

JOHN LACH

Professor and Chair

Charles L. Brown Department of Electrical and Computer Engineering
University of Virginia

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EDUCATION

Stanford University

Science, Technology, and Society

BS 1996

UCLA

Electrical Engineering

MS 1998, Ph.D 2000

APPOINTMENTS

Charles L. Brown Department of Electrical and Computer Engineering

University of Virginia

- Professor and Chair (August 2012-present)
- Associate Director for Translational Research, NSF Nanosystems Engineering Research Center for Advanced Self-Powered Systems of Integrated Sensors and Technologies (ASSIST) (2012-present)
- Co-founder and Co-director, UVA Center for Wireless Health (2009-present)
- Associate Professor (August 2006-August 2012)
- Assistant Professor (August 2000-August 2006)

RESEARCH INTERESTS

Embedded and cyber-physical systems, wireless and mobile health, body sensor networks, integrated circuit design methodologies, fault and defect tolerance, safety-critical system design and analysis, application-specific and general-purpose processor design

AWARDS

- UVA School of Engineering and Applied Science Distinguished Faculty Award – 2016
- Best Paper Award Finalist (2 papers), *IEEE Wireless Health Conference* – 2016
- Best Paper Award Finalist, *International Conference on Body Sensor Networks* – 2015
- Best Paper Award Finalist, *International Symposium on Low Power Electronics and Design* – 2015
- Best Paper Award, *International Conference on Body Area Networks* – 2014
- Best Demo Award, *IEEE Wireless Health Conference* – 2014
- Best Student Paper Award, *International Conference on Body Area Networks* – 2013
- Best Paper Award, *IEEE Wireless Health Conference* – 2011
- Best Paper Award Finalist, *IEEE Wireless Health Conference* – 2011
- Winner, *DAC/ISSCC Student Design Contest* – 2011
- Best Poster Paper Award, *Government Microcircuit Applications & Critical Technology Conference* – 2011
- Best Paper Award, *IEEE International Conference on Computer Design* – 2007
- All-University Teaching Award – 2005
- Rodman Scholars Outstanding Faculty Award – 2005
- Electrical and Computer Engineering New Faculty Teaching Award – 2003
- University of Virginia Teaching Fellow – 2001-2002
- Best Student Paper Award, *ACM Workshop on Self-Healing, Adaptive, and Self-Managed Systems* – 2002
- UCLA School of Engineering and Applied Sciences Dean's Award – 1998 and 1999

REFEREED PUBLICATIONS (153 REFEREED PAPERS, H-INDEX = 32)

Journals

- J1. J. Lach, W.H. Mangione-Smith, M. Potkonjak, "Low Overhead Fault-Tolerant FPGA Systems," *IEEE Transactions on VLSI Systems*, 6(2):212-21, June 1998

- J2. J. Lach, W.H. Mangione-Smith, M. Potkonjak, "Enhanced FPGA Reliability Through Efficient Runtime Fault Recovery," *IEEE Transactions on Reliability*, 49(3):296-304, September 2000
- J3. A.B. Kahng, J. Lach, W.H. Mangione-Smith, S. Mantik, I.L. Markov, M. Potkonjak, P. Tucker, H. Wang, G. Wolfe, "Constraint-Based Watermarking Techniques for Design IP Protection," *IEEE Transactions on Computer-Aided Design*, 20(10):1236-52, October 2001
- J4. J. Lach, W.H. Mangione-Smith, M. Potkonjak, "Fingerprinting Techniques for Field Programmable Gate Array Intellectual Property Protection," *IEEE Transactions on Computer-Aided Design*, 20(10):1253-61, October 2001
- J5. Z. Lu, J. Lach, M. Stan, K. Skadron, "Alloyed Branch History: Combining Global and Local Branch History for Robust Performance," *International Journal of Parallel Programming*, 31(2):137-77, April 2003
- J6. M. Stan, P.D. Franzone, S.C. Goldstein, J. Lach, M. Ziegler, "Molecular Electronics: From Devices and Interconnect to Circuits and Architecture," *Proceedings of the IEEE*, 91(11):1940-57, November 2003
- J7. Z. Lu, J. Lach, M. Stan, K. Skadron, "Improved Thermal Management with Reliability Banking," *IEEE Micro*, special issue on Reliability-Aware Microarchitectures, 40-9, November/December 2005
- J8. V. Vijay Kumar, J. Lach, "Highly Flexible Multi-Mode Digital Signal Processing Systems Using Adaptable Components and Controllers," *EURASIP Journal on Applied Signal Processing*, Article ID 79595, 9 pages, 2006
- J9. Z. Lu, W. Huang, M. Stan, K. Skadron, J. Lach, "Interconnect Lifetime Prediction for Reliability-Aware Systems," *IEEE Transactions on VLSI Systems*, 15(2):159-72, February 2007
- J10. M.A. Hanson, H.C. Powell Jr., A.T. Barth, K. Ringgenberg, B.H. Calhoun, J.H. Aylor, J. Lach, "Body Area Sensor Networks: Challenges and Opportunities," *IEEE Computer*, 58-65, January 2009
- J11. H.C. Powell Jr., M.A. Hanson, J. Lach, "On-Body Inertial Sensing and Signal Processing for Clinical Assessment of Tremor," *IEEE Transactions on Biomedical Circuits and Systems*, 3(2):108-16, April 2009
- J12. J. Lach, V. Vijay Kumar, "Application Specific Product Generics," *IEEE Computer*, 64-74, August 2009
- J13. B.H. Calhoun, J. Ryan, S. Khanna, M. Putic, J. Lach, "Flexible Circuits and Architectures for Ultra Low Power," *Proceedings of the IEEE*, 98(2):267-82, February 2010
- J14. Y. Zhang, Y. Shakhsheer, A.T. Barth, H.C. Powell Jr., S.A. Ridenour, M.A. Hanson, J. Lach, B.H. Calhoun, "Energy Efficient Design for Body Sensor Nodes," *Journal of Low Power Electronics and Applications*, 1(1):109-130, 2011
- J15. B.H. Calhoun, J. Lach, J. Stankovic, D.D. Wentzloff, K. Whitehouse, A.T. Barth, J.K. Brown, Q. Li, S. Oh, N.E. Roberts, Y. Zhang, "Body Sensor Networks: A Holistic Approach from Silicon to Users," *Proceedings of the IEEE*, 100(1):91-106, January 2012
- J16. M.A. Hanson, H.C. Powell Jr., A.T. Barth, J. Lach, "Application-Focused Energy-Fidelity Scalability for Wireless Motion-Based Health Assessment," *ACM Transactions on Embedded Computing Systems*, 11(S2):1-21, August 2012
- J17. A. Bankole, M. Anderson, T. Smith-Jackson, A. Knight, K. Oh, J.S. Brantley, A.T. Barth, J. Lach, "Validation of Non-Invasive Body Sensor Network Technology in the Detection of Agitation in Dementia," *American Journal of Alzheimer's Disease & Other Dementias*, 27(5):346-354, August 2012
- J18. S. Chen, J.S. Brantley, T. Kim, S.A. Ridenour, J. Lach, "Characterising and Minimising Sources of Error in Inertial Body Sensor Networks," *International Journal of Autonomous and Adaptive Communications Systems*, 6(3):253-271, March 2013
- J19. R. Soangra, T.E. Lockhart, J. Lach, E.M. Abdel-Rahman, "Effects of Hemodialysis Therapy on Sit-to-Walk Characteristics and Dynamic Stability in ESRD Patients," *Annals of Biomedical Engineering*, 41(4):795-805, April 2013
- J20. C.M. Archer, J. Lach, S. Chen, M.F. Abel, B.C. Bennett, "Activity Classification in Users of Ankle Foot Orthoses," *Gait & Posture*, 39(1):111-7, January 2014
- J21. K. Craig, Y. Shakhsheer, S. Arrabi, S. Khanna, J. Lach, B.H. Calhoun, "A 32b 90nm Processor Implementing Panoptic DVS Achieving Energy Efficient Operation from Sub-threshold to High Performance," *IEEE Journal of Solid-State Circuits*, 49(2):545-552, February 2014
- J22. V. Misra, A. Bozkurt, B. Calhoun, T. Jackson, J. Jur, J. Lach, B. Lee, J. Muth, O. Oralkan, M. Ozturk, S. Trolier-McKinstry, D. Vashae, D. Wentzloff, Y. Zhu, "Flexible Technologies for Self-Powered Wearable Health and Environmental Sensing," *Proceedings of the IEEE*, 103(4):665-81, April 2015
- J23. S.M. Boker, T.R. Brick, J.N. Pritikin, Y. Wang, T. von Oertzen, D. Brown, J. Lach, R. Estabrook, M.D. Hunter, H.H. Maes, M.C. Neale, "Maintained Individual Data Distributed Likelihood Estimation," *Multivariate Behavioral Research*, 50(6):706-20, November 2015

