John E. Karro

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Citizenship: U.S.A.

Work
506B Wartik
Department of Biology
Pennsylvania State University
University Park, PA 16802
U.S.A.

Professional Interests

- Bioinformatics / Computational Biology
  - Computational methods for genomic-level analysis
  - Comparative genomics
  - Sequence alignment and ancestor reconstruction
  - Molecular evolution
- Algorithms and algorithmic theory
  - Complexity Theory
  - Stochastic processes
  - Probabilistic search methods
- Electronic Design Automation
- Closure Spaces and Anti-Matroids

Professional Associations and Activities

- Member of the Association for Computing Machinery (ACM)
- Former Member of the ACM Special Interest Group on Design Automation (SIGDA)
- Former Member of the ACM Special Interest Group on Computer Science Education (SIGCSE)
- Former Member of the Society for Applied and Industrial Mathematics (SIAM)
- Reviewer for the IEEE ISCAS, the Design Automation Conference, and the Journal of Transactions on Parallel and Distributed Systems

Professional Experience and Services

Research Associate, Department of Biology, Pennsylvania State University — Aug. 2004-present

Full time faculty research position in bioinformatics, funded by National Institute of Health K01 grant.

Research Associate, Department of Molecular Biophysics and Biology, Yale University — June 2003-July 2004
Full time postdoctoral research position in bioinformatics.

Student Activities Chair for the ACM Federated Computing Research Conference — June 2003
Volunteer Position. Responsible for the creation and organization of certain student activities at the ACM FCRC.

Information Director, ACM/SIGDA — July, 2001-July, 2005
Volunteer position. Responsible for the collection and distribution of all design automation conference information.
Editor of the ACM/SIGDA Conference Planner.

Assistant Professor, Oberlin College — July, 2000 - June 2003
Full time assistant professor in the Computer Science Program at Oberlin College.

Adjunct Faculty, University of Virginia — Fall, 1998/1999 Spring, 2000
Taught courses on algorithmic theory and discrete math.

ACM Student Mentor for the 1997 and 1998 DAC — June, 1997/98
Responsible for several graduate students at the 34th and 35th Design Automation Conferences.

Research Assistant — 1995 - 2000
University of Virginia, Department of Computer Science

Head Teaching Assistant — Spring, 1995/96/97
Coordinated and managed 10 teaching assistants for an undergraduate class of 425 students.
University of Virginia, Department of Computer Science

Teaching Assistant — 1994 – 1997
University of Virginia, Department of Computer Science — Spring, 1998

Education

Ph.D. in Computer Science — August, 2000
University of Virginia
Advisor: James Cohoon

Masters of Computer Science — January, 1998
University of Virginia
Advisor: James Cohoon

B.S. in Mathematics — May, 1994
College of William and Mary
Advisor: Dr. Chi-Kwong Li
Graduated Cum Laude

Research Education for Undergraduates — Summer, 1993
Oregon State University
Sponsored by the National Science Foundation
Advisor: Dr. Paul Cull

Mathematics Semester in Budapest — Spring, 1993
One semester of mathematics at the University of Budapest
Sponsored by St. Olaf College

Grants, Awards and Honors

National Institute of Health K01 Grant — Aug. 2004
Provided full support (salary, benefits, equipment, etc.) for a three year faculty position at Pennsylavania State University.
Competitive grant based on research proposal, aimed to support researchers switching focus from quantitative to biological sciences.
Proposal Title: "Software Tools for Genome Comparisons."

NSF Research Award, Major Research Instrumentation Program — Sept, 2004 – Aug, 2007
Provided $308,909 for purchase of a Beowulf Cluster for use at Oberlin College.
Co-investigator, written in collaboration with two chemistry professors and one physics professor.
Proposal Title: "Acquisition of a Beowulf Cluster for use in Research and Research Training."

NSF AIRE Curriculum Development Grants — Summer, 2002
Grant for the development of a course on computational biology.
Covered summer salary, texts and materials, and money for a student assistant.

McGregor Teaching Assistant Grant — Spring, 2001
Used to pay a teaching assistant for aid in course development. — Spring, 2002

Nominated for 7th Society Teaching Fellowship — Spring, 1999
Nominated by students for outstanding teaching.

Outstanding Teaching Graduate Student — Spring, 1997
Awarded by the UVa Department of Computer Science.

NASA 1997 Graduate Student Researchers Program — Spring, 1997
Honorable Mention

Virginia Space Grant Consortium Aerospace Graduate Research Fellowship — 1996-2000
Fellowship grant for support of research.

