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Education

Massachusetts Institute of Technology

Doctor of Philosophy, Electrical Engineering and Computer Science, June 1999
Thesis: Design of Low Power VLSI Systems Powered by Ambient Mechanical Vibration

Master of Engineering, Electrical Engineering and Computer Science, May 1994
Thesis: High Bandwidth Interchip Communication for Regular Networks

Bachelor of Science, Electrical Science and Engineering, May 1994

Experience

University of California, Davis, ECE Dept.

Associate Professor

July 2008—Present

Assistant Professor

July 2003—July 2008

Teaching and research in mixed-signal circuit design, VLSI, and embedded systems. Research interests include micropower systems, power electronics which convert ambient energy sources to electrical power for batteryless device operation, circuits and architectures for energy scalable signal processing of sensor data, sensor interfaces, and innovative multicore circuit and interconnect design.

Independent Consulting

Oct 2002—June 2003

Consulted on low power design, hardware feasibility studies, high performance I/O design, and digital ASIC and mixed-signal circuit design for several small companies and startups including SiCortex, BlueD Technologies, OcuNET Devices, and SmaL Camera Technologies.

High Speed Solutions, an Intel Company

June 1999—Oct 2002

Senior Member of Technical Staff

One of two principal contributors on an engineering staff of six who brought an early venture startup company from initiating engineering development to successful acquisition by Intel in thirteen months. Half of a two designer team responsible for innovative signaling and circuit design and implementation of a chip set for a prototype high performance memory system. Also responsible for initial electromagnetic simulation of a novel connector concept. The prototype achieved 1.6 Gbps/pair bandwidth across an 8 load multidrop bus while dissipating peak power of 40 mW/transceiver. Performed initial work to extend performance to 3.2 Gbps for 8 loads and 5 Gbps for point-to-point links. Also developed two new interconnect concepts to enable multidrop peer-to-peer communication.

Primary responsibilities included signaling theory, analysis, and design, circuit design, simulation, and custom layout, initial interconnect design and simulation, and post fabrication silicon testing. Further responsibilities involved intellectual property development, interaction with RF, mechanical, verification, and CAD engineers, test methodology development, documentation, support for technical marketing and product intercept planning, definition of R&D directions, and interviewing and training new hires.

MIT Microsystems Technology Laboratory

Jan 1995—June 1999

Research Assistant

Investigated techniques for top to bottom implementation of signal processing systems which scavenge energy from vibration sources in their environment. Developed, modeled, and tested an electromagnetic vibration-to-electric energy converter based on a moving-coil transducer. Designed, implemented, and tested a custom low power DC-DC converter IC for regulating transducer output voltage based on desired load performance. Developed a detection/classification algorithm for estimating heart rate from a novel acoustic sensor's output. Designed, implemented, and tested a full custom 250K transistor low power DSP with innovative features for sensor signal processing as part of a system incorporating a MEMS vibration-to-electric energy converter and voltage regulator for energy scavenging operation of the heartbeat detection algorithm. Also designed and implemented a low power dynamic comparator incorporated in several group test chips.

MIT Department of EECS

Fall 1998

Teaching Assistant, 6.374 Analysis and Design of Digital Integrated Circuits

Developed and graded problem sets, exams, labs, and design projects in addition to running one-on-one and small group tutorials.

Lockheed Sanders Corp.

Summer 1997

Summer Intern

Developed and tested algorithms for detection and classification of signals for cardiac monitoring from a novel acoustic sensor.

MIT Artificial Intelligence Laboratory, Abacus Project

Oct 1992—Jan 1995

Research Assistant

Designed circuits for high bandwidth interchip communication for a SIMD array.

Undergraduate Researcher

Designed and simulated the architecture of a microsequencing unit, memory controller, and i/o system for a large-scale SIMD multiprocessor. Contributed to architectural and VLSI circuit design and layout of a high performance processor chip.

IBM Thomas J. Watson Research Center,**Communication Circuits Group**

Summer 1992

Summer Intern

Designed a low-latency phase recovery circuit that uses transition detection to accelerate initial tracking.

Skills

Programming Languages: HSPICE, MATLAB, C, Verilog HDL, Skill, Scheme/Lisp
CAD: Cadence, Mentor Graphics, LINPAR

Grants

Texas Instruments, Inc., "Optical Energy Harvesting and Conversion," \$60,000, 2013-Present, **PI: R. Amirtharajah**

Agilent, Inc., "Dielectric Relaxation Spectroscopy Viable Yeast Sensor for Food and Biofuel Processing", \$43,149, 2014-Present, PI: A. Knoesen, Co-PIs: **R. Amirtharajah**, R. Boulton

UC Davis Center for Excellence in Teaching and Learning Undergraduate Instructional Improvement Program (UIIP), "Renewable Energy and Green Engineering Laboratory Projects for ENG 6: Engineering Problem Solving," \$4,800, 2011-Present, **PI: R. Amirtharajah**

