

# Kirk W. Cameron, Ph.D.

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- EDUCATION**    **LOUISIANA STATE UNIVERSITY**, Baton Rouge, LA    *August 1995-August 2000*  
**Doctor of Philosophy** in Computer Science  
Advisor: Professor Xian-He Sun (CS)                      Minor Advisor: Professor J Ramanujam (EE)  
Committee: Professors Donald Kraft (CS), J. Bush Jones (CS), Aiichiro Nakano (CS), William Metcalf (Physics)  
Ph.D. Thesis: "Empirical and Statistical Application Modeling Using On-chip Performance Monitors"
- UNIVERSITY OF FLORIDA**, Gainesville, FL    *April 1994*  
**Bachelor of Science** in Mathematics
- TECHNICAL**    **VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY**    *August 2005-Present*  
**EXPERIENCE**    **Associate Professor of Computer Science**  
**Faculty Fellow, College of Engineering**    *May 2007-Present*
- MISERWARE, INC.**    *August 2007-Present*  
**Founder and CEO:** (<http://www.miserware.com>)  
VT Spinout Company; Over \$1.3M in private funding invested to date.
- SCALABLE PERFORMANCE LABORATORY (SCAPE)**    *August 2001-Present*  
**Founder and Director:** (<http://scape.cs.vt.edu>)
- UNIVERSITY OF SOUTH CAROLINA**    *August 2001-August 2006*  
**Assistant Professor of Computer Science and Engineering**, 2001-2005  
**Adjunct Professor of Computer Science and Engineering**, 2005-2006;
- FLORIDA INSTITUTE OF TECHNOLOGY**    *August 2000-July 2001*  
**Assistant Professor of Computer Science**
- LOS ALAMOS NATIONAL LABORATORY CIC DIVISION**    *January 1998-August 2000*  
**Research Assistant:** Parallel Architecture Laboratory, ASCI (Accelerated Strategic Computing Initiative)
- INTEL CORPORATION**    *May 1996-January 1997*  
**Engineer:** 82450 NX Multiprocessor Chipset Design Team
- GREEN IT**    **GRANO.LA WEBSITE**  
**RELATED**    **Founder.** Over 200K downloads of free power management software: April 2010 – present.
- STANDARD PERFORMANCE EVALUATION CORPORATION**  
**Founding member**, SPEC Power Subcommittee: Jun 1995 – present.
- DEPARTMENT OF ENERGY – ENERGY STAR PROGRAM FOR SERVERS**  
**Consulting member**, Aug 1995 – present.
- IEEE COMPUTER MAGAZINE – GREEN IT COLUMN EDITOR**  
**Member of Editorial Board.** January 2009 – present.
- GREEN500.ORG – THE GREEN500 LIST**  
**Co-founder**, Jan 2006 – present.
- THE UPTIME INSTITUTE**  
**Fellow**, Aug 2008 – present.

**RESEARCH,  
HONORS,  
AWARDS**

NATIONAL ACADEMY OF ENGINEERING  
    Invitee (1 of 60 in US/EU) to 2010 US/EU Frontiers of Engr. Symposium (September 2010)  
    Invitee (1 of 81 in the U.S.) to 2008 US Frontiers of Engr. Symposium (September 2008)  
THE UPTIME INSTITUTE  
    Fellow (August 2008 - Present)  
INTERNATIONAL BUSINESS MACHINES (IBM)  
    IBM Faculty Award (July 2007)  
VIRGINIA TECH COLLEGE OF ENGINEERING  
    Faculty Fellow (May 2007)  
IEEE/ACM SUPERCOMPUTING 2006  
    Best Paper Finalist (November 2006)  
ALFRED P. SLOAN FOUNDATION  
    Sloan Research Fellowship Nominee (VT COE, August 2006)  
USC COLLEGE OF ENGINEERING & INFORMATION TECHNOLOGY  
    Young Investigator Research Award (May 2005)  
DEPARTMENT OF ENERGY  
    Early Career Principal Investigator Award (August 2004)  
NATIONAL SCIENCE FOUNDATION  
    CAREER Award (February 2004)

**OTHER  
HONORS,  
AWARDS**

VT SCHOLAR OF THE WEEK  
    October 2010  
MICROSOFT FACULTY SUMMIT  
    Invitee, Redmond, WA, July 2009  
    Invitee, Redmond, WA July 2007  
UPSILON PI EPSILON  
    Computing Honor Society Member (May 2004)  
ACADEMIC KEYS  
    Who's Who in Sciences Higher Education (January 2004)  
TRAVEL GRANT/HONORARIUM  
    HPCA-6; ISHPC '99, ISCA '99, Micro-32, SC 98  
LOUISIANA STATE UNIVERSITY  
    May 1996, Dec 1997, Recognized for outstanding teaching performance by Dean of Basic Sciences  
U.S. NAVAL R.O.T.C.  
    March 1993, "Outstanding Midshipman of the Month"  
    March 1990 Finalist Admiral Byrd National Essay Contest  
UNIVERSITY OF FLORIDA DIVISION OF HOUSING  
    1991 "Most Energized Program Award," Southern Regional RA Convention  
    1990 "Most Involved RA"  
    1989 "Special Recognition"

**SELECT FUNDED GRANTS (Total External Funding: \$6,581,055, Personal Share: \$3,309,960)**

- National Science Foundation, "SBIR Phase II: Intelligent Software Power Management for Windows-based Systems," \$500,000, 9/15/10 – 9/14/12. Awarded to MiserWare, Inc. (Kirk W. Cameron, CEO)
- National Science Foundation, "CSR: Large: Collaborative Research: Multi-core Applications Modeling Infrastructure (MuMI)," \$2,400,000, 9/1/09 – 8/31/14. PIs: Kirk W. Cameron (VT), Shirley Moore (UTenn), Valerie Taylor (TAMU).
- National Science Foundation, "CSR: Medium: Collaborative Research: GridPac: A Resource Management System for Energy and Performance Optimization on Computational Grids," \$1,100,000, 9/1/09 – 8/31/13. PIs: Kirk W. Cameron, Jack Dongarra (UTenn), Ishfaq Ahmad (UTSA), Sanjay Ranka (UF).
- National Science Foundation, "SBIR Phase I: Intelligent Software Power Management on Multicore Systems," \$100,000, 5/1/10 – 9/15/10. Awarded to MiserWare, Inc. (Kirk W. Cameron, CEO)
- National Science Foundation, "Metrics And Methodologies for High Performance System Energy Benchmarking," \$200,000, 7/31/08 -7/30/09. Kirk W. Cameron (PI), Wu-Chun Feng (co-PI).
- National Science Foundation, "CSR-AES: Thermal Conductors: Runtime Software Support for Proactive Heat Management in Advanced Execution Systems," \$350,000, 7/30/07-7/29/10. Kirk W. Cameron (PI), Dimitris Nikolopoulos (co-PI).

