Andrew James Mason, Ph.D.

Michigan State Univ., ECE Dept.
2120 Engineering Building
E. Lansing, MI 48824-1226

517-355-6502
mason@egr.msu.edu
http://www.egr.msu.edu/~mason/

EDUCATION

Ph.D. in Electrical Engineering, *University of Michigan*, Ann Arbor, MI, 2000

M.S. in Electrical Engineering, *University of Michigan*, Ann Arbor, MI, 1994

B.E.E. in Electrical Engineering (with honors), *Georgia Institute of Technology*, Atlanta, GA, 1992

B.S. in Physics (with highest honors), *Western Kentucky University*, Bowling Green, KY, 1991

FIELDS OF INTEREST

VLSI Circuits and Architectures: mixed-signal integrated circuits for sensor/actuator interface, signal processing, and communications; reconfigurable, low-power analog/digital circuits; energy efficient microcontroller architectures; electrochemical and impedance spectrum readout circuits.
Integrated Microsystems: low-power wireless microsystem integration; integrated electrochemical systems; bioelectrochemical sensor arrays; biomedical and neuroprosthetic microsystems; post-CMOS microelectrode arrays; thermal isolation and control microstructures.

PROFESSIONAL EXPERIENCE

Associate Professor, *Michigan State University*, ECE Department, 7/07 – present

Assistant Professor, *Michigan State University*, ECE Department, 7/01 – 6/07

Assistant Professor, *University of Kentucky*, ECE Department, 7/99 - 6/01

Electronic Systems Engineer, *Canopus Systems Inc.*, Ann Arbor MI, 1/97 – 6/99

Graduate Student Research Assistant, *University of Michigan,* 6/93 – 6/99

Teaching Assistant, *University of Michigan,* 9/92 – 5/98

Teaching Assistant, *Georgia Institute of Technology,* 3/91 – 3/92

Systems Engineer, *International Business Machines (IBM),* Gaithersburg MD, 6/91 – 8/91

Research Analyst, *Martin Marietta (U.S. Dept. of Energy),* Oak Ridge TN, 6/90 – 8/90

Lab Technician, *Siemens Corporation*, Franklin KY, 6/89 – 8/89

HONORS & AWARDS

2005-06 recipient of the Michigan St. University *Teacher-Scholar Award*
(granted annually to six junior faculty across the university)

Best Student Paper Finalist, *IEEE Int. Conf. on Sensors*, Oct. 2006

Promoted to *Senior Member* of the IEEE, 2006.

3rd Prize (Phase I & Phase2), 2005 *Semic. Res. Corp./Semic. Industry Assoc. System-on-Chip Design Challenge*

College of Engineering "Most helpful Faculty/Staff", 2003 (voted by CoE undergraduates)

1st Place (experienced class) *1996 Univ. of Michigan Student VLSI Design Contest* (national contest)

3rd Place (experienced class) *North American 1996 Mentor Graphics Student VLSI Design Contest*

Award of Excellence Scholarship, M. L. Fitten Scholarship

Honor societies: Phi Eta Sigma, Sigma Pi Sigma

PUBLICATIONS

REFEREED JOURNAL PUBLICATIONS

[1] C. Yang and A. Mason, "Precise RSSI with High Process Variation Tolerance," *IEEE Tran. Circuits and Systems I*, (in press).

[2] A. Kamboh, M. Raetz, K. Oweiss, A. Mason "Area-Power Efficient VLSI Implementation of Multichannel DWT for Data Compression in Implantable Neuroprosthetics," *IEEE Trans. Biomedical Circ. Systems*, (in press).

[3] A. M. Kamboh, A. Mason, K. G. Oweiss, "Analysis of Lifting and B-Spline DWT Implementations for Implantable Neuroprosthetics," *J. VLSI Signal Processing*, (in press).

[4] A. Mason, A. V. Chavan, K. D. Wise, "A Mixed-Voltage Sensor Readout Circuit with On-Chip Calibration and Built-In Self-Test," *IEEE Sensors J*, vol. 7, no. 9, pp. 1225-1232, September 2007.

[5] K. Oweiss, A. Mason, K. Thomson, J. Li, and Y. Suhail, "A Scalable Wavelet Transform VLSI Architecture for Real-Time Neural Signal Conditioning in Implantable Multichannel Neuroprosthetic Devices," *IEEE Trans. Circuits and Systems I*, vol. 54, no. 6, pp. 1266-1278, June 2007.

