UNIVERSITY OF HOUSTON
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

2005 ANNUAL REPORT

CONTENTS

ACKNOWLEDGEMENTS

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Haluk Ogmen, P.E., Ph.D.
Professor and Chair

On behalf of the Department of Electrical & Computer Engineering at the University of Houston, I would like to present this annual report which provides an overview of our activities during calendar year 2005.

One of our faculty members, Dr. Gerhard "Gerry" Paskusz retired. Gerry joined the University of Houston in 1961. He was among the first researchers to use computers and electrical circuits to simulate biological systems. In 1974, he founded PROMES (Program for Minorities in Engineering Studies; later changed to Program for Mastery in Engineering Studies), which offers study groups and workshops to minority students, allowing them the opportunity to reach their full potential as productive engineers. In addition to his academic contributions, Gerry will be remembered as a pioneer in programs designed to give equal opportunities to minorities and under-represented groups. His legacy will live on in our department and college. The spotlight on page 19 provides a review of Gerry's career.

As a department, we continue to pursue our strategic hiring plan. In 2004, three junior faculty members in the areas of computer engineering and neuro-engineering were hired. In 2005, Dr. Stanko Brankovic joined the department as a new assistant professor from Seagate Technologies. Stanko is working in the areas of electro-deposition, electrocatalysis and nanofabrication technology. The spotlight on page 18 highlights his background and achievements.

The year 2005 marked the completion of the new $81M Science and Engineering Research and Classroom Complex (SERCC). SERCC was designed by the world-renowned *Cesar Pelli and Associates* architectural firm and provides 200,000 sq-ft, state-of-the-art facilities for teaching and research. A more in-depth coverage of SERCC can be found on page 16 of the annual report.

During the calendar year 2005, our faculty published 63 refereed journal articles; four book chapters; gave 109 conference presentations; and one faculty member was granted seven U.S. patents. The core faculty of the department generated research expenditures of approximately $4M during the year. Furthermore, 82 B.S.E.E., 17 B.S.Cp.E., 31 M.E.E., four M.S. (Computer and Systems), 15 M.S.E.E., and 13 Ph.D. degrees were awarded during 2005.

The excellence of our faculty members has been recognized by several honors and awards during 2005:

Betty Barr	» *Abraham E. Dukler Distinguished Engineering Faculty Award, Cullen College of Engineering*
David R. Jackson	» *IEEE Region V Conference Best Educator Award*
Valery A. Kalatsky	» *Alfred P. Sloan Research Fellow, Neuroscience*
Stuart A. Long	» *Elected to IEEE Board of Directors, 2005–2006*
Haluk Ogmen	» *Member, Central Visual Processing Study Section (CVP), Center for Scientific Review, National Institutes of Health, 2005–2009* » *Honorary Visiting Professor of Computational Neuroscience, University of Bradford, Bradford, U.K.*
Paul Ruchhoeft	» *Outstanding Teacher Award, Cullen College of Engineering*
John C. Wolfe	» *Member of the Advisory Committee, International Conference on Electron, Ion and Photo Beam Technology and Nanofabrication* » *Member of the Advisory Committee, International Conference on Micro- and Nano-Engineering*

However, these accomplishments need to be put in a broader context to fully understand and appreciate what our department is all about. Throughout the twentieth century, our discipline produced innovations, such as electronic systems, computers, and the internet, all of which has fundamentally transformed our society. Our field has been a major engine for economic growth and job creation. Today, leading-edge research in electrical and computer engineering is exploring structures at the nanoscale and building technologies that will impact a wide-range of areas, including computing and data storage, energy conversion, biological sensing and the environment.

Neuroscience is viewed by many as the scientific frontier of the twenty first century. Significant amount of data has been accumulating over the last three decades. It is highly desirable to develop a theoretical understanding coupled with engineering fundamentals to transform this information into technologies that impact the field of mental health.