- National Science Foundation, “CRI: MISER: A High-Performance Power-Aware Cluster,” **\$500,000**, 9/18/07-9/17/10. Kirk W. Cameron (PI), Dimitris Nikolopoulos (co-PI), Adrian Sandu (co-PI).
- National Science Foundation, “High-Performance Power-Aware Computing Workshop,” **\$5,000**, 9/21/07-1/3/09. Kirk W. Cameron (PI).
- IBM Faculty Award, “Building the Tree of Life using IBM BlueGene/L and Cell Broadband Engine Technologies”, **\$38,000**, 7/1/07 – 6/30/08. Kirk W. Cameron (PI).
- Merrill Lynch & Co. Inc, “Integrating PowerPack technologies in the Virtual Server Switch,” **\$55,000**, 7/1/07 – 6/30/08. Kirk W. Cameron (PI).
- Crucial Security, “Study of Parallel I/O,” **\$25,000**, 1 semester. 9/1/06-12/15/06. Kirk W. Cameron (PI).
- National Science Foundation, “CCF: REU Supplement for high-performance, power-aware, distributed computing,” **\$12,000**, 1 year. 5/15/06-5/14/07. Kirk W. Cameron (PI).
- National Science Foundation, “Collaborative Research: CSR(SMA): Scalable performance modeling and analysis framework,” **\$50,000**, 1 year. 9/1/05-8/31/06. Kirk W. Cameron (PI, VT), Xian-He Sun (PI, IIT).
- Department of Energy, Office of Science, Early Career Principal Investigator Program. “Ultra-scale memory analysis for high-end computing”, **\$300,004**, 3 years. 9/1/04-8/31/07. Kirk W. Cameron (PI).
- National Science Foundation, “CCF: REU Supplement for high-performance, power-aware, distributed computing,” **\$17,500**, 1 year. 5/15/04-5/14/05. Kirk W. Cameron (PI).
- National Science Foundation, “CAREER: High-performance, power-aware distributed computing,” **\$402,203**, 5 years. 2/1/04-1/31/09. Kirk W. Cameron (PI).
- USC Office of Research Equipment Grant, “The SC Grid Initiative.” **\$45,000**, 1 year. 04/04/03 – 06/30/04. Kirk W. Cameron (PI), John Rose (co-PI).
- Intel Corporation, “Telecommunication softswitch hardware.” **\$4,000**. Equipment. Permanent beginning 2/1/03. Kirk W. Cameron (PI).
- Ixia Corporation, “Utilization of Aggregate Network Load Modules for High-Performance Computing Applications.” **\$301,204** (\$250,000 in hardware, \$51,204 direct+indirect). 9 months. 1/1/03-08/31/03. Kirk W. Cameron (PI), Duncan Buell (co-PI).
- Ixia University Partnership Program (IxUPP), “Ixia Network Performance Monitoring System.” **\$106,950**. Equipment. Ixia 1600 Chassis (\$26950) and IxExplorer (\$80000). Permanent donation 10/1/02. Kirk W. Cameron (PI), Srihari Nelakuditi (co-PI).
- USC Office of Research VPR Opportunity Fund. “Benchmarking Telecommunication Workloads for the Next Generation Network”, **\$71,194**, (\$35,597 + 1:1 match), 1 year. 7/1/02-6/30/03. Kirk W. Cameron (PI).
- Department of Energy, Laboratory Directed R&D (DOE-LDRD) Computer Science and Software "Dynamic Adaptive Superscalar Microprocessor Architecture" **\$110,000** per year, 3 years. 9/1/99-8/31/02 Yong Luo (PI), Maya Gokhale (PI), Kirk W. Cameron (Senior Personnel).

#### **PATENTS/DISCLOSURES**

1. K.W. Cameron and J. Turner, “Portable methods for reducing component energy while guaranteeing performance in computer systems”, VTIP Disclosure Number 08.xxx [Patent Pending]
2. R. Ge, X. Feng, and K.W. Cameron, “Automatic, systemic, performance-constrained techniques for reducing power consumption in computer systems”, VTIP Disclosure Number 07.029
3. K.W. Cameron, X. Feng, and H.K. Pyla, "Method and system for correlation and analysis of performance and sensor data in computer systems", VTIP Disclosure Number 07.019.
4. M. Tolentino, J. Turner, and K.W. Cameron, “Performance-centric runtime system minimizing energy consumption in power-scalable cluster architectures”, VTIP Disclosure Number 06.079.
5. K.W. Cameron, M.A. Cameron, and J.A. Turner, "Method and System for Classification, Analysis, and Presentation of Spatial-Temporal Risk-of-Incidents During Travel", VTIP Disclosure Number 06.060.

#### **PUBLICATIONS – REFEREED JOURNAL/MAGAZINE** (\*=students or former students)

1. \*Z. Cao, \*D. R. Easterling, L. T. Watson, \*D. Li, K. W. Cameron, and W.-C. Feng, Power saving experiments for large scale global optimization", *International Journal of Parallel Emergent Distributed Systems*, 25(4): pp. 381-400, (2010).
2. \*Ge, R., \*Feng, X., \*Song, S., \*Chang, H-C., \*Li, D., Cameron, K.W., PowerPack: Energy Profiling and Analysis of High-Performance Systems and Applications. *IEEE Transactions on Parallel and Distributed Systems*, IEEE Computer Society, 21(5): 658-671 (2010)