[6] J. Zhang, J. Zhou and A. Mason, "Highly Adaptive Transducer Interface Circuit for Multi-Parameter Microsystems," *IEEE Trans. Circ. Sys. I,* vol. 54, no. 1, pp. 167-178, Jan. 2007.

[7] D. Rairigh, C. Yang and A. Mason, "Analysis of On-Chip Impedance Spectroscopy Methodologies for Sensor Arrays," *Sensor Letters*, vol. 4, no. 4, pp. 398-402, 2006.

[8] J. Zhou, P. Balasundaram, and A. Mason, "Architecture for a Microsystem Controller in Wireless Sensor Networks," *Sensor Letters*, vol. 2, no. 1, pp. 64-68, March 2004.

[9] C. A. Grimes, K. G. Ong, O. K. Varghese, X. Yang, G. Mor, M. Paulose, E. C. Dickey, C. Ruan, M. V. Pishko, J. W. Kendig, and A. J. Mason, "A Sentinel Sensor Network for Hydrogen Sensing," *SENSORS*, vol. 3(3), pp. 69-82, March 2003.

[10] J. Zhou and A. Mason, "Communication Buses and Protocols for Sensor Networks," *SENSORS*, vol. 2 (7), pp. 244-257, August 2002.

[11] N. Yazdi, A. Mason, K. Najafi, and K. D. Wise, "A Generic Interface Circuit for Capacitive Sensors in Low-Power Multi-Parameter Microsystems," *Sensors and Actuators A,* vol. 84, pp. 351-361, 2000.

[12] A. Mason, N. Yazdi, A. V. Chavan, K. Najafi, and K. D. Wise, "A Generic Multielement Microsystem for Portable Wireless Applications," *Proc. IEEE*, vol. 86 (8), pp. 1733-1745, August 1998.

[13] J. Zhou, P. Zhong and A. Mason, "Architectural and Circuit-Level Optimization of Instruction Queue for Superscalar Microprocessors," *IEEE Trans. VLSI*, (pending review).

[14] J. Xi, C. Yang, A. Mason, P. Zhong, "Adaptive Mixed-Signal System-On-Chip for Multi-Sensor Interface," *IET Computers & Digital Techniques,* (pending review).

[15] N. Trombly, A. Mason, "Post-CMOS Thermally Controlled Electrochemical Electrodes," *IET Electronics Letters*, (pending review).

[16] A. Mason, B. Hassler, Y. Huang, A. Greiner, R. M. Worden, "Electrochemical Biosensor Arrays with Bioelectronic Enzyme Interfaces," *IEEE Sensors J.*, (pending review).

[17] C. Yang, Y. Huang, A. Mason, "On-Chip Electrochemical Instrumentation for Biosensor Array Microsystems," *IEEE Sensors J.*, (pending review).

REVIEWED CONFERENCE PUBLICATIONS

[1] D. Rairigh and A. Mason, "Compact Impedance Spectroscopy for High Density Sensor Arrays," *IEEJ Int. Analog VLSI Workshop*, November 2007.

[2] Chao Yang, Daniel Rairigh and Andrew Mason, "Fully Integrated Impedance Spectroscopy for Biochemical Sensor Arrays," *IEEE Biomedical Circuits and Systems Conference*, November 2007.

[3] M. A. Shetliffe, A. M. Kamboh, A. Mason, K. G. Oweiss, "Impact of Real Time Hardware Processing on Neural Spike Train Information Content," *Int. Conf. IEEE Engineering in Medicine and Biology Society*, Lyon, France, August 2007.

[4] A. Mason, Y. Huang, C. Yang, J. Zhang, "Amperometric Readout and Electrode Array Chip for Bioelectrochemical Sensors," *IEEE Int. Sym. Circuits and Systems (ISCAS)*, pp. 3562-3565, May 2007.

[5] A. Kamboh, M. Raetz, A. Mason and K. Oweiss "Area-Power Efficient Lifting-Based DWT Hardware for Implantable Neuroprosthetics," *IEEE Int. Sym. Circuits and Systems (ISCAS)*, pp. 2371-2374, May 2007.

[6] C. Yang and A. Mason, "Precise RSSI with High Process Variation Tolerance," *IEEE Int. Sym. Circuits and Systems (ISCAS)*, pp. 2870-2873, May 2007.

[7] A. M. Kamboh and A. Mason, "Comparison of Area-Power Efficient Techniques for Neural Data Compression using Discrete Wavelet Transform," *IEEE Int. Conf. on Sensors*, Daejeon, Korea, October 2006.