Rodgers Family Foundation, "T. J. Rodgers Graduate Fellowships in Electrical and Computer Engineering," \$240,000, 2010-Present, PI: A. Knoesen, Co-PIs: **R. Amirtharajah**, D. Block, R. Boulton

Texas Instruments, Inc., "Integrated Solar Energy Harvesting," \$60,000, 2012-2013, **PI: R. Amirtharajah**

The MathWorks, Inc., “Renewable Energy and Green Engineering Laboratory Projects for ENG 6: Engineering Problem Solving,” \$39,919, 2011-2013, **PI: R. Amirtharajah**, Co-PIs: R. Boulton, A. Knoesen, A. Scaglione

National Science Foundation GOALI Supplement to Award #0547113, “Energy Scalable Signal Processing for Energy Harvesting Microsystems,” \$25,000, 2011-2012, **PI: R. Amirtharajah**

National Science Foundation CAREER Award #0547113, “Energy Scalable Signal Processing for Energy Harvesting Microsystems,” \$400,000, 2006-2011, **PI: R. Amirtharajah**

Agilent Technologies Foundation, “Low Power Sigma Delta Narrowband and Wideband Digital Signal Processing on FPGAs,” \$25,000, 2009-2010, **PI: R. Amirtharajah**

Intel, “The Capstone of the Curriculum: Improving Senior Design Projects at UC Davis ECE Department,” \$30,000, 2010, PI: S. Ghiasi, Co-PIs: **R. Amirtharajah**, A. Knoesen, S. Lewis

Focus Center Research Program Interconnect Focus Center, “Modulated Low Power Interconnect for Energy Harvesting Sensors; Circuits and Architectures for Exploiting Silicon Nanowire Interconnect,” \$332,513, 2005-2009, **PI: R. Amirtharajah**

UC Center for Information Technology Research in the Interest of Society (CITRIS), “Energy Harvesting for Biomedical Devices and Health Care Intelligent Infrastructure,” \$75,000, 2007-2009, **PI: R. Amirtharajah**, Co-PIs: P. Wright, J. Stewart

UC Center for Information Technology Research in the Interest of Society (CITRIS), “Ultra-high Performance Low Power, and Ubiquitous Data Centers on a Chip,” \$75,000, 2007-2009, PI: S.-J. . Yoo, Co-PIs: V. Akella, **R. Amirtharajah**, B. Baas, V. Carey, S. Ghiasi, S. Islam, J. Brunberg

Nokia, “Repurposing Mobile Phones for Surveillance Applications,” \$9,000, 2007-2008, PI: F. Chong, Co-PIs: V. Akella, **R. Amirtharajah**

Xilinx University Program, “Energy Scalable Distributed Arithmetic on FPGAs,” \$10,000 (software + equipment), 2004, **PI: R. Amirtharajah**

University of California, Davis - New Faculty Research Grant, “Energy Scalable Reconfigurable Logic for Energy Scavenging Microsystems,” \$2,500, 2004-2005, **PI: R. Amirtharajah**

Journal Publications

F. Maker, R. Amirtharajah, and V. Akella, “Runtime Adaptation of Applications Using Design of Experiments: A Smartphone-Based Case Study,” *IEEE Embedded Systems Letters*, Vol. 6, Number 2, June 2014, pp. 25-8.

T. Zink, F. Maker, R. Geyer, R. Amirtharajah, and V. Akella, “Comparative Life Cycle Assessment of Smartphone Reuse: Repurposing vs. Refurbishment,” *International Journal of Life Cycle Assessment*, Vol. 19, Number 5, May 2014, pp. 1099-1109.

K. Shaik, T. Kleeburg, and R. Amirtharajah, “Ultralow-Power Optical CDR for Integrated Photovoltaic Energy-Harvesting Sensors,” *IEEE Transactions on Circuits and Systems - II: Express Briefs*, Vol. 60, No. 12, Dec. 2013, pp. 832-6.

F. Maker, R. Amirtharajah, and V. Akella, “MELOADES: Methodology for Long-Term Online Adaptation Embedded Software for Heterogeneous Devices,” *Journal of Systems Architecture*, Vol. 59, Issue 8, September 2013, pp. 643-55.

E. Fong, N. Guilar, T. Kleeburg, H. Pham, D. Yankelevich, and R. Amirtharajah, “Integrated Energy-Harvesting Photodiodes With Diffractive Storage Capacitance,” *IEEE Transactions on VLSI Systems*, Vol. 21, No. 3, March 2013, pp. 486-97.

J. Wenck, J. Collier, J. Siebert, and R. Amirtharajah, “Scaling Self-Timed Systems Powered by Mechanical Vibration Energy Harvesting,” *ACM Journal of Emerging Technologies in*

Computing Systems, Vol. 6, No. 2, Article 5, June 2010, pp. 5:1-24.