- J24. J. Gong, P. Asare, Y. Qi, J. Lach, "Piecewise Linear Dynamical Model for Action Clustering from Real-World Deployments of Inertial Body Sensors," *IEEE Transactions on Affective Computing*, 7(3):231-42, April 2016
- J25. M.M. Engelhard, S.R. Dandu, S.D. Patek, J. Lach, M.D. Goldman, "Quantifying Six-Minute Walk Induced Gait Deterioration with Inertial Sensors in Multiple Sclerosis Subjects," *Gait & Posture*, 49:340-5, July 2016
- J26. J. Gong, Y. Qi, M.D. Goldman, J. Lach, "Causality Analysis of Inertial Body Sensors for Multiple Sclerosis Diagnostic Enhancement," *IEEE Journal of Biomedical and Health Informatics*, 20(5):1273-80, September 2016
- J27. S. Chen, J. Lach, B. Lo, G.-Z. Yang, "Towards Pervasive Gait Analysis with Wearable Sensors: A Systematic Review," *Journal of Biomedical and Health Informatics*, 20(6):1521-37, November 2016
- J28. M.M. Engelhard, S.D. Patek, K. Sheridan, J.C. Lach, M.D. Goldman, "Remotely Engaged: Lessons from Remote Monitoring in Multiple Sclerosis," *International Journal of Medical Informatics*, in press, 2017

Conferences

- C1. J. Lach, W.H. Mangione-Smith, M. Potkonjak, "Signature Hiding Techniques for FPGA Intellectual Property Protection," *International Conference on Computer-Aided Design*, 186-9, 1998
- C2. A.B. Kahng, J. Lach, W.H. Mangione-Smith, S. Mantik, I.L. Markov, M. Potkonjak, P. Tucker, H. Wang, G. Wolfe, "Watermarking Techniques for Intellectual Property Protection," *Design Automation Conference*, 776-81, 1998
- C3. J. Lach, W.H. Mangione-Smith, M. Potkonjak, "FPGA Fingerprinting Techniques for Protecting Intellectual Property," *Custom Integrated Circuits Conference*, 299-302, 1998
- C4. J. Lach, W.H. Mangione-Smith, M. Potkonjak, "Efficiently Supporting Fault-Tolerance on FPGAs," *International Symposium on Field Programmable Gate Arrays*, 105-15, 1998
- C5. J. Lach, W.H. Mangione-Smith, M. Potkonjak, "Fingerprinting Digital Circuits on Programmable Hardware," *International Workshop on Information Hiding*, 16-31, 1998
- C6. J. Lach, W.H. Mangione-Smith, M. Potkonjak, "Robust FPGA Intellectual Property Protection Through Multiple Small Watermarks," *Design Automation Conference*, 831-6, 1999
- C7. J. Lach, W.H. Mangione-Smith, M. Potkonjak, "Algorithms for Efficient Runtime Fault Recovery on Diverse FPGA Architectures," *International Symposium on Defect and Fault Tolerance in VLSI Systems*, 386-94, 1999
- C8. J. Lach, W.H. Mangione-Smith, M. Potkonjak, "Enhanced Intellectual Property Protection for Digital Circuits on Programmable Hardware," *International Workshop on Information Hiding*, 286-301, 1999
- C9. J. Lach, W.H. Mangione-Smith, and M. Potkonjak, "Runtime Logic and Interconnect Fault Recovery on Diverse FPGA Architectures," *International Conference on Military and Aerospace Applications of Programmable Devices and Technologies*, D3:1-8, 1999
- C10. J. Lach, W.H. Mangione-Smith, M. Potkonjak, "Efficient Error Detection, Localization, and Correction for FPGA-Based Debugging," *Design Automation Conference*, 207-12, 2000
- C11. Z. Lu, J. Hein, M. Humphrey, M. Stan, J. Lach, K. Skadron, "Control-Theoretic Dynamic Frequency and Voltage Scaling for Multimedia Workloads," *International Conference on Compilers, Architecture, and Synthesis for Embedded Systems*, 156-63, 2002
- C12. Y. Zhang, J. Lach, K. Skadron, M. Stan, "Odd/Even Bus Invert with Two-Phase Transfer for Buses with Coupling," *International Symposium on Low Power Electronics and Design*, 80-3, 2002
- C13. ¹Z. Lu, J. Hein, M. Stan, J. Lach, K. Skadron, "Control-Theoretic Dynamic Frequency and Voltage Scaling," *Workshop on Self-Healing, Adaptive and Self-Managed Systems*, 2002
- C14. J. Lach, J. Aylor, N. Merris, M. Hanson, C. Rehorn, "Wearable Gait Data Collection for Longitudinal Fall Analysis," *International Conference on Aging, Disability and Independence*, 481-9, 2003
- C15. V. Vijay Kumar, J. Lach, "Heterogeneous Redundancy for Fault and Defect Tolerance with Complexity Independent Area Overhead," *International Symposium on Defect and Fault Tolerance in VLSI Systems*, 571-8, 2003
- C16. V. Vijay Kumar, J. Lach, "Flexible Arithmetic Components for Area-Efficient Fault Tolerance," *International Conference on Military and Aerospace Programmable Logic Devices*, D7:1-6, 2003
- C17. J. Lach, D. Evans, J. McCune, J. Brandon, "Power-Efficient Adaptable Wireless Sensor Networks," *International Conference on Military and Aerospace Programmable Logic Devices*, B5:1-8, 2003