[8] Y. Huang and A. Mason, "Post-CMOS Compatible Microfabrication of a Multi-Analyte Bioelectrochemical Sensor Array Microsystem," *IEEE Int. Conf. on Sensors*, Daejeon, Korea, October 2006.

[9] C. Yang, D. Rairigh, A. Mason, "On-Chip Electrochemical Impedance Spectroscopy for Biosensor Arrays," *IEEE Int. Conf. on Sensors*, Daejeon, Korea, October 2006.

[10] C. Yang, A. Mason, J. Xi, P. Zhong, "Configurable Hardware-Efficient Interface Circuit for Multi-Sensor Microsystems," *IEEE Int. Conf. on Sensors*, Daejeon, Korea, October 2006, (finalist for Best Student Paper).

[11] J. Xi, C. Yang, P. Zhong, A. Mason, "Adaptive Multi-Sensor Interface System-On-Chip", *IEEE Int. Conf. on Sensors*, Daejeon, Korea, October 2006.

[12] K. Thomson, T. Shlien, Y. Suhail, K. Oweiss, A. Mason, "B-Spline vs. Lifting Architecture for Neuroprosthetic Devices," *IEEE Int. Conf. Electro/Information Technology*, E. Lansing MI USA, May 2006.

[13] C. Yang and A. Mason, "Zero-IF VGA with Novel Offset Cancellation," *IEEE Int. Symp. Circuits and Systems*, Kos Greece, pp.3438-3441, May 2006.

[14] J. Zhou and A. Mason, "A Two-level Hybrid Select Logic for Wide-Issue Superscalar Processors," *IEEE Int. Symp. Circuits and Systems*, Kos Greece, pp. 41-44, May 2006.

[15] J. Zhang, Y. Huang, N. Trombly, C. Yang, A. Mason, "Electrochemical Array Microsystem with Integrated Potentiostat," *IEEE Int. Conf. on Sensors*, Irving CA, pp. 385-388, October 2005.

[16] C. Kun, A. Mason, S. Chakrabartty,"A Dynamic Reconfigurable A/D Converter for Sensor Applications," *IEEE Int. Conf. on Sensors*, Irving CA, pp. 1221-1224, October 2005.

[17] K. Oweiss, A. Mason, K. Thomson, J. Li, Y. Suhail, "Augmenting Real-Time DSP in Implantable High-Density Neuroprosthetic Devices," *IEEE-EMBS Int. Conf. on Microtechnologies in Medicine and Biology*, pp.108-111, May 2005.

[18] A. Mason, J. Li, K. Thomson, Y. Suhail and K. Oweiss, "Design Optimization of Integer Lifting DWT Circuitry for Implantable Neuroprosthetics," *IEEE-EMBS Int. Conf. on Microtechnologies in Medicine and Biology*, pp. 112-115, May 2005.

[19] J. Zhou and A. Mason, "Increasing Design Space of the Instruction Queue with Tag Coding," *Great Lakes Symp. on VLSI*, pp. 404-407, April 2005.

[20] B. Hassler, R. M. Worden, A. Mason, P. Kim, N. Kohli, J. G. Zeikus, M. Laivenieks, and R. Ofoli, "Biomimetic Interfaces for a Multifunctional Biosensor Array Microsystem," *IEEE Int. Conf. on Sensors*, Vienna, Austria, pp. 991-994, October 2004.

[21] J. Zhang, N. Trombly, and A. Mason, "A Low Noise Readout Circuit for Integrated Electrochemical Biosensor Arrays," *IEEE Int. Conf. on Sensors*, Vienna, Austria, pp. 36-39, October 2004.

[22] J. Zhang and A. Mason, "Characterization of a Configurable Sensor Signal Conditioning Circuit for Multi-Sensor Microsystems," *IEEE Int. Conf. on Sensors*, Vienna, Austria, pp. 198-201, October 2004.

[23] Cheong KUN, Shaolei Quan, and Andrew Mason, "A Power-Optimized 64-bit Priority Encoder Utilizing Parallel Priority Look-Ahead," *IEEE Int. Symposium on Circ. and Systems (ISCAS),* Vancouver Canada, vol. II, pp. 753-756, May 2004.

[24] Prasanna Balasundaram, Kartik Vaidyanathan, and Andrew Mason, "Microsystem Controller for Sensor Network Control and Data Correction," *IEEE Int. Symposium on Circ. and Systems (ISCAS),* Vancouver Canada, vol. II, pp. 809-812, May 2004.

