

Shantanu Chakrabartty

Department of Electrical and Computer Engineering
Department of Biosystems Engineering
Michigan State University
2120 Engineering Building
East Lansing, MI 48824, USA.
Citizenship:U.S.A.

Work: 517-432-5679
Fax: 517-353-1980
Email: shantanu@msu.edu
Personal URL: <http://www.egr.msu.edu/~shantanu>
Research URL: <http://www.egr.msu.edu/aimlab>

RESEARCH INTERESTS

Analog computing and integrated circuits with focus on: (a) energy scavenging and self-powered sensors, circuits and systems; (b) biomedical and implantable circuits and systems; (c) speech and acoustic processing systems; (d) learning and pattern recognition systems; (e) neuromorphic systems; (f) floating-gate circuits and systems.

EDUCATION

The Johns Hopkins University, Baltimore, MD

Ph.D., Electrical and Computer Engineering, 2004.

Dissertation: Design and Implementation of Ultra-low-power Pattern Recognizers and Sequence Decoders;

Advisor: Gert Cauwenberghs

The Johns Hopkins University, Baltimore MD

M.S., Electrical and Computer Engineering, 2001.

Indian Institute of Technology, New Delhi

B.Tech, Electrical Engineering, 1996.

PROFESSIONAL EXPERIENCE

Washington University, St. Louis, MO

7/2015 –

Professor, Department of Computer Science and Engineering

Michigan State University, East Lansing, MI

7/2010 – 6/2015

Associate Professor, Department of Electrical and Computer Engineering

Michigan State University, East Lansing, MI

1/2012 – 6/2015

Adjunct Professor, Department of Biosystems Engineering

Piezonix LLC., East Lansing, MI

5/2013 – Present

Co-founder and Chief Scientific Officer

Data Guild Inc., Palo Alto, California

7/2013 – Present

Affiliate

Michigan State University, East Lansing, MI

8/2004 – 6/2010

Assistant Professor, Department of Electrical and Computer Engineering

The Johns Hopkins University, Baltimore, MD

5/1999 – 8/2004

Research Assistant, Electrical and Computer Engineering

University of Tokyo, Tokyo, Japan

9/2002 - 12/2002

Visiting Researcher, Department of Informatics

Qualcomm Incorporated, San Diego, CA

1/1996 – 5/1999

Engineer, Network and Switching Subsystem Group

AWARDS AND HONORS

- *MSU Innovation of the Year Award, 2012.*
- *NSF CAREER Award, 2010.*
- *MSU Teacher-Scholar Award, 2011.*
- *Invited Member, Japan-America National Academy Frontiers of Engineering, 2014.*
- *Best Paper Award in Sensory Systems, IEEE ISCAS 2014.*
- *Best Paper Award in Sensory Systems, IEEE ISCAS 2013.*
- *Honorary Mention, Best Paper Award, IEEE ISCAS 2012.*
- *Honorary Mention, Best Paper Award, IEEE ISCAS 2011.*
- *Invited Member, Defense Science Research Council, USA, 2006.*
- *Catalyst Foundation Fellow, 1999-2004.*
- *Academic Frontiers Student Exchange Scholarship (Japanese Govt.), 2002.*
- *Best Undergraduate Thesis, IIT Delhi, 1996.*
- *National Talent Search Scholarship Recipient, India, 1990.*
- *Junior Talent Search Scholarship Recipient, India, 1989.*

TEACHING

Average SIRS evaluation score (over last 3 years): 3.84/4.00

Courses:

- Analog Integrated Circuits, Spring 2009, Spring 2010, 2012, 2014.
- Introduction to Mixed-signal Integrated Circuits, Fall 2007,2008,2009,2010,2011,2012.
- Biomedical Instrumentation, Fall 2007.
- Low-power analog and mixed-signal VLSI systems, Michigan State University, Fall 2004, Spring 2006, Spring 2007. Spring 2008
- Mixed-signal Prototyping and Testing, Michigan State University, Spring 2005.
- Algorithms of Circuit Design, Michigan State University, Fall 2005, Fall 2006.