High Honors in Mathematics — May, 1994
College of William and Mary
Based on a thesis and defense.
Thesis: *An Examination of the Extreme Points of the Set of Positive Semidefinite Doubly Stochastic Matrices*
Advisor: C.K. Li

Publications and Presentations

Peifer, M., Karro, J.E. and von Gruenberg, H.H., "Evidence againt the acceleration of the CpG transition rate during the mammalian radiaton", Molecular Biology and Evolution (in review)

Tyekucheva, S., Moakova, K., Karro, J., Hardison, R., Miller, W. and Chiaromonte, F., "Human-macaque comparisons illuminate variation in neutral substitution rates," Genome Research (in review)

Karro, J.E., Peifer, M., Hardison, R.C., Mollmann, M. and von Gruenburg, H.H., "Exponential decay of GC-content detected by strand-symmetric substitution rates influcens the evolution of isochore structure", Molecular Biology and Evolution (in review)

The Rhesus Macaque Genome Sequencing and Analysis Consortium, “The Rhesus Macaque Genome Sequence Informs Biomedical and Evolutionary Analyses”, *Science*, v. 316, April 2007, pp. 222-234

Karro, J.E., Yan, Y., Zheng, D., Zhaolei, Z., Carriero, N., Cayting, P., Harrison, P. and Gerstein, M., “Pseudogene.org: A comparison platform and comprehensive resource for pseudogene annotations”, *Nucleic Acids Research*, 2006

Zheng, Z., Carriero, N., Zhang, D., Karro, J., Harrison, P. and Gerstein, M., "PseudoPipe: an automated pseudogene identification pipeline", *Bioinformatics*, v. 22(12), 2006, p. 1437-9

Bertone, P, Trifonov, V., Rozowsky, J., Schubert, F., Emanuelsson, O., Karro, J., Kao, M.Y., Snyder, M. and Gerstein, M., "Design optimization methods for genomic DNA tiling arrays", *Genome Research*, v. 16(2), Feb. 2006, pp. 271-81

Karro, J., Peifer, M., Kollman, M., Timmer, J., Hardison, R., Miller, W., von Grünberg, H.H., "Time-averaged neutral substitution rate variation over the genomes of modern mammals and the mammalian ancestor", *Biology of Genomes* (2006), Cold Spring Harbor Laboratory (poster presentation)

Zheng, D., Zhang, Z., Harrison, P.M., Karro, J., Carriero, N. and Gerstein, M., "Integrated pseudogene annotation for human chromosome 22: evidence for transcription", *Journal of Molecular Biology*, v. 349(1), May 2005, pp. 27-45

Karro, J, Haussler, D. and Miller, W, "Removing Duplications for the Reconstructions of the Placental Mammalian Ancestor Genome", *Biology of Genomes* (2005), Cold Spring Harbor Laboratory (poster presentation)

Yu, H., Zhu, Xiaowei, Greenbaum, D., Karro, J., and Gerstein, M., "TopNet: a tool for comparing biological sub-networks, correlating protein properties with topological statistics", *Nucleic Acids Research*, v. 32(1), 2004, pp. 328-337

Cohoon, J., Karro, J. and Lienig, J., "Evolutionary Algorithms for the Physical Design of VLSI Circuits: A Survey", Theory and Application of Evolutionary Computation: Recent Trends, Ghosh, A. and Tsturi S., Springer-Verlag, 2002.

Karro, J. and Cohoon, J, "Gambit: A Tool for the Simultaneous Placement and Detailed Routing of Gate-Arrays," 11th International Conference on Field Programmable Logic and Applications, Belfast, Northern Ireland, Aug. 2001, pp. 243-253.

Karro, J., and Cohoon, J., "An Approach to the Physical Design Problems of 3D-FPGAs," International Symposium on Circuits and Systems, Iasi, Rumania, July 1999, pp. 69-72.

Karro, J. and Cohoon, J., "A Spiffy Tool for the Simultaneous Placement and Global Routing for Three-Dimensional Field Programmable Gate Arrays," *Ninth Great Lakes Symposium on VLSI*, Ann Arbor, Michigan, March 1999, pp. 226-227.

Cohoon, J., Karro, J., Martin, W., Nagel, K., and Neible, W., "Perturbation method for the Traveling Salesperson Problem," (invited paper) *Application and Science of Neural Networks,* SPIE 1998, pp. 118-127.

Pfaltz, J., Karro, J., and McCulloch, S., "Distance in Anti-Matroids", *Congresses Numerantium*, 127:5-22, 1997.

Karro, J., Li, C.K., "A Unified Elementary Approach to Canonical Forms of Matrices," *Siam Review*, 39:2, June 1997, pp. 305-309.

Alexander, M.J., Cohoon, J.P., Colflesh, J.L., Karro, J., Peters, E.L., and Robins, G., "Placement and Routing for Three-Dimensional FPGAs", Fourth Canadian Workshop on Field-Programmable Devices, Toronto, Canada, May 1996, pp. 11-18.

Alexander, M., Cohoon, J.P., Karro, J., Peters, E.L., and Robins, G., "Physical Layout for Three-Dimensional FPGAs," ACM/SIGDA Physical Design Workshop, Reston, VA, April 1996, pp. 142-149.

Alexander, M., Cohoon, J.P., Colflesh, J.L., Karro, J., and Robins, G., "Three-Dimensional Field- Programmable Gate Arrays," *Proceedings of the IEEE International ASIC Conference*, Austin, TX, September 1995, pp. 253-256.