L. Zhou, S. Djordjevic, R. Proietti, D. Ding, S. Yoo, R. Amirtharajah, and V. Akella, "Design and Evaluation of an Arbitration-Free Passive Optical Crossbar for On-Chip Interconnection Networks," *Applied Physics A*, Vol. 95, No. 4, June 2009, pp. 1111-8.

N. Guilar, A. Chen, T. Kleeburg, D. Yankelevich, and R. Amirtharajah, "Integrated Solar Energy Harvesting and Storage," *IEEE Transactions on VLSI Systems*, Vol. 17, No. 5, May 2009, pp. 627-37.

N. Guilar, R. Amirtharajah and P. Hurst, "A Full-Wave Rectifier With Integrated Peak Selection for Multiple Electrode Piezoelectric Energy Harvesters," *IEEE Journal of Solid-State Circuits*, Vol. 44, No. 1, Jan. 2009, pp. 240-6.

R. Amirtharajah, A. Chen, J. Loo and N. Guilar, "Nanomaterial Resistive Sensors: Noise, Power, and Circuit Interfaces," *International Journal of Nanotechnology*, Vol. 5, Nos. 4/5, 2008, pp. 497-518.

J. Oliver, R. Amirtharajah, V. Akella, R. Geyer, and F. Chong, "Life Cycle Aware Computing: Reusing Silicon Technology," *IEEE Computer*, Vol. 40, No. 12, Dec. 2007, pp. 56-61.

R. Rao, J. Wenck, D. Franklin, R. Amirtharajah, and V. Akella, "Exploiting Non-Uniform Memory Access Patterns Through Bitline Segmentation," *ACM SIGMICRO Newsletter*, Vol. 24, No. 1, 2006, [online], available: http://sigmicro-online.org/papers24_1/6.pdf.

R. Amirtharajah, J. Collier, J. Siebert, B. Zhou and, A. Chandrakasan, "DSPs for Energy Harvesting Sensors: Applications and Architectures," *IEEE Pervasive Computing Magazine*, Vol. 4, Issue 3, July-Sep. 2005, pp. 72-9.

D. D. Thaker, R. Amirtharajah, F. Impens, I. L. Chuang and, F. T. Chong, "Recursive TMR: Scaling Fault Tolerance in the Nanoscale Era," *IEEE Design & Test of Computers*, Vol. 22, Issue 4, July-Aug. 2005, pp. 298-305.

R. Amirtharajah and A. Chandrakasan, "A Micropower Programmable DSP Using Approximate Signal Processing Based on Distributed Arithmetic," *IEEE Journal of Solid-State Circuits*, Vol. 39, No. 2, Feb. 2004, pp. 337-47.

J. R. Benham, R. Amirtharajah, J. Critchlow, T. Simon, and T. F. Knight, Jr., "An Alignment Insensitive Separable Electromagnetic Coupler for High Speed Digital Multidrop Bus Applications," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 51, No. 12, Dec. 2003, pp. 2597-2603.

S. Meninger, J.-O. Mur-Miranda, R. Amirtharajah, A. Chandrakasan, and J. Lang, "Vibration-to-Electric Energy Conversion," *IEEE Transactions on VLSI Systems*, Vol. 9, No. 1, Feb. 2001, pp. 64-76.

A. Dancy, R. Amirtharajah, and A. Chandrakasan, "High-Efficiency Multiple-Output DC-DC Conversion for Low-Voltage Systems," *IEEE Transactions on VLSI Systems*, Vol. 8, No. 3, June 2000, pp. 252-63.

R. Amirtharajah and A. Chandrakasan, "Self-Powered Signal Processing Using Vibration-Based Power Generation," *IEEE Journal of Solid-State Circuits*, Vol. 33, No. 5, May 1998, pp. 687-695.

Conferences

H. Zhang, R. Amirtharajah, C. Nitta, M. Farrens, and V. Akella, "Burst Mode Processing: An Architectural Framework for Improving Performance in Future Chip Multiprocessors," *ACM Workshop on Managing Overprovisioned Systems (W-MOS 2014) at 19th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2014)*, 1 March 2014.