¹ Best Student Paper Award

- C18. Z. Lu, J. Lach, M. Stan, K. Skadron, "Reducing Multimedia Decode Power using Feedback Control," *International Conference on Computer Design*, 489-96, 2003
- C19. V. Vijay Kumar, J. Lach, "Designing, Scheduling, and Allocating Flexible Arithmetic Components," *International Conference on Field Programmable Logic and Applications*, 1166-9, 2003
- C20. V. Vijay Kumar, J. Lach, "Fine-Grained Self-Healing Hardware for Large-Scale Autonomic Systems," *International Workshop on Autonomic Computing Systems*, 707-12, 2003
- C21. N. Gergel, S. Craft, J. Lach, "Modeling QCA for Area Minimization in Logic Synthesis," *Great Lakes Symposium on VLSI*, 60-3, 2003
- C22. Z. Lu, W. Huang, J. Lach, M. Stan, K. Skadron, "Interconnect Lifetime Prediction Under Dynamic Stress for Reliability-Aware Design," *International Conference on Computer Aided Design*, 327-34, 2004
- C23. J. Lach, J. Brandon, K. Skadron, "A General Post-Processing Approach to Leakage Current Reduction in SRAM-based FPGAs," *International Conference on Computer Design*, 144-50, 2004
- C24. V. Vijay Kumar, R. Verma, J. Lach, J. Dugan, "A Markov Reward Model for Reliable Synchronous Dataflow System Design," *International Conference on Dependable Systems and Networks*, 817-25, 2004
- C25. ²K. Skadron, M. Stan, W. Huang, K. Sankaranarayanan, Z. Lu, J. Lach, "A Computer-Architecture Approach to Thermal Management in Computer Systems: Opportunities and Challenges," *International Conference on Thermal, Mechanical and Thermo-Mechanical Simulation and Experiments in Micro-Electronics and Micro-Systems*, 415-22, 2004
- C26. M.W. Ashburn, J. Lach, M. Sulcoski, "NETSS: A Networked Environment for Testing Suspicious Software," *Systems and Information Engineering Design Symposium*, 163-70, 2004
- C27. V. Vijay Kumar, J. Lach, "Highly Flexible Multi-Mode System Synthesis," *International Conference on Hardware/Software Co-Design and System Synthesis*, 27-32, 2005
- C28. Y. Zhang, Z. Lu, J. Lach, M. Stan, K. Skadron, "Optimal Procrastinating Voltage Scheduling for Hard Real-Time Systems," *Design Automation Conference*, 905-8, 2005
- C29. V. Vijay Kumar, J. Lach, "IC Modeling for Yield-Aware Design with Variable Defect Rates," *Annual Reliability and Maintainability Symposium*, 489-95, 2005
- C30. S. Velusamy, W. Huang, J. Lach, M. Stan, K. Skadron, "Monitoring Temperature in FPGA-based SoCs," *International Conference on Computer Design*, 634-40, 2005
- C31. J. Lach, S. Bingham, C. Elks, T. Lenhart, T. Nguyen, P. Salaun, "Accessible Formal Verification for Safety-Critical FPGA Design," *International Conference on Military and Aerospace Programmable Logic Devices*, B3, 2005
- C32. Z. Lu, J. Lach, M. Stan, K. Skadron, "Banking Chip Lifetime: Opportunities and Implementation," *Workshop on High Performance Computing Reliability Issues*, 2005
- C33. J. Lach, S. Bingham, C. Elks, T. Lenhart, T. Nguyen, P. Salaun, "Accessible Formal Verification for Safety-Critical Hardware Design," *Annual Reliability and Maintainability Symposium*, 29-32, 2006
- C34. Z. Lu, Y. Zhang, M. Stan, J. Lach, K. Skadron, "Procrastinating Voltage Scheduling with Discrete Frequency Sets," *Design Automation and Test in Europe*, 456-61, 2006
- C35. W. Wu, S. Acton, J. Lach, "Real-Time Processing of Ultrasound Images with Speckle Reducing Anisotropic Diffusion," *Asilomar Conference on Signals, Systems, and Computers*, 1458-64, 2006
- C36. H.C. Powell Jr., J. Lach, "Design of Multiple Bandpass Filters with Integer Coefficients for a Microcontroller Environment with an Emphasis on Applications in Wearable Tremor Analysis," *Asilomar Conference on Signals, Systems, and Computers*, 1865-9, 2006
- C37. M.A. Hanson, J. Lach, "Assessing Joint Time-Frequency Methods in the Detection of Dysfunctional Movement," *Asilomar Conference on Signals, Systems, and Computers*, 1870-4, 2006
- C38. Z. Lu, J. Lach, K. Skadron, M. Stan, "Design and Implementation of an Energy Efficient Multimedia Playback System," *Asilomar Conference on Signals, Systems, and Computers*, 1491-7, 2006
- C39. T. Lenhart, J. Lach, "A Formalized Verification Methodology for Soft IP Cores in Safety-Critical Applications," *International Conference on Military and Aerospace Applications of Programmable Devices and Technologies*, E6, 2006
- C40. J. Lach, S. Bingham, T. Lenhart, T. Nguyen, P. Salaun, "RAFFIA – Reliable ASIC/FPGA-based Solutions For I&C Applications," *American Nuclear Society International Topical Meeting on Nuclear Plant Instrumentation, Controls, and Human Machine Interface Technology*, 1032-7, 2006

² Keynote

- C41. ³J. Li, J. Lach, "Negative-Skewed Shadow Registers for At-Speed Delay Variation Characterization," *International Conference on Computer Design*, 354-9, 2007
- C42. M.A. Hanson, H.C. Powell Jr., R.C. Frysinger, D.S. Huss, W.J. Elias, J. Lach, "Teager Energy Assessment of Tremor Severity in Clinical Application of Wearable Inertial Sensors," *IEEE-NIH Life Science Systems and Applications Workshop*, 191-4, 2007
- C43. H.C. Powell Jr., M.A. Hanson, J. Lach, "A Wearable Inertial Sensing Technology for Clinical Assessment of Tremor," *IEEE Biomedical Circuits and Systems Conference*, 9-12, 2007
- C44. A.T. Barth, M.A. Hanson, H.C. Powell Jr., D. Unluer, S.G. Wilson, J. Lach, "Body-Coupled Communication for Body Sensor Networks," *International Conference on Body Area Networks*, 2008
- C45. N. George, J. Lach, S. Gurusurthi, "Towards Transient Fault Tolerance for Heterogeneous Computing Platforms," *Workshop on Compiler and Architectural Techniques for Application Reliability and Security*, accepted for publication, 2008
- C46. S. Che, J. Li, J.W. Sheaffer, K. Skadron, J. Lach, "Accelerating Compute-Intensive Applications with GPUs and FPGAs," *IEEE Symposium on Application Specific Processors*, 101-7, 2008
- C47. J. Li, J. Lach, "At-Speed Delay Characterization for IC Authentication and Trojan Horse Detection," *IEEE International Workshop on Hardware-Oriented Security and Trust*, 8-14, 2008
- C48. J. Huang, J. Lach, "IC Activation and User Authentication for Security-Sensitive Systems," *IEEE International Workshop on Hardware-Oriented Security and Trust*, 76-80, 2008
- C49. L. Di, M. Putic, J. Lach, B. Calhoun, "Power Switch Characterization for Fine-Grained Dynamic Voltage Scaling," *International Conference on Computer Design*, 605-11, 2008
- C50. S. Bingham, J. Lach, "Exhaustive Integrated Circuit Fault Coverage Analysis Using Formal Methods," *American Nuclear Society International Topical Meeting on Nuclear Plant Instrumentation, Controls, and Human Machine Interface Technology*, 2009
- C51. H.C. Powell Jr., A.T. Barth, J. Lach, "Dynamic Voltage-Frequency Scaling in Body Area Sensor Networks using COTS Components," *International Conference on Body Area Networks*, 2009
- C52. S. Arrabi, J. Lach, "Adaptive Lossless Compression in Wireless Body Area Sensor Networks," *International Conference on Body Area Networks*, 2009
- C53. M.A. Hanson, H.C. Powell Jr., A.T. Barth, J. Lach, "Enabling Data-Centric Energy-Fidelity Scalability in Wireless Body Area Sensor Networks," *International Conference on Body Area Networks*, 2009
- C54. Q. Li, J.A. Stankovic, M. Hanson, A. Barth, J. Lach, "Accurate, Fast Fall Detection Using Gyroscopes and Accelerometer-Derived Posture Information," *International Conference on Body Sensor Networks*, 138-43, 2009
- C55. A.T. Barth, M.A. Hanson, H.C. Powell Jr., J. Lach, "TEMPO 3.1: A Body Area Sensor Network Platform for Continuous Movement Assessment," *International Conference on Body Sensor Networks*, 71-6, 2009
- C56. M.A. Hanson, H.C. Powell Jr., A.T. Barth, J. Lach, M. Brandt-Pearce, "Neural Network Gait Classification for On-Body Inertial Sensors," *International Conference on Body Sensor Networks*, 181-6, 2009
- C57. S. Bingham, J. Lach, "Enhanced Fault Coverage Analysis Using ABVFI," *Workshop on Dependable and Secure Nanocomputing*, accepted for publication, 2009
- C58. D. Rai, J. Lach, "Performance of Delay-Based Trojan Detection Techniques under Parameter Variations," *IEEE International Workshop on Hardware-Oriented Security and Trust*, 58-65, 2009
- C59. J. Huang, J. Lach, "ColSpace: Towards Algorithm/Implementation Co-Optimization," *International Conference on Computer Design*, 404-11, 2009
- C60. M. Putic, L. Di, B.H. Calhoun, J. Lach, "Panoptic DVS: A Fine-Grained Dynamic Voltage Scaling Framework for Energy Scalable CMOS Design," *International Conference on Computer Design*, 491-7, 2009
- C61. B.H. Calhoun, S. Arrabi, S. Khanna, Y. Shakhsheer, K. Craig, J. Ryan, J. Lach, "REESES: Rapid Efficient Energy Scalable ElectronicS," *Government Microcircuit Applications & Critical Technology Conference*, accepted for publication, 2010
- C62. N. George, C.R. Elks, B.W. Johnson, J. Lach, "Bit-Slice Logic Interleaving for Spatial Multi-Bit Soft-Error Tolerance," *International Conference on Dependable Systems and Networks*, 141-50, 2010
- C63. N. George, C.R. Elks, B.W. Johnson, J. Lach, "Transient Fault Models and AVF-Estimation Revisited," *International Conference on Dependable Systems and Networks*, 477-86, 2010
- C64. A.T. Barth, M.A. Hanson, H.C. Powell Jr., J. Lach, "Online Data and Execution Profiling for Dynamic Energy-Fidelity Optimization in Body Sensor Networks," *International Conference on Body Sensor Networks*, 213-8, 2010

