mathematical Statistics, Non-Euclidean Geometry, Linear Algebra, Calculus I/II/III, Precalculus, Applied Statistics, College Algebra