3. \*Song, S., \*Ge, R., \*Feng, X., Cameron, K.W., Energy profiling and analysis of the HPC Challenge Benchmarks, *International Journal of High Performance Computing Applications*, Sage Publications, New York, 2009, 23(3): 265-276 (2009)
4. \*M. Tolentino, \*J. Turner, and K.W. Cameron, Memory-MISER: Improving Main Memory Energy Efficiency in Servers. *IEEE Transactions on Computers*, IEEE Computer Society Press, vol. 58, no. 3, 2008, pp. 336-350.
5. \*D. Li, \*S. Huang, and K. W. Cameron, CG-Cell: An NPB Benchmark Implementation on Cell Broadband Engine. *Electrical Notes in Theoretical Computer Science*, Elsevier, Amsterdam, 12 pages, 2008.
6. W. Feng and K.W. Cameron, "The Green500 List: Encouraging Sustainable Supercomputing", *IEEE Computer*, Volume 40, Number 12, pp. 50-55, 2007.
7. K.W. Cameron, \*R. Ge, and X.-H. Sun, "log<sub>n</sub>P and log<sub>3</sub>P: Accurate analytical models of point-to-point communication in distributed systems", *IEEE Transactions on Computers*, Volume 56, Number 3, pp. 314-327, 2007.
8. K. W. Cameron, \*X. Feng and \*R. Ge, "The Argus Prototype: Aggregate Use of Load Modules as a High density Supercomputer," *Concurrency and Computation: Practice and Experience*, Volume 18, Issue 1, pp. 1975-1987, 2006.
9. K. W. Cameron, \*R. Ge, \*X. Feng, "High-Performance, Power-Aware Distributed Computing for Scientific Applications," *IEEE Computer*, Volume 38, Issue 11, pp. 40-47, November 2005.
10. S. Byna, K. W. Cameron and X.-H. Sun, "Memory-Aware Communication -An Experimental Study with MPI," *Parallel Processing Letters*, Volume 15, Issue 4, December 2005. pp 357-365.
11. X.-H. Sun, K. W. Cameron, D. He, and Y. Luo, "Adaptive Multivariate Regression for Advanced Memory System Evaluation," *Journal of Performance Evaluation*, Volume 45, Issue 1, May 2001, Pages 1-18.

#### **PUBLICATIONS –IEEE COMPUTER COLUMN**

12. Cameron, K. W., Computing's Role in Resource Accounting. *IEEE Computer* 44(3): 87-88 (2011)
13. Cameron, K. W., A Tale of Two Green Lists. *IEEE Computer* 43(9): 86-88 (2010)
14. Cameron, K. W., The Challenges of Energy-Proportional Computing. *IEEE Computer* 43(5): 82-83 (2010)
15. Cameron, K. W., Trading in Green IT. *IEEE Computer* 43(3): 83-85 (2010)
16. Cameron, K. W., My IT Carbon Footprint. *IEEE Computer* 42(11): 99-101 (2009)
17. Cameron, K. W., The Road to Greener IT Pastures. *IEEE Computer* 42(5): 87-89 (2009)
18. Cameron, K. W., Green Introspection, *IEEE Computer*, 42(1): 101-103 (2009)

#### **PUBLICATIONS - REFEREED CONFERENCES** (\*=students or former students)

1. D. Li, D. Nikolopoulos, K.W. Cameron, B. R. de Supinski and M. Schulz. Efficient Memory Registration for High Performance Networks Using Helper Threads,. ACM International Conference on Computing Frontiers (CF'11), 12 pages, May 2011 (to appear). **[21% accept rate]**
2. \*S. Song, \*C.-Y. Su, \*R. Ge, A. Vishnu, and K.W. Cameron, Iso-energy-efficiency: An approach to power-constrained parallel computation, Proceedings of 25<sup>th</sup> IEEE International Parallel and Distributed Processing Symposium (IPDPS 11), 12 pages, May 2011 (to appear). **[19% accept rate]**
3. A. Vishnu, \*S. Song, A. Marquez, K. Barker, D. Kerbyson, K.W. Cameron, P. Balaji, Designing Energy Efficient Communication Runtime Systems for Data Centric Programming Models, IEEE/ACM International Conference on Green Computing and Communications (GreenCom 2010), Hangzhou, China, 12 pages, December 2010. **[31% accept rate]**
4. \*D. Li, \*R. Ge, and K.W. Cameron, System-level, Unified In-band and Out-of-band Dynamic Thermal Control, proceedings of 2010 International Conference on Parallel Processing (ICPP 2010), 10 pages, September 2010. **[32% accept rate]**
5. \*D. Li, B. R. de Supinski, M. Schulz, K. W. Cameron, D. S. Nikolopoulos, Hybrid MPI/OpenMP Power-Aware Computing. Proceedings of 24th IEEE International Parallel and Distributed Processing Symposium (IPDPS 10), 12 pages, April 2010. **[24% accept rate]**
6. \*D. Li, D. Nikolopoulos, K. W. Cameron, B. R. de Supinski, M. Schulz, Power-aware MPI Task Aggregation Prediction for High-End Computing Systems. Proceedings of 24th IEEE International Parallel and Distributed Processing Symposium (IPDPS 10), 12 pages, April 2010. **[24% accept rate]**
7. \*Z. Cao, L. T. Watson, K. W. Cameron, \*R. Ge: A power aware study for VTDIRECT95 using DVFS. Proceedings of SpringSim 2009, 10 pages.
8. \*D. Li, \*S. Huang, and K. W. Cameron, CG-Cell: An NPB Benchmark Implementation on Cell Broadband Engine, proceedings of International Conference on Distributed Computing and Networking (ICDCN 2008), Kolkata, India, pp. 263-273, January 2008. **[16% accept rate]**
9. \*Filip Blagojevic, \*Xizhou Feng, Kirk W. Cameron, and Dimitris Nikolopoulos, "Modeling Multigrain Parallelism on Heterogeneous Multicore Processors: A Case Study of the Cell BE," proceedings of International Conference on High Performance Embedded Architectures & Compilers (HiPEAC 2008), pp. 38-52, Goteberg, Sweden, January 2008. **(29% accept rate)**