³ Best Paper Award

- C65. H.C. Powell Jr., M. Brandt-Pearce, A.T. Barth, J. Lach, "A Methodology for the Systematic Evaluation of ANN Classifiers for BSN Applications," *International Conference on Body Sensor Networks*, 240-5, 2010
- C66. M. Guevara, P. Wu, M.D. Marino, J. Meng, L.G. Szafaryn, P. Satyamoorthy, B. Meyer, K. Skadron, J. Lach, B.H. Calhoun, "Exploiting Dynamically Changing Parallelism with a Reconfigurable Array of Homogeneous Sub-cores," *TECHCON*, accepted for publication, 2010
- C67. S. Chen, J.S. Brantley, T. Kim, J. Lach, "Characterizing and Minimizing Synchronization and Calibration Errors in Inertial Body Sensor Networks," *International Conference on Body Area Networks*, accepted for publication, 2010
- C68. H.C. Powell Jr., J. Lach, M. Brandt-Pearce, "Systematic Estimation of ANN Classification Performance Employing Synthetic Data," *IEEE Workshop on Machine Learning for Signal Processing*, 319-24, 2010
- C69. X. Zhang, T.E. Lockhart, J. Lach, E. Abdel-Rahman, "Locomotion Stability Adaptation to the Virtual Reality Induced Sensory Conflicts," *US National Congress of Theoretical and Applied Mechanics*, accepted for publication, 2010
- C70. T.E. Lockhart, A.T. Barth, X. Zhang, R. Songra, E. Abdel-Rahman, J. Lach, "Portable, Non-Invasive Fall Risk Assessment in End Stage Renal Disease Patients on Hemodialysis," *IEEE Wireless Health Conference*, 84-93, 2010
- C71. A.T. Barth, B.C. Bennett, B. Boudaoud, J.S. Brantley, S. Chen, C.L. Cunningham, T. Kim, H.C. Powell, Jr., S.A. Ridenour, J. Lach, "Longitudinal High-Fidelity Gait Analysis with Wireless Inertial Body Sensors," *IEEE Wireless Health Conference*, 192-3, 2010
- C72. J. Huang, J. Lach, "Exploring the Fidelity-Efficiency Design Space using Imprecise Arithmetic," *Asia and South Pacific Design Automation Conference*, 579-84, 2011
- C73. ⁴B.H. Calhoun, Y. Zhang, S. Khanna, K. Craig, Y. Shakhsheer, J. Lach, "A Sub-threshold FPGA for Energy Efficient and Flexible Computation," *Government Microcircuit Applications & Critical Technology Conference*, accepted for publication, 2011
- C74. B.H. Meyer, N. George, B.H. Calhoun, J. Lach, K. Skadron, "Reducing the Cost of Redundant Execution in Safety-Critical Systems using Relaxed Dedication," *Design Automation and Test in Europe*, 1-6, 2011
- C75. S. Khanna, K. Craig, Y. Shakhsheer, S. Arrabi, J. Lach, B.H. Calhoun, "Stepped Supply Voltage Switching for Energy Constrained Systems," *International Symposium on Quality Electronic Design*, 683-8, 2011
- C76. Y. Yao, J. Huang, S. Khanna, B.H. Calhoun, J. Lach, a. shelat, D. Evans, "A Sub-0.5V Lattice-Based Public-Key Encryption Scheme for RFID Platforms in 130nm CMOS," *Workshop on RFID Security Asia*, accepted for publication, 2011
- C77. J. Huang, J. Lach, G. Robins, "Analytic Error Modeling for Imprecise Arithmetic Circuits," *Silicon Errors in Logic - System Effects*, accepted for publication, 2011
- C78. S. Chen, C.L. Cunningham, B.C. Bennett, J. Lach, "Extracting Spatio-Temporal Information from Inertial Body Sensor Networks for Gait Speed Estimation," *International Conference on Body Sensor Networks*, 71-6, 2011
- C79. T. Kim, S. Chen, J. Lach, "Detecting and Preventing Forward Head Posture with Wireless Inertial Body Sensor Networks," *International Conference on Body Sensor Networks*, 125-6, 2011
- C80. N. George, J. Lach, "Characterization of Logical Masking and Error Propagation in Combinational Circuits and Effects on System Vulnerability," *International Conference on Dependable Systems and Networks*, 323-34, 2011
- C81. Y. Shakhsheer, S. Khanna, K. Craig, S. Arrabi, J. Lach, B. H. Calhoun, "A 90nm Data Flow Processor Demonstrating Fine Grained DVS for Energy Efficient Operation from 0.25V to 1.2V," *Custom Integrated Circuits Conference*, 1-4, 2011
- C82. ⁵A. Bankole, M. Anderson, A. Knight, K. Oh, T. Smith-Jackson, M.A. Hanson, A.T. Barth, J. Lach, "Continuous, Non-Invasive Assessment of Agitation in Dementia Using Inertial Body Sensors," *IEEE Wireless Health Conference*, 1:1-9, 2011
- C83. ⁶S. Chen, C. Cunningham, B.C. Bennett, J. Lach, "Enabling Longitudinal Assessment of Ankle-Foot Orthosis Efficacy for Children with Cerebral Palsy," *IEEE Wireless Health Conference*, 4:1-10, 2011
- C84. A. Shrinivasan, M. Brandt-Pearce, A.T. Barth, J. Lach, "Analysis of Gait in Patients with Normal Pressure Hydrocephalus," *International Workshop for Mobile Systems, Applications, and Services for Healthcare*, 3:1-6, 2011