INVITED PRESENTATIONS

- *Expeditions in Floating-gate Circuits and Systems: Self-powered sensing and computing, Department of Electrical and Computer Engineering, Stony Brook University, NY, Dec. 2013 (Host: Prof. Milutin Stanacevic).*
- *Expeditions in Floating-gate Circuits and Systems: Self-powered sensing and computing, Department of Electrical and Computer Engineering, Tufts University, MA, Nov. 2013 (Host: Prof. Valencia Koomson).*

- *Expeditions in Floating-gate Circuits and Systems: From Self-powered sensors to nano-watt analog processors*, Department of Electrical and Computer Engineering, University of Toronto, Canada, Nov. 2013 (Host: Prof. Roman Genov).
- *Expeditions in Floating-gate Circuits and Systems: From Self-powered sensors to nano-watt analog processors*, Department of Computer Science and Engineering, Washington University, St. Louis, Oct. 2013 (Host: Prof. Viktor Gruev).
- *Approaching limits of sensing using neuromorphic noise-exploitation principles*, SPIE, San Diego, Mar. 2013 (Host: Prof. R.J. Martin-Palma)
- *Reproducing Kernel-based Methods for Extracting and Identifying Noise-robust Speech Features*, IEEE Asilomar Conference on Signal, Systems and Computers, Nov. 2012. (Host: Ghassan Alregib)
- *Noise-exploitation and Adaptation in Neuromorphic Sensors*, SPIE, San Diego, Mar. 2012 (Host: Prof. Akhlesh Lakhtakia).
- *Grand Challenge: Sensing-to-learn and Learning-to-sense – Exploiting biological symbiosis of sensing, computing, memory and adaptation for designing the next-generation of smart sensors*, NSF sponsored US-Japan Joint Workshop on Bioinspired Sensing and Actuation, Berkeley, Nov 12-13, 2011.
- *Morphing, Synthesis and Monitoring: Exploring the trinity of Hybrid Analog Integrated Circuits*, Department of Engineering Mechanics, Penn State University, Apr. 2011 (Host: Prof. Akhlesh Lakhtakia).
- *CMOS Integrated Circuits for Energy Scavenging and Self-powered Sensors*, IEEE Biomedical Circuits and Systems Conference, Paphos, Cyprus, Nov, 2010 (Host: Dr. Jennifer Blain)
- *Designing Microsystems that Learn: Algorithms and Hardware, Pattern Recognition and Machine Intelligence (PREMI09)*, Indian Institute of Technology, Delhi, Dec. 2009 (Host: Prof. Jayadeva).
- *Forward error-correcting biosensors: Hybrid bio-CMOS circuits and systems*, CMOS Emerging Technologies Workshop, Sep. 2009 (Host: Dr. Kris Iniweski).
- *Design of Neuromorphic Data Converters*, Telluride Neuromorphic and Cognitive Workshop, Telluride, Colorado, Jul. 2009 (Host: Prof. John G. Harris).
- *Sigma-Delta Learning: Bridging the gap between neuromorphic systems, machine learning and mixed-signal processing*, Department of Informatics, University of Tokyo, Japan, June 2009 (Host: Prof. Toshihiko Yamasaki).
- *Sensors and Processors for Structural Health Monitoring*, VDEC, University of Tokyo, Japan, June 2009 (Host: Prof. Tadashi Shibata).
- *Operating below the sub-microwatt barrier – Explorations in Analog Computing*, Invited Presentation, Wireless Integrated Microsystems (WIMS), University of Michigan, Ann Arbor, April 2009 (Host: Prof. Jerome K. Lynch).
- *CMOS Circuits for Biomechanical Implants*, Invited Presentation, CMOS Emerging Technologies Workshop, Vancouver, August 2008 (Host: Dr. Kris Iniweski).
- *Sub-microwatt Sensors for Structural Health Monitoring of Biomechanical Implants*, Invited

Presentation, Department of Bioengineering, University of California, San Diego, August 2008 (Host: Prof. Gert Cauwenberghs).