S. Hsu, E. Fong, V. Jain, T. Kleeburg, and R. Amirtharajah, "Switched-Capacitor Boost

- Converter Design and Modeling for Indoor Optical Energy Harvesting with Integrated Photodiodes,” *ACM/IEEE 2013 International Symposium on Low Power Electronics and Design (ISLPED 2013)*, September 2013, pp. 169-74.
- F. Maker, R. Amirtharajah, and V. Akella, “Update Rate Tradeoffs for Improving Online Power Modeling in Smartphones,” *ACM/IEEE 2013 International Symposium on Low Power Electronics and Design (ISLPED 2013)*, September 2013, pp. 114-9.
- C. Freed, R. Amirtharajah, R. Boulton, D. Block, C. Brenneman, and A. Knoesen, “Inline Dielectric Sensor for Real-Time Monitoring of Yeast Growth in White Wine Fermentation,” *64th American Society for Enology and Viticulture (ASEV) National Conference*, 24-28 June 2013.
- N. Shrake, R. Amirtharajah, R. Boulton, C. Brenneman, and A. Knoesen, “Inline Multi-spectral Colorimeter for Real-Time Color and Total Phenolic Analysis During Red Wine Fermentations,” *64th American Society for Enology and Viticulture (ASEV) National Conference*, 24-28 June 2013.
- S. Hsu, R. Amirtharajah, and A. Knoesen, “Lab and Team Project Development for Engineering Problem Solving using MATLAB, with Emphasis on Solar Power and Engineering for Sustainability,” *120th ASEE Annual Conference and Exposition (ASEE 2013)*, 23-26 June 2013, pp. 1-14.
- M. Scott and R. Amirtharajah, “Pulse Width Modulation for Reduced Peak Power Full-Swing On-Chip Interconnect,” *ACM/IEEE 2009 International Symposium on Low Power Electronics and Design (ISLPED 2009)*, 19-21 August 2009, pp. 213-8.
- R. Amirtharajah, J. Wenck, and N. Guilar “Energy Harvesting and Limits of Low Power Mixed-Signal Circuit Design,” *IEEE 2009 International Symposium on Circuits and Systems (ISCAS 2009)*, 24-29 May 2009, pp. 1425-8.
- N. Guilar, R. Amirtharajah, P. Hurst, and S. Lewis, “An Energy-Aware Multiple-Input Power Supply with Charge Recovery for Energy Harvesting Applications,” *2009 IEEE Int’l. Solid-State Circuits Conference Digest of Technical Papers (ISSCC 2009)*, 8-12 Feb. 2009, pp. 298-9, 299a.
- S. Yoo, V. Akella, R. Amirtharajah, B. Baas, K. Bergman, S. Fan, J. Harris, M. Lipson, D. Miller, and J. Shalf, “Balanced Computing with Nanophotonic Interconnects,” *21st Annual Meeting of the IEEE Lasers and Electro-Optics Society (LEOS 2008)*, 9-13 Nov. 2008, pp. 368-9.
- A. Hadke, T. Benavides, R. Amirtharajah, M. Farrens, and V. Akella, “Design and Evaluation of an Optical CPU-DRAM Interconnect,” *2008 IEEE Int’l. Conference on Computer Design (ICCD 08)*, 12-5 Oct. 2008, pp. 492-7.
- A. Hadke, T. Benavides, S. Yoo, R. Amirtharajah, and V. Akella, “OCDIMM: Scaling the DRAM Memory Wall Using WDM Based Optical Interconnects,” *16th IEEE Symposium on High Performance Interconnects (HOTI 08)*, 26-8 Aug. 2008, pp. 57-63.
- N. Guilar, E. Fong, T. Kleeburg, D. Yankelevich, and R. Amirtharajah, “Energy Harvesting Photodiodes with Integrated 2D Diffractive Storage Capacitance,” *ACM/IEEE 2008 International Symposium on Low Power Electronics and Design (ISLPED 2008)*, 11-3 Aug. 2008, pp. 63-8.
- J. Oliver, R. Amirtharajah, V. Akella, and F. Chong, “Credit-Based Dynamic Reliability Management Using Online Wearout Detection,” *Proceedings of the 5th ACM Conference on Computing Frontiers (CF ’08)*, 5-7 May 2008, pp. 139-47.
- N. Guilar, P. Hurst, R. Amirtharajah, D. Margolis, and D. Horsley, “Interface Circuits for Multiphase Piezoelectric Energy Harvesters,” *23rd Annual IEEE Applied Power Electronics Conference and Exposition (APEC 08)*, 24-8 Feb. 2008, pp. 639-44.