Innovations in sensor design offer a broad range of technological opportunities. Many sensors are based on nano-structures and have potential applications in neuro-engineering. For example, sensors embedded in nervous system implants can be used to reduce the symptoms associated with Parkinson disease, epilepsy and depression. Advanced sensors also find applications in oil exploration and defect detection in highways and buildings, thus impacting the energy and infrastructure sectors.

Our vision is to contribute through education and research to technological changes that will shape society in the coming decades. The strategic plan of our department is to supplement relatively mature areas of research such as control systems and applied electromagnetics, by focused efforts in novel and innovative areas in nano-technology and neuro-engineering. We are also initiating a third synergetic effort in sensor technology. This annual report gives a brief overview of our efforts in these areas.

I thank you for your interest in our department and would like to encourage you to visit us in person or online at www.egr.uh.edu/ece/.

MISSION STATEMENT

At the undergraduate level, the mission of the Electrical and Computer Engineering Department is to ensure that our students acquire the necessary knowledge, skills, and abilities to perform successfully in today's world as engineers, and to instill in them an ability for life-long learning and a sense of professional responsibility that will enable them to continue their professional development throughout their careers.

At the graduate level, the mission of our program is to involve our students in advanced education and state-of-the-art research, in order to give them the technical expertise that will enable them to become advanced practicing engineers and productive researchers.

To fulfill our mission, we have set the following specific goals for our programs.

Undergraduate Program

1. To ensure that each student acquires a solid knowledge-base in the fundamentals of mathematics and basic science, as well as the basic skills of critical thinking and problem solving.
2. (a) To develop within each student in the Bachelor of Science in Electrical Engineering program a thorough knowledge of the electrical engineering discipline, including a broad knowledge of the main fields, and an in-depth knowledge in one or more of these fields, chosen by the student.

   (b) To develop within each student in the Bachelor of Science in Computer Engineering program a thorough knowledge of the computer engineering discipline, including a broad knowledge of the electrical and computer engineering fields, and an in-depth knowledge in the computer engineering field.
3. To maintain a state-of-the-art set of laboratories and ensure that students receive a significant and positive laboratory experience as part of their curriculum.
4. To develop in each student the communication and team-working skills necessary to perform effectively as an engineer, and to impart to each student a sense of ethical and professional responsibility.
5. To have each student obtain the type of real-world design experience that is crucial to the education of an engineer, including an appreciation for technical, as well as economic and contemporary social issues.
6. To give each student the ability to achieve life-long learning and a desire for professional development.
7. To improve retention rates, promote academic success, and allow students to get the most from their educational experience by giving all students access to beneficial mentoring and advising.
8. To instill students with an enthusiasm for electrical and computer engineering by offering exciting and interesting freshman engineering courses.
9. To allow all students the opportunity to participate in a beneficial cooperative educational experience with industry during their program, if they choose to do so.
10. To keep a sufficient percentage of the required courses in the program scheduled during the early morning and evening, so that part-time students can attend and complete the program.

Graduate Program

1. To offer advanced state-of-the-art courses on topics of modern interest and importance.
2. To provide students in the M.E.E. (non-thesis) programs the opportunity to participate in professional projects, including internships with industry, as preparation for professional careers in industry.
3. To direct students in the M.S. (thesis) programs in significant research, as preparation for continued graduate work or professional/research careers in industry.
4. To direct Ph.D. students in leading-edge research, as preparation for academic careers or advanced research-oriented careers in industry.

BRIEF FACULTY PROFILES


Anderson

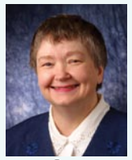
Wallace L. Anderson

Professor

Sc.D., University of New Mexico

Research Interests

Coherent Optics, Signal Processing, Pattern Recognition, Communications, Estimation Theory