- *Towards Reliable Multi-pathogen Biosensors using High-dimensional Encoding and Decoding Techniques*, Invited Presentation, SPIE Symposium on NanoScience+Engineering, CA 2008 (Host: Prof. Gert Cauwenberghs, UCSD) .
- *High-dimensional Encoding-Decoding Techniques for Reliable Pathogen Detection*, Invited Presentation, Hunter College, City University of New York, Feb 2008 (Host: Prof. Hiroshi Matsui).
- *Mixed-signal data mining on microphone array hearing aids*, Invited Presentation, Radio-Frequency Integrated Circuits Symposium, Atlanta Georgia, July, 2008 (Host: Sudipto Chakraborty, Texas Instruments).
- *Trainable Mixed-signal Interfaces*, Invited Presentation, Defense Science Research Council (DSRC) Adaptive Electronics Workshop, Arlington VA, Nov 28th 2006 (Host: Prof. Peter Asbeck, UCSD).
- *Micro-power Speaker Verification System-on-chip*, Invited Presentation, Applied Physics Laboratory, Laurel, MD, July 2005 (Host: Dr. Chris P. Diehl).
- *Sequence Learning and Decoding in Margin Propagation Networks*, Invited Presentation, Snowbird Learning Workshop, Snowbird, Utah, April 2005 (Host: Dr. Yoshua Bengio).
- *Hardware-Algorithm Tradeoffs in Implementing Support Vector Machines in Silicon*, PRIP Seminar Series, Michigan State University, 2004 (Host: Prof. Anil Jain).
- *Design of a floating-gate CMOS kernel machine for speech recognition*, Tutorial on Floating Gate Technology, IEEE International Symposium on Circuits and Systems, Phoenix AZ, 2002 (Host: Prof. Paul Hasler, Georgia Tech).
- *A hybrid HMM/SVM speech recognition system*, IEEE Midwest Symposium on Circuits and Systems, Lansing MI, 2000.

RESEARCH GRANTS AND CONTRACTS

- [G1] Principal Investigator, *Trusted Verification of CMOS Integrated Circuits using Zero-power Timers and Synchronization Circuits*, **Defense Advanced Research Projects Agency (DARPA)**, 9/1/2014 - 8/31/2015, 133,564.
- [G2] Senior Personnel, *Mechanically-Equivalent Response Amplifiers and Frequency Modulators for Energy-harvesting Devices*, **National Science Foundation**, 8/16/2014 - 8/15/2017, \$324,309.00 (Credit 10%)
- [G3] Co-Principal Investigator, *CSR: Medium: Self-organizing Cyber Substrates: Exploring a Modular Computing and Communications Architecture for Structural Health Monitoring*, **National Science Foundation**, 08/01/14-07/30/18, \$1,000,000 (Credit 30%).
- [G4] Principal Investigator, *STTR Phase I: Health Monitoring of Orthopedic Implants using Self-powered Piezo-floating-gate Sensing Technology*, **Piezonix LLC/National Science Foundation**, 07/01/14-12/31/14, \$72,253.
- [G5] Principal Investigator, *Self-powered RFID Sensing for Monitoring Complex Product Supply-chain*, **Midland Research Institute for Value Chain Creation**, 05/20/14-05/19/17,

\$300,000.

