

Research

GRANTS:

Project Title: Architectural Support for Regular Expression Matching
Sponsor: Intel Corporation
Amount: \$23,000
Duration: Dec 2006 – Dec 2007
PI: Yan Luo

Project Title: Cycle and Charge/Discharge Conditioning of Large Format Lithium -Ion Cells
Sponsor: International Battery INC.
Amount awarded: \$ 27,610
Duration: Dec.1, 2006-July 31,2007
PI: Ziyad Salameh

JOURNAL PUBLICATIONS:

"Fabrication of a Novel Micron Scale Y-Structure-Based Chiral Metamaterial: Simulation and Experimental Analysis of its Chiral and Negative Index Properties in the Terahertz and Microwave Regimes," Nantakan Wongkasem, Alkim Akyurtlu, Kenneth A. Marx, William D. Goodhue, Jin Li, Qi Dong, and Earl T. Ada, Special Issue on Nanomanufacturing, *Microscopy Research and Technique*, accepted January, 2007.

"Homogenization of Metamaterial-loaded Substrates and Superstrates for Antennas," A. Semicaevsky and A. Akyurtlu, *PIERS*, accepted, February 23, 2007.

CONFERENCE PRESENTATIONS:

P. Piyachon and Y. Luo, "Efficient Memory Utilization on Network Processors for Deep Packet Inspection", presented at ACM Symposium on Architectures for Network and Communications System, San Jose, CA, Dec 4, 2006

Frank Tredeau and Ziyad Salameh, "Characterization of the M100-12 NiZn Battery," *Power Engineering Society Annual Conference*, January 3- 5, 2007, Clearwater, Florida.

Joel Therrien and Amir Dindar, "A resonant tunneling CdSe quantum dot photodetector for spectral resolution in the visible region", 20–25 January 2007, San Jose, California.

Clay Didier, Stephen Glick, Mufeed Mahd, Xing Gong, Yu Chen, "Investigation Of The Use Of Iodine In A Proposed CT Mammography System," accepted in the *Proceedings of SPIE, Smart Structures & Materials/NDE, March 2007, San Diego, California, USA.*

Michael O'Connor, Stephen J. Glick, Mufeed Mahd, Xing Gong, Clay Didier, "Characterization Of A Prototype Tabletop X-Ray Ct Breast Imaging System," accepted in the *Proceedings of SPIE, Smart Structures & Materials/NDE, March 2007, San Diego, California, USA.*

Clay Didier, Stephen Glick, Xing Gong, Yu Chen, Mufeed Mahd, "Investigation of the Use Of Iodine Contrast Agent In A Proposed Flat Panel CT Mammography System," Third Biomedical Society Symposium, February 23, 2007, Lowell, MA

J. Michael O'Connor, Stephen J. Glick, Xing Gong, Clay Didier, Mufeed Mahmoud, "Characterization of a Prototype Tabletop X-ray CT Breast Imaging System," Third Biomedical Society Symposium, February 23, 2007, Lowell, MA

Narendra Vaidya, Bryan Buchholz, Mufeed Mahd, "A Three Degree of Freedom Control Scheme for a Prosthetic Hand," Third Biomedical Society Symposium, February 23, 2007, Lowell, MA

Faculty News:

Two technologies developed in Prof. S. Mil'shtein lab are have been opted for commercialization:

- 1) Developed at AETC the transistor design technology allows designing linear amplifiers with constant transconductance and switches with improved linearity using the technique of tailoring electrical field in quantum electronic transistors. The essence of this technology:

Properly shaping electrical field profile along the channel of a transistor allows better control of the flux of electrons through a device. That in turn leads to improved performance of electronic circuits. Operational frequency is higher so is power, breakdown voltage increases, gain (amplification) is almost constant and linearity gets better.

The Massachusetts Technology Transfer Center' \$5000 award was received together with Prof. B.Nelson of the College of Management to study semiconductor electronics market. Recent MTTC \$40,000 award will support the expansion of the technology platform. In addition to amplifiers and switches variety of mixers, shifters etc. will be included.

Experimental wafers with novel amplifiers are on their way to production at TYCO Electronics. The company invested significant amount of money in production of trial wafers. In addition, Tyco's contract of \$48,586 will support students' design work. The licensing agreements are in discussions with other electronic companies.

2) In research conducted by the AETC novel imaging had been developed, namely, a low cost Infra-Red (IR) imaging system (hardware and software). Using IR one can biological objects, and human arms, legs, palms, fingers, etc. in order to visualize different tissues, tendons, muscles, ligaments, blood vessels, bones and cartilages, and tumors. Some of these objects cannot be detected by conventional X-rays. The major advantage of this technology:

The light from infrared sources is not damaging, therefore imaging can be both real-time and continuous. Moreover, we can visualize moving tendons and bones in patient hands or legs with simultaneous presence of hands of a physician, who assesses the damage. This kind of examination is impossible with x-rays.

The Infrared scanner for medical diagnostics was supported recently by \$20,000 NCIIA award. This award was received together with Prof. V.Kijewsky of the College of Management. Part of this study was focused on medical device market. Recent \$20,000 UMass CVIP award will help to extend the IR diagnostics in to the mammography area.

Calendar of Important Dates

March

9 Friday *Spring Recess Begins at 10:00 P.M.
*Residence halls close at 6:00 P.M.
18 Sunday *Residence halls Open at 12 Noon
19 Monday *Classes Resume
20 Tuesday *Mid-Semester: At Least One Evaluation Required in Each Course