⁴ Best Poster Paper Award

⁵ Best Paper Award Finalist

⁶ Best Paper Award

- C85. B.H. Meyer, B.H. Calhoun, J. Lach, K. Skadron, "Cost-effective Safety and Fault Localization using Distributed Temporal Redundancy," *International Conference on Compilers, Architectures, and Synthesis of Embedded Systems*, 125-34, 2011
- C86. J. Huang, J. Lach, G. Robins, "A Methodology for Energy-Quality Tradeoff Using Imprecise Hardware," *Design Automation Conference*, 504-9, 2012
- C87. A. Shrivastava, J. Lach, B.H. Calhoun, "A Charge Pump Based Receiver Circuit for Voltage Scaled Interconnect," *International Symposium on Low Power Electronics and Design*, 327-32, 2012
- C88. K. Craig, Y. Shakhsher, S. Khanna, S. Arrabi, J. Lach, B.H. Calhoun, S. Kosonocky, "A Programmable Resistive Power Grid for Post-Fabrication Flexibility and Energy Tradeoffs," *International Symposium on Low Power Electronics and Design*, 167-72, 2012
- C89. I. Armenti, P. Asare, J. Su, J. Lach, "A Methodology for Developing Quality of Information Metrics for Body Sensor Design," *IEEE Wireless Health Conference*, 2:1-8, 2012
- C90. S. Chen, A.T. Barth, J.T. Barth, B.C. Bennett, M. Brandt-Pearce, D.K. Broshek, J.R. Freeman, H.L. Samples, J. Lach, "Aiding Diagnosis of Normal Pressure Hydrocephalus with Enhanced Gait Feature Separability," *IEEE Wireless Health Conference*, 3:1-8, 2012
- C91. J.S. Brantley, A.T. Barth, J. Lach, "Optimizing Battery Lifetime-Fidelity Tradeoffs in BSNs using Personal Activity Profiles," *International Conference on Body Area Networks*, 106-12, 2012
- C92. M. Weber, J. Huang, M. Putic, H. Zhang, J. Lach, "Balancing Adder for Error Tolerant Applications," *International Symposium on Circuits and Systems*, 3038-41, 2013
- C93. P. Asare, J. Lach, J.A. Stankovic, "FSTPA-I: A Formal Approach to Hazard Identification via System Theoretic Process Analysis," *International Conference on Cyber-Physical Systems*, 150-159, 2013
- C94. S. Chen, J. Lach, O. Amft, M. Altini, J. Penders, "Unsupervised Activity Clustering to Estimate Energy Expenditure with a Single Body Sensor," *International Conference on Body Sensor Networks*, 1-6, 2013
- C95. F. Wu, J. Wadden, J. Lach, K. Skadron, J. Saucerman, "Gene Expression from the Gq Transgenic Mouse is Sufficient to Mechanistically Predict Altered Cardiac EC Coupling," *Biomedical Engineering Society Annual Meeting*, 2013
- C96. ⁷P. Asare, J. Lach, J.A. Stankovic, Y. Zhang, P.L. Jones, S. Weininger, "Towards a Framework for Safety Analysis of Body Sensor Networks," *International Conference on Body Area Networks*, 15-21, 2013
- C97. P. Asare, R.F. Dickerson, X. Wu, J. Lach, J.A. Stankovic, "BodySim: A Multi-Domain Modeling and Simulation Framework for Body Sensor Networks Research and Design," *International Conference on Body Area Networks*, 72:1-2, 2013
- C98. S. Chen, J. Lach, "Nonlinear Feature for Gait Speed Estimation Using Inertial Sensors," *International Conference on Body Area Networks*, 185-8, 2013
- C99. J. Gong, J. Lach, "Reconfigurable Differential Accelerometer Platform for Inertial Body Sensor Networks," *IEEE SENSORS*, 1-4, 2013
- C100. S. Chen, J. Gong, J. Lach, M.D. Goldman, "Enhanced Multiple Sclerosis Gait Assessment using Inertial Sensors," *IEEE Wireless Health Conference*, 2013
- C101. H. Zhang, M. Putic, J. Lach, "Low Power GPGPU Computation with Imprecise Hardware," *Design Automation Conference*, 99:1-6, 2014
- C102. S. Arrabi, D. Moore, L. Wang, K. Skadron, B.H. Calhoun, J. Lach, B.H. Meyer, "Flexibility and Circuit Overheads in Reconfigurable SIMD/MIMD Systems," *International Symposium on Field-Programmable Custom Computing Machines*, 236, 2014
- C103. W. Zhang, H. Zhang, J. Lach, "Adaptive Front-End Throttling for Superscalar Processors," *International Symposium on Low Power Electronics and Design*, 21-6, 2014
- C104. H. Zhang, W. Zhang, J. Lach, "A Low-Power, Accuracy-Configurable Floating Point Multiplier," *International Conference on Computer Design*, 48-54, 2014
- C105. ⁸J. Gong, J. Lach, Y. Qi, R.S. Zee, S.J. Seaman, N.S. Schenkman, "Motion Assessment for Robotic Surgery Education using Inertial Body Sensors," *IEEE Wireless Health Conference*, 2014
- C106. T.E. Lockhart, C. Frames, R. Soangra, J. Lach, "Identifying Fall Risk in the Obese Elderly using a Wireless Sensor and Movement Complexity," *IEEE Wireless Health Conference*, 2014
- C107. J. Gong, S.R. Dandu, B. Reynolds, J. Lach, J. Druzgal, "Unsupervised Head Impact Identification using Inertial Body Sensors based on Linear Dynamical Model," *IEEE Wireless Health Conference*, 2014

⁷ Best Student Paper Award

⁸ Best Demo Award

- C108.⁹J. Gong, P. Asare, J. Lach, Y. Qi, “Piecewise Linear Dynamical Model for Human Actions Clustering from Inertial Body Sensors with Considerations of Human Factors,” *International Conference on Body Area Networks*, 90-6, 2014
- C109.B. Boudaoud, H.C. Powell Jr., J. Lach, “Application-Informed Platform Evaluation for Commercial-off-the-Shelf Dynamic Voltage Scaling,” *International Conference on Electronics Circuits and Systems*, 455-8, 2014
- C110.¹⁰J. Gong, J. Lach, Y. Qi, M.D. Goldman, “Causal Analysis of Inertial Body Sensors for Enhancing Gait Assessment Separability towards Multiple Sclerosis Diagnosis,” *International Conference on Body Sensor Networks*, 1-6, 2015
- C111.¹¹W. Zhang, H. Zhang, J. Lach, “Reducing Dynamic Energy of Set-Associative L1 Instruction Cache by Early Tag Lookup,” *International Symposium on Low Power Electronics and Design*, 49-54, 2015
- C112.R. Nama, K. Sanders, J. Guy, T. Smith-Jackson, J. Lach, A. Bankole, M. Anderson, “Knowledge Representation for Complex Systems: Empowering Caregivers of People with Dementia,” *Industrial and Systems Engineering Research Conference*, in press, 2015
- C113.J. Gong, K.M. Rose, I.A. Emi, J.P. Specht, E. Hoque, D. Fan, S.R. Dandu, R.F. Dickerson, Y. Perkhounkova, J. Lach, J.A. Stankovic, “Home Wireless Sensing System for Monitoring Nighttime Agitation and Incontinence in Patients with Alzheimer’s Disease,” *IEEE Wireless Health Conference*, 8 pages, 2015
- C114.W. Zhang, H. Zhang, J. Lach, “Dynamic Core Scaling: Trading off Performance and Energy Beyond DVFS,” *International Conference on Computer Design*, 319-326, 2015
- C115.J. Gong, M.M. Engelhard, M.D. Goldman, J. Lach, “Correlations between Inertial Body Sensor Measures and Clinical Measures in Multiple Sclerosis,” *International Conference on Body Area Networks*, 18-24, 2015
- C116.M.M. Engelhard, S.R. Dandu, J. Lach, M.D. Goldman, S.D. Patek, “Toward Detection and Monitoring of Gait Pathology using Inertial Sensors under Rotation, Scale, and Offset Invariant Dynamic Time Warping,” *International Conference on Body Area Networks*, 269-75, 2015
- C117.J. Gong, J. Lach, “Motion Markers Discovery from Inertial Body Sensors for Enhancing Objective Assessment of Robotic Surgical Skill,” *International Symposium on Bioelectronics and Bioinformatics*, 215-18, 2015
- C118.J. Gong, D. Fan, L. Lopez Ruiz, J. Lach, “Profiling, Modeling, and Predicting Energy Harvesting for Self-Powered Body Sensor Platforms,” *International Conference on Body Sensor Networks*, 402-7, 2016
- C119.S. Russell, Y. Zhuang, J. Gong, D.C. Kerrigan, B.C. Bennett, J. Lach, “Gait Tracker Shoe for Accurate Step-by-step Determination of Gait Parameters,” *International Conference on Body Sensor Networks*, 13-8, 2016
- C120.S.R. Dandu, M.M. Engelhard, M.D. Goldman, J. Lach, “Determining Physiological Significance of Inertial Gait Features in Multiple Sclerosis,” *International Conference on Body Sensor Networks*, 266-71, 2016
- C121.D. Fan, J. Gong, J. Lach, “Eating Gestures Detection by Tracking Finger Motion,” *IEEE Wireless Health Conference*, 1-6, 2016
- C122.¹²J. Gong, M.D. Goldman, J. Lach, “DeepMotion: A Deep Convolutional Neural Network on Inertial Body Sensors for Gait Assessment in Multiple Sclerosis,” *IEEE Wireless Health Conference*, 165-71, 2016
- C123.¹³M.M. Engelhard, J. Lach, M.D. Goldman, S.D. Patek, “Adaptive Symptom Reporting for Mobile Patient-Reported Disability Assessment,” *IEEE Wireless Health Conference*, 172-9, 2016
- C124.R. Alam, J.E. Dugan, N. Homdee, N. Gandhi, B. Ghaemmaghami, H. Meda, A. Bankole, M. Anderson, J. Gong, T. Smith-Jackson, J. Lach, “BESI: Reliable and Heterogeneous Sensing and Intervention for In-Home Health Applications,” *IEEE International Conference on Connected Health: Applications, Systems and Engineering Technologies*, accepted for publication, 2017
- C125.R. Alam, J. Gong, M.A. Hanson, A. Bankole, M. Anderson, T. Smith-Jackson, J. Lach, “Motion Biomarkers for Early Detection of Dementia-Related Agitation,” *ACM Workshop on Digital Biomarkers*, accepted for publication 2017