- N. Guilar, R. Amirtharajah, and P. Hurst, "A Full-Wave Rectifier for Interfacing with Multi-Phase Piezoelectric Energy Harvesters," *2008 IEEE Int'l. Solid-State Circuits Conference Digest of Technical Papers (ISSCC 2008)*, 3-7 Feb. 2008, pp. 302-3, 615.
- R. Geyer, J. Oliver, R. Amirtharajah, V. Akella, and F. T. Chong, "Microchip Reuse: Environmental Rationale and Design Implications," *3rd International Conference on Life Cycle Management (LCM 2007)*, 27-29 August 2007.
- J. Wenck, J. Collier, J. Siebert, and R. Amirtharajah, "AC Power Supply Circuits for Energy Harvesting," *2007 Symposium on VLSI Circuits (VLSI 2007)*, 14-16 June 2007, pp. 92-3.
- N. Guilar, P. Hurst, and R. Amirtharajah, "Analysis of DC-DC Conversion for Energy Harvesting Systems Using a Mixed-Signal Sliding-Mode Controller," *38th IEEE Power Electronics Specialists Conference (PESC 07)*, 17-21 June 2007, pp. 2620-5.
- L. Guo, M. Scott, and R. Amirtharajah, "An Energy Scalable Functional Unit for Sensor Signal Processing," *IEEE 2007 International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 15-20 April 2007, Vol. II, pp. 73-6.
- R. Rao, J. Wenck, D. Franklin, R. Amirtharajah, and V. Akella, "Segmented Bitline Cache: Exploiting Non-Uniform Memory Access Patterns," *13th IEEE International Conference on High Performance Computing (HiPC 2006)*, 18-21 December 2006, pp. 123-34.
- J. Oliver, R. Amirtharajah, R. Geyer and F. T. Chong, "Life-Cycle Aware Computer Architecture: Reusing Silicon in the Technology Food Chain," *ACM 12th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2006) Wild and Crazy Ideas (WACI-4)*, 24-26 October 2006.
- N. Guilar, A. Chen, T. Kleeburg, and R. Amirtharajah, "Integrated Solar Energy Harvesting and Storage," *ACM/IEEE 2006 International Symposium on Low Power Electronics and Design (ISLPED 2006)*, 4-6 October 2006, pp. 20-4.
- L. Guo, M. Scott, and R. Amirtharajah, "An Energy Scalable Computational Array for Sensor Signal Processing," *IEEE 2006 Custom Integrated Circuits Conference (CICC)*, 10-13 September 2006, pp. 317-20.
- R. Amirtharajah, J. Collier, J. Siebert, J. Wenck, and B. Zhou, "Circuits for Energy Harvesting Sensor Signal Processing" (invited) *2006 43rd ACM/IEEE Design Automation Conference*, 24-28 July 2006, pp. 639-44.
- R. Amirtharajah, "An Energy Scalable Computational Array for Sensor Signal Processing" (invited) *2006 ISSCC Special Topic Session on Power-Aware Signal Processing*, 5 February 2006.
- R. Rao, J. Wenck, D. Franklin, R. Amirtharajah, and V. Akella, "Exploiting Non-Uniform Memory Access Patterns Through Bitline Segmentation," *4th Workshop on Memory Performance Issues (WMPI-2006)*, 11 February, 2006.
- R. Amirtharajah, A. Chen, D. Thaker, and F. T. Chong, "Circuit Interfaces and Optimization for Resistive Nanosensors," (invited) *Proc. of SPIE, Vol. 6008: Nanosensing: Materials and Devices II*, 23-26 October 2005, pp. 60080J1-15.
- J. Siebert, J. Collier, and R. Amirtharajah, "Self-Timed Circuits for Energy Harvesting AC Power Supplies," *ACM/IEEE 2005 International Symposium on Low Power Electronics and Design (ISLPED 2005)*, August 2005, pp. 315-8.
- R. Amirtharajah, "Micropower ICs for Energy Scavenging and Sensor Signal Processing," (invited) *IEEE 2005 Vail Computer Elements Workshop*, 26-29 June 2005.
- D. D. Thaker, A. Chen, R. Amirtharajah, and F. T. Chong, "On Designing Self-Calibrating Nanoscale Sensors that Adaptively Invest Power for Accuracy," *Proc. of IEEE International Workshop on Design and Test of Defect-Tolerant Nanoscale Architectures (NANOARCH'05)*, May 2005, pp. 4.9-4.17.

D. D. Thaker, F. Impens, I. L. Chuang, R. Amirtharajah, and F. T. Chong, "On Using Recursive TMR as a Soft Error Mitigation Technique," *2005 Workshop on the System Effects of Logic Soft Errors (SELSE-1)*, 5-6 April 2005.

J. R. Benham, R. Amirtharajah, J. Critchlow, T. Simon, and T. F. Knight, Jr., "An Alignment Insensitive Separable Electromagnetic Coupler for High Speed Digital Multidrop Bus Applications," *2003 International Microwave Symposium*, 8-13 June 2003, vol. 2, pp. 1163-6.

T. Simon, R. Amirtharajah, J.R. Benham, J. Critchlow, and T.F. Knight, Jr., "A 1.6 Gb/s/pair Electromagnetically Coupled Multidrop Bus Using Modulated Signaling," *2003 ISSCC Digest of Technical Papers*, Feb. 2003, pp. 184-5, 487.

R. Amirtharajah, S. Meninger, J.-O. Mur-Miranda, A. Chandrakasan, and J. Lang, "A Micropower Programmable DSP Powered Using a MEMS-Based Vibration-to-Electric Energy Converter," *2000 ISSCC Digest of Technical Papers*, 2000, pp. 362-3, 469.

R. Amirtharajah, T. Xanthopoulos, and A. Chandrakasan, "Power Scalable Processing Using Distributed Arithmetic," *1999 International Symposium on Low Power Electronics and Design*, 1999, pp. 170-5.

S. Meninger, J.-O. Mur-Miranda, R. Amirtharajah, A. Chandrakasan, and J. Lang, "Vibration-to-Electric Energy Conversion," *1999 International Symposium on Low Power Electronics and Design*, 1999, pp. 48-53.

