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RESEARCH INTERESTS

- Low-power Analog/Mixed-signal Circuits
- Neural Inspired Circuits
- Bio-CMOS circuits for reliable biosensing
- Energy scavenging and self-powered circuits and systems
- Speech biometrics
- Biomedical Instrumentation

EDUCATION

The Johns Hopkins University, Baltimore, MD
PhD, Electrical and Computer Engineering, 2005

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

Michigan State University , East Lansing, MI <i>Assistant Professor, Department of Electrical and Computer Engineering</i>	8/2004 – Present
The Johns Hopkins University , Baltimore, MD <i>Research Assistant, Electrical and Computer Engineering</i>	5/1999 – 8/2004
University of Tokyo , Tokyo, Japan <i>Visiting Researcher, Department of Informatics</i>	9/2002 - 12/2002
Qualcomm Incorporated , San Diego, CA <i>Engineer, Network and Switching Subsystem Group</i>	1/1998 – 5/1999
Qualcomm International , New Delhi, India <i>Field Engineer, Field Engineering Group</i>	7/1996-1/1998

AWARDS AND HONORS

- *Invited Member, Defense Science Research Council, 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

- 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.
- Introduction to Mixed-signal Integrated Circuits, Fall 2007, Fall 2008
- Analog Integrated Circuits, Spring 2009

INVITED PRESENTATIONS

- *Design of Neuromorphic Data Converters*, Telluride Neuromorphic and Cognitive Workshop, Telluride, Colorado, Jul. 2009.
- *Sigma-Delta Learning: Bridging the gap between neuromorphic systems, machine learning and mixed-signal processing*, Department of Informatics, University of Tokyo, Japan, June 2009.
- *Sensors and Processors for Structural Health Monitoring*, VDEC, University of Tokyo, Japan, June 2009.
- *Operating below the sub-microwatt barrier – Explorations in Analog Computing*, Invited Presentation, Wireless Integrated Microsystems (WIMS), University of Michigan, Ann Arbor, April 2009.
- *CMOS Circuits for Biomechanical Implants*, Invited Presentation, CMOS Emerging Technologies Workshop, Vancouver, August 2008.
- *Sub-microwatt Sensors for Structural Health Monitoring of Biomechanical Implants*, Invited Presentation, University of California, San Diego, August 2008.
- *Towards Reliable Multi-pathogen Biosensors using High-dimensional Encoding and Decoding Techniques*, Invited Presentation, SPIE Symposium on NanoScience+Engineering, CA 2008.
- *High-dimensional Encoding-Decoding Techniques for Reliable Pathogen Detection*, Invited Presentation, Hunter College, City University of New York, Feb 2008.
- *Mixed-signal data mining on microphone array hearing aids*, Invited Presentation, Radio-Frequency Integrated Circuits Symposium, Atlanta Georgia, July, 2008.
- *Trainable Mixed-signal Interfaces*, Invited Presentation, Defense Science Research Council (DSRC) Adaptive Electronics Workshop, Arlington VA, Nov 28th 2006.
- *Micro-power Speaker Verification System-on-chip*, Invited Presentation, Applied Physics Laboratory, Laurel, MD, July 2005.
- *Sequence Learning and Decoding in Margin Propagation Networks*, Invited Presentation, Snowbird Learning Workshop, Snowbird, Utah, April 2005.
- *Micro-power Speaker Verification System-on-chip*, Invited Presentation, Applied Physics Laboratory, Laurel, MD, July 2005.
- *Hardware-Algorithm Tradeoffs in Implementing Support Vector Machines in Silicon*, PRIP Seminar Series, Michigan State University, 2004.
- *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.
- *A hybrid HMM/SVM speech recognition system*, IEEE Midwest Symposium on Circuits and Systems, Lansing MI, 2000.