[25] N. Dotson, P. Kim and A. Mason, "Low Cost MEMS Processing Techniques," *Proc. ASEE/NCS Spring Conference,* Kalamazoo MI, April 2004.

[26] N. Kohli, B. Hassler, S. Vaidya, L. Parthasarathy, R. Ofoli, R. M. Worden, P. Kim, and A. Mason "Biomimetic Interface for Integrated Biosensor Arrays," *Proc. American Inst. Chemical Engineers Annual Meeting*, San Francisco, November 2003.

[27] J. Zhang, J. Zhou, P. Balasundaram, and A. Mason, "A Highly Programmable Sensor Network Interface with Multiple Sensor Readout Circuits," *IEEE Int. Conf. on Sensors*, Toronto, Canada, pp. 748-752, October 2003.

[28] P. Kim, N. Kohli, B. Hassler, N. Dotson, A. Mason, R. M. Worden, and R. Ofoli, "An Electrochemical Interface for Integrated Biosensors," *Proc., IEEE Int. Conf. on Sensors*, Toronto, Canada, pp. 1036-1040, October 2003.

[29] A. Mason, N. Yazdi, J. Zhang, and Z. Sainudeen, "A Modular Sensor Microsystem Utilizing a Universal Interface Circuit," *Proc., IEEE Int. Symposium on Circ. and Systems (ISCAS)*, Bangkok Thailand, vol. III, pp. 926-929, May 2003.

[30] J. Zhang, K. Zhang, Z. Wang, and A. Mason, "A Universal Micro-Sensor Interface Chip with Network Communication Bus and Highly-Programmable Sensor Readout," *Midwest Symposium on Circuits and Systems*, August 2002.

[31] M. Jain, C. Grimes, K. Takahata, Y. Gianchandani, S. Singh, and A. Mason, "Magnetoelastic Microsensors for Environmental Monitoring," *Digest, IEEE Int. MEMS-01 Conf.*, Interlaken, Switzerland, January 2001.

[32] J. C. Fox, A. Mason, and N. Yazdi, "Spacecraft Microaccelerometer Microsystem," *Space Technology Conference and Exposition*, Albuquerque NM, September 1999.

[33] A. V. Chavan, A. Mason, U. Kang, and K. D. Wise, "A Programmable Mixed-Voltage Sensor Readout Circuit and Bus Interface with Built-In Self-test," *Digest*, *Int. Solid State Circ. Conf.*, San Francisco CA, pp. 136-137, February 1999.

[34] N. Yazdi, A. Mason, K. Najafi, and K. D. Wise, "A Low-Power Generic Interface Circuit for Capacitive Sensors" *Digest, Solid-State Sensor and Actuator Workshop*, Hilton Head Island SC, pp. 215-218, June 1996.

[35] N. Yazdi, A. Mason, K. Najafi, and K. D. Wise, "A Smart Sensing Microsystem with a Capacitive Sensor Interface," *Digest, IEEE Int. Symposium on Circ. and Systems*, Atlanta GA, vol. IV, pp. 336-339, May 1996.

[36] Mason, W. Bear, and K. D. Wise, "A Microinstrumentation System for Remote Environmental Monitoring," *Digest, Int. Conf. on Integrated Micro-Nano Tech. for Space Applications*, Houston TX, November 1995.

[37] A. Mason, N. Yazdi, K. Najafi, and K. D. Wise, "A Low-Power Wireless Microinstrumentation System for Environmental Monitoring," *Digest, Int. Conf. on Sensors and Actuators (Transducers' 95)*, Stockholm Sweden, pp. 107-110, June 1995.

BOOK CHAPTERS

[1] Andrew Mason, Jichun Zhang, and Chao Yang, "Analogue Electronics for Sensor Signal Conditioning," chapter in Comprehensive Sensor Technology, Elsevier Ltd, 2007 (accepted).

[2] A. Mason, S. Amimoto, and K. D. Wise, "MEMS-Based Macro- and Micro-Sensing Systems: Architecture, Design and Implementation," chapter in Microengineering for Aerospace Systems, editor: H. Helvajian, The Aerospace Press, 1999.