A. Chandrakasan, R. Amirtharajah, S.-H. Cho, J. Goodman, G. Konduri, J. Kulik, W. Rabiner, and A. Wang, "Design Considerations for Distributed Microsensor Systems," *1999 Proceedings of the IEEE Custom Integrated Circuits Conference*, 1999, pp. 279-86.

A. Chandrakasan, R. Amirtharajah, J. Goodman, and W. Rabiner, "Trends in Low Power Digital Signal Processing," *1998 International Symposium on Circuits and Systems*, Vol. 4, 1998, pp. 604-7.

R. Amirtharajah and A. Chandrakasan, "Self-Powered Low Power Signal Processing," *1997 Symposium on VLSI Circuits Digest of Technical Papers*, June 1997, pp. 25-26.

M. Bolotski, T. Simon, C. Vieri, R. Amirtharajah, and T.F. Knight, Jr., "Abacus: A 1024 Processor 8 ns SIMD Array," *Proc. Sixteenth Conference on Advanced Research in VLSI*, March 1995, pp. 28-40.

M. Bolotski, et al., "Abacus: A High-Performance Architecture for Vision," *Proc. of ICPR*, 1994.

Textbooks

A. Knoesen and R. Amirtharajah, (2014) *Programming in MATLAB*. Zyante, Inc. [Online] Available: <http://matlab.zyante.com>.

Book Chapters

R. Amirtharajah, "Distributed Arithmetic," in *Reconfigurable Computing: The Theory and Practice of FPGA-Based Computation*, S. Hauck and A. DeHon, eds., Morgan Kaufman, Burlington, MA, 2008.

A. Chandrakasan, R. Amirtharajah, A. Dancy, J. Goodman, W. Rabiner, and T. Xanthopoulos, "Future Directions in Energy Efficient Computing," in *Low-Power, High-Speed VLSI Circuits and Technology*, Realize, Inc., Japan, 1998.

Patents

T. Simon, R. Amirtharajah, N. Marketkar, T. F. Knight, Jr., and J. R. Benham, "Symbol-Based Signaling Device for an Electromagnetically-Coupled Bus System," U.S. Patent No. 8,204,138, (2012).

T. Simon, R. Amirtharajah, J. R. Benham, and J. Critchlow, "Electromagnetic Coupler Registration and Mating," U.S. Patent No. 7,815,451, (2010).

T. Simon, R. Amirtharajah, and J. R. Benham, "Controlling Coupling Strength in Electromagnetic Bus Coupling," U.S. Patent No. 7,649,429, (2010).

T. Simon, R. Amirtharajah, and J. R. Benham, "Controlling Coupling Strength in Electromagnetic Bus Coupling," U.S. Patent No. 7,411,470, (2008).

T. Simon, R. Amirtharajah, J. R. Benham, and J. Critchlow, "Electromagnetic Coupler Registration and Mating," U.S. Patent No. 7,252,537, (2007).

R. Amirtharajah, T. Simon, J. R. Benham, J. Critchlow, and M. Naylor, "Interconnecting of Digital Devices," U.S. Patent No. 7,199,681, (2007).

T. Simon, R. Amirtharajah, and J. R. Benham, "Bus Signaling Through Electromagnetic Couplers Having Different Coupling Strengths at Different Locations," U.S. Patent No. 7,126,437, (2006).

T. Simon, R. Amirtharajah, and J. R. Benham, "Controlling Coupling Strength in Electromagnetic Bus Coupling," U.S. Patent No. 7,088,198, (2006).

T. Simon, R. Amirtharajah, T. F. Knight, Jr., N. Marketkar, and J. R. Benham, "Electromagnetically Coupled Bus System," U.S. Patent No. 7,080,186 (2006).

T. Simon, R. Amirtharajah, N. Marketkar, and T. F. Knight, Jr., "Symbol-Based Signaling Device for an Electromagnetically-Coupled Bus System," U.S. Patent No. 7,075,996, (2006).

T. Simon and R. Amirtharajah, "Calibrating Return Time With Cross-Coupled Arbitrator/Delay Circuits to Compare Clock Signals," U.S. Patent No. 7,039,824, (2006).

N. Marketkar, T. F. Knight, Jr., J. R. Benham and R. Amirtharajah, "Electromagnetic Coupler Flexible Circuit With a Curved Coupling Portion," U.S. Patent No. 6,987,428, (2006).

T. Simon, R. Amirtharajah, J. R. Benham, and J. Critchlow, "Electromagnetic Coupler Registration and Mating," U.S. Patent No. 6,887,095 (2005).

T. Simon and R. Amirtharajah, "Selectively Combining Signals to Produce Desired Output Signal," U.S. Patent No. 6,812,761 (2004).

J. R. Benham and R. Amirtharajah, "Digital Network," U.S. Patent No. 6,788,163, (2004).

T. Simon and R. Amirtharajah, "Calibrating Return Time for Resynchronizing Data Demodulated From a Master Slave Bus," U.S. Patent No. 6,779,123, (2004).