10. K. W. Cameron; \*H. K. Pyla; and S. Varadarajan, "Tempest: A portable tool to identify hot spots in parallel code," proceedings of 2007 International Conference on Parallel Processing (ICPP 07), Xi An, China, 10 pages, September 2007. **(25% accept rate)**
11. \*R. Ge; \*X. Feng; W. Feng; and K. W. Cameron, "CPU Miser: A performance-Directed, Run-Time System for Power-aware Clusters," proceedings of 2007 International Conference on Parallel Processing (ICPP 07), Xi An, China, 10 pages, September 2007. **(25% accept rate)**
12. \*M. Tolentino, \*J. Turner, and K.W. Cameron, "Memory-MISER: A performance-constrained runtime system for power-scalable clusters", Proceedings of ACM International Conference on Computing Frontiers (CF07), pp. 237-246, May 2007. **(31% accept rate)**
13. \*R. Ge, and K. W. Cameron, "Power-Aware Speedup", Proceedings of the 21<sup>st</sup> IEEE International Parallel and Distributed Processing Symposium (IPDPS 07), 12 pages, March 2007. **(26% accept rate)**
14. \*X. Feng, K. W. Cameron, B. Smith, and C. Sosa, "Building the Tree of Life on Tera-scale Systems," Proceedings of the 21<sup>st</sup> IEEE International Parallel and Distributed Processing Symposium (IPDPS 07), 12 pages, March 2007. **(26% accept rate)**
15. \*X. Feng, K.W. Cameron and D.A. Buell, "High Performance, Bayesian-based Phylogenetic Inference Framework", Proceedings of the 18th IEEE/ACM High Performance Computing, Networking and Storage Conference (SC), 15 pages, 2006. **(23% accept rate, Best Paper Finalist, top 2% of submitted papers)**
16. K. W. Cameron, \*X. Feng and \*R. Ge, "Performance-constrained Distributed DVS Scheduling for Scientific Applications on Power-aware Clusters," Proceedings of the 17<sup>th</sup> IEEE/ACM High Performance Computing, Networking and Storage Conference (SC 2005), 15 pages, November 2005, 15 pgs. **(24% accept rate)**
17. \*X. Feng, \*R. Ge, and K. W. Cameron, "Power and Energy Profiling of Scientific Applications on Distributed Systems," Proceedings of the 19<sup>th</sup> IEEE International Parallel and Distributed Processing Symposium (IPDPS 05), April 2005, 12 pages. **(34.3% accept rate)**
18. \*X. Feng, \*R. Ge, and K. W. Cameron, "ARGUS: Supercomputing in 1/10 Cubic Meter," Proceedings of the International Conference on Parallel and Distributed Computing and Networks (PDCN 2005), pp. 20-25, February 2005.
19. K. W. Cameron, and \*R. Ge, "Predicting and Evaluating Distributed Communication Performance," Proceedings of the 16<sup>th</sup> IEEE/ACM International Conference on High Performance Computing and Communications (SC 2004), 15 pages, Nov 2004. **(31% accept rate)**
20. K. W. Cameron and X.-H. Sun, "Quantifying Locality Effect in Data Access Delay: Memory logP," Proceedings of the 17<sup>th</sup> IEEE International Parallel and Distributed Processing Symposium (IPDPS 03), 12 pages, April 2003. **(29% accept rate)**
21. Y. Solihin, K. W. Cameron, Y. Luo, D. Lavenier, and M. Gokhale, "Mutable Functional Units and Their Applications on Microprocessors," Proceedings of the International Conference on Computer Design 2001 (ICCD 2001), September 2001, pp 234-239. **(34% accept rate)**
22. D. Lavenier, K. W. Cameron, Y. Solihin, "Integer/Floating Point Reconfigurable ALU," Proceedings of the 6th Symposium on New Machine Architectures (SympA'6), 12 pages, June 2000.
23. X.-H. Sun, and K. W. Cameron, "A Statistical-Empirical Hybrid Approach to Hierarchical Memory Analysis," Proceedings of Euro-Par 2000, August 2000, pp 141-148.
24. K. W. Cameron, and Y. Luo, "Instruction-level Microprocessor Modeling of Scientific Applications," Proceedings of the Second International Symposium on High Performance Computing (ISHPC 99), May 1999, pp. 29-41.
25. X.-H. Sun, D. He, K. W. Cameron, and Y. Luo, "A Factorial Performance Evaluation for Hierarchical Memory Systems," Proceedings of the 13th International Parallel Processing Symposium (IPPS/SPDP 99), April 1999, pp. 70-74. **(39% accept rate)**
26. X.-H. Sun, K. W. Cameron, D. He, and Y. Luo, "A Memory-Centric Characterization of ASCI Applications Via A Combined Approach of Statistical and Empirical Analysis," Proceedings of the Ninth SIAM Conference on Parallel Processing for Scientific Computing (PPSC 1999), 10 pages, March 1999.

#### **PUBLICATIONS - REFEREED WORKSHOPS**

27. R. Ge, X. Feng, and K. W. Cameron, "Modeling and Evaluating Energy-Performance Efficiency of Parallel Processing on Multicore based Power Aware Systems," Proceedings of the 5th Workshop on High-performance, Power-aware Computing (HPPAC), Rome, Italy, 2009, 8 pages.
28. D. Li, H. Pyla, and K. W. Cameron, "System-level, Thermal-aware, Fully-loaded Processor Scheduling," Proceedings of the 4th Workshop on High-performance, Power-aware Computing (HPPAC), Miami, FL, 2008, 8 pages.
29. D. Nikolopoulos and K. W. Cameron, "Synthesizing Parallel Programming Models for Asymmetric Multi-Core Systems," Proceedings of the 11th Workshop on High Performance Embedded Computing, MIT Lincoln Lab, 2007, 2 pages.
30. M. Tolentino, J. Turner, and K.W. Cameron, "An Implementation of Page Allocation Shaping for Energy Efficiency," Proceedings of the 3<sup>rd</sup> Workshop on High-performance, Power-aware Computing (HPPAC) 2007, 8 pages.