Barr

Betty J. Barr

Associate Professor & Director of Undergraduate Studies

Ph.D., University of Houston

Honors & Awards

» Abraham E. Dukler Distinguished Engineering Faculty Award, 2005
» Career Teaching Award, Cullen College of Engineering, University of Houston, 2003
» Outstanding Teaching Award, Cullen College of Engineering, University of Houston, 2001
» George Magner Academic Advising Award, 1993
» Outstanding Faculty Advisor, Engineering Student Organizations, 1993
» Commendation, College Effective Instruction Committee, 1992, 1985, 1984, 1983
» W.T. Kittinger Teaching Excellence Award, Cullen College of Engineering, University of Houston, 1990, 1982

Research Interests

Numerical Analysis


Brankovic

Stanko R. Brankovic

Assistant Professor

Ph.D., Arizona State University

Honors & Awards

» Graduate Academic Scholarship Award, Arizona State University, 1997–1998
» Annual Award "Fond Paja S. Tutundzic" for outstanding undergraduate record, 1992–1993 and 1993–1994
» Serbian Academy of Sciences Annual Award for outstanding undergraduate research, 1994

Research Interests

Electrochemical Thin Film Growth, Magnetic Materials and Sensors, Nanofabrication, Electrocatalysis and Interfacial Electrochemistry


Charlson

Earl J. Charlson

Professor

Ph.D., Carnegie Mellon

Honors & Awards

» Most Admired Professor Award by Eta Kappa Nu (UMC)
» Outstanding Electrical Engineering Professor by graduating classes of Dec. 1971, Dec. 1973, May 1975 (UMC)
» Two Curator Scholarships, Westinghouse Achievement Scholarship, Missouri Power
» Conference Award, Outstanding AIEE Junior Award, Outstanding AIEE Senior Award from Eta Kappa Nu, Sigma Xi, Tau Beta Pi, Phi Kappa Phi
» TMAC Champion Award (for service to Gulf Coast Texas Manufacturing Assistance Center)
» Vice Chairman, Graduate and Professional Studies Council, University of Houston, 2003–2004

Research Interests

Integrated Circuit Layout Design and Fabrications, Solid State Devices


J. Chen

Ji Chen

Assistant Professor

Ph.D., University of Illinois at Urbana-Champaign

Honors & Awards

» Junior Faculty Research Award, Cullen College of Engineering, University of Houston, 2004–2005
» IEEE Electromagentic Compatibility Symposium Best Student Paper Award, Advisor, 2005
» Motorola Engineering Award, 2000

Research Interests

Computer Engineering, Computational Electromagnetics, Micro and Nano-electromagnetics, Biomedical Instruments


X. Chen

Xuemin Chen

Research Assistant Professor

Ph.D., Nanjing University of Science and Technology (NUST), P.R. China

Honors & Awards

» Top Research Innovations and Findings, Texas Department of Transportation

Research Interests

Advanced Sensor Development, Signal Processing, RF and Microwave Circuit Design, Control and Measurement System Design


Y. Chen

Yuhua Chen

Assistant Professor

D.Sc., Washington University in St. Louis

Research Interests

Optical Networks, FPGA-based Reconfigurable Systems, Intelligent Sensor Networks, Reconfigurable System-on-Chip (SoC), Networks-on-Chip (NoC), Quality-of-Service (QoS), Heterogeneous Networks, High Performance Routers and System Prototyping

Frank J. "Fritz" Claydon

Professor & Associate Dean for Undergraduate Programs and Computer Facilities

Ph.D., Duke University

Honors & Awards

» Tau Beta Pi, Engineering Honor Society
» Eta Kappa Nu, Electrical Engineering Honor Society
» Beta Mu Beta, Biomedical Engineering Honor Society
» IEEE/HKN Outstanding Teacher, University of Houston, 2000
» Superior Performance in University Research, University of Memphis, 1991–1995
» Distinguished Research Award: Finalist, University of Memphis, 1994, 1993
» Distinguished Teaching Service Award: Finalist, University of Memphis, 1992

Research Interests

Cardiac Electrophysiology, Undergraduate Education

Ovidiu Crisan

Professor

Ph.D., Polytechnic Institute of Timisoara, Romania

Honors & Awards

» Member of the Editorial Board of "Electric Power Components and Systems", Taylor & Francis Ltd. Publishing Corporation
» Senior Member of IEEE
» Member of CIGRE
» Outstanding Teacher Award, Cullen College of Engineering, University of Houston, 2001–2002
» Outstanding Student Branch Counselor Award, IEEE Region 5, 2004, 2003, 1998

