

BILL RANKIN

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EDUCATION

DUKE UNIVERSITY Durham, NC
May 1999
Ph.D. - Electrical and Computer Engineering
Dissertation: *Efficient Parallel Implementations of Multipole Based N-Body Algorithms*

DUKE UNIVERSITY Durham, NC
December 1993
M.S. - Electrical Engineering
Thesis: *Optimal Golomb Rulers: An Exhaustive Parallel Search Implementation*

NORTH CAROLINA STATE UNIVERSITY Raleigh, NC
May 1987
B.S. - Electrical Engineering
B.S. - Computer Science
Cum Laude
Recipient - National Merit Scholarship.

EXPERIENCE

DUKE UNIVERSITY Durham, NC
CENTER FOR COMPUTATIONAL SCIENCE, ENGINEERING AND MEDICINE
December 2001 to October 2007
Director, Cluster and Grid Technology Group

- Direct the design, development and operation of a large high performance computing facility to support the strategic research objectives of the University
- Assist Duke researchers in programming and utilizing clustered computer systems for high performance scientific computing
- Establish a distributed computing lab for campus-wide use as a teaching resource for research computing.
- Develop and instruct seminars and workshops in high performance parallel scientific computing

DUKE UNIVERSITY Durham, NC
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
July 2001 to October 2007
Adjunct Assistant Professor

- Collaborate in research on high performance scientific and distributed computing through participation on a number of NSF and NIH grants
- Conceive, develop and teach the graduate level course ECE-299 - High Performance Cluster Computing

- Instruct graduate and senior undergraduate students in departmental course ECE-252 - High Performance Computer Architecture
- Give invited presentations on parallel and cluster computing to corporate audiences

RECIPROCAL, INC.

Morrisville, NC

August 1999 to October 2001

System/Production Engineer

- Designed and implemented performance tuning and testing software for clustered servers used for Internet transaction applications in a high availability operations center
- Areas of design concern focused on processing throughput, availability and program validation
- Provided for the installation, integration, testing and maintenance of both in-house as well as third party software in support of high performance transaction processing facility

DUKE UNIVERSITY DEPARTMENT OF ELECTRICAL ENGINEERING

Durham, NC

August 1992 to August 1999

Graduate Research Assistant

- Developed the Distributed Parallel Multipole Tree Algorithm (DPMTA), a highly scalable, distributed program to calculate N-body potentials for Molecular Dynamics (MD) and other scientific applications
- Research goals that have been addressed by DPMTA include program performance and scalability on a wide variety of multi-processor platforms, development and integration of new MD algorithms, and the implementation of efficient load balancing schemes
- Performed as guest lecturer for graduate and undergraduate classes on computer architecture and parallel processing

DUKE UNIVERSITY DEPARTMENT OF ELECTRICAL ENGINEERING

Durham, NC

April 1996 to December 1996

Network Administrator

- Administered and maintained departmental network of approximately 150 workstations and servers
- Established departmental policies on usage, performed software and hardware installations and upgrades, and maintained the day-to-day operations of the facility
- Instructed departmental members in the use of available computational facilities and programs

AT&T BELL LABORATORIES

FEDERAL SYSTEMS DIVISION

Whippany, NJ and Greensboro, NC

July 1987 to August 1992

Development Engineer/Member of the Technical Staff

- Designed, wrote and maintained operating system software for Advanced Naval Signal Processor (AN/UYS-2), a high speed parallel data flow computer
- Duties included algorithm specification, microcode and embedded processor implementation, verification on hardware and software simulators, development of unit test procedures and on-site support of customer
- Performed system test engineering for AN/UYS-2 Signal Processor - developed test specifications, implemented signal processing test software, and prepared test reports for release to Navy and civilian customers, performing these duties as both a technical team leader as well as a programming team member

- Acted as the user support representative to Navy customer, representing AT&T during bi-weekly customer support meeting with Navy Labs
- Recipient of AT&T Bell Laboratories President's Quality Award

CURRENT AND PAST GRANTS

Multiscale Integrative Immunology for Adjuvant Development,
NIH-NIAID (NIH-NIAID-DAIT-BAA-05-10), 8/1/05-7/30/10

Monte Carlo Studies of Continuous Hamiltonian Systems Coupled to Dissipative Mechanisms,
ARO (DAAG55-98-D-0002)

NMI: Collaborative Research: A Grid Service for Dynamic Virtual Clusters,
NSF (NSF-ANI-03-30658), 10/1/03-9/30/06

PUBLICATIONS

"Molecular dynamics modeling of radiation damage in normal partly inverse and inverse spinels",
D. Bacorisen, R. Smith, J.A. Ball, R.W. Grimes, B.P. Uberuaga, K.E. Sickafus and W.T. Rankin,
Nuclear Instruments and Methods in Physics Research, 2006

"Herding Penguins: DHCP, TFTP and PXE - Your Installation Friends", W. Rankin,
Cluster World, December 2003.

"What is Our Grid?", H. Schaffer, W. Rankin, et. al., *Grid Today*, v.1 no.14, September 2002.

"Efficient Parallel Implementations of Multipole Based N-Body Algorithms", W.T. Rankin,
Ph.D. Dissertation, Advisor: John A. Board, Jr., May 1999.

"The Impact of Data Ordering Strategies on a Distributed Hierarchical Multipole Algorithm",
W. Rankin, J. Board and V. Henderson, *Proceedings, Ninth SIAM Conference on Parallel Process-
ing for Scientific Computing*, March 1999.

"A New Algorithm for Golomb Ruler Derivation and Proof of the 19 Mark Ruler", A. Dollas, W.
Rankin and D. McCracken, *IEEE Transactions on Information Theory*, January 1998.

"Ewald and Multipole Methods for Periodic N-body Problems", J. Board, C. Humphres, C. Lam-
bert, W. Rankin and A. Toukmaji, in P. Deuffhard et al, eds., *Lecture Notes in Computational
Science and Engineering*, Springer-Verlag, 1998.

"A Portable Distributed Implementation of the Parallel Multipole Tree Algorithm", W. Rankin
and J. Board, *Proceedings, 1995 IEEE Symposium on High Performance Distributed Computing*,
August 1995.

"Scalable Variants of Multipole-Accelerated Algorithms for Molecular Dynamics Applications", J.
Board, Z. Hakura, W. Elliott and W. Rankin, *Proceedings, Seventh SIAM Conference on Parallel
Processing for Scientific Computing*, February 1995.

"Optimum Golomb Rulers: An Exhaustive Parallel Search Implementation," W.T. Rankin, *Masters
Thesis*, Advisor: Apostolos Dollas, December 1993.