FUNDING AND CONTRACTS

- Co-Principal Investigator, *Smart Pavement Monitoring System*, Federal Highway Administration, 08/15/08-08/14/11, \$375,000.
- Principal Investigator, *SGER: Cooperative Learning-Unlearning Algorithms for Identifying Noise Robust Auditory Manifolds*, National Science Foundation, 08/01/08-07/31/09, \$62,010.
- Principal Investigator, *Development of forward error-correcting biosensor based on molecular biowires*, National Science Foundation, 09/01/06-08/30/09 \$270,000.
- Principal Investigator, Investigation into *non-conventional analog decoders for low-density parity check codes*, National Science Foundation, 01/01/07-09/30/10, \$250,000.
- Co-Principal Investigator, *Advanced Microsystems for Neural Information Processing*, National Institute of Health, 04/01/06-03/31/08 \$350,000.
- Principal Investigator, *A sub-microwatt self-powered fatigue sensor*, National Science Foundation, 05/01/07-04/30/10 \$289,999.
- Principal Investigator, *Development of micro-power VLSI devices*, Johns Hopkins Applied Physics Laboratory (sub-contract through MBI International), 04/01/08-03/31/09, \$75,300.
- Principal Investigator, *Micropower speaker verification systems*, Johns Hopkins Applied Physics Laboratory (sub-contract through MBI), 12/01/2005-11/30/2006, \$75,000.
- 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

- S. Chakrabarty, "**Multiple-input Multiple-output Analog-to-digital Converter**", US Patent no: 7,479,911, Issued January 20, 2009.
- S. Chakrabarty, "**Margin Decoding Algorithm and Circuit for High-speed Communications**", (**pending**) US patent application 784519, 04/06/2007
- S. Chakrabarty, N. Lajnef, N. Elvin, A. Elvin, A. Gore, "**Self-powered sensor**", (**pending**) US Provisional Patent no: 60/840,056, Filed Aug 24, 2006.

PROFESSIONAL ACTIVITIES

- Associate Editor, *Advances in artificial neural systems*, Hindawi Publications.
- Panelist, National Science Foundation (2006, 2007, 2008)
- Senior Member, IEEE
- Member technical committee for IEEE Neural Network Society and Biomedical circuits and systems (BioCAS) society.
- Organizing Committee, IEEE Electro-Information Technology Conference (East Lansing, 2006).
- Technical Program Committee for 20th Symposium on Integrated Circuits and Systems Design, 2007.
- Reviewer for IEEE transactions on Circuits and Systems, IEEE Int. Symp. On Circuits and systems, IEEE sensors journal, IEEE transactions on signal processing, IEEE transactions on Neural Networks, IEEE transactions on Biomedical engineering, Pattern Recognition Journal.

PAST GRADUATE STUDENTS

- Paul Kucher, (M.S. 2007), Currently Research Scientist at *JHU APL*.
- Nizar Lajnef, (Ph.D. 2008) Currently Assistant Professor, *Michigan State University*

- Amit Gore, (Ph.D. 2008) Currently Research Scientist, *General Electric Corporate Research*.

PUBLICATIONS

Book Chapters

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.

Journal Publications (* denotes corresponding author)

A.Fazel, A.Gore, S.Chakrabartty*, **Resolution Enhancement in sigma-delta Learners for Super-Resolution Source Separation**, *IEEE Transactions of Signal Processing*, (To appear 2009).

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*, (To appear 2009).

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*, (To appear 2009).

A.Gore, S. Chakrabartty*, **A Min-Max Optimization Framework for Designing SigmaDelta Learners: Theory and Hardware**, *IEEE Transactions of Circuits and Systems I*, (To appear 2009).

Y.Liu, S.Chakrabartty*, **Factor Graph based Biomolecular Circuit Analysis for Designing Forward Error Correcting Biosensors**, *IEEE Transactions of Biomedical Circuits and Systems* (To appear 2009).

N. Lajnef, N. Elvin, A. Elvin and S. Chakrabartty, **“Piezo-Powered Floating Gate Injector for Self-Powered Fatigue Monitoring in Biomechanical Implants”**, *IEEE Transactions of Biomedical Circuits and Systems*, pp.164-172, Vol. 2, Sept. 2008.