JOURNAL PAPERS IN PREPARATION

[1] N. Trombly, A. Mason, "Post-CMOS Thermally Controlled Electrodes for Bioelectrochemical Sensors," *IET Electronics Letters*, (in preparation)

[2] C. Kun, A. Mason, S. Chakrabartty, "A Dynamic Reconfigurable Hybrid Algorithmic ΣΔ A/D Converter, *IEEE Sensors J.* (in preparation)

[3] A. Greiner, Y. Huang, B. Hassler, A. Mason, R. M. Worden, "Electrochemical Biomimetic Sensor Microarrays," *Biosensors & Bioelectronics*, (in preparation)

[4] X. Jin, L. Yu, Y. Huang, X. Zeng and A. Mason, "Ionic Liquid Electrochemical Microarray Explosives Sensors," *IEEE Sensors J.* (in preparation)

INVITED SEMINARS/PRESENTATIONS

Oakland University Chemistry Dept. Seminar Series, Rochester MI, September 2006
"On-Chip Bioelectrochemical Sensor Array Microsystems"

NSF Wireless Integrated Microsystem (WIMS) Center Seminar, Ann Arbor MI, December 2005,
"Nanostructured Bioelectrochemical Sensor Arrays"

Pennsylvania State University Graduate Seminar, State College, PA, October 2004
"Multifunctional Integrated Biosensor Array Microsystems"

Texas Instruments, Dallas TX, November 2003,
"Analog and Mixed Signal Design Capabilities at Michigan State"

NSF Wireless Integrated Microsystem (WIMS) Center Seminar, Ann Arbor MI, November 2002,
"Transducer Interface Electronics in Modular Systems"

IEEE Student Chapter (MSU) Meeting, E. Lansing MI, October 2001,

"Microinstruments for Biological and Environmental Monitoring"

IMAPS/SMTP Regional Symposium, Indianapolis IN, April 2001,
"Microinstruments: Small, Low Power, Embedded Systems for Measurement and Control"

IMAPS Indiana Chapter Meeting, Cincinnati OH, November 2000.
Invited presentation on advanced packaging of microinstruments.

Sensor Technology Conference, *New Technology Week*, Baltimore MD, September 1998.
Invited presentation on IC sensors and microinstruments.

Naval Research Laboratory, Washington DC, August 1998.
Guest seminar on MEMS-based Microsystems.

Force Command Headquarters, Fort McPherson, Atlanta, GA, January 1998.
Invited presentation on UM Microinstrumentation System and MEMS in weather measurements.

NASA-Langley, Langley VA, April 1996
Invited presentation on MEMS research at the University of Michigan.

Naval Research Laboratory, Washington DC, February 1996.
Guest lecture on research activities in MEMS and Microsystems.

OTHER CONFERENCE PRESENTATIONS

[1] J. Xi, C. Yang, A. Mason, P. Zhong "Adaptive Sensor Network Platform SoC," (Phase II) SRC Student Symposium, Cary NC., Oct. 2006.

[2] J. Xi, C. Yang, A. Mason, P. Zhong "Adaptive Sensor Network Platform SoC," (Phase I) TECHCON Conference, Portland, OR., Oct. 2005.

[3] Y. Huang, C. Yang, A. Mason, "Electrochemical Impedance Spectroscopy for On-Chip Biosensor Arrays," *AANM Nanomedicine Conf.*, E. Lansing MI USA, April 2006.

[4] "Biomimetic Sensors: A Multidisciplinary Research Initiative," *University of Michigan/MSU Joint Symposium,* E. Lansing MI, March 2003.

[5] "Biomimetic Sensors: A Multidisciplinary Research Initiative," *17th Center for Fundamental Materials Research (CFMR) Symposium*, E. Lansing MI, March 2003.

[6] A. Mason, D. Birdsall, Y. Gianchandani, J. Clark, and S. McNamara, "A Wireless Environmental Monitoring Microsystem for Military Assets," *2nd Biennial Sensors Symposium*, Naval Surface Warfare Center, Crystal City VA, April 8-10, 2002.

[7] A. Mason and C. Grimes, "Microinstruments for Battlefield Awareness," *Magnetic Sensors Symposium*, Baltimore MD, October 2000.

RESEARCH SUPPORT

At Michigan State University

2007 PI "Temperature Controlled Array Microsystem for Functional Proteomics," *National Science Foundation*, $600,000, 10/07-9/10.

2006 PI "Wireless Sensor Tags for Advanced Weapons and Defense Materials Monitoring," *Evigia Systems Inc. (Prime: MEDC 21st Century Jobs Fund)*, $135,889, 12/1/06-11/30/08.

2006 PI "Au-Thiolate Nanoparticles as Interfacial Layers on Microsensor Arrays for Trace Explosive Vapor Detection," *University of Michigan (Prime: Dept. Homeland Security)*, $155,500 (of total $1,300,000), 11/01/06 – 10/31/09.

