# Daniel R. Kunkle

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## Education

- **Northeastern University**, Boston, MA.
  Ph.D. in Computer Science. Expected graduation Fall, 2010. GPA: 3.97/4.0
  Adviser: Prof. Gene Cooperman (leads the High Performance Computing Lab)
  Thesis Title: *Roomy: A New Approach to Parallel Disk-based Computation*
  Research Interests: high performance and disk-based computing; combinatorial optimization; and adaptive systems.
- **Rochester Institute of Technology**, Rochester, NY.
  M.S. in Computer Science, received August, 2003. GPA: 4.0/4.0
  Thesis title: *Automatically Classifying One-Dimensional Cellular Automata*
- **Rochester Institute of Technology**, Rochester, NY.
  B.S., Highest Honors, received May, 2001. GPA: 3.91/4.0
  Majored in Information Technology
  Minored in Science, Technology, The Environment & Society

## Academic Experience

- **Graduate Assistant,** College of Computer and Information Science,
  Northeastern University, Boston, MA
  Research Assistant: Academic years 2006, 2008, 2009
  - Research assistant to Prof. Gene Cooperman. Researched, designed, and developed techniques for: parallel disk-based computation; and checkpointing graphical applications.

  Teaching Assistant: Academic years 2004, 2005, 2007
  - Developed and taught lab sessions for introductory computer science courses, provided office hours, and evaluated student progress.
- **Researcher,** Laboratory for Applied Computing,
  Rochester Institute of Technology, Rochester, NY
  6/2002 to 10/2002
  - Researched and developed genetic algorithms for optimizing halftone masks to produce superior printed images.
- **Graduate Assistant,** Department of Computer Science,
  Rochester Institute of Technology, Rochester, NY
  9/2001 to 5/2002
  - Designed and implemented web-based information systems.

## Professional Experience

- **Intern,** Google, Mountain View, CA,
  5/2009 to 8/2009
  - Designed and developed a system for real-time processing of large data streams.
  - Integrated new system with existing infrastructure and evaluated overall performance.

- **Intern,** NetApp (Advanced Technology Group), Waltham, MA,
  1/2007 to 8/2007 and 5/2008 to 8/2008
  - Developed a new framework for automatic load balancing in clustered storage systems.
  - Experimentally analyzed this new load balancing system using several clustered storage systems handling a variety of real workloads.
- **Intern,** MIT Lincoln Laboratory, Lexington, MA,
  5/2006 to 8/2006
  - Researched and designed several novel methods for automatic parallelization of serial programs, including the use of evolutionary algorithms and graph-based techniques.
  - Implemented these new methods in an existing Matlab-based system and demonstrated improvements over previous techniques.
- **Consultant,** DARPA SAPIENT Program, BAA 04-32, Situation-Aware Protocols In Edge Network Technologies
  6/2005 to 9/2005
  - Researched and developed multiobjective evolutionary algorithms for inclusion in a system to select the optimal network communication protocol in response to real-time impairments.
- **Principal Partner,** RedfishGroup, Santa Fe, NM
  11/2002 to 8/2004
  - Developed software for the modeling, visualization, and optimization of a wide range of commercial and governmental organizations.
  - Performed research in complex adaptive systems and self-organization.
- **Intern,** BiosGroup, Santa Fe, NM (since acquired by NuTech Solutions)
  6/2001 to 9/2001
  - Developed applications for 3D visualization and manipulation of models of complex and self-organizing systems.
- **Database Administrator,** College of Applied Science and Technology,
  Rochester Institute of Technology, Rochester, NY
  2/2000 to 9/2000
  - Designed and implemented web-based information systems.
- **Software Test Engineer,** Xerox Corporation, Rochester, NY
  6/1999 to 9/1999
  - Designed and executed procedures to insure quality of large software systems.

## Conference and Workshop Publications

- D. Kunkle. "Roomy: A System for Space Limited Computations" (invited tutorial), in *Proceedings of the International Workshop on Parallel Symbolic Computation* (PASCO '10), Grenoble, 22–25, 2010.
- D. Kunkle, V. Slavici and G. Cooperman. "Parallel Disk-Based Computation for Large, Monolithic Binary Decision Diagrams", in *Proceedings of the International Workshop on Parallel Symbolic Computation* (PASCO '10), Grenoble, 63–72, 2010.
- V. Slavici, X. Dong, D. Kunkle and G. Cooperman. "Fast Multiplication of Large Permutations for Disk, Flash Memory and RAM", in *Proceedings of the International Symposium on Symbolic and Algebraic Computation* (ISSAC '10), Munich, 355–362, 2010.
- D. Kunkle and G. Cooperman. "Biased Tadpoles: a Fast Algorithm for Centralizers in Large Matrix Groups", in *Proceedings of the International Symposium on Symbolic and Algebraic Computation* (ISSAC '09), Seoul, 223–230, 2009.