Y. Liu, A. Gore, S. Chakrabartty*, and E. C.Alocilja, **“Characterization of Sub-systems of a Molecular Bio-wire based Biosensor Device,”** *Microchimica Acta*, 2008, DOI: 10.1007/s00604-008-0950-0.

Y. Liu, S. Chakrabartty*, and E. C.Alocilja, **“Fundamental Building Blocks for Molecular Bio-wire based Forward-error Correcting Biosensors”**, *Nanotechnology*, 18, (2007), 4240172.

S. Chakrabartty*, G.Cauwenberghs, **A Sub-microwatt Analog VLSI Trainable Pattern Classifier**, *IEEE Journal of Solid-State Circuits*, vol. 42, no: 5, May 2007.

S. Chakrabartty* and G. Cauwenberghs, **Gini-Support Vector Machine: Quadratic Entropy Based Multi-class Probability Regression**, *Journal of Machine Learning Research*, Volume 8, pp. 813-839, April 2007.

V. Venkataramani, S. Chakrabartty*, and W. Byrne, **Gini-Support Vector Machines for Segmental Minimum Bayes Risk Decoding of Continuous Speech**, *Computer Speech and Language*, Volume

21, Issue 3, July 2007, pp. 423-442.

S. Chakrabartty*, Y. Deng and G. Cauwenberghs, **Robust Speech Feature Extraction by Growth Transformation in Reproducing Kernel Hilbert Space**, *IEEE Transactions on Speech, Language and Acoustics*, pp. 1842-1849, Vol. 15 Issue: 6, Aug. 2007.

C.Kong and S.Chakrabartty*, **Analog Iterative Decoders based on Margin Propagation**, *IEEE Transactions on Circuits and Systems II*, pp. 1140-1144, Vol. 54, no. 12, Dec. 2007.

Gore, A.; Chakrabartty*, S.; Pal, S.; Alocilja, E. C. "A Multichannel Femtoampere-Sensitivity Potentiostat Array for Biosensing Applications", *IEEE Transactions on Circuits and Systems I: Regular Papers*, Volume 53, Issue 11, Nov. 2006 Page(s):2357-2363.

Y. Zuo; S. Chakrabartty*, S. Pal, Z. Tahir,E.C. Alocilja, "Spatio-temporal Processing of Multichannel Biosensors using Support Vector Machines", *IEEE Sensors Journal*, Volume 6, Issue 6, Page(s): 1644-1651, Dec 2006.

R. Genov, S. Chakrabartty and G.Cauwenberghs*, **Silicon Support Vector Machine with On-Line Learning**, *Int. J. Pattern Recognition and Artificial Intelligence*, vol. 17 (3), pp. 385-404, 2003.

Journal Publications Under Review

M.Gu, K.Misra, H.Radha, S. Chakrabartty*, **Sparse Decoding of Low-density Parity Check Codes based on Margin Propagation**, *IEEE Transactions of Information Theory*, (submitted 2009).

Refereed Conference Publications

M.Gu, K.Misra, H.Radha, S. Chakrabartty, **Sparse Decoding of Low-density Parity Check Codes based on Margin Propagation**, Proc. of *IEEE Globecom*, Honolulu, HI, 2009.

Y.Liu, E. Alocilja, S. Chakrabartty, **Co-detection in Forward Error Correcting Biosensors**, *Nano-DDS Conference*, FL, 2009.

Y.Liu, E. Alocilja, S. Chakrabartty, **Time-based Forward Error Correcting Biosensors**, *Nano-Giga Systems Conference*, Hamilton, CA, 2009.

A. Fazel, S. Chakrabartty, **Non-Linear Filtering in Reproducing Kernel Hilbert Spaces for Noise-Robust Speaker Verification**, to appear in International Symposium on Circuits and Systems (ISCAS), Taipei, Taiwan, 2009.