T. Simon, R. Amirtharajah, N. Marketkar, T. F. Knight, Jr., and J. R. Benham, "Symbol-Based Signaling for an Electromagnetically-Coupled Bus System," U.S. Patent No. 6,697,420, (2004).

T. Simon and R. Amirtharajah, "Generating and Using Calibration Information," U.S. Patent No. 6,665,624, (2003).

T. Simon and R. Amirtharajah, "Selectively Combining Signals to Produce Desired Output Signal," U.S. Patent No. 6,661,269 (2003).

T. Simon, R. Amirtharajah, T. F. Knight, Jr., N. Marketkar, and J. R. Benham, "Electromagnetically Coupled Bus System," U.S. Patent No. 6,625,682 (2003).

N. Marketkar, J. R. Benham, T. F. Knight, Jr., and R. Amirtharajah, "An Electromagnetic Coupler Circuit Board Having at Least One Angled Conductive Trace," U.S. Patent No. 6,611,181 (2003).

J. R. Benham, N. Marketkar, and R. Amirtharajah, "An Electromagnetic Coupler," U.S. Patent No. 6,573,801 (2003).

T. Simon and R. Amirtharajah, "Clock Reshaping," U.S. Patent No. 6,498,512 (2002).

Talks

- R. Amirtharajah, "Low Power Design and the Internet of Things," Invited Seminar, Intel, June 18, 2014 (Folsom, CA).
- R. Amirtharajah, "Energy Harvesting and Power Management Research," Invited Seminar, Redpine Signals, May 23, 2014 (San Jose, CA).
- R. Amirtharajah, "Integrated Systems for Extreme Environments," Invited Seminar, Workshop on Electronics for Harsh Environments, May 5, 2014 (Davis, CA).
- R. Amirtharajah, "A New Life for Mobile Phones," TED Talk, TEDxUCDavis, May 4, 2014 (Davis, CA).
- R. Amirtharajah, "Microwatt Energy Scalable Reconfigurable Arrays for Sensor Signal Processing," Invited Seminar, Altera, April 30, 2014 (San Jose, CA).
- R. Amirtharajah, "Opportunities and Challenges for Energy Harvesting in Wearable and Embedded Systems," Google Tech Talk, Google X, July 10, 2013 (Mountain View, CA).
- R. Amirtharajah, "Microwatt Power Electronics for Energy Harvesting Wireless Sensors," Invited Seminar, Power and Energy Systems Program Review, Office of Naval Research (ONR), November 8, 2012 (San Diego, CA).
- R. Amirtharajah, "III-Nitride Integrated Systems Technologies," Invited Seminar, Workshop on Integrated Systems Enabled by Nanoengineered Group-III Nitrides, February 9, 2012 (Davis, CA).
- R. Amirtharajah, "Energy Harvesting for Implantable Devices," Invited Seminar, Konica Minolta/CITRIS, October 7, 2011 (Berkeley, CA).
- R. Amirtharajah, "Power Management and Energy Harvesting for Mobile Devices," Google Tech Talk, Google, July 25, 2011 (Mountain View, CA).
- R. Amirtharajah, "Blending Wireless Technology with Winemaking," Invited Seminar, BWRC Wireless Sensor Workshop, Berkeley Wireless Research Center, Univ. of California, Berkeley, June 8, 2011 (Berkeley, CA).
- R. Amirtharajah, "Near and Long Term Challenges and Solutions for Low Power Energy Scavenging Applications," Invited Seminar, ST Microelectronics, February 9, 2010 (Greater Noida, India).
- R. Amirtharajah, "Microwatt Design for Energy Harvesting Wireless Sensors," Invited Seminar, IEEE Circuits and Systems Society (Silicon Valley Chapter), January 26, 2009 (San Jose, CA).
- R. Amirtharajah, "Opportunities and Challenges in Ultra Low Voltage CMOS," Invited Seminar, DSM Solutions, Inc., January 23, 2009 (Los Gatos, CA).
- R. Amirtharajah, "Microwatt Design for Energy Harvesting Wireless Sensors," Invited Seminar, Intel, December 12, 2008 (Hillsboro, OR).
- R. Amirtharajah, "Microwatt Design for Energy Harvesting Wireless Sensors," Invited Seminar, Bosch Palo Alto Research Center, September 18, 2008 (Palo Alto, CA).
- R. Amirtharajah, "Micropower Integrated Circuits for Energy Harvesting Wireless Sensors," Berkeley Wireless Research Center Seminar, Univ. of California, Berkeley, November 15, 2007 (Berkeley, CA).
- R. Amirtharajah, "An Energy Scalable Computational Array for Energy Harvesting Sensor Signal Processing," Invited Seminar, Univ. of Albany, October 31, 2007 (Albany, NY).
- R. Amirtharajah, "Micropower Integrated Circuits for Energy Harvesting Wireless Sensors," MIT Microsystems Technology Lab VLSI Seminar, MIT, October 30, 2007 (Cambridge, MA).

