MICHAEL B. SULLIVAN

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Electrical & Computer Engr.
University of Texas at Austin
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EDUCATION

Cockrell School of Engineering, University of Texas at Austin
Ph.D. in Computer Engineering 2008–2015
> Advisors: Mattan Erez & Earl E. Swartzlander, Jr.
> Dissertation: Low-Cost Duplication for Separable Error Detection in Computer Arithmetic

Cockrell School of Engineering, University of Texas at Austin
M.S.E. in Computer Engineering MAY 2011
> Advisor: Mattan Erez
> Report: Application of Residue Codes for Error Detection in Modern Computers

Volgeneu School of Engineering, George Mason University
M.S. in Computer Science (GPA 3.95) JAN 2009
B.S. in Computer Engineering, summa cum laude MAY 2008

College of Science, George Mason University
B.A. in Mathematical Sciences, summa cum laude MAY 2008

RESEARCH POSITIONS

University of Texas
Austin, TX
Research Assistant, Locality Parallelism and Hierarchy Lab (LPH) 2010–2015
> Studied the design of efficient and reliable computers with a focus on large-scale high-performance systems.

Los Alamos National Lab
Los Alamos, NM
Research Assistant, Applied Computer Science (CCS-7) SUMMER 2011
> Gave architectural insight to a multi-displinary team focused on the computational co-design of an exascale system tailored to a real-world problem.

George Mason University
Fairfax, VA
Research Asst., Lab for the Study and Sim. of Human Mvmt. SUMMER 2008

> Developed system software and analysis tools for the study of body movement using the simultaneous capture of muscle activity (EMG), positional movement (magnetic tracking), and video.

Research Assistant, Neural Engineering Lab 2007–2008

> Designed, built, and programmed portable research-grade medical instruments, including ECG and EMG devices. Demonstrated the viable low-cost application of system-on-chip hardware to these medical instruments, and investigated the limits of SoC precision through EEG capture.

Argonne National Lab
Argonne, IL
Research Assistant, Mathematics and Computer Science (MCS) SUMMER 2007

> Worked to reduce the difficulty of profiling and tuning parallel code by developing a framework to automate and encapsulate disparate performance analysis tools. Focused on distributed-memory multi-processing for large scale supercomputers.

University of California at Irvine
Irvine, CA
Research Assistant, Nanotechnology Lab SUMMER 2006

> Provided lab assistance for a nanotechnology project spanning the fields of chemistry, physics, and engineering. Developed some data analysis tools for the classification of molecular substances flowing through a single nanopore.

TEACHING EXPERIENCE

University of Texas
Austin, TX
Guest Lecturer, High Speed Computer Arithmetic I 2013–2014

Fairfax County Public Schools
Fairfax, Virginia
Instructional Assistant, Introduction to Programming 2003–2004

George Mason University
Fairfax, Virginia
Mentor, School of Music 2004

OTHER WORK EXPERIENCE

George Mason University
Fairfax, Virginia
Computer Lab Manager, University Scholars Program 2005–2007

PUBLICATIONS

Kim, J., Sullivan, M. B., Gong, S. L., Erez, M. "Frugal ECC: Efficient and Versatile Memory Error Protection through Fine-Grained Compression", *Proceedings of the International Conference on High Performance Computing, Networking, Storage and Analysis (SC)*, 2015.

Sullivan, M. B., Swartzlander, E. E. "Low-Cost Duplicate Multiplication", *Proceedings of the International Symposium on Computer Arithmetic (ARITH)*, 2015.

Kim, J., Sullivan, M. B., Erez, M. "Bamboo ECC: Strong, Safe, and Flexible Codes for Reliable Computer Memory", *Proceedings of the International Symposium on High Performance Computer Architecture (HPCA)*, 2015.

Rhu, M., Sullivan, M. B., Leng, J., Erez, M. "A Locality-Aware Memory Hierarchy for Energy-Efficient GPU Architectures", *Proceedings of the International Symposium on Microarchitecture (MICRO)*, Davis, CA, December 7, 2013.

Sullivan, M. B., Swartzlander, E. E. "On Separable Error Detection for Addition", *Proceedings of the Asilomar Conference on Signals and Systems*, Pacific Grove, CA, November 3, 2013.

Chung, J., Lee, I., Sullivan, M. B., Ryoo, J. H., Kim, D. W., Yoon, D. H., Kaplan, L., Erez, M. "Containment Domains: A Scalable, Efficient, and Flexible Resilience Scheme for Exascale Systems," *Scientific Programming*, Vol. 21, Number 3-4, (January 2013): 197–212.

Sullivan, M. B., Swartzlander, E. E. "Truncated Logarithmic Approximation," *Proceedings of the International Symposium on Computer Arithmetic (ARITH)*, Austin, TX, April 7, 2013.

Chung, J., Lee, I., Sullivan, M. B., Ryoo, J. H., Kim, D. W., Yoon, D. H., Kaplan, L., Erez, M. "Containment Domains: A Scalable, Efficient, and Flexible Resilience Scheme for Exascale Systems," *Proceedings of the International Conference on High Performance Computing, Networking, Storage and Analysis (SC)*, Salt Lake City, UT, November 12, 2012.