- [G6] Principal Investigator, *Design and Evaluation of Self-powered Time-stamped Event-logger*, **Johns Hopkins Applied Physics Laboratory/US Department of Navy**, 04/01/14-09/30/14, \$68,000.
- [G7] Co-Principal Investigator, *Ultra-low Power Wireless Sensing System for Multi-metric Self-Powered Monitoring of Bridge Components*, **United States Department of Transportation**, 08/01/13-07/30/17, \$937,135 (Credit 30%).
- [G8] Co-Principal Investigator, *Smart Pavement Monitoring System*, **Federal Highway Administration** (Contract: DTFH61-13-C-00015), 08/15/13-08/14/16, \$444,944 (Credit 25%).
- [G9] Principal Investigator, *Motion Artifact Cancelling MIMO method for Ambulatory Respiratory-rate Monitoring*, **National Institute of Health/General Electrical Global Research**, 08/01/13-07/31/15, \$164,000.
- [G10] Co-Principal Investigator, *Center for Cyber-enabled Cognitive Structures*, **Strategic Partnership Grant, Michigan State University**, 08/01/13-07/31/16, \$481,000 (Credit 35%).
- [G11] Principal Investigator, *Development of Self-powered Age-monitoring Sensor*, **Targeted Support Grant for Technology Development (TSGTD)**, MSU Foundation, 09/01/12-08/01/13, \$60,000.
- [G12] Principal Investigator, *Fabrication and Testing of Gen-II Age-monitoring Sensors*, **Johns Hopkins Applied Physics Laboratory**, 03/01/12-08/30/12, \$47,574.
- [G13] Principal Investigator, *SHF:FAST: A Simulation and Analysis Framework for Designing Large-Scale Biomolecular-Silicon Hybrid Circuits*, **National Science Foundation**, 09/01/11-08/30/15, \$386,602.
- [G14] Principal Investigator, *AIR: Development and Evaluation of Self-Powered Piezo-Floating-Gate Sensor Chipsets for Embedded and Implantable Structural Health Monitoring*, **National Science Foundation**, 08/01/11-07/31/14, \$258,000.
- [G15] Principal Investigator, *Self-powered Age Monitoring Sensors*, **Johns Hopkins Applied Physics Laboratory**, 04/15/11-08/30/11, \$65,000.
- [G16] Principal Investigator, *CAREER: Integrated Research and Education in Self-powered Microsensing for Embedded and Implantable Structural Health Monitoring*, 04/01/10-03/31/15, **National Science Foundation**, CMMI:0954752, \$406,000.
- [G17] Principal Investigator, *Low-power Speaker Identification System (LPSIS)*, **Johns Hopkins Applied Physics Laboratory** (sub-contract through MSU Foundation), 10/01/09-07/30/11, \$286,046.
- [G18] Co-Principal Investigator, *Smart Pavement Monitoring System*, **Federal Highway Administration**, Contract: DTFH61-08-C-00015, 08/15/08-08/14/11, \$375,000 (Credit 25%)
- [G19] Principal Investigator, *SGER: Cooperative Learning-Unlearning Algorithms for Identifying Noise Robust Auditory Manifolds*, **National Science Foundation**, IIS: 0836278, 08/01/08-07/31/09, \$62,010.

- [G20] Principal Investigator, Investigation into *non-conventional analog decoders for low-density parity check codes*, **National Science Foundation**, CCF: 0728996, 01/01/07-09/30/10, \$250,000.
- [G21] Principal Investigator, *A sub-microwatt self-powered fatigue sensor*, CMMI: 0700632, **National Science Foundation**, 05/01/07-04/30/10 \$295,999.
- [G22] Principal Investigator, *Development of forward error-correcting biosensor based on molecular biowires*, **National Science Foundation**, ECCS: 0622056, 09/01/06-08/30/10 \$270,000.
- [G23] Principal Investigator, *Development of micro-power VLSI devices*, **Johns Hopkins Applied Physics Laboratory** (sub-contract through MBI International), Contract No: 0905899, 04/01/08-03/31/09, \$75,300.
- [G24] Co-Principal Investigator, *Advanced Microsystems for Neural Information Processing*, **National Institute of Health**, 04/01/06-03/31/08 \$375,000 (Credit 25%).
- [G25] Principal Investigator, *Micropower speaker verification systems*, **Johns Hopkins Applied Physics Laboratory** (sub-contract through MBI), Contract No: 0939031, 12/01/2005-11/30/2006, \$75,000.
- [G26] Principal Investigator, *Development of ultra-low power acoustic sensors*, **Intramural Research Grant Program**, Michigan State University, 12/01/2005-12/14/2007, \$50,000.

PATENTS

- [P1] S. Chakrabartty, ``*Multiple-input Multiple-output Analog-to-digital Converter*'', US Patent no: 7,479,911, Issued Jan. 20, 2009.
- [P2] S. Chakrabartty, ``*Self-powered Strain-rate Sensor*'', US Patent: 7,757,565, Issued Jul. 20, 2010.
- [P3] S. Chakrabartty, N. Lajnef, N. Elvin, A.Gore, ``*Self-powered Sensor*'', US Patent: 8,056,420, Issued Nov. 15, 2011.
- [P4] S. Chakrabartty, ``*Margin Decoding Communication System*'', US patent: 8,060,810 , Issued Nov. 15, 2011.
- [P5] S. Chakrabartty, ``*Self-powered Strain-gauge*'', US provisional patent: 61/602,247, Filed: 02/23/2012.
- [P6] S.Chakrabartty, Y. Liu, E.C. Alocilja, ``*A Co-detection Protocol for Trace Detection of Pathogens on a Forward-error Correcting Biosensor*'', Michigan State University Disclosure Reference Number TEC2009-0009, 2009.
- [P7] S. Chakrabartty, W.A. Qureshi, ``*Method and Apparatus for On-Chip Optical Spectroscopy*'', Michigan State University Disclosure Reference Number, TEC2011-0020, 2010.
- [P8] S. Chakrabartty, M.Gu, C.Huang, ``*Temperature Independent Floating-gate Current Memory and Analog Processor*'', US provisional patent: 61/566,251, Filed: 03/13/2012.
- [P9] A. Fazel, S. Chakrabartty, ``*Sparse Auditory Reproducing Kernel (SPARK) Features for Noise-robust Speech and Speaker Recognition*'', US provisional patent: 61/643,550, Filed: 05/07/2012.