2006 Co-PI "Advanced Microsystems for Neural Information Processing," *National Institutes of Health* (R21), $395,391, 6/1/06 - 5/31/08.

2006 Co-PI "Adaptive Sensor Network Platform Chip," *Semiconductor Research Corp.*, $62,620, ($13,000 cash, $49,620 in kind IC fabrication services), May-Oct. 2006.

2004 Co-PI "Functional and Nanostructured Biomimetic Interfaces," *Michigan Economic Development Corp. Technology Tri-Corridor Fund*, $1,369,097, 10/01/05 – 9/30/08

2003 Co-PI "Wireless Integrated Microsystems," *University of Michigan (Prime: National Science Foundation, ERC)*, $584,000, 9/1/03 – 8/31/08.

2002 PI "Universal Readout and Communication Interfaces for Low-Power Microsystems," *University of Michigan Center for Wireless Integrated Microsystems (Prime: National Science Foundation)*, $53,800 + $37,873 (supplement), 2/1/02 - 9/01/03.

2001 PI "Monitoring Microsystem Interface Circuit," *Canopus Systems Inc.*, $50,000, 7/01/01 – 6/30/02.

Grants prior to joining MSU

2000 PI "Intelligent Sensor Modules for an Environmental Monitoring Microsystem", *Canopus Systems Inc.* (*Prime: DARPA* Phase2 SBIR), $200,000, 6/16/00 -6/30/02.

2000 Co-PI "Establishment of a 2-D/3-D Micro/Nano-Scale Device Fabrication Facility at The University of Kentucky," *National Science Foundation*, $747,000, 7/1/00 – 6/30/02.

2000 Co-PI "Integrated Microsensor Devices and Systems for Industrial, Environmental, and Biomedical Applications," *Dept. of Energy*, $330,000, 6/15/00 – 6/1/03.

1999 PI "MEMS-Based Environmental Monitoring Microsystem," *DARPA,* Phase1 SBIR, $100,000, 1/99 – 6/99.

PENDING RESEARCH GRANTS (Michigan State University)

2007 PI "Rapid Biodefense Diagnosis Microarray System using Recombinant Antibodies," *Oakland University (Prime: NIH)*, $1,138,438, 3/1/08-2/28/13 (submitted June 2007)

2007 Co-PI "Advanced Microsystems for Neural Information Processing," NIH (R01), $395,391, 3/1/06 - 2/28/08, (submitted June 2007)

2007 PI "Array Microsystem for Category B Bacterial Detection Using Carbohydrate and Lectin Recognition," *Oakland Univ. (prime: NIH),* ~$1,200,000, (in preparation).

PROFESSIONAL SERVICE AND MEMBERSHIP

Institute of Electrical and Electronic Engineers, *Senior Member*, (Electron Device Society, Solid-State Circuits Society, Circuits and Systems Society)
IEEE Circuits and Systems Society Technical Committees: Sensory Systems, Biomedical Circ. and Sys.
Editorial Board, *Sensor Letters*, 1/03- 12/05

Conference Committees/Services

IEEE International Symposium on Circuits and Systems (ISCAS)
Session Chair, May 2003, May 2004
Short Course (Tutorial) Presenter, May 2002
Technical Review Committee, 2003, 2004, 2005, 2006, 2007
IEEE International Conference on Sensors (Sensors)
Special Session Organizer, "Multi-Parameter Sensor Systems," Oct. 2004
Session Chair, Oct. 2003, Oct. 2004, Oct. 2005
Technical Program/Review Committee, 2003-2007
IEEE Int. Conf. Engineering in Medicine and Biology (EMBS)
Technical Review Committee, 2006-2007
IEEE Int. Conf. Biomedical Circuits and Systems (BioCAS)
Technical Program Committee, 2005-2007
IEEE Int. Workshop on Biomedical Circuits and Systems
Technical Program Committee, 2004-2007

IEEE/NIH BISTI Life Science Systems & Applications Workshop 2007, Review Committee

Ad hoc Journal Paper Reviews
IEEE Trans. on Circuits and Systems I, May 06, Oct 06, June 07
IEEE Sensors Journal, May 03, Feb 05, June 05, June 06, July 06, Sept 06, Nov 06
IEEE Journal of Solid State Circuits, May 02, July 06, Sept. 06
Sensor Letters, Aug 03, July 06
Sensors and Actuators Journal, Oct. 01, Nov. 02, May 04
IEEE Trans. on Electron Devices, Jan. 01, April 04
Nano Letters, November 04
Journal of Nanoscience and Nanotechnology, Sept. 02.
Journal of Applied Physics, April 02
SENSORS, Sept. 2001