31. R. Ge, X. Feng, and K. W. Cameron, "Improvement of Power-Performance Efficiency for High-End Computing," Proceedings of the 19<sup>th</sup> IEEE International Parallel and Distributed Processing Symposium (IPDPS 05) - HPPAC '05 Workshop, April 2005, 8 pages. (Denver, CO)
32. S. Byna, K. W. Cameron and X.-H. Sun, "Memory-Aware Communication -An Experimental Study with MPI," Proceedings of the 1st International Workshop on Hardware/Software Support for Parallel and Distributed Scientific and Engineering Computing (SPDSEC02), September 2002, 10 pgs. (42% accept rate)
33. Y. Luo, K. W. Cameron, and O. Lubeck, Instruction-level Characterization of Computational Physics and Multimedia Applications Using Performance Counters. Proceedings of 2nd Workshop on Computer Architecture Evaluation Using Commercial Workloads (CAECW), 1999, 12 pages.
34. Y. Luo, O. M. Lubeck, H. Wasserman, F. Bassetti and K. W. Cameron, "Development and Validation of a Hierarchical Memory Model Incorporating CPU- and Memory-operation Overlap," Proceedings of the 1st International Workshop on Software and Performance (WOSP '98), October 1998, pp. 152-163.
35. O. Lubeck, A. Hoisie, F. Bassetti, K. W. Cameron, Y. Luo, and H. Wasserman, "ASCI Application Performance and the Impact of Commodity Processor Architectural Trends," Proceedings of the International Workshop on Innovative Architecture for Future Generation High-Performance Processors and Systems, October 1998.

#### **PUBLICATIONS – BOOKS/BOOK CHAPTERS**

36. S. Song\* and K.W.Cameron, "Green Computing at Scale," *Harnessing Green IT: Principals and Practice*, 2011, (in press).
37. R. Ge\* and K.W. Cameron, "Power-aware, High-Performance Computing," *Green Computing*, Wiley & Sons, 2011, (in press).
38. NSF Report on the Science of Power Management, Eds. K. Cameron and K. Pruhs, pp. 37, August 2010. (Technical Report No. VT/CS-09-19).
39. K.W. Cameron, R. Ge, and X. Feng, "Designing Computational Clusters for Performance and Power," *Advances in Computers*, Elsevier Science BV, Amsterdam, 2007. (*invited*)
40. S. Byna, K. W. Cameron, and X.-H. Sun, "Quantification of Memory Communication," *High Performance Scientific and Engineering Computing: Hardware/Software Support*, Kluwer Academic Publishers, Boston, MA, (2004) pp. 31-44.
41. S. Ashby, D. H. Bailey, M. Blackmon, P. Bohrer, K. Cameron, C. DeTar (U. Utah), J. Dongarra, D. Dwoyer, P. Freeman, A. Gheith, B. Gorda, G. Hammer, W. Felter, J. Kepner, D. Koester, S. McKee, D. Nelson, J. Nichols, M. Vahle, J. Vetter, T. Windus, P. Worley, "Performance Modeling, Metrics and Specifications," *Workshop on The Roadmap for the Revitalization of High-End Computing*, Computer Research Association, Washington, DC, (2003) pp. 59-68. (*invited*)
42. X.-H. Sun, and K. W. Cameron, "A Statistical-Empirical Hybrid Approach to Hierarchical Memory Analysis," *Lecture Notes in Computer Science 1900*. Springer Verlag Publishers, New York, NY, (2000) pp. 141-148. (from EuroPAR 2000)
43. K. W. Cameron, and Y. Luo, "Instruction-level Microprocessor Modeling of Scientific Applications," *Lecture Notes in Computer Science 1615*, Springer Verlag Publishers, New York, NY, (1999) pp. 29-41. (from ISHPC 99)
44. Y. Luo and K. W. Cameron, "Instruction-level Characterization of Scientific Computing Applications Using Hardware Performance Counters," *Scientific, Engineering and Desktop Workloads of Workload Characterization: Methodology and Case Studies*, IEEE-CS Press, Los Alamitos, CA, (1999) pp. 90-98.

#### **OTHER PUBLICATIONS**

1. \*M.T. Maxwell and K.W. Cameron, "Optimizing Application Performance: A Case Study Using LMBench," *ACM Crossroads*, 8(5), September 2002.

#### **SYSTEMS/SOFTWARE DESIGNS**

- **Granola**. First-of-its-kind commercial software for saving energy without performance loss in laptops, PCs, and servers. Developed by VT spinout company MiserWare. Over 200,000 downloads from 160+ countries in the first 10 months.
- **PowerPack 3.0**, Improved version of PowerPack toolset now in use by dozens of researchers. Added support for remote access and integration with other toolkits (Prophesy, PAPI, and visualization tools).
- **SystemG**. First-of-its-kind Green Supercomputer with over 15,000 temperature and power sensors over 325 nodes. Built with Prof. Varadarajan. Sponsored in part by the National Science Foundation.
- **Tempest**: First-of-its-kind system (*Temperature Estimator*) infrastructure for measuring the temperature of software applications and correlating thermal characteristics to source code. Currently available for download at SourceForge.net.
- **SystemMISER**: System Management Infra-Structure for Energy Reduction includes DVS scheduling techniques (CPU MISER) and power-aware memory techniques (Memory MISER) presently. Future NIC MISER, Disk MISER, and systemic coscheduling of power modes. (2002-present)

- **Manticore:** First-of-its-kind cluster of Sony Playstation 3 machines running parallel applications on IBM Cell architecture; sponsored in part by Virginia Tech and the National Science Foundation, (2007).
- **PBPI:** First large-scale parallel Bayesian-based phylogenetic inference tool currently running on System X and IBM BlueGene/L; 3 orders of magnitude faster than best available codes; sponsored in part by the National Science Foundation and IBM.
- **DORI:** The second-generation, power-aware high-performance cluster built from dual-processor, dual-core AMD systems; sponsored in part by Virginia Tech.
- **NEMO:** The first power-aware, high-performance cluster built from Dell laptop computers; sponsored in part by the National Science Foundation, 2003.
- **PowerPack:** The first power measurement, analysis, and control system to adapt cluster-wide energy and power at component-level granularity; sponsored in part by the National Science Foundation, 2002.
- **ARGUS:** High-density supercomputer built from network load modules; sponsored in part by Ixia Corporation, 2001.
- **Memory Medic.** Global memory checker software for Intel 82450 NX Chipset Validation; sponsored by Intel Corporation, 1996.