FUNDED RESEARCH PROJECTS (\$17.6M TOTAL, \$6.8M TO LACH)

Current

- National Science Foundation (PI: John Lach, co-PIs: Benton Calhoun, Susan Trolrier-McKinstry), “Towards Dependable Self-Powered Things for the IoT,” \$800,000 (\$533,000 to UVa), 2016-2019

⁹ Best Paper Award

¹⁰ Best Paper Award Finalist

¹¹ Best Paper Award Finalist

¹² Best Paper Award Finalist

¹³ Best Paper Award Finalist

- National Science Foundation (PI: John Lach, co-PIs: Martha Anderson, Azziza Bankole, Tonya Smith-Jackson), “SCH: INT: Collaborative Research: BESI: Behavioral and Environmental Sensing and Intervention for Dementia Caregiver Empowerment,” \$2,103,622 (\$574,954 to UVa), 2014-2018
- National Science Foundation (PI: Veena Misra, many co-PIs), “NSF Nanosystems Engineering Research Center for Advanced Self-Powered Systems of Integrated Sensors and Technologies (ASSIST),” \$18,494,327 (\$2,387,749 to UVa), 2012-2017
- National Science Foundation (PI: Donna Spruijt-Metz, co-PIs: Kayla de la Haye, John Lach, Jack Stankovic), “SCH: INT: Collaborative Research: Monitoring and Modeling Family Eating Dynamics (M2 FED): Reducing Obesity Without Focusing on Diet and Activity,” \$1,723,585 (\$689,315 to UVa), 2015-2019
- National Institutes of Health (PI: David Peden, co-PIs: Wayne Cascio, John Lach, Veena Misra, John Muth, Haibo Zhou), “ViCTER: Phase II Studies of Gamma Tocopherol as an Intervention for Environmental Asthma,” \$1,134,972 (\$334,152 to UVa), 2015-2018
- National Science Foundation (PI: John Lach, co-PI: Carolyn Vallas), “REU Site: Wireless Technologies for Health Applications,” \$299,077, 2015-2018

Completed

- National Science Foundation (PI: Maite Brandt-Pearce, co-PIs: John Lach, Harry Powell), “SHB: Type I (EXP): Personalized Signal Processing for Early Diagnosis of Mobility Impairment,” \$360,128, 2012-2016
- National Science Foundation (PI: Thurmon Lockhart, co-PIs: Dong Ha, John Lach, Karen Roberto), “SHB: Medium: Non-Intrusive Multi-Patient Fall-Risk Monitoring in Health Care Facilities,” \$1,200,000, 2011-2016
- Night Vision Laboratory (via WICAT) (PI: John Lach, co-PIs: Scott Acton, Benton Calhoun), “Ultra Low Power Processing in Wireless Sensor Nodes,” \$355,000, 2009-2016
- National Science Foundation (PI: D. Casey Kerrigan, co-PIs: Brad Bennett, John Lach, Shawn Russell), “STTR Phase I: Gait Tracker Shoe for Long Term Accurate Determination of Gait Parameters and Activity,” \$224,830 (\$125,662 to UVa), 2015
- National Science Foundation (PI: Kevin Skadron, co-PIs: John Lach, Jeff Saucerman), “CDI-Type I: Accelerating Simulations Using CPU+FPGA Heterogeneous Processing,” \$595,519, 2011-2015
- National Institutes of Health (PI: Karen Rose, co-PIs: John Lach, Janet Specht, Jack Stankovic), “Correlates Among Nocturnal Agitation, Sleep, and Urinary Incontinence in Dementia,” \$428,269, 2012-2015
- National Science Foundation (PI: Jack Stankovic, co-PIs: Benton Calhoun, John Lach, David Wentzloff, Kamin Whitehouse), “CPS: Medium: Collaborative Research: Body Area Sensor Networks: A Holistic Approach from Silicon to Users,” \$1,040,000, 2010-2014
- National Science Foundation (PI: Bradford Bennett, co-PIs: John Lach, Mark Abel), “Enhancing AFO Efficacy through Continuous, Non-Invasive Gait Assessment,” \$300,000, 2010-2014
- National Science Foundation (PI: John Lach), “NSF-FDA Scholar-in-Residence: Safety Analysis of Body Sensor Networks,” \$35,000, 2012-2013
- National Science Foundation (PI: David Evans, co-PIs: Benton Calhoun, John Lach, Abhi Shelat), “Implementable Privacy and Security for Resource-Constrained Devices,” \$1,000,000, 2008-2013
- National Institutes of Health (PI: John Lach – subcontract from AFrame Digital), “SBIR: Continuous Fall Risk Monitoring System: Walking vs. Activities of Daily Living,” \$25,000, 2011-2012
- Semiconductor Research Corporation, National Science Foundation (PI: Kevin Skadron, co-PIs: Benton Calhoun, John Lach), “Heterogeneous Multi-core Architectures from Homogeneous Arrays using Configurable Interconnect,” \$370,000, 2009-2013 (REU: \$20,000 2011-2013)
- Semiconductor Research Corporation (PI: Kevin Skadron, co-PIs: Benton Calhoun, John Lach), “Design Space Exploration for Safety Critical Applications,” \$165,000, 2009-2013
- National Science Foundation (PI: John Lach, co-PIs: Jack Stankovic, Gang Zhou), “Multi-Scale QoS for Body Sensor Networks,” \$525,000, 2009-2012
- National Science Foundation (PI: John Lach, co-PI: Thurmon Lockhart), “Continuous, Non-Invasive Gait Analysis and Fall-Risk Assessment,” \$450,000, 2008-2012
- MITRE (via WICAT) (PI: Steve Patek, co-PI: John Lach), “Lifetime Assurance in Battery-Limited Wireless Systems,” \$34,000, 2011
- Biomedical Innovation Fund (PI: John Lach, co-PIs: Jeffrey Barth, Maite Brandt-Pearce, Donna Broshek, Jason Freeman), “Remote, Continuous Gait Assessment for Improved Diagnosis of Normal Pressure Hydrocephalus,” \$40,000, 2009-2010