Y. Liu, D. Zhang, E. C.Alocilja, and S. Chakrabartty, "**Design and Characterization of a Silver-Enhanced Gold Nanoparticle-Based Biochip**", to appear in *IEEE International Symposium on Circuits and Systems*, Taipei, Taiwan, 2009.

N. Lajnef, C. Huang and S. Chakrabartty, "**Infrasonic Power-Harvesting and Nanowatt Self-Powered Sensors**", to appear in *IEEE International Symposium on Circuits and Systems*, Taipei, Taiwan, 2009.

S. Chakrabartty and A.Gore, "**Sigma-Delta Analog to LPC Feature Converters for Portable**

- Recognition Interfaces"**, to appear in *IEEE International Symposium on Circuits and Systems*, Taipei, Taiwan, 2009.
- C. Huang and S. Chakrabartty, "**Reducing Indirect Programming Mismatch Due to Oxide-Traps Using Dual-Channel Floating-Gate Transistors**", to appear in *IEEE International Symposium on Circuits and Systems*, Taipei, Taiwan, 2009.
- M. Shi, A. Abbas, S. Chakrabartty and G. Cauwenberghs "**An Analog Wavelet Transform CMOS APS Imager Chip**", to appear in *IEEE International Symposium on Circuits and Systems*, Taipei, Taiwan, 2009.
- C. Huang and S. Chakrabartty, "**Low-threshold Voltage Multipliers based on Floating-gate Charge-pumps**", *IEEE Biomedical Circuits and Systems Conference*, Baltimore, USA, 2008.
- C. Huang and S. Chakrabartty, "**Self-powered CMOS Impact-rate Monitors for Biomechanical Implants**", *IEEE Biomedical Circuits and Systems Conference*, Baltimore, USA, 2008.
- Y. Liu, E. C. Alcilja and S. Chakrabartty, "Forward Error Correcting Biosensors: Modeling, Algorithm, and Fabrication," *IEEE Biomedical Circuits and Systems Conference*, Baltimore, USA, 2008.
- S. Chakrabartty and Y. Liu, "**Towards Reliable Multi-pathogen Biosensors using High-dimensional Encoding and Decoding Techniques**", *SPIE Symposium on NanoScience+Engineering*, San Diego, CA, 2008.
- A. Fazel , S. Chakrabartty, "**Sigma-Delta Learning for Super-Resolution Independent Component Analysis**", *IEEE International Symposium on Circuits and Systems (ISCAS)*, Seattle, WA, 2008.
- Y. Liu, S. Chakrabartty, E. C. Alcilja, "**A Multiplexed Biosensor based on Biomolecular Nanowires**," *IEEE International Symposium on Circuits and Systems* , Seattle, USA, 2008.
- Y. Liu, S. Chakrabartty, "**Computer Aided Simulation and Verification of Forward Error-Correcting Biosensors**," *IEEE International Symposium on Circuits and Systems* , Seattle, USA, 2008.
- N. Lajnef, S. Chakrabartty and N. Elvin, "**Calibration and Characterization of Self-powered Floating-gate Sensor Arrays for Long-term Fatigue Monitoring**", *IEEE Symposium on Circuits and Systems (ISCAS)*, Seattle WA, May 2008.
- A. Fazel , S. Chakrabartty, "**Sigma-Delta Resolution Enhancement for Far-field Acoustic Source Separation**," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Las Vegas, NV, 2008.
- Y. Liu, A. Gore, S. Chakrabartty, E. C. Alcilja, "**A Molecular Bio-wire based Multi-array Biosensor with Integrated potentiostats**," *IEEE Biomedical Circuits and Systems Conference*, pp. 29-32, Montréal, Canada, Nov.2007.
- Y. Liu, S. Chakrabartty, D. S. Gkinosatis, A. K. Mohanty, and N. Lajnef, "**Multi-walled Carbon Nanotubes/Poly(L-lactide) Nanocomposite Strain Sensor for Biomechanical Implants**," *IEEE*

Biomedical Circuits and Systems Conference, pp. 119-122, Montréal, Canada, Nov.2007.