#### **INVITED TALKS SINCE 2002 (Excluding conference paper presentations)**

1. *Presentation, "MiserWare: A University Spinout in the Commonwealth"*, presented to Virginia Commonwealth CIO Sam Nixon, Richmond, VA, December 2010. **(invited)**
2. *Plenary Speaker, "MiserWare: A University Spinout for Sustainability"*, Sustainable Venture Capital Investment Competition, UNC Kenan-Flagler Business School, Chapel Hill, NC, March, 2011. **(invited)**
3. *Poster Presentation, EU-US Frontiers of Engineering Symposium* sponsored by the National Academy of Engineering and the EU Council of Applied Sciences and Engineering, Cambridge, UK, September, 2010. **(invited)**
4. *Adventures in Green Computing: HPC and Beyond*, LSU Department of Computer Science, November, 2010. **(invited)**
5. *BoF, Feng, W. and Cameron, K.W., The Green 500*, Presented at the SC10, New Orleans, LA, November 2010. **(refereed)**
6. *Panel, Software for a Sustainable World*, OOPSLA 2010, October 2010. **(invited)**
7. *A Tale of Two Lists: Green500 and SPECPower*, CCGSC Workshop, September 2010. **(invited)**
8. *The Past, Present, and Future of Green Computing*, Computer Science Distinguished Lecture Series, Wayne State University, April 2010. **(invited)**
9. *Panel, Value Opportunities in Green IT*, The GreenIT Economic Workshop, Washington DC, April 2010. **(invited)**
10. *Panel, Present and Future Directions in Sustainable IT*, SustainIT Workshop, San Jose, CA, February 2010. **(invited)**
11. *BoF, Feng, W. and Cameron, K.W., The Green 500*, Presented at the SC 09, Portland, OR, November 2009. **(refereed)**
12. *Directions in Energy Efficient Computing*, IBM Federal Strategy and Technology Institute Speaker Series, Washington DC, October 2009. **(invited)**
13. *The Past, Present, and Future of High-Performance, Power-Aware Computing*, Portland State University, July 2009. **(invited)**
14. *BoF: The Green 500*, (with W. Feng) Presented at the International Supercomputing Conference (ISC), June 2008. **(refereed)**
15. *BoF: Improving The Green 500*, (with W. Feng) Presented at the International Conference on High Performance Computing and Communications (SC 2008), November 2008. **(refereed)**
16. *The Past, Present, and Future of High-Performance, Power-Aware Computing*, Thai Grid Computing Conference, September 2008. **(invited)**
17. *The Past, Present, and Future of High-Performance, Power-Aware Computing*, CCGSC Workshop, September 2008, **(invited)**
18. *The Green500 and the HPCChallenge Benchmarks*, HPC Challenge Summit, November 2008, **(invited)**.
19. *PBPI: High Performance Implementations of Parallel Bayesian Phylogenetic Inference on IBM Technologies*, IBM Life Sciences Virtual Expo [Apr 2008]
20. *Nature, Nurture, and the Green500*, National Science Foundation, Arlington, VA [Jan 2008]
21. *The HEC Energy Crisis*, University of Florida, Gainesville, FL [Sep 2007]
22. *PowerPack and SystemISER: The past, present, and future of high-performance, power-aware computing*, Merrill Lynch Power Summit, New York, NY [Mar 2007]
23. *The HPC Energy Crisis*, IBM Research, Austin, TX [Feb 2007]
24. *Parallel I/O for digital forensics*, Crucial Security. [Dec 2006]
25. *The HPC Energy Crisis*, The 7<sup>th</sup> Annual International Workshop on Performance Analysis and Optimization of High-End Computing Systems (APART) at IEEE/ACM SC06. [Nov 2006]
26. *Crucial Technologies for High-end computing*, Crucial Security. [Aug 2006]
27. *High-performance, power-aware distributed computing*, Lawrence Livermore National Laboratory. [May 2005]

28. *High-performance, power-aware distributed computing*, University of Delaware. [Feb 2005]
29. *High-performance, power-aware distributed computing*, Oak Ridge National Laboratory. [Oct 2004]
30. *Topics in HPC*, Savannah River National Laboratory. [Aug 2004]
31. *High End / Grid Computing*, Software Developers Association. [June 2004]
32. *SC Grid Computing*, Columbia Chamber of Commerce. [Nov 2003]
33. *Telecommunication workload characterization*, Intel Corporation [Dec 2002].
34. *Scalable Performance at USC*, Michelin Corporation visitors. [Nov 2002]
35. *Toward a unified, practical model of parallel computation*, Illinois Institute of Technology. [April 2002]
36. *Approaches to Telecom Benchmarking*, Intel Corporation. [March 2002]

### **SELECT PRESENTATIONS**

37. Dong Li, Kirk W. Cameron, Dimitrios S. Nikolopoulos, Martin Schulz, and Bronis R. de Supinski. *POSTER: Model-Based Hybrid MPI/OpenMP Power-Aware Computing*. Proceedings of Supercomputing'2009: High-performance Computing, Networking, Storage and Analysis Conference (SC), poster session, 2pp., Portland, OR, November 2009.
38. Hari K. Pyla, Dong Li, and Kirk W. Cameron, *POSTER: Thermal-aware High-performance Computing Using TEMPEST*, Proceedings of 19<sup>th</sup> International Conference on High Performance Computing and Communications (SC 2007), November 2007. (**26% accept rate**)
39. Kirk W. Cameron (moderator), *PANEL: Is there an HEC energy crisis?*, Presented at the 19<sup>th</sup> International Conference on High Performance Computing and Communications (SC 2007), November 2007.
40. Matthew Tolentino and Kirk W. Cameron, *WIP Session: Improving the energy efficiency of high-performance server systems*. Proceedings of 20<sup>th</sup> ACM Symposium on Operating Systems Principles (SOSP), October 2005, pp. 1.
41. Kirk W. Cameron, Rong Ge, Xizhou Feng, Drew Varner, and Chris Jones, *POSTER: High-performance, Power-aware Distributed Computing Framework*. Proceedings of 16<sup>th</sup> International Conference on High Performance Computing and Communications (SC 2004), November 2004. (**32% accept rate**)
42. Yong Luo, Kirk W. Cameron, Josep Torrellas, and Yan Solihin, *TUTORIAL: Performance Modeling using Hardware Performance Counters*. The 6<sup>th</sup> International Symposium on High Performance Computer Architecture (HPCA-6), Jan, 2000.
43. Kirk W. Cameron, and Yong Luo, *TUTORIAL: Performance Evaluation using Hardware Performance Counters*. 26<sup>th</sup> Annual International Symposium on Computer Architecture (ISCA 26), May, 1999.
44. Kirk W. Cameron, *POSTER: Empirical Performance Modeling Using Synthetically Built Assemble Directives (SynBAD)*. 10th International Conference of High Performance Computing and Communications (SC'99), November, 1999.