Michigan State University Positions and Committees
Undergraduate Studies Committee, ECE MSU, 7/07 – present
Awards Committee, 5/06 – present
Cleanroom Advisory Committee, 8/01-present
Ph.D. Qualifying Exam, preparation and grading, 8/02 - present
ECE Lab Committee, 8/03 – 8/06
CpE/VLSI Faculty Group, Chair, 1/01-8/03
Faculty Search Committee (CpE), 10/01 – 3/03
Faculty Search Committee (Biomed Egr), 1/02 – 5/02
Graduate Studies Committee, ECE MSU, 7/01 – 8/02

University of Kentucky Positions and Committees
Undergraduate Recruitment Committee, 1/01 – 6/01
Faculty Advisor, Eta Kappa Nu Honor Society, 7/00 – 6/01
Curriculum Committee, 7/00 – 6/01
Faculty Search Committee, 8/00 – 6/01

Other Professional Services
National Institutes of Health, Electromagnetic Devices Special Study Session, September 2007
National Science Foundation, Proposal Review Panel, May 2003, June 2005, May 2006
U.S. Army Research Office proposal reviewer, May 2006
MSU IRGP proposal reviewer (New Faculty Award), October 2003, 2004, 2005
Textbook Review, J. Uyemura, *Intro. to VLSI Circuits and Systems, Wiley, 2002.* Reviewed Oct. 2004

EDUCATIONAL ACTIVITIES

TEACHING HISTORY

Michigan State University

ECE 410: VLSI Design (with lab), F01 (lab), S02, F02, S03 (lab), F03, S05, F05, S06, F06 (lab), S08
ECE 418: Analog Integrated Circuits, F04
ECE 480: Senior Design: Facilitator, F07
ECE 491: Biomedical Instrumentation, F07
ECE 491-604: Integrated Circuit Testing Lab, F05, F06
ECE 499: Undergraduate Independent Study, F04, F05, S06, F06, S07, F07
ECE 801: Graduate Independent Study, Su02, F02, S03, F03, F04, S05
ECE 813: Logic Design Principles (Advanced VLSI), S02, S03
ECE 932: Advanced Topics in Analog Design (Biomedical Microsystems), S08
ECE 932: Advanced Topics in Analog Design (Mixed-Signal Integrated Circuits), S04

Computer Engineering Honors College Advisor, 8/01 – 8/03

University of Kentucky

EE 564: Digital Electronic Circuits, S01
EE 562: Analog Electronic Circuits, F99, F00
EE 461G: Introduction of Electronics, S00

Teaching Assistant Positions

University of Michigan, EECS 425 Integrated Circuits Laboratory, S97, S98
University of Michigan, EECS 523 Digital Integrated Circuits, F95, F97
University of Michigan, EECS 359 Measurements and Instrumentation, S93
University of Michigan, EECS 320 Intro to Semiconductor Device Theory, F92
Georgia Institute of Technology, Physics Department, TA for undergrad physics labs, 1991-92

COURSE/CURRICULUM DEVELOPMENT

Orchestrated modernization of VLSI-related courses by establishing use of industry-standard EDA tools (Cadence and Synopsis) and creating tutorials for analog and digital IC design using Cadence software. This effort has fostered significant improvements in several undergraduate and graduate courses, including implementation of a team-oriented design project in ECE410 that now results in microprocessor datapath chips being fabricated through the MOSIS Service. The lab materials created ECE410 are currently used in ECE418, ECE809, ECE813, and ECE932, and have been requested by faculty at several universities across the country.

Served as Chair of the CpE/VLSI Faculty Group (2001-2003) and lead efforts to modify the curriculum to produce CpE and EE graduates who are well versed in VLSI design flow and use of standard EDA tools. This has significantly increased the appeal of our students to major semiconductor companies.

Recreated ECE 410 (VLSI Design) to cover modern topics and use modern EDA tools. Developed web-based course material for this course, including over 600 pages of PowerPoint lecture notes, and electronic documents for design project description, lab tutorials and guides, and homework assignments and solutions.

Recreated ECE 418 as an Analog IC Design course (F04) covering modern topics of transistor-level analog design using Cadence EDA tools. Developed a full set of PowerPoint notes for this new course format.

Introduced an ECE 932 (Special Topics) course on Mixed-Signal Integrated Circuits, S04.