- ◇ D. Kunkle and J. Schindler. "A Load Balancing Framework for Clustered Storage Systems", in *Proceedings of the IEEE International Conference on High Performance Computing* (HiPC '08), Bangalore, 57–72, 2008.
- ◇ D. Kunkle and G. Cooperman. "Twenty-Six Moves Suffice for Rubik's Cube", in *Proceedings of the International Symposium on Symbolic and Algebraic Computation* (ISSAC '07), Waterloo, Ontario, 235–242, 2007.
- ◇ E. Robinson, D. Kunkle, and G. Cooperman. "A Comparative Analysis of Parallel Disk-Based Methods for Enumerating Implicit Graphs", in *Proceedings of the International Workshop on Parallel Symbolic Computation* (PASCO '07), London, Ontario, 78–87, 2007.
- ◇ D. Kunkle, D. Zhang, and G. Cooperman. "Efficient Mining of Max Frequent Patterns in a Generalized Environment" (poster paper), in *Proceedings of the 15th ACM Conference on Information and Knowledge Management* (CIKM '06), Arlington, VA, 810–811, 2006.
- ◇ M. Agar, S. Guerin, R. Holmes, and D. Kunkle. "Epidemiology or Marketing? The Paradigm-Busting Use of Complexity and Ethnography", in *Proceedings of Agent 2004: Social Dynamics: Interaction, Reflexivity and Emergence*, Chicago, October 2004.
- ◇ M. Gambhir, S. Guerin, S. Kauffman, D. Kunkle. "Steps Toward a Possible Theory of Organization", in *Proceedings of the International Conference on Complex Systems*, Boston, May 2004.
- ◇ P. Anderson, J. Arney, S. Inverso, D. Kunkle, T. Lebo, and C. Merrigan. "A Genetic Algorithm Search for Improved Halftone Masks". in *Proceedings of Artificial Neural Networks in Engineering* (ANNIE '03), St. Louis, November 2003.
- ◇ S. Boyle, S. Guerin, J. Pratt, and D. Kunkle. "Application of Agent-Based Simulation to Policy Appraisal in the Criminal Justice System in England", in *Proceedings of Agent 2003: Challenges in Social Simulation*, Chicago, October 2003.

## Journal and Book Publications

- ◇ D. Kunkle and G. Cooperman. "Harnessing Parallel Disks to Solve Rubik's Cube", *Journal of Symbolic Computation*, Volume 44, Issue 7, 872–890, July, 2009.
- ◇ D. Kunkle and G. Cooperman. "Solving Rubik's Cube: Disk is the New RAM", *Communications of the ACM*, New York, Volume 51, Issue 4, 31–33, April 2008.
- ◇ D. Kunkle, D. Zhang, and G. Cooperman. "On Mining Frequent Generalized Itemsets and Essential Generalized Association Rules without Redundancy", *Journal of Computer Science and Technology* (JCST), P. R. China, 23(1): 77–102, Jan. 2008.
- ◇ S. Boyle, S. Guerin, and D. Kunkle. "An Application of Multi-agent Simulation to Policy Appraisal in the Criminal Justice System in England", in *Computational Economics: A Perspective from Computational Intelligence*, Idea Group Publishing, Pennsylvania, 2005.
- ◇ S. Guerin and D. Kunkle. "Emergence of Constraint in Self-organizing Systems", *Journal of Nonlinear Dynamics, Psychology, and Life Sciences*, Vol. 8, No. 2, April, 2004.

## Open Source Software

- ◇ Roomy: A C/C++ Library for Parallel Disk-based Computation
  `http://roomy.sourceforge.net`

## Invited Talks

- ◇ "Roomy: A System for Space Limited Computations" invited tutorial at the International Workshop on Parallel Symbolic Computation (PASCO '10), July 21, 2010.
- ◇ "Roomy: A New Approach to Parallel Disk-based Computation", MIT Computer Science and Artificial Intelligence Laboratory, December 21, 2009.
- ◇ "Twenty-Six Moves Suffice for Rubik's Cube", ITA Software, Cambridge, MA, August 8, 2007.

## Awards and Memberships

- ◇ Northeastern University Outstanding Graduate Student Research Award in the Life Sciences, Physical Sciences and Engineering (2010)

- ◇ Dissertation Completion Fellowship, Northeastern University (2010)
- ◇ Best Intern Project Presentation, Advanced Technology Group, NetApp (2008)
- ◇ Distinguished Citizenship Award, Northeastern University, CCIS (2007)
- ◇ Student Representative to PhD Committee, Northeastern University, CCIS (2006 and 2007)
- ◇ Rochester Institute of Technology Outstanding Undergraduate Scholarship (2001)
- ◇ ACM Member
- ◇ Phi Kappa Phi Honor Society Member

References

References and academic transcripts are available by request.