Sullivan, M. B., Swartzlander, E. E. "Truncated Error Correction for Flexible Approximate Multiplication," *Proceedings of the Asilomar Conference on Signals and Systems*, Pacific Grove, CA, November 3, 2012.

Yoon, D. H., Sullivan, M. B., Jeong, M. K., Erez, M. "Towards Proportional Memory Systems", *Intel Technology Journal*, Vol. 17, Issue 1, 2012.

Willert, J., Kelley, C. T., Knoll, D. A., Dong, H., Ravishankar, M., Sathre, P., Sullivan, M. B., Taitano, W. "Hybrid Deterministic/Monte Carlo Neutronics Using GPU Accelerators," *International Symposium on Distributed Computing and Applications to Business, Engineering & Science (DCABES)*, Guilin, China, October 19, 2012.

Sullivan, M. B., Swartzlander, E. E. "Long Residue Checking for Adders," *Proceedings of the International Conference on Application-specific Systems, Architectures and Processors (ASAP)*, Delft, Netherlands, July 9, 2012.

Yoon, D. H., Sullivan, M. B., Jeong, M. K., Erez, M. "The Dynamic Granularity Memory System," *Proceedings of the 39th International Symposium on Computer Architecture (ISCA)*, Portland, OR, June 9, 2012.

Jeong, M. K., Yoon, D. H., Sunwooz, D., Sullivan, M. B., Lee, I., Erez, M. "Balancing DRAM Locality and Parallelism in Shared Memory CMP Systems," *Proceedings of the International Symposium on High Performance Computer Architecture (HPCA)*, New Orleans, LA, February 25, 2012.

Sullivan, M. B., Swartzlander, E. E. "Hybrid Residue Generators for Increased Efficiency," *Proceedings of the Asilomar Conference on Signals*, Pacific Grove, CA, November 3, 2011.

Powell, M. R., Sullivan, M. B., Vlassiouk, I., Constantin, D., Sundre, O., Martens, C. C., Eisenberg, R. E., and Siwy, Z. S.. "Nanoprecipitation-assisted ion current oscillations," *Nature Nanotechnology*, Vol. 3, No. 1 (January 2008): 51–57.

TECHNICAL REPORTS

Lee, I., Basoglu, M., Sullivan, M. B., Yoon, D. H., Kaplan, L., and Erez, M. "Survey of Error and Fault Detection Mechanisms," Technical Report TR-LPH-2011–002, LPH Group, Department of Electrical and Computer Engineering, The University of Texas at Austin, April, 2011.

Sullivan, M. B., Yoon, D. H., and Erez, M. "Containment Domains: A Full-System Approach to Computational Resiliency". Technical Report TR-LPH-2011–001, LPH Group, Department of Electrical and Computer Engineering, The University of Texas at Austin, January, 2011.

POSTER SESSIONS

Sullivan, M. B., Swartzlander, E. E. "Long Residue Checking for Adders," Presented at the TexasWISE Workshop on VLSI, Round Top, TX, March 8, 2013.

Sullivan, M. B., Swartzlander, E. E. "Hybrid Residue Generators for Increased Efficiency," Presented at the 45th Asilomar Conference on Signals, Pacific Grove, CA, November 3, 2011.

Sullivan, M. B., Basoglu, M., Lee, I., Krimer, E., Erez, M. "Echelon: Reliability at the Exascale," Locality, Parallelism, and Hierarchy (LPH) Research Highlight, Austin, Texas, March 3, 2011.

Sullivan, M. B., Siwy, Z. S., Powell, M. R., and Kalman, E. "Voltage-Gating in Synthetic Nanopores Induced by Cobalt Ions," American Chemical Society, Chicago, Illinois, March 26, 2007. Also presented at Innovations 2007, George Mason University, Fairfax, Virginia, April 25, 2007.

Sullivan, M. B., Siwy, Z. S., Powell, M. R., and Kalman, E. "Voltage-Gating in Synthetic Nanopores Induced by Cobalt Ions," IM-SURE Symposium, University of California, Irvine, August 2006.

AWARDS & FELLOWSHIPS

Temple Foundation MCD Fellowship	2010–2013
National Defense Science and Engineering Graduate Fellowship	2008–2010
Graduate Dean Prestigious Fellowship Supplement	2009
NSF Graduate Research Fellowship Program Honorable Mention	2008
George Mason University Scholar	2004–2008
Northern Virginia Technology Council Bannister Scholarship	2006–2008
AFCEA-NOVA Scholarship	2005–2008

PROFESSIONAL AFFILIATIONS

Alpha Chi Honor Society
Alpha Lambda Delta Honor Society
American Chemical Society
Armed Forces Communications & Electronics Association
Institute of Electrical and Electronics Engineers
Golden Key International Honor Society

RESEARCH GRANTS

GMU Undergraduate Faculty-Student Research Apprenticeship Grant	2007
DoE Undergraduate Laboratory Internship Program	2007
NSF-REU Chemistry Leadership Group Travel Award	2007
NSF Research Experience for Undergraduates Program	2006