Y. Liu, A. Gore, S. Chakrabartty, E. C.Alocilja, "**A Molecular Bio-wire based Multi-array Biosensor with Integrated potentiostats**," *IEEE Biomedical Circuits and Systems Conference*, pp. 29-32, Montréal, Canada, Nov.2007. (Invited)

Y. Liu , D. S. Gkinosatis, A. K.Mohanty, and S. Chakrabartty, "**Carbon Nanotube/Poly lactide Nanocomposites for Wearable Strain Sensors**", Nano and Giga Challenges in Electronics and Photonics, Phoenix, Arizona, March, 2007, U.S.A

P. Kucher and S. Chakrabartty , **An Energy-Scalable Margin Propagation-Based Analog VLSI Support Vector Machine**, *IEEE Symposium on Circuits and Systems (ISCAS'2007)*, New Orleans 2007.

N. Lajnef, S. Chakrbartty, N. Elvin and A. Elvin, **Piezo-Powered Floating Gate Injector for Self-Powered Fatigue Monitoring in Biomechanical Implants**, *IEEE Symposium on Circuits and Systems (ISCAS'2007)*, New Orleans 2007.

N. Lajnef, S. Chakrbartty, N. Elvin and A. Elvin, **A sub-microwatt self-powered fatigue sensor** , 14th International Symposium on: Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring, San Diego, March 2007.

A. Gore and S. Chakrbartty , **Large Margin Analog-to-digital converters with applications in Neural Prosthetics**, *Adv. Neural Information Processing Systems (NIPS'2006)*.

S. Chakrbartty, A.Gore and K.Oweiss, **An Adaptive multiple-input multiple-output sigma-delta converter for high-density neuroposthetic electrode arrays**, *IEEE Conference on Engineering in Medicine and Biology (EMBC 2006)*, New York.

A.Gore, S.Chakrabartty, S. Pal and E. Alocilja, **A Multi-channel Femtoampere Sensitivity Conductometric Array for Biosensing Applications**, *IEEE Conference on Engineering in Medicine and Biology (EMBC 2006)*, New York.

N. Lajnef, S.Chakrabartty and N.Elvin, **A Sub-microwatt Piezo-floating-gate Sensor for Long-term Fatigue Monitoring in Biomechanical Implants**, *IEEE Conference on Engineering in Medicine and Biology (EMBC 2006)*, New York.

C.Kong and S.Chakrabartty, **Analog Margin Propagation based Iterative LDPC Decoders**, Analog Decoding Workshop, Torino, Italy 2006.

S. Chakrabartty, **CMOS analog iterative decoders using margin propagation circuits**, *Proceedings of IEEE International Symposium on Circuits and Systems (ISCAS 2006)*, 21-24 May 2006

P. Kucher and S. Chakrabartty, **An Adaptive CMOS Imager with Time-based Compressive Active-pixel Response**, , *Proceedings of IEEE International Symposium on Circuits and Systems (ISCAS 2006)*, 21-24 May 2006.

A. Gore and S. Chakrabartty, **Online Calibration of Floating-gate Detectors for RFID Sensors**,

Midwest Symposium on Circuits and Systems 2005 (Invited Presentation), 7-10 Aug. 2005 Page(s):87 - 90 Vol. 1.

S. Chakrabartty and G. Cauwenberghs, **Sub-Microwatt Analog VLSI Support Vector Machine for Pattern Classification and Sequence Estimation**, Adv. Neural Information Processing Systems (NIPS'2004), Cambridge: MIT Press, 17, 2005

C. Kun, S. Chakrabartty and A. Mason, **A Dynamic Reconfigurable A/D Converter for Sensor Applications**, IEEE Sensors Conference, 30 Oct.-3 Nov. 2005.

S. Chakrabartty and G. Cauwenberghs, **Fixed-current Method for Programming Large Floating Gate Arrays**, Proceedings of IEEE International Symposium on Circuits and Systems (ISCAS 2005), 23-25 May 2005.