### **TEACHING – VT/USC RESEARCH SUPERVISION**

#### **Supervision of Post-Doctoral Research**

Matthew Grove (VT), Power-aware Software and Architectures, 8/10/10 – Present.  
 Rong Ge (VT), Improving Efficiency in Distributed Systems, 1/1/08 – 8/14/08.  
 Xizhou Feng (VT), High Performance Computing Algorithms and Systems, 5/16/06 – 5/16/07.

#### **[Chair] Supervision of Doctoral Research (PhD Graduates = 4)**

Matthew Tolentino (VT), Managing Memory for Power, Performance, and Thermal Efficiency, 1/1/05 – 5/1/09.  
 Xizhou Feng (USC), High Performance Computing Algorithms and Systems, 1/1/03 – 5/15/06.  
 Rong Ge (VT), Power-performance Efficiency in Distributed Systems, 8/16/02 – 12/31/07.  
 Dong Li (VT), Scalable and Energy Efficient Execution Methods for Multicore Systems, 8/16/06 – 2/15/11.  
 Song “Leon” Shuaiwen (VT), Thermal-aware High-performance Computing, 8/16/06 – Present.  
 Hung-Ching Chang (VT), Power and Thermal Benchmark Development, 8/16/07 – Present.  
 Chun-Yi Su (VT), Power-Performane Analysis of HPC Systems, 8/16/07 – Present.

#### **Ph.D. Advisee First Positions Held**

Xizhou Feng, Research Faculty, Virginia Bioinformatics Institute [2007]  
 Rong Ge, Assistant Professor, Marquette University [2008]  
 Matthew Tolentino, Researcher, Intel Research [2009]  
 Dong Li, Staff Scientist, Oak Ridge National Laboratory [2011]

#### **[Chair] Supervision of Masters Research (M.S. Graduates = 7)**

Song “Leon” Shuaiwen (VT), Thermal-aware High-performance Computing, 8/16/06 – 5/1/09. M.S. CS.  
 Hari K. Pyla (VT), Thermal Profiling Tools for Emergent Systems, 1/15/06 – 6/1/07. [w/ Varadarajan] M.S. CS.  
 Rong Ge (USC), Performance Evaluation/Prediction of Communication Overhead, 8/16/02 – 5/1/05. M.S. CE.



Chip Aaron (USC), Thermal Characteristics of Advanced DRAM Architectures, 9/1/04 – 5/1/05. M.S. CE.  
 Drew Varner (USC), Evaluation of High-performance Power-aware Clusters, 1/1/04 – 5/1/05. M.S. CE.  
 Vidya Kolipaka (USC), Performance Evaluation of Intel’s Softswitch Architecture, 5/1/02 - 6/1/03. M.S. CE.  
 Raghuram Renduchintala (USC), Advanced Use of the Simplescalar Simulator, 7/1/02 – 12/15/02. M.S. CE.

**Supervision of Undergraduate Research (B.S. Graduates = 3)**

Chris Jones, Honors College Research: Evaluation of Power-aware Clusters, 1/1/04 – 5/15/06.  
 Joseph Turner, Honors College Research: Hardware counter evaluation of high-end systems, 1/1/04 – 12/15/06. B.S. CE.  
 Tyler Maxwell, Research Project: Implementation & analysis of Intel Softswitch Architecture, 1/1/02 – 8/30/02. B.S. CE.

**Supervision of High School Students**

Kevin Hencke, Blacksburg High School, Summer 2006 Project: Empirical Study of Memory Hierarchies, now at UMD.  
 Robert Lewis, Dreher High School, Project: Building a Beowulf, entrant in 2004 SC Region II Science and Engineering Fair.

**Advisee Awards**

Song Shuaiwen 3<sup>rd</sup> place Torgersen Graduate Student Research Excellence Award [March 2010]  
 Matthew Tolentino invited to attend NAE Grand Challenge Summit [March 2009]  
 Chris Jones, UC System GREAT Award (PhD Fellowship at UCLA) [April 2008]  
 Rong Ge, VT CS Outstanding Ph.D. Thesis, [June 2007]  
 Joseph Turner, Virginia Tech Cunningham Graduate Fellowship [May 2007]  
 Joseph Turner, NSF Fellowship Honorable Mention [May 2007, April 2008]  
 Chris Jones, NSF Fellowship Honorable Mention [May 2007]  
 Matt Tolentino, Travel grant to attend HPPAC [April 2007]  
 Rong Ge, Award to attend Computer Architecture Summer School Workshop, Princeton [July 2006]  
 Rong Ge, USC CSE Outstanding Graduate Student [April 2005]  
 Allen Michalski, Grant to attend Landau Meeting of Nobel Laureates [June 2005]  
 Chris Jones, Joseph Turner, Rong Ge, UPE inductees [March 2005]  
 Chris Jones, Joseph Turner, Phi Beta Kappa inductees [March 2005]  
 Joseph Turner, Student Volunteer Grant SC 2005 [November 2005]  
 Xizhou Feng, IPDPS Student Travel Award [June 2005]  
 Chris Jones, Student volunteer grant SC 2004 [Nov 2004]  
 Robert Lewis, Runner-up in Mathematics Division of 2004 SC Region II Science and Engineering Fair.

**[Member] Advisement Committees**

Ruslan Nikolav, PhD – VT [2013]  
 Mustafa Rafiki, PhD – VT [2013]  
 Filip Balgojevic, PhD – VT [2009]  
 Amine Chigani, PhD – VT [2009]  
 Rajesh Sudarsan, PhD – VT [2010]  
 Matthew Curtis-Maury, PhD – VT [2008]  
 Joseph Ruscio, PhD – VT (expected 8/2012)  
 Song Huang, PhD – VT (expected 5/2012)  
 Mehmet Belgin, PhD – VT [2010]  
 Scott Scheider, Ph.D. – VT [2011]  
 Balaji Subramaniam, M.S. – VT [2011]  
 John Linford – M.S. VT [2009]  
 Amine Chigani, M.S. – VT [2007]  
 Ankur Shah, M.S. – VT [2008]  
 Ashwin Aji, M.S. – VT [2008]  
 Veena Basavaraj, M.S. – VT [2006]