PROFESSIONAL ACTIVITIES

- *Senior Member, IEEE*
- *Member, American Society for Engineering Education (ASEE)*
- *Associate Editor, IEEE Transactions of Biomedical Circuits and Systems.*
- *Associate Editor, Advances in artificial neural systems, Hindawi Publications.*
- *Review Editor, Frontiers in Neuromorphic Engineering.*
- *Chair, IEEE Circuits and Systems Society, Neural Systems and Applications Technical Committee.*
- *Panelist :*
 - National Science Foundation, ECCS, 2006, 2008.
 - National Science Foundation, CISE, 2014.
 - National Science Foundation, CMMI, 2007, 2010, 2012.
 - National Science Foundation, IIP, 2011, 2012, 2013, 2014.
- *Panelist :*
 - American Society of Engineering Education, SMART Scholarship, 2012.
 - American Society of Engineering Education, NDSEG Scholarship, 2012.
- *International Panel Reviewer :*
 - Natural Sciences and Engineering Research Council of Canada (NSERC), 2008.
 - Dutch Technology Foundation STW, 2009.
- *Keynote Panel:*
 - Pattern Recognition and Machine Intelligence (PReMI09), IIT Delhi, 2009.
- *Organizing Committee :*
 - IEEE Biomedical Circuits and Systems Conference, San Diego, 2011.
 - IEEE Electro-Information Technology Conference, East Lansing, MI, 2006.
- *Technical Committee Member :*
 - IEEE Circuits and Systems: Sensory Systems
 - IEEE Circuits and Systems: Biomedical circuits and systems
 - IEEE Circuits and Systems: Neural systems and applications.
- *Program Committee Member :*
 - 20th Symposium on Integrated Circuits and Systems Design, 2007.
 - 22nd Symposium on Integrated Circuits and Systems Design, 2009
 - IEEE Biomedical Circuits and Systems Conference, 2006-2011.
 - IEEE Statistical Signal Processing Workshop, Ann Arbor, 2012.
- *Session Chair/Co-chair:*
 - Neural Systems and Applications, ISCAS 2012, Seoul, Korea.
 - Analog Circuits and IC Technology, ISCAS 2009, Taipei, Taiwan.
 - Sensor Networks and Algorithms, ISCAS 2009, Taipei, Taiwan.
 - Image Sensors, ISCAS 2009, Taipei, Taiwan
 - Biomedical Instrumentation and Bioanalysis, BIOCAS 2008, Baltimore, MD, USA.
 - Sigma-Delta Modulators, ISCAS 2007, New Orleans, USA.
- *Reviewer*
 - IEEE Journal of Solid-State Circuits.
 - IEEE transactions on Circuits and Systems I and II (TCAS).
 - IEEE transactions on Signal Processing (TSP).

- IEEE transactions on Very Large Scale Integration (TVLSI).
- IEEE transactions on Neural Networks (TNN)
- IEEE sensor journal
- IEEE transactions on Biomedical Engineering (TBME)
- IEEE transactions on Biomedical Circuits and Systems (TBioCAS)
- IEEE transactions on Neural Systems and Rehabilitation Engineering
- Pattern Recognition Journal
- IEEE Communication Letters
- Advances in fuzzy systems, Hindawi.
- Fuzzy sets and systems, Elsevier.
- Sensors and Actuators, Elsevier.
- Analytical Chemistry
- IEEE Int. Symp. On Circuits and Systems (ISCAS).