Vogelstein, R.J.; Murari, K.; Thakur, P.H.; Diehl, C.; Chakrabartty, S.; Cauwenberghs, G.; **Spike sorting with support vector machines**, *IEEE Conference on Engineering in Medicine and Biology (EMBC 2004)*, Volume 1, 2004 Page(s):546 - 549 Vol.1.

S. Chakrabartty and G. Cauwenberghs, **Margin Propagation and Forward Decoding in Analog VLSI**, *Proc. IEEE Int. Symp. Circuits and Systems (ISCAS'2004)*, Vancouver Canada, 2004.

Y. Deng, S. Chakrabartty and G. Cauwenberghs, **A Three Decades Programmable Fully Differential OTA Design**, *Proc. IEEE Int. Symp. Circuits and Systems (ISCAS'2004)*, Vancouver Canada, 2004.

S. Chakrabartty, Y. Deng and G. Cauwenberghs, **Robust Speech Feature Extraction by Growth Transformation in Reproducing Kernel Hilbert Space**, *Proc. IEEE Int. Conf. Acoustics Speech and Signal Processing (ICASSP'2004)*, Montreal Canada, 2004.

V. Venkataramani, S. Chakrabartty and W. Byrne, **Support Vector Machines for Segmental Minimum Bayes Risk Decoding of Continuous Speech**, *IEEE Automatic Recognition and Understanding Workshop (ASRU'03)* St. Thomas, U.S. Virgin Islands, Nov. 30-Dec. 4, 2003.

S. Chakrabartty, G. Cauwenberghs and Jayadeva, **Sparse Probability Regression by Label Partitioning**, *Proc. 16th Conf. Computational Learning Theory (COLT'03)*, Washington DC, Aug. 24-27, 2003.

S. Chakrabartty and G. Cauwenberghs, **Power Dissipation Limits and Large Margin in Wireless Sensors**, *Proc. IEEE Int. Symp. Circuits and Systems (ISCAS'2003)*, Bangkok Thailand, May 25-28, 2003.

S. Chakrabartty, M. Yagi, T. Shibata and G. Cauwenberghs, **Robust Cephalometric Landmark Identification Using Support Vector Machines**, *Proc. IEEE Int. Conf. Acoustics Speech and Signal Processing (ICASSP'2003)*, Hong Kong, Apr. 6-10, 2003.

S. Chakrabartty and G. Cauwenberghs, **Expectation Maximization of Forward Decoding Kernel Machines**, *Proc. 9th Int. Workshop Artificial Intelligence and Statistics (AISTATS'2003)*, Key West FL, Jan. 3-6, 2003.

S. Chakrabartty and G. Cauwenberghs, **Forward-Decoding Kernel-Based Phone Sequence**

Recognition, *Adv. Neural Information Processing Systems (NIPS'2002)*, Cambridge: MIT Press, vol. 15, 2003.

S. Chakrabartty and G. Cauwenberghs, **Forward Decoding Kernel Machines: A Hybrid HMM/SVM Approach to Sequence Recognition**, *Proc. SVM'2002, Lecture Notes in Computer Science*, vol. 2388, pp. 278-292, 2002.

S. Chakrabartty and G. Cauwenberghs, **Sequence Estimation and Channel Equalization Using Forward Decoding Kernel Machines**, *Proc. IEEE Int. Conf. Acoustics Speech and Signal Processing (ICASSP'2002)*, Orlando FL, May 13-17, 2002.

S. Chakrabartty and G. Cauwenberghs, **Hybrid Support Vector Machine, Hidden Markov Model Approach for Continuous Speech Recognition**, *Proc. 43rd IEEE Midwest Symp. Circuits and Systems (MWSCAS'2000)*, Lansing MI, August 8-11, 2000.

S. Chakrabartty, M. Stanacevic and T.D. Tran, **Adaptive Image Database Using Wavelets**, *Proc. 34th IEEE Asilomar Conference on Signals, Systems and Computers*, vol. 2, pp. 1856-1860, Pacific Grove, Oct. 2000.