- National Science Foundation (PI: John Lach, co-PI: Benton Calhoun), “CI-P: Development of Community Infrastructure for Body Sensor Network Research, Education, and Support,” \$100,000, 2009-2011
- National Science Foundation (PI: John Lach, co-PIs: Scott Acton, Kevin Skadron), “Hierarchical Dependency Graphs for Col-Space Design with Application to Leukocyte Detection and Tracking,” \$703,479, 2006-2010 (REU: \$15,996 2009-2010)
- National Science Foundation (PI: John Lach), “Exploring Fidelity/Power Tradeoffs for Body-Area Network Protocols,” \$25,000, 2008-2009
- National Science Foundation (PI: John Lach, co-PIs: Henry Bertoni, Dariusz Czarkowski, Barry Horowitz), “Body-Area Sensor Networks for Detection and Assessment of Movement Disorder: Dynamically Adaptable Communication and Power Management with Energy Harvesting,” \$150,000, 2007-2009
- National Science Foundation (PI: John Lach), “Highly Flexible Multi-Mode Embedded Systems,” \$300,000, 2004-2008
- National Science Foundation (PI: John Lach, co-PIs: Kevin Skadron, Mircea Stan), “Small-Scale Dynamic Reconfigurability for Large-Scale Benefits,” \$419,784, 2001-2004 (REU: \$12,000 2003-2004)
- National Science Foundation (PI: Miodrag Potkonjak, co-PIs: Farinaz Koushanfar, John Lach), “Manufacturing Variability-Based HW Protection Techniques,” \$150,000, 2007-2008
- National Science Foundation (PI: Kevin Skadron, co-PIs: John Lach, Mircea Stan), “Physically Aware Computer Architecture,” \$161,942, 2004-2007 (REU: \$6,000 2005-2006, \$6,000 2006-2007)
- Electricité de France (PI: John Lach, co-PI: Barry Johnson), “Assessment of Safety Critical Systems Incorporating Application Specific Integrated Circuits,” \$223,900, 2003-2006
- DARPA (PI: Benton Calhoun, co-PI: John Lach), “REESES: Rapid Efficient Energy Scalable ElectronicS for Embedded Computing,” \$300,000, 2009-2010
- DARPA subcontract through Information Sciences Institute (PI: John Lach, co-PI: Miodrag Potkonjak), “Leveraging Technology Scaling for IC Security,” \$15,000, 2006
- NanoSTAR (PI: Avik Ghosh, co-PIs: John Lach, William Levy), “Pulse Shaping for Low Power Communication in Nano-Micro Networks,” \$30,000, 2010-2011
- MITRE (via WICAT) (PI: Steve Patek, co-PI: John Lach), “Adaptive Allocation of System Resources in Body Sensor Networks,” \$68,000, 2008-2010
- Paul Mellon Prostate Cancer Institute (PI: Scott Acton, co-PI: John Lach), “Real-Time Hardware for Enhancement and Segmentation of Ultrasonic Imagery of the Prostate,” \$98,886, 2004-2005
- Carilion Health System (PI: Martha Anderson, co-PI: John Lach), “Designing Efficient and Objective Methods of Assessing Agitation and Preventing Akathisia in Dementia Patients through Wearable Motion Capture Technology,” \$28,208, 2006
- Carilion Health Systems (PI: Azziza Bankole, co-PIs: Aubrey Knight, Tonya Smith-Jackson, John Lach, David Trinkle), “Validation of a Wearable Motion Sensor Technology in the Agitation of Dementia,” \$15,630, 2010
- Empirical Technologies Corporation (PI: John Lach), “First Responders Monitoring Project,” \$20,204, 2006-2007
- Southeastern Center for Electrical Engineering Education (PI: John Lach), “Multi-Mode SOC Synthesis,” \$22,500 (+\$24,003 matching)
- University of Virginia Institute on Aging (PI: John Lach, co-PIs: James Aylor, John Nesselrode), “Wearable Sensor System for Portable, Non-Invasive Collection of Ambient, Biological, Physiological, and Functional Data,” \$26,000, 2004-2005

ACTIVITIES

- National Academies Technical Advisory Board for Army Research Lab (2013-present)
- NSF SCH PI Meeting: Co-organizer (2013)
- Leadership in Academic Matters (LAM), Fall 2013
- Co-founder and Co-director of the UVA Center for Wireless Health (<http://wirelesshealth.virginia.edu/>)
- Co-founder and Steering Committee member of IEEE Wireless Health Conference (<http://www.wirelesshealth.org/>)
- Co-founder and Co-organizer of the Body Sensor Network Contest (<http://bsncontest.org/>)
- IEEE Transactions on Computers: Associate editor (2005-2010)
- IEEE Transactions on Computer Aided Design of Integrated Circuits and Systems: Associate editor (2006-2010)
- ACM Transactions on Embedded Computing Systems: Special issue co-editor (2011)
- ACM Transactions on Embedded Computing Systems: Special issue co-editor (2004)

- BodyNets: Publicity chair (2009), Technical program committee member (2010-2011, 2013-present)
- BSN: Technical program committee co-chair (2011), Publicity chair (2012), Contest organizer (2011), Technical program committee member (2010-2012)
- CASES: Technical program committee member (2005)
- CBUH: Technical program committee member (2010)
- CHASE: Steering committee member (2016)
- DATE: Technical program committee member (2007)
- DSN: DCCS Technical program committee member (2012)
- GLSVLSI: Steering committee member (2006-2010), General chair (2005), Technical program committee co-chair (2004), Publicity chair (2003), Technical program committee member (2003-2011)
- HOST: Technical program committee member (2008-2011)
- ICCD: Technical program committee member (2004-2006)
- ISCAS: Review committee member (2004-2011)
- MAPLD: Technical program committee member (2003-2006), Workshop organizer (2005-2006)
- mHealthSys: Technical program committee member (2012)
- mHealth Obesity Society Training Institute: Organizer, presenter, and faculty mentor (2013)
- NIH mHealth Summit: NIH mHealth Training Institute faculty mentor (2011)
- Wireless Health: Steering committee member (2010-2015), Publicity chair (2010- 2012), Program committee member (2010-2012, 2014-present), Workshop organizer (2010, 2013), Panel organizer (2011)
- University of Virginia School of Engineering and Applied Science Undergraduate Research and Design Symposium, Chair (2003, 2004)
- Organized and led an effort to propose a departmental plan to the NSF Department-Level Reform of Undergraduate Engineering Education Program focused on improving the quality and student-appeal of our undergraduate Electrical Engineering program (2004-2006)
- Led an inter-departmental committee to establish a computer engineering graduate program jointly administered by the Computer Science and Electrical and Computer Engineering Departments (program unanimously approved by the School of Engineering and Applied Science faculty in May 2002)
- Helped organize an electrical engineering undergraduate recruiting effort, including informational sessions for undeclared undergraduates and open houses for high school students and the general community (resulted in an approximately 40% increase in electrical engineering declarations in the first year)
- Developed a graduate-level course on modern logic synthesis techniques to complement the integrated circuit physical design computer-aided design courses offered in the School of Engineering and Applied Science
- Restructured the computer engineering undergraduate capstone digital design course including the development and implementation of a new semester-long design project
- Regular reviewer/referee for several conferences and journals, a Senior Member of the IEEE, and a member of the ACM, IEEE Computer Society, IEEE Circuits and Systems Society, IEEE VLSI Systems and Applications Technical Committee, ACM SIGDA, and Eta Kappa Nu

CURRENT GRADUATE STUDENTS AND POST-DOCTORAL RESEARCHERS (EXPECTED GRADUATION DATE)

- Ridwanul Alam (PhD 2019)
- Sriram Dandu (PhD 2019)
- Dawei Fan (PhD 2018)
- Stephen Goadhouse (ME 2017)
- Jiaqi Gong (Senior Scientist – 10/2016-present, Research Scientist – 10/2014-10/2016, Research Associate – 3/2013-10/2014)
 Best Paper Award, *International Conference on Body Area Networks* – 2014
 Best Demo Award, *IEEE Wireless Health Conference* – 2014
 Best Paper Award Finalist, *International Conference on Body Area Networks* – 2015
 Best Paper Award Finalist, *IEEE Wireless Health Conference* – 2016
- Nutta Homdee (PhD 2020)
- Ahmad Mansouri (PhD 2021)
- Matthew Ridder (MS 2017)
- Luis Lopez Ruiz (PhD 2019)

- Shery Shojaie (ME 2017)
- Victor Sobral (PhD 2021)
- Anyi Zhang (ME 2017)