INSTITUTIONAL SERVICES

- *Chair*, Graduate Studies Committee (Michigan State Univ.), 2011 – 2013
- *Publicity Chair*, (MSU Electrical and Computer Engineering), 2013 – current.
- *Member*, Department Advisory Committee (MSU Electrical and Computer Engineering), 2011-2013, 2014 – current.
- *Member*, Department Research Committee (MSU Electrical and Computer Engineering), 2011-current.
- *Member*, College Graduate Studies Committee (Michigan State Univ.), 2011-2012.
- *Advisor*, Honors College, Computer Engineering, 2011 - current

GRADUATE ADVISEES

Past Graduate Advisees

- Ming Gu, (Ph.D. Spring 2012) Currently Senior Engineer, Fairchild Semiconductors, California. (Thesis: Theory, synthesis and implementation of current-mode CMOS piecewise-linear circuits using margin propagation).
- Pikul Sarkar, (M.S. Summer 2012). Currently Senior Engineer, LSI Corp., Bangalore, India (Thesis: Programmable and Reconfigurable Strain-powered Micro-data-loggers based on Linear Piezo-Floating-Gate Injectors).
- Amin Fazel, (Ph.D. 2012) Currently Research Staff, *CRS Inc., Auburn Hills, Michigan*. (Thesis: Robust Signal Processing Methods for Miniature Acoustic Sensing, Separation and Recognition).
- Chenling Huang, (Ph.D. 2011) Currently Senior Engineer, *Qualcomm Incorporated, San Diego*. (Thesis: Design and Implementation of Integrated Self-powered Sensors, Circuits and Systems).
- Ravi Shaga, (M.S. 2011) Currently Senior Engineer, *Intel Corp., Hillsboro, Oregon*. (Thesis: Noise-shaping Stochastic Optimization and Online Learning with Applications in Digitally-assisted Analog Circuits).
- Yang Liu, (Ph.D. 2010) Currently CEO and co-founder, *Piezonix LLC, East Lansing*. (Thesis: Forward Error-Correcting Biosensors: Design, Modeling and Fabrication).

- Amit Gore, (Ph.D. 2008) Currently Research Scientist, *General Electric Corporate Research, New York, USA*. (Thesis: Design of High-dimensional Oversampling Converters with On-chip Learning: Theory, Design and Hardware Realization).
- Nizar Lajnef, (Ph.D. 2008) Currently Assistant Professor, *Department of Civil and Environmental Engineering, Michigan State University, East Lansing, MI, USA*. (Thesis: Self-powered sensing in structural health and usage monitoring)
- Paul Kucher, (M.S. 2007), Currently Research Scientist, *Johns Hopkins University, Applied Physics Laboratory, Laurel, MD, USA*. (Thesis: Design and evaluation of an automated test platform for large-scale analog floating-gate programming.)
- Cheong Kun, (M.S. 2006) Currently Senior Engineer, *Qualcomm Incorporated, San Diego, CA, USA*. (Thesis: Design, implementation and testing of hybrid algorithmic sigma-delta A/D converters).

Current Graduate Advisees

- Tao Feng, *Ph.D. Candidate* (Expected Spring 2015)
- Kenji Aono, *Ph.D. Candidate* (Expected Fall 2017)
- Mingquan Yuan, *Ph.D. Candidate* (Expected Fall 2017)
- Liang Zhou, *Ph.D. Candidate* (Expected Fall 2017)
- Hassan Khan, *Ph.D. Candidate* (Expected Fall 2015)
- Yarub Omer, *Ph.D. Candidate* (Expected Fall 2017)

PUBLICATIONS

Book Chapters

- [B1] S.Chakrabartty, N. Lajnef, N.Elvin, A.Elvin, ``Toward Self-powered Sensors and Circuits for Biomechanical Implants'', *VLSI Circuits for Biomedical Applications*, eds. Krzysztof Iniewski, Artech House, 2008.
- [B2] S.Chakrabartty, E.C. Alocilja, Y.Liu, ``Integrated Nano-Bio-VLSI Approach for Designing Error-free Biosensors'', *Nano-biosensors*, eds. Sandro Carrara, Springer, 2010.
- [B3] T. Hindo, S. Chakrabartty, ``Noise-exploitation in Neuromorphic Sensors'', *Engineered Biomimicry: Bioinspiration, Biomimetics and Bioreplication*, eds. A. Lakhtakia, R.J. Martin-Palma, Elsevier, 2013.
- [B4] S. Chakrabartty, ``Asynchronous Self-powered Sensing, Computation and Data-logging'', *Advances in Energy Harvesting Methods*, eds. A. Ertuk, N. Elvin, Springer, 2013.