Introduced ECE419-604 Integrated Circuits Testing Lab, offered F05 and F06. Introduces students to the setup and use of benchtop and LabVIEW-based instruments for microelectronics testing. Will be added to the ECE undergraduate curriculum as a new course starting F07 or F08.

Supported the CHE 883 Multidisciplinary Bioprocessing Lab course, supervising a research project team and providing a graduate student mentor from my lab. 2003, 2004, 2005.

ACADEMIC/RESEARCH ADVISING

Ph.D. Graduates: 2, Masters Graduates: 19 (Thesis option, 11; Project option, 2; Course option, 6)

GRADUATE DISSERTATION CHAIR

year	*deg.*	*name*	*thesis title*	*current*
2006	Ph.D.	Junwei Zhou	Optimization of Technology-Scalable Wide-Issue Superscalar Microprocessors	Sun Microsystems
2005	Ph.D.	Jichun Zhang	Low Noise Multi-Mode Sensors Readout Circuits for Low Power Microsystems	Mindspeed Tech.
2007	M.S.	Daniel Rairigh	A Compact Fully On-Chip Impedance Spectroscopy System	Ph.D. student
2006	M.S.	Nicholas Trombly	Electrical and Thermal Interfaces for On-chip Electrochemical Biosensor Arrays	Texas Instruments
2005	M.S.	Cheong Kun	Design, Implementation and Testing of a Hybrid Algorithmic ΣΔ A/D Converter	Siemens Corp.
2005	M.S.	Jian Li	VLSI Design Implementation for Lifting Scheme DWT	Google
2004	M.S.	Nathan Dotson	Analysis and Design of Post-CMOS Thermally Controlled Biosensor Array Microsystems	IBM
2003	M.S.	Prasanna Balasundaram	Low-Power Signal Processing Core for Sensor Microsystems	Qualcomm Inc.
2003	M.S.	Kartik Vaidyanathan	Application Specific Programmable Processor for Sensor Based Networks	
2002	M.S.	Aravind Murarishetty	Implementation of a CMOS Temperature Sensor with Programmable Range	
2002	M.S.	Kun Zhang	Implementation of a Universal MicroSensor Interface Circuit	Qualcomm Inc.
2001	M.S.	Mark Underwood	Development of an Embedded Controller Prototyping System	Lexmark
2000	M.S.	Ye Gu	A Low-Power CMOS Temperature Sensor with Programmable Range Control	

Project-Option MS Students: Zhigang Wang (2001, Cisco), Jameelah Hadee (2005, 3M).

CURRENT RESEARCH ADVISEES

name	*exp. deg.*	*thesis topic*
Chao Yang	Ph.D. 2008	Electrochemical Instrumentation for Biosensor Microsystems
Awais Kamboh	Ph.D. 2009	Ultra Efficient Implantable Neural Signal Processing Hardware
Yue Huang	Ph.D. 2010	Post-CMOS Bioelectrochemical Array Microsystems
Daniel Rairigh	Ph.D. 2010	A Compact Fully On-Chip Impedance Spectroscopy System
Xiaowen Liu	M.S. 2009	Thermal Control of On-Chip Biosensor Arrays
Zhenwen Peng	M.S. 2007	Microfluidics for Protein Interfaces

Undergraduate research assistants: G. Warnell (B.S. 2009), J. Harris (B.S. 2010)

OUTREACH MENTORING/SERVICE ACTIVITIES

Supervised many research projects for undergraduate students: F07 (1), Su07 (1), S07 (3), Su06 (2), S06 (3), F05 (1), Su05 (2), S05 (2), F04 (1), Su04 (1).

Participate in recruitment/training programs for underrepresented groups (particularly female and African American) hosted by the Diversity Programs Office, 2002 – present

Supervise graduate research of underrepresented students, including (to date), three female and two African American students.

Developed and presented a two-day hands-on workshop on "Microfabrication & Biomimetic Microsystems" for the *Frontiers in Science* program for secondary education teachers, 5/03

Participated in the Sloan Engineering Program Graduate Student Orientation, 9/02

Presented at the MSU Middle School Career Information Seminar, 7/01

College of Engineering Undergraduate Internship Supervisor, 2005, 2006

Masters Research Project Advisor, Student Exchange, TU Kaiserslautern Germany: Sacha Loitz (2003), Artin Papanian (2004)

NSF Research Experience for Undergraduates (REU) Supervisor, 2003, 2004

Computer Engineering Honors College (Undergraduate) Advisor (8/01-8/03)