ALUMNI – PHD

- Saad Arrabi (PhD 2014)
“Maximizing Energy Efficiency through Vertically Integrated Dynamic Reconfigurability”
Winner, *DAC/ISSCC Student Design Contest* – 2011
First job: AMD
- Philip Asare – co-advised with Jack Stankovic (PhD 2015)
“A Framework for Reasoning about Patient Safety of Emerging Computer-Based Medical Technologies”
ECE Louis T. Rader Graduate Research Award – 2015
Charles L. Brown Fellow
Google Lime Connect Scholar – 2013-2014
Best Student Paper Award, *BodyNets* – 2013
Best Paper Award, *International Conference on Body Area Networks* – 2014
Current job: Assistant Professor, Department of Electrical and Computer Engineering, Bucknell University (<http://philip.asare.net/>)
- Adam Barth (PhD 2011)
“Runtime Management of Energy-Fidelity Tradeoffs in Body Sensor Networks”
ECE Louis T. Rader Graduate Research Award – 2011
Best Paper Award Finalist, *IEEE Wireless Health Conference* – 2011
First job: Wireless Health Interactive (BeClose.com)
- Scott Bingham (PhD 2009)
“Fault Coverage Analysis of Integrated Circuit Designs Through Assertion-Based Verification and Fault Injection (ABVFI)”
University of Virginia Award for Excellence in Scholarship in the Sciences & Engineering – 2007
First job: Northrop Grumman
- Shanshan Chen (PhD 2013)
“Gait Feature Extraction from Inertial Body Sensor Networks for Medical Applications”
ECE Louis T. Rader Graduate Research Award – 2013
Best Paper Award, *IEEE Wireless Health Conference* – 2011
Current job: Assistant Professor, Department of Biostatistics & Department of Internal Medicine, Virginia Commonwealth University (<http://www.biostatistics.vcu.edu/shanshan-chen/>)
- Kyle Craig – co-advised with Benton Calhoun (PhD 2014)
“Design and Analysis of the On-chip Power Delivery Network for Energy Efficient Designs”
Winner, *DAC/ISSCC Student Design Contest* – 2011
First job: PsiKick
- Nishant George (PhD 2011)
“Modeling and Mitigating Transient Faults in Nanoscale Digital Systems”
University of Virginia Award for Excellence in Scholarship in the Sciences & Engineering – 2011
First job: Intel
- Mark Hanson (PhD 2009)
“Wireless Body Area Sensor Network Technology for Motion-Based Health Assessment”
Achievement Rewards for College Scientists (ARCS) Scholar – 2007-2009
University of Virginia Award for Excellence in Scholarship in the Sciences & Engineering – 2008
Best Paper Award Finalist, *IEEE Wireless Health Conference* – 2011
First job: Wireless Health Interactive (BeClose.com), Co-Founder
- Jiawei Huang (PhD 2012)
“A Digital System Design Methodology for Efficiency-Quality Tradeoffs Using Imprecise Hardware”
ECE Louis T. Rader Graduate Research Award – 2012
First job: NVIDIA
- Zhijian Lu (PhD 2006)
“Runtime Management Techniques for Power- and Temperature-Aware Computing”
ECE Louis T. Rader Graduate Research Award – 2007

Best Student Paper Award, *ACM Workshop on Self-Healing, Adaptive, and Self-Managed Systems* – 2002

First job: Marvell Technology Group

- Harry Powell (PhD 2011)
“A Framework for Modeling Energy-Accuracy Tradeoffs in Neural Network-based Classification for Resource Constrained Embedded Systems”
Current job: Associate Professor, Department of Electrical & Computer Engineering, University of Virginia
(<http://www.ece.virginia.edu/faculty/powell.html>)
- Vinu Vijay Kumar (PhD 2005)
“Application-Specific Small-Scale Reconfigurability”
ECE Louis T. Rader Graduate Research Award – 2005
Ballard Fellow – 2003-2004
First job: Texas Instruments DSP R&D
- Wei Zhang (PhD 2016)
“Scrutinizing Resource Utilization for High Performance and Low Energy Computation”
Best Paper Award Finalist, *International Symposium on Low Power Electronics and Design* – 2015
ECE Louis T. Rader Graduate Research Award – 2016
First job: Samsung R&D

ALUMNI – MASTERS

- Adam Barth (MS 2009)
- Ben Boudaoud (MS 2014)
Charles L. Brown Department of Electrical and Computer Engineering Award for Excellence – 2012
- Jason Brandon (MS 2004)
- Jeff Brantley (MS 2012)
Charles L. Brown Fellow
National Science Foundation Fellow
- Sriram Dandu (MS 2016)
- Joshua Dugan (MS 2016)
- Latriese Jackson (ME 2009)
- Taeyoung Kim – co-advised with Benton Calhoun (MS 2012)
- Travis Lenhart (MS 2007)
- Jie Lie (MS 2008)
Best Paper Award, *IEEE International Conference on Computer Design* – 2007
4th place University of Virginia Engineering Research Symposium – 2007
- Yoshihiro Masui (MS 2006)
- Harry Powell (MS 2006)
- Mateja Putic (MS 2008)
- Devendra Rai (MS 2009)
- Samuel Ridenour (MS 2011)
- Victor Sobral (visiting scholar 2014-2015)
- Kranti Uppala (ME 2005)
- Wenqian Wu (MS 2006)
- Hang Zhang (MS 2014)

CURRENT UNDERGRADUATE STUDENTS (EXPECTED GRADUATION DATE)

- Neeraj Gandhi (BS 2017)
Charles L. Brown Department of Electrical & Computer Engineering Award for Excellence – 2017
- Ben Ghaemmaghami (BS 2018)
James S. Miller Award for outstanding third-year student in Electrical and Computer Engineering – 2017
- Kevin Kozlowski (BS 2019)
- Alyson Irizarry (BS 2017)
- Renee Mitchell (BS 2020)
- John Park (BS 2018)
- Jack Ross (BS 2017)

- Phillip Seaton (BS 2018)
- Sean Wolfe (BS 2019)
- William Zhang (BS 2019)

ALUMNI – UNDERGRADUATE RESEARCH

- Alla Aksel (BS 2004)
2nd place at the SEAS Undergraduate Research and Design Symposium
- Borna Alaeddini (BS 2012)
- Joshua Anderson (BS 2007)
- Matthew Ashburn (BS 2004)
- Daniel Bagley (BS 2006)
- Marcellus Black (BS 2017)
- Matthew Baron (BS 2016)
- Robert Baummer (BS 2004)
- Irene Beckman (BS 2012)
- Davis Blalock (BS 2014)
SEAS Outstanding Student Award – 2014
Louis T. Rader Chairperson's Award – 2014
Barry M. Goldwater Scholarship – 2013
James S. Miller Award for outstanding third-year student in Electrical and Computer Engineering – 2013
- Ben Boudaoud (BS 2012)
Charles L. Brown Department of Electrical and Computer Engineering Award for Excellence – 2012
- Brian Cason (BS 2007)
- Christopher Cunningham (BS 2012)
Charles L. Brown Department of Electrical and Computer Engineering Award for Excellence – 2012
Best Paper Award, *IEEE Wireless Health Conference* – 2011
Honorable Mention for Computing Research Association's Outstanding Undergraduate Researcher Award – 2011
James S. Miller Award for outstanding third-year student in Electrical and Computer Engineering – 2011
- Anish Dalal (BS 2015)
- Brandon Decoursey (BS 2015)
- William Devine (BS 2014)
- Iberedem Ekure (BS 2010)
- Emilio Esteban (BS 2015)
- Teya Flick (BS 2003)
- Jackie Fok (BS 2003)
- Niroop Gonchikar (BS 2002)
- Khade Grant (BS 2016, VCU)
- Yonathan Habtemichael (BS 2009)
- David Hammack (BS 2005)
- Jennifer Henderson (BS 2003)
- Justin Hornback (BS 2002)
- Paul Jang (BS 2015)
- Adam Kamihara (BS 2006)
- Jeremy Kim (BS 2013)
- Shawn Kim (BS 2013)
- Connor Kyle (BS 2002)
- David Lattimore (BS 2002)
- JJ Lindsay (BS 2015)
- Nicole Litton (BS 2010)
- Hampton Maher (BS 2004)
- Sholanda McCullough (BS 2008)
- Jason Mondesir (BS 2009)
- Mohammed Nauage (BS 2013)

- Brandon Purvis (BS 2017)
- Bo Qin (BS 2013)
- Anders Quigg (BS 2014)
- Martin Rauscher (BS 2004)
- Christopher Rehorn (BS 2004)
- Matthew Ridder (BS 2015)
Louis T. Rader Chairperson's Award – 2015
- Anish Simhal (BS 2014)
- Matt Skancke (BS 2005)
- Christopher Skarka (BS 2002)
- Brandon Speed (BS 2016, Morehouse College)
- Kathy Takeguchi (BS 2002)
- Arun Thomas (BS 2003)
- Gustavo Torrico (BS 2003)
- Tommy Tracy (BS 2010)
- Paul Tschirhart (BS 2007)
- Carlos Valle (BS 2008)
- Christopher Waters (BS 2015)
- Tia Webb (BS 2003)
- Matthew Weber (BS 2013)
Louis T. Rader Chairperson's Award – 2013
2nd place at the SEAS Undergraduate Research and Design Symposium – 2013
Honorable Mention for Computing Research Association's Outstanding Undergraduate Researcher Award – 2013
James S. Miller Award for outstanding third-year student in Electrical and Computer Engineering – 2012