Journal Publications in Chronological order (* denotes corresponding author)

- [J1] N. Lajnef, W. Borchani, R. Burgueno, S. Chakrabartty*, ``Self-powered Piezo-floating-gate Smart-gauges based on Quasi-static Mechanical Energy Concentrators and Triggers'', *IEEE Sensors Journal*, (To appear 2015).
- [J2] T. T. Nguyen*, T. Feng, P. Häfliger, S. Chakrabartty, ``Hybrid CMOS Rectifier based on

- Synergistic RF-Piezoelectric Energy Scavenging”, *IEEE Transactions of Circuits and Systems – I*, (To appear 2014).
- [J3] M. Yuan, Alocilja E. C., S. Chakrabartty*, “A Novel Biosensor based on Silver-enhanced Self-assembled Radio-frequency Antennas”, *IEEE Sensors Letters*, vol. 14, no: 4, pp. 941-942, 2014.
- [J4] M. Gu, S. Chakrabartty*, “Design of a Programmable Gain, Temperature Compensated Current-input Current-output CMOS Logarithmic Amplifier”, *IEEE Transactions of Biomedical Circuits and Systems*, vol.8, no: 3, pp.423-431, 2014.
- [J5] P. Sarkar, S. Chakrabartty*, “Compressive Self-powering of Piezo-Floating-Gate Mechanical Impact Detectors”, *IEEE Transactions of Circuits and Systems-I, (TCAS)*, vol. 60, no: 9, 2013.
- [J6] S. Chakrabartty*, R. Shaga, K. Aono “Noise-shaping Gradient Descent based Online Optimization Algorithms for Digital Calibration of Analog Circuits”, *IEEE Transactions of Neural Networks and Learning Systems*, vol. 24, no:4, pp.554-565, 2013.
- [J7] M. Gu, S. Chakrabartty*, “FAST: A Framework for Simulation and Analysis of Large-scale Protein-Silicon Biosensor Circuits”, *IEEE Transactions of Biomedical Circuits and Systems*, vol.7, no:4, 2013.
- [J8] P. Sarkar, C. Huang, S. Chakrabartty*, “An Ultra-linear Piezo-Floating-Gate Strain-Gauge for Self-powered Measurement of Quasi-static-strain”, *IEEE Transactions of Biomedical Circuits and Systems*, vol. 7, no: 4, Aug 2013.
- [J9] K. Aono, R. Shaga, S. Chakrabartty*, “Exploiting Jump-resonance Hysteresis in Silicon Cochlea for Extracting Speaker Discriminative Formant Trajectories”, *IEEE Transactions of Biomedical Circuits and Systems*, vol.7, no:4, pp. 389-400, 2013.
- [J10] M. Gu, S. Chakrabartty*, “A Varactor-driven, Temperature Compensated CMOS Floating-gate Current Memory with 130ppm/K Temperature Sensitivity”, *IEEE Journal of Solid-State Circuits*, vol. 47, no: 11, pp. 2846-2856, Nov. 2012.
- [J11] A. Fazel, S.Chakrabartty*, “Sparse Auditory Reproducing Kernel (SPARK) Features for Noise-Robust Speech Recognition”, *IEEE Transactions of Audio, Speech and Language Processing*, DOI:10.1109/TASL.2011.2179294, vol.20, no:4, 2012.
- [J12] C. Huang, S. Chakrabartty*, “An Asynchronous Analog Self-powered Sensor-Data-Logger with a 13.56MHz RF Programming Interface”, *IEEE Journal of Solid-State Circuits*, DOI:10.1109/JSSC.2011.2172159, vol. 47, no: 2, Feb, 2012.
- [J13] M. Gu, S. Chakrabartty*, “Synthesis of Bias-Scalable Analog Computing Circuits based on Margin Propagation”, *IEEE Transactions of Circuits and Systems-I*, vol. 69, no:2, Feb. 2012. DOI:10.1109/TCSI.2011.2163968.
- [J14] C. Huang, P. Sarkar, S. Chakrabartty*, “Rail-to-Rail Hot-electron Injection Programming of Floating-gate Voltage Bias Generators at a Resolution of 13bits”, *IEEE Journal of Solid-State Circuits*, vol. 46, no:1, Nov. 2011.
- [J15] M. Gu, S. Chakrabartty*, “An Adaptive, 100pJ/bit, (32,8,4), “Analog LDPC Decoder based on Margin Propagation”, *IEEE Journal of Solid-State Circuits*, vol. 46, no:6, pp.1433-1442, 2011.
- [J16] C. Huang*, S. Chakrabartty, “A current-input current-output CMOS logarithmic amplifier based on translinear Ohm's law”, *Electronics Letters*, vol. 47, no:7, pp.433-434, 2011.