**TEACHING – VT/USC COURSES AND CLASS SIZE**

Term	USC Course	# Students
Fall 2001	Comp Arch	24
Spring 2002	Adv Comp Arch	17

Fall 2002	Comp Arch	31
Spring 2003	Perf Analysis	8
Fall 2003	Comp Arch	25
Spring 2004	Adv Comp Arch	6
Fall 2004	Comp Arch	26
Spring 2005	Power-conscious	9
<b>Term</b>	<b>VT Course</b>	<b># Students</b>
Spring 2006	Comp Org	20
Spring 2006	Adv Systems	6
Spring 2007	Comp Org	25
Spring 2007	Adv Comp Arch	30
Fall 2008	Green Computing	7
Spring 2009	Comp Org	7
Spring 2009	Adv Comp Arch	30
Fall 2009	Comp Org	30
Fall 2010	Parallel Comp.	35
Spring 2011	Comp Org II	75
Spring 2011	Adv Comp Arch	30

## **SERVICE –UNIVERSITY AND COMMUNITY**

**Editorial Board:** IEEE Computer, editor of Green IT Column, (2009-).

**Editorial Board,** Sustainable Energy Development Book Series, (2011-).

**Co-founder:** Green500 list of power efficient supercomputers (with Wu-Chun Feng) (2006-)

**Co-Chair:** Workshop on Science of Power Management, Sponsored by NSF. (2008-2009) **[invited]**

**Publicity Chair:** ICS 2011

**Contributing Member:** SPECPower Working Group (2005-)

**Steering Committee Member:** ERSS 2011-, GreenCom 2009-, GCM 2009-,HPPAC 2005-, APART Workshop 2007

**Program Co-chair:** HPPAC 2007

**Guest Editor:** IEEE Transactions on Parallel and Distributed Systems, Special Issue on Power-Aware Parallel and Distributed Systems (PAPADS), (2007-2008).

**Session Chair:** IPDPS 2011, SC 2009, HPPAC 2005-2010, ICPP 2007-2008, SC 2005, SPDSEC 2002, PDPTA 1999

**Program Committee Member:** HiPC 2011, ERSS 2011, PMP 2011, IGCC 2010, Euro-Par 2010, Cluster 2010, WEED 2010, SC 2009, PACT 2009, IPDPS 2009, ICPP 2008, HPPAC 2008, APART 2007, ICPP 2007, PDCN 07, ACMSE 07, HPPAC 2006, ACMSE 06, SC 2005, ICPP 2004, HPPAC 2005, SPDSEC 2002.

**Awards Committee:** Green Enterprise IT Awards, IT Symposium 2009-

**Proposal Reviewer:** Department of Energy Panels, NSF Panels (Expeditions, CAREER x 3, SBIR, CPA, ITR, ACR, CCF, CNS-DDDAS, REU); USC Research and Productive Scholarship Panel; Ontario Research Fund, Canada (2006, 2007).

**Textbook Reviewer:** Digital Principals and Design, 1e (702 pgs, McGraw-Hill).

**Manuscript Reviewer:** IEEE Transactions on Computing, IEEE Transactions on Parallel and Distributed Systems, IEEE Micro, IEEE Computer, IBM Systems Journal, IPDPS, ICPP, Journal of Future Generation Computing, Journal of Systems Software, Journal of Parallel and Distributed Computing, IEEE Internet Computing, High-Performance Computing and Communications Conference (SC), International Conference on Parallel and Distributed Computing Systems (PDCS), IEEE Transactions on Mobile Computing, Integration: The VLSI Journal, High-performance, power-aware computing workshop, The Computing Journal, Parallel Computing and various others.

**Elected Member:** NERSC User's Group Executive Committee (2007-2010).

**Invited Participant:** EPA Tier II Energy Star Workshop, Interagency High End Computing Revitalization Task Force (HECRTF) commissioned by the White House Office of Science and Technology Policy (OSTP), in coordination with the National Science and Technology Council (2003). National Security Agency Advanced Computing Systems (ACS) Workshop (2007), EPA Stakeholders Workshop (2008), Judge for Uptime Institute Green Awards (2009).

**Expert Witness:** Commonwealth of Virginia, Office of the Attorney General.

**Outreach Activities:** Co-founder Green500, VT High-end Computing Challenge (Founder and Chair), VT CS Alliance (HPC Lead), NSF CAREER Internal Review committee (Founder and Chair)

**Professional Memberships:** Associate Member SPEC (3/03 – Present), SPECPower Working Group, SPEC High Performance Working Group, SPEC Open Systems Working Group, SPEC Power Working Group, Institute of Electrical and

Electronics Engineers (IEEE), Institute of Electrical and Electronics Engineers Computer Society (IEEE-CS), Association of Computing Machinery (ACM), Upsilon Pi Epsilon (UPE) Honor Society for the Computing Sciences.

***VT College of Engineering Service.***

***Committees:*** Associate Dean Search Committee (2010-2011)

***Departmental Service:***

***Committees:*** 40<sup>th</sup> Anniversary Event Committee (2011), P&T Committee (2010-), HBCI Computer Science Alliance (2007-), CS 4504 Course Coordinator (2005-), Marston Entrepreneurial Fund Committee (2007-), VT CS Computer Resources Committee (Chair, 2008-), COE NSF CAREER Internal Review Committee, VT CS Marston Entrepreneurial Fund Committee (2007), VT CS NSF CAREER Internal Review Committee (Founder and Chair, 2006-2008)VT CS Dept Head Search Committee (2007-2008), HBCU CS Alliance HPC Liaison (2007-), VT CS Steering Committee (2007-), VT CS Systems Faculty Search (2006), VT CS Systems Qualifier Committee (2005-2008), VT CS Systems Qualifier Chair (2007-2008), VT CS Course Coordinator CS4504 (2005-), VT CS Graduate Admissions Committee (2006-2008), USC CSE NSF CAREER Internal Review Committee (2003-2005), USC CSE Distinguished Lecture Series (Founder and Chair), USC CSE Faculty Search Committee, USC CSE Computing Committee.

***Faculty mentor:***

Appointed by VT department chair to mentor junior faculty (Ali Butt)

Appointed by USC department chair to mentor new junior faculty (Jijun Tang).

***Undergraduate mentor:*** VT CS Internship Panel (2008), Advise 15-20 undergraduates per semester.