Research Interests

Power Systems Operation Optimization, Control and Available Transfer Capability (ATC) within the Deregulated Environment

John R. Glover

Professor

Ph.D., Stanford University

Honors & Awards

» Elected to Phi Kappa Phi, March 2003
» Professor of the Year Award, IEEE Student Branch, 2003
» Outstanding Engineering Educator Award, IEEE Region 5, 2000
» Outstanding Teaching Award, Cullen College of Engineering, University of Houston, 1992
» Outstanding Transactions Paper Award from the IEEE Trans. on Education, 1981

Research Interests

Adaptive Signal Processing, Biomedical Signal Analysis, Intelligent Systems

Thomas J. Hebert

Associate Professor

Ph.D., University of Southern California

Honors & Awards

» Research Excellence Award, Cullen College of Engineering, University of Houston, 1996
» Fellow, American Electronic Association, University of Southern California, 1984–1988

Research Interests

3-D Medical Imaging, Video/Image Processing, Bayesian Estimation, Adaptive Optics

David R. Jackson

Professor

Ph.D., UCLA

Honors & Awards

» IEEE Region V Conference Best Educator Award, 2005
» W.T. Kittinger Teaching Excellence Award, Cullen College of Engineering, University of Houston, 2003–2004
» Best Presentation Award, ION GPS Conference, 2003, 2002
» Outstanding Teaching Award, Cullen College of Engineering, University of Houston, 2002–2003
» Distinguished Lecturer, IEEE Antennas and Propagation Society, 2000–2002
» Outstanding Teaching Award, Cullen College of Engineering, University of Houston, 1999–2000
» Fellow of the IEEE, 1999
» University-wide Excellence in Research and Scholarship Award at the Associate Professor level, University of Houston, 1997
» Faculty Recognition Award, City of Houston, 1993
» Young Faculty Research Award, Cullen College of Engineering, University of Houston, 1991

Research Interests

Microstrip Antennas, Leaky-wave Antennas, Periodic Structures, High-frequency Effects in Microwave Integrated Circuits, Electromagnetic Interference and Compatibility

Ben H. Jansen

Professor

Ph.D., Free University, Amsterdam, The Netherlands

Honors & Awards

» Consulting Editor for Clinical Neurophysiology (formerly: Electroencephalography and Clinical Neurophysiology, published under the supervision of the Int. Fed. of Societies for Electroencephalography and Clinical Neurophysiology), 1989–2004
» Scientific Program Chair, 5th Annual Conference of the EEG and Clinical Neuroscience Society, Houston, 2003
» Member, Special Study Section-8, SBIR-program, NIH, 1993–2001
» Elected Senior Member of IEEE, 1990
» Faculty Development Leave Award, University of Houston, 1988–1989

Research Interests

(Biomedical) Signal Analysis and Intelligent Systems, Neural Engineering


Claydon


Crisan


Glover


Hebert


Jackson


Jansen


Kalatsky


Karayiannis


Le


Li


Litvinov


Liu

Valery Kalatsky

Assistant Professor

Ph.D., Texas A&M University

Honors & Awards

» Alfred P. Sloan Research Fellow, Neuroscience, 2005
» New Faculty Research Program, University of Houston, 2005
» Phi Kappa Phi, Texas A&M University Chapter, 1998
» Distinguished Scholarship, Moscow Institute of Physics and Technology, 1989–1993

Research Interests

Neuro-engineering, Optical Imaging of Intrinsic Signals, Neuro-biology, Brain Mapping, Representation of Sensory Modalities in Mammalian Neocortex