- [J17] C. Huang*, S. Chakrabartty, "A Compact Self-powered CMOS Strain-rate Monitor for Piezoelectric Energy Scavengers", *Electronics Letters*, vol. 47, no:4, pp. 277-278, 2011.
- [J18] A. Fazel, S. Chakrabartty*, "Statistical Pattern Recognition Techniques for Speaker Verification", *IEEE Circuits and Systems Magazine*. vol: 11, no:2, pp. 62-81, 2011.
- [J19] Y. Liu*, M. Gu, E.C. Alocilja, S. Chakrabartty, Co-detection: Ultra-reliable Nanoparticle-Based Electrical Detection of Biomolecules in the Presence of Large Background Interference, *Biosensors and Bioelectronics*, Vol. 26, No:3, pp.1087-1092, 2010.
- [J20] Y. Liu*, E.C. Alocilja, S. Chakrabartty, "Biomolecules Detection using a Silver-Enhanced Gold Nanoparticle-Based Biochip", *Nano Research Letters*, 2010, DOI 10.1007/s11671-010-9542-0.
- [J21] A.Fazel, A.Gore, S.Chakrabartty*, "Resolution Enhancement in Sigma-delta Learners for Super-Resolution Source Separation", *IEEE Transactions of Signal Processing*, vol. 58, no:3, pp. 1193 – 1204, 2010, DOI: 10.1109/TSP.2009.2034909.
- [J22] A.Gore, A.Fazel, S. Chakrabartty*, "Far-field Acoustic Source Localization and Bearing Estimation using Sigma-delta Learners", *IEEE Transactions of Circuits and Systems I*, vol. 57, no:4, pp. 783 – 792, 2010, DOI: 10.1109/TCSI.2009.2027627.
- [J23] C.Huang, N.Lajnef, S. Chakrabartty*, "Calibration and Characterization of Self-powered Floating-gate Usage Monitors with Single Electron per Second Operational Limit", *IEEE Transactions of Circuits and Systems I*, vol. 57, no: 3, pp. 556 – 567, 2010, DOI: 10.1109/TCSI.2009.2024976.
- [J24] A.Gore, S. Chakrabartty*, "A Min-Max Optimization Framework for Designing SigmaDelta Learners: Theory and Hardware", *IEEE Transactions of Circuits and Systems I*, vol. 57, no: 3, pp. 604 – 617, 2010, DOI: 10.1109/TCSI.2009.2025002.
- [J25] Y.Liu, S.Chakrabartty*, "Factor Graph based Biomolecular Circuit Analysis for Designing Forward Error Correcting Biosensors", *IEEE Transactions of Biomedical Circuits and Systems*, vol. 3, no. 3, pp.150-159, June 2009.
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- [C2] L. Zhou, S. Chakrabartty, ``A 7-Transistor-Per-Cell, High-Density Analog Storage Array with 500 μ V Update Accuracy and Greater Than 60dB Linearity'', IEEE Symposium on Circuits and Systems (ISCAS 2014), Melbourne, Australia, 2014.
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- [C5] N. Lajnef, S. Chakrabartty, R. Burgueno, W. Borchani, ``Quasi-static self-powered sensing and data logging'', Proceedings of SPIE NDE/Smart Structures, San Diego, USA, 2014.
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- [C14] K. Aono, R. Shaga, S. Chakrabartty, "Exploiting Jump-Resonance Hysteresis in Silicon Cochlea for Formant Trajectory Encoding", IEEE Proc. Of 55th International Midwest Symposium on Circuits and Systems, Boise, Idaho, 2012.
- [C15] F. Tao, S. Chakrabartty, "Analysis and Design of High-Efficiency Inductive Power-links Using a Novel Matching Strategy", IEEE Proc. Of 55th International Midwest Symposium on Circuits and Systems, Boise, Idaho, 2012.
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