

STEVEN M. KAUTZ, PH.D.

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PROFILE

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

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

Lecturer, Department of Computer Science

- Course development, teaching, and independent research.

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 networked architecture for a high-reliability emergency communication station.
 - OSGi-based architecture for a dynamic application framework for military aircraft communication.
 - A set of C++ libraries for vehicle routing algorithms (complex variations on the multi-vehicle “Traveling Salesman Problem”).
- 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.

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

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

Algorithmic and resource-bounded randomness, nanoscale self-assembly, concurrency.

PUBLICATIONS

“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.

“An improved zero-one law for algorithmically random sequences,” *Theoretical Computer Science*, 191:185-192, 1998.

“Independence properties of algorithmically random sequences,” Technical Report CC/0301013, Computing Research Repository.

“Relative to a random oracle, NP is not small” (with P. Miltersen), *Journal of Computer and System Sciences* 53:235-250, 1996. Also in *Proceedings of the Ninth Annual IEEE Conference on Structure in Complexity Theory*, 1994.

“Some sums of some significance” (with M. Dasef), *The College Mathematics Journal* 28, 1997.

“Degrees of random sets,” doctoral dissertation, Cornell University, 1991. (Much of the content of this work will appear in the forthcoming book *Algorithmic Randomness and Complexity* by Rod Downey and Denis Hirschfeldt.)

INVITED TALKS

"Some results in resource-bounded measure theory," Special session on computable mathematics and its applications, American Mathematical Society/Mathematical Association of America joint meetings, Baltimore, January 1998.

"Random oracles that don't separate P from NP (and other tall tales)," Information and Complexity Seminar, Iowa State University, April 1997.

"Resource-bounded randomness and maximal compression of binary sequences," Capital Area Theory Seminar (University of Maryland), March 1997.

"Algorithmic randomness in computer science," Departamento de Informatica e Ingenieria de Sistemas, University of Zaragoza, Spain, July 1996.

"Randomness and compressibility with respect to nonuniform measures," International Conference and Research Center for Computer Science, Schloss Dagstuhl, Wadern, Germany, June 1996.

"Independence properties of algorithmically random sequences," Special session on complexity theory, American Mathematical Society, Greensboro, NC, November 1995.

"Some thoughts on nonuniform random oracles," Computer Science Department, University of Chicago, June 1995.

"Some applications of algorithmic randomness," Capital Area Theory Seminar (University of Maryland), April 1995.

"Relative to a random oracle, NP is not small," Computer Science Department Theory Seminar, University of Chicago, August 1993.

"Two informal and elementary talks on fixed-point-free functions and random oracles," Information and Complexity Seminar, Iowa State University, June 1993.

"Explicit definitions of randomness in recursion theory," Computer Science Department, Iowa State University, November 1992

"Randomness and recursion theory," Computer Science Department, University of Chicago, 1991.

"N-random and weakly n-random sets," Mathematical Sciences Research Institute, Berkeley, CA, May 1990.

CONTRIBUTED TALKS

"Resource-bounded randomness and compressibility with respect to nonuniform measures," Randomization and Approximation Techniques in Computer Science (RANDOM '97), Bologna, July 1997.

"A brief introduction to computational definitions of randomness," Seventh International Conference on Random Structures and Algorithms, Emory University, May 1995.

"An improved zero-one law for algorithmically random sequences," American Mathematical Society/Mathematical Association of America joint meetings, San Francisco, January 1995.

"Relative to a random oracle, NP is not small", Ninth Annual IEEE Conference on Structure in Complexity Theory, Amsterdam, 1994

"Relative to a random oracle, NP is not small: an application of the independence properties of algorithmically random sequences," Association for Symbolic Logic annual meeting, 1994.

"Degree-invariance of randomness," Association for Symbolic Logic annual meeting, 1993.

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)

College and university courses

- Computer Programming (including ISU Com S 227)
- Discrete Computational Structures (ISU Com S 330)
- Data Structures and Algorithms (including ISU Com S 228 and 208)
- Principles of Programming Languages
- Computer Organization
- Operating Systems
- Computer Graphics
- Analysis
- Abstract Algebra
- Discrete Mathematics with Graph Theory
- Mathematical Statistics
- Number Theory
- Non-Euclidean Geometry
- Linear Algebra
- Calculus I, II, III
- Elementary Applied Statistics
- Precalculus

REFERENCES

Dr. Jack Lutz, Professor of Computer Science, Iowa State University
lutz@cs.iastate.com

Dr. James Lathrop, Senior Lecturer in Computer Science, Iowa State University
(formerly Director of Professional Services, NewMonics, Inc.)
jl.@cs.iastate.edu