Nicolaos B. Karayiannis

Professor

Ph.D., University of Toronto

Honors & Awards

» El Paso Energy Foundation Faculty Achievement Award, University of Houston, 2000
» Outstanding Teacher Award, HKN and IEEE Student Chapters, Department of Electrical & Computer Engineering, 1997
» Young Faculty Research Excellence Award, Cullen College of Engineering, University of Houston, 1997
» Outstanding Teacher Award, Cullen College of Engineering, University of Houston, 1992–1997
» W.T. Kittinger Teaching Excellence Award, Cullen College of Engineering, University of Houston, 1994

Research Interests

Medical Imaging and Diagnostic Video, Computational Intelligence (Neural Networks and Neuro-fuzzy Systems), Pattern Recognition, Wireless Communications, Image and Video Compression

Han Le

Professor

Ph.D., Massachusetts Institute of Technology

Honors & Awards

» Technology Council of the Gerson-Lehrman Investment Group
» Member of focus study group, U.S. Department of Homeland Security, 2004
» DARPA Outstanding Performer Award (team), 2000
» Chief Technology Advisor of Applied Optoelectronics, 1999–2000
» IBM National Fellowship, National Magnet Laboratory, MIT, 1984–1985

Research Interests

Semiconductor Optoelectronics, Lasers, Photonics, Optical Sensing and Imaging, Optical System, Lidars, Smart Sensing Systems

Jing Li

Research Assistant Professor

Ph.D., Jiaotong University, Xian, China

Honors & Awards

» Top Research Innovations and Findings, Texas Department of Transportation, 2005

Research Interests

Ground Penetrating Radar, GPR Modeling and Signal Processing, Ultra Wide Band Antennas, EM Numerical Simulation, Sensor Design, Electromagnetic Interference and Compatibility

Dmitri Litvinov

Associate Professor

Ph.D., University of Michigan, Ann Arbor

Research Interests

Nanomagnetics: Magnetic Computing, Single-molecule Biosensors, Terabit Data Storage Systems Based on Patterned Magnetic Recording Medium, Scalability Issues in Magnetoelectronics, Nanofabrication

C. Richard Liu

Professor

Ph.D., Jiaotong University, Xian, China

Honors and Awards

» Most Innovative Research Project, Texas Department of Transportation, 2005
» Device Provides Concrete Answers, Houston Chronicle Article, Nov. 14, 2005

Research Interests

Sensor Technologies, Well Logging and Wireless Communications

Stuart A. Long

Professor & Associate Dean for Educational Activities

Ph.D., Harvard University

Honors and Awards

» Phi Beta Kappa, Tau Beta Pi, B.A. granted magna cum laude
» NSF Fellowship
» Sigma Xi
» Member, Electromagnetics Academy
» Fellow of the IEEE
» Elected to IEEE Board of Directors, 2005–2006
» Educator of the Year, IEEE Region 5, 2003
» Outstanding Faculty Award, University of Houston Alumni Organization, 2002
» IEEE Millennium Medal, 2000
» President, IEEE Antennas and Propagation Society, 1996
» Senior Research Award, Cullen College of Engineering, University of Houston, 1995
» Outstanding Electrical Engineering Teacher, IEEE-HKN, 1994
» Distinguished Lecturer, IEEE Antennas and Propagation Society, 1992–1994
» Distinguished Engineering Faculty Award, Engineering Alumni Association, 1992
» University Teaching Excellence Award, 1991
» Editorial Board of the Journal of Electromagnetic Waves and Application, 1986–1990
» W.T. Kittinger Teaching Excellence Award, Cullen College of Engineering, University of Houston, 1983
» Nomination for C. Holmes MacDonald Distinguished Young Electrical Engineering Teacher Award by local Eta Kappa Nu Chapter, 1980, 1978, 1977
» Hamilton Award as Outstanding Engineering Graduate, 1968

Research Interests

Dielectric Resonator and Microstrip Antennas, Wireless Communications Antennas, High Temperature Superconducting Antennas, Electromagnetic Measurements