R. Amirtharajah, "Energy Harvesting for Wireless Sensors," Stanford EE Computer Systems Colloquium (EE 380), Stanford University, May 30, 2007 (Palo Alto, CA).

R. Amirtharajah, "Energy Harvesting for Wireless Sensors," Spring Quarter 2007 Seminar Series (MAE 297), Dept. of Mechanical and Aeronautical Engineering, Univ. of California, Davis, April 26, 2007 (Davis, CA).

R. Amirtharajah, "Microwatt Sensor Interfaces for Energy Harvesting Systems," Invited Seminar, S3C Corp., May 2, 2006 (Santa Clara, CA).

R. Amirtharajah, "Power Supplies for Energy Harvesting Sensors," Invited Seminar, National Semiconductor, August 16, 2005 (Grass Valley, CA).

R. Amirtharajah, "Micropower ICs for Energy Scavenging and Sensor Signal Processing," Invited Talk, Berkeley Manufacturing Institute, June 13, 2005 (Berkeley, CA).

R. Amirtharajah, "Energy Scalable Low Power DSP for Energy Harvesting Sensor Applications," Electrical Engineering Seminar, University of California, Los Angeles, September 9, 2004 (Los Angeles, CA).

R. Amirtharajah, "Energy Scalable Low Power DSP for Energy Harvesting Sensor Applications," Computer Science Seminar, California Institute of Technology, September 7, 2004 (Pasadena, CA).

R. Amirtharajah, "Energy Scalable Signal Processing for Energy Harvesting Sensors," Invited Seminar, Xilinx, Inc., June 22, 2004 (San Jose, CA).

R. Amirtharajah, "Energy Scalable Signal Processing for Energy Harvesting Sensors," BWRC Seminar, Berkeley Wireless Research Center, University of California, Berkeley, May 7, 2004 (Berkeley, CA).

R. Amirtharajah, "Energy Scalable Signal Processing for Energy Harvesting Sensors," Pico-Radio Meeting Talk, Berkeley Wireless Research Center, University of California, Berkeley, April 9, 2004 (Berkeley, CA).

R. Amirtharajah, "Ultra Low Power DSP for Energy Harvesting Applications," Invited Seminar, Dust, Inc., March 11, 2004 (Berkeley, CA).

R. Amirtharajah, "A 1.6 Gb/s/pair Electromagnetically Coupled Multidrop Bus Using Pulse-Based Modulated Signaling," 6.976 Invited Guest Lecture, Massachusetts Institute of Technology, May 9, 2003 (Cambridge, MA).

R. Amirtharajah, "Micropower Energy Scalable DSP Systems Powered From Vibration-to-Electric Energy Conversion," Invited Seminar, Brown University, Nov. 20, 2002 (Providence, RI).

Professional

IEEE Solid-State Circuits Society

IEEE Computer Society

IEEE Microwave Theory and Techniques Society

Sigma Xi, The Scientific Research Society

American Association for the Advancement of Science

Book Proposal Reviewer for Cambridge University Press

Book Proposal Reviewer for John Wiley and Sons, Inc.

Book Reviewer for NTS Press

Paper Reviewer for IEEE *Journal of Solid-State Circuits*

Paper Reviewer for IEEE *Communications Magazine*

Paper Reviewer for IEEE *Transactions on Computer-Aided Design*
Paper Reviewer for IEEE *Transactions on Power Electronics*
Paper Reviewer for IEEE *Sensors Journal*
Paper Reviewer for IEEE *Transactions on Very Large Scale Integration (VLSI) Systems*
Paper Reviewer for IEEE *Transactions on Circuits and Systems II*
Paper Reviewer for IEEE *Transactions on Industrial Electronics*
Paper Reviewer for IEEE *Transactions on Mobile Computing*
Paper Reviewer for ACM *Transactions on Architecture and Code Optimization*
Paper Reviewer for ACM *Transactions on Embedded Computing Systems*
Paper Reviewer for ACM *Journal on Emerging Technologies in Computing Systems*
Paper Reviewer for *Pervasive and Mobile Computing*
Reviewer for 12th IEEE International Symposium on High-Performance Computer Architecture (HPCA-12), 2006
Reviewer for 17th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA 2005)
Technical Program Committee for 2004 Great Lakes Symposium on VLSI
Technical Program Committee for International Solid-State Circuits Conference (ISSCC), 2005-2009
Technical Program Committee for Hot Chips Conference, 2006 (Member) and 2007 (Co-Chair)
Technical Program Committee for International Symposium on Low Power Electronics and Design (ISLPED), 2012
Technical Program Committee for Custom Integrated Circuits Conference (CICC), 2007-2014 (Member), Power Electronics Subcommittee Chair, 2011-2013

Awards & Honors National Science Foundation Graduate Fellowship 1994-1997
National Science Foundation CAREER Award 2006-2011
Lockheed-Martin Teaching Award for Assistant Professor 2008
Electrical and Computer Engineering Graduate Student Association Award for Graduate Teaching and Mentorship 2010

References Available upon request.