Pauline Markenscoff

Associate Professor

Ph.D., University of Minnesota

Research Interests

Cellular Automata—Modeling of Biological Systems Using Cellular Automata, Development and Implementation of Parallel Algorithms based on Cellular Automata; Parallel Processing—Task Scheduling Problems on Parallel Processors, Modeling and Performance Evaluation of Computer Systems

Haluk Ogmen

Department Chair & Professor

Ph.D., Université Laval, Québec, Canada

Honors & Awards

» Member of Central Visual Processing Study Section (CVP), Center for Scientific Review, National Institutes of Health, 2005–2009
» Honorary Visiting Professor of Computational Neuroscience, University of Bradford, Bradford, U.K.
» Fellow, Hanse Wissenschaftskolleg (Hanse Institute for Advanced Studies), 2004
» Senior Faculty Research Award, Cullen College of Engineering, University of Houston, 2003
» W.T. Kittinger Teaching Excellence Award, Cullen College of Engineering, University of Houston, 1998
» Outstanding Teacher Award, Cullen College of Engineering, University of Houston, 1995, 1994, 1993
» Young Faculty Research Award, Cullen College of Engineering, University of Houston, 1994

Research Interests

Visual Perception, Visual Psychophysics, Neural Modeling, Neuro-Engineering, Computational Neuroscience

David M. Pai

Associate Professor

Ph.D., University of British Columbia, Canada

Research Interests

Optical Communications, High Power Fiber Lasers

Saumil S. Patel

Research Assistant Professor

Ph.D., University of Houston

Honors & Awards

» Nomination, Invention of the Year, NASA, 1993
» Certificate of Recognition, NASA, 1993
» Public Service Achievement Award, NASA, 1991
» Lightning Award, G.E./NASA, 1991
» Peer Recognition Award Nominee, G.E./NASA, 1989

Research Interests

Sensorimotor Systems, Visual Perception, Computational Modeling of Neural Systems, Neuro-Engineering, Artificial Vision Systems and Biomedical Instrumentation

Steven S. Pei

Professor

Ph.D., State University of New York at Stony Brook

Honors & Awards

» Outstanding Achievement Award, Association of American-Chinese Professionals, 1999
» Senior Faculty Research Award, Cullen College of Engineering, University of Houston, 1999
» Shell Interdisciplinary Scholar, 1995

Research Interests

Optoelectronic Materials and Devices, High Speed and High Band Width Electronic Materials and Devices, Sensors and Tracking Devices for Public Safety, Homeland Security and Health Care Applications


Long


Markenscoff


Ogmen


Pai


Patel


Pei


Ruchhoeft


Shattuck


Sheth


Shieh


Trombetta

Paul Ruchhoeft

Assistant Professor

Ph.D., University of Houston

Honors & Awards

» Outstanding Teacher Award, Cullen College of Engineering, University of Houston, 2005

» Young Faculty Research Excellence Award, Cullen College of Engineering, University of Houston, 2004

Research Interests

Nanofabrication, Microfabrication, Lithography, Solid-liquid Separation, Thin-film Deposition, Reactive Ion Etching, and Modeling of Resist Exposure and Development

David P. Shattuck

Associate Professor

Ph.D., Duke University

Honors & Awards

» IEEE/HKN Outstanding Teacher Award, Department of Electrical and Computer Engineering, 2004, 2002, 1999, 1991

» Outstanding Engineering Educator Award, IEEE Region 5, 2003

» El Paso Corporation Faculty Achievement Award, University of Houston, 2003

» A.E. Dukler Distinguished Faculty Award, 2001

» Outstanding Teacher Award, Cullen College of Engineering, University of Houston, 2001, 1999

» Outstanding Faculty Award, Houston Alumni Organization, 1999

» Enron Teaching Excellence Award, University of Houston System, 1999

» Runner-up, W.T. Kittinger Teaching Excellence Award, Cullen College of Engineering, University of Houston, 1996–1997

» W.T. Kittinger Teaching Excellence Award, Cullen College of Engineering, University of Houston, 1990–1991

» Outstanding Educator, Mortar Board National Honor Society, 1989–1990

Research Interests

Development of Computer-based Tools for Effective Instruction in Circuit Analysis and Electronics

Bhavin R. Sheth

Assistant Professor

Ph.D., Massachusetts Institute of Technology

Honors & Awards

» Caltech, Division of Biology Fellowship, 1998–2003

» The Sontheimer Award (MIT), 1996

» McDonnell-Pew Fellowship in Cognitive Neuroscience, 1991–1995

Research Interests

Visual Perception, Multisensory Integration, Functions of Sleep, Autism and Related Developmental Disorders, Neural Basis of Insight

Leang S. Shieh

Professor

Ph.D., University of Houston

Honors & Awards

» Senior Members, IEEE

» Senior Members, AIAA

» Registered Professional Engineer in the State of Texas

» Recipient of more than 10 College Outstanding Teacher Awards, Cullen College of Engineering, University of Houston

» Fluor Daniel Faculty Excellence Award, Cullen College of Engineering, University of Houston, 2003–2004

» El Paso Faculty Achievement Award, University of Houston, 2001–2002

» W.T. Kittinger Teaching Excellence Award, Cullen College of Engineering, University of Houston, 1997, 1973

» Senior Faculty Research Excellence Award, Cullen College of Engineering, University of Houston, 1988

» Honor of Merit, Instituto Universitario Politecnico, Republic of Venezuela, 1978

» University Teaching Excellence Award, University of Houston, 1976

Research Interests

Digital Control, Optimal Control, Self-tuning Control, Hybrid Control of Uncertain Systems, Soft Computing

Len P. Trombetta

Associate Professor

Ph.D., Lehigh University

Honors & Awards

» Outstanding Teacher Award, Cullen College of Engineering, University of Houston, 2001, 1994, 1991

» W.T. Kittinger Teaching Excellence Award, Cullen College of Engineering, University of Houston, 1995

» Outstanding Teacher Award, Eta Kappa Nu, 1992

Research Interests

Dielectric Materials for Advanced CMOS Devices, including High-K Materials; MOS Insulator Defect Studies, especially Hot Carrier Induced Defects, Si-SiO_2 Interface Defect Generation, and Radiation Damage; Electron Device Physics, particularly Ultra-small MOSFETs; Wide Bandgap Semiconductor Materials; Quantum Transport Modeling in Electron Nano-devices

Jeffery T. Williams

Professor

Ph.D., University of Arizona

Honors and Awards

» Best Presentation Award (L.I. Basilio, R.L. Chen, J.T. Williams, and D.R. Jackson), at the ION GPS Conference, 2003

» IEEE/HKN Outstanding Electrical Engineering Instructor, Department of Electrical and Computer Engineering, University of Houston, 2003, 1993

» Best Presentation Award (L.I. Basilio, J.T. Williams, and D.R. Jackson), at the ION GPS Conference, 2002

» Senior Member, Institute of Electrical and Electronics Engineers (IEEE), 1997

» Elected Full Member, International Union of Radio Scientists (USRI), 1996

» Outstanding Engineering Educator Award, Cullen College of Engineering, University of Houston, 1995, 1994, 1991

» Finalist for the University Outstanding Teacher Award, University of Houston, 1994

» Greenwood Award (Faculty Achievement Award), City of Houston, 1993

» W.T. Kittinger Teaching Excellence Award, Cullen College of Engineering, University of Houston, 1993

» Young Faculty Research Award, Cullen College of Engineering, University of Houston, 1992

» Nominated for National Distinguished Young Electrical Engineering Teacher Award by local Eta Kappa Nu Chapter, 1991

Research Interests

Microstrip Antennas, Antenna Design, Electromagnetic Measurements, Leaky Wave Effects, RF and Microwave Circuits

Donald R. Wilton

Professor

Ph.D., University of Illinois, Urbana-Champaign

Honors and Awards

» Tau Beta Pi

» Phi Kappa Phi

» UIUC Bronze Tablet

» NSF Traineeship

» Sigma Xi

» Member of the Electromagnetics Academy

» Fellow of the IEEE

» Who's Who in America, 2003–present

» Highly Cited rating, ISIhighlycited.com, 2003–present

» Distinguished Alumni Award, UIUC ECE Department, 2002

» IEEE Millennium Medal, 2000

» Chair, U. S. Commission B of URSI, 1997–1999

» Guest Co-Editor, IEEE Trans. Antennas and Propagat., Special Issue on Advanced Numerical Techniques in Electromagnetics, 1997

» Senior Faculty Research Award, Cullen College of Engineering, University of Houston, 1996

» Member, IEEE Antennas and Propagation Society Administrative Committee, 1992–1994

» Distinguished Lecturer, IEEE Antennas and Propagation Society, 1984–1986

» Outstanding Faculty Member, College of Engineering, University of Mississippi, 1982–1983

» Best Basic EMP Non-Source Region Papers, Nuclear EMP Meetings, 1982, 1978

Research Interests

Computational Electromagnetics, Antennas, Scattering, Electromagnetic Theory and Compatibility; Well Logging

John C. Wolfe

Professor

Ph.D., University of Rochester

Honors & Awards

» Member of the Advisory Committee, International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication

» Member of the Advisory Committee, International Conference on Micro- and Nano-Engineering

Research Interests

Nanofabrication, Advanced Lithography, Charged Particle Optics, Thin Film Technology, Reactive Ion Etching

Jarek Wosik

Research Professor

Ph.D., Institute of Physics, Polish Academy of Science, Warsaw, Poland

Research Interests

Design and Fabrication of Magnetic Resonance Imaging Surface and Intravascular Single Probes and Arrays for Biomedical Research and Clinical Applications, High Frequency Bio-sensors and Dielectric Spectroscopy, Bio-sensors for Microwave and mm-Wave Spectroscopy

Wanda Zagozdzon-Wosik

Associate Professor

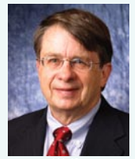
Ph.D., Warsaw University of Technology, Warsaw, Poland

Research Interests

Novel Materials for Nanoscale Integrated Circuits, Silicon Processing including VLSI Process Integration and Process/Device Simulation, Nano- and Micro-Electromechanical Systems (NEMS/MEMS) for Applications in Biomedical Sensors


Williams


Wilton


Wolfe


Wosik


Zagozdzon-Wosik

Applied Electromagnetics Laboratory

Participating Faculty:
» Dr. D. Jackson, Dr. S. Long, Dr. J. Williams, Dr. D. Wilton, *Electrical & Computer Engineering*

www.egr.uh.edu/ael/

Electromagnetics deals with the study of electromagnetic fields and the engineering applications of these fields, with applications including areas such as antenna design, microwave circuits and the scattering and interaction of electromagnetic waves with objects. At the University of Houston Cullen College of Engineering, the Applied Electromagnetics Laboratory is a group that is dedicated exclusively to this area.

The four faculty members affiliated with the lab (listed above) have established a collaborative environment within the group. According to David Jackson, professor in the Department of Electrical and Computer Engineering and one of the lab's researchers, the AEL's participating faculty members often jointly advise the lab's graduate students and work collaboratively on many of the projects.

The projects themselves can be divided among three broad categories.

The first of these is the numerical modeling of electromagnetically complex structures. Under the leadership of Donald Wilton, the AEL, in partnership with a variety of agencies and organizations, has developed a powerful computational electromagnetics (CEM) tool dubbed EIGER (Electromagnetic Interactions GEneRalized). The collaborating agencies include the Lawrence Livermore National Laboratory; Sandia National Laboratories; NASA; the Navy's SPAWAR lab, and the consulting firm Advanced Numerical Tools & Services.

The EIGER tool can model the electromagnetic state of large and complex structures, such as an entire Navy ship. An ongoing project, EIGER is constantly being updated and improved to enable it to model larger and more complex structures and systems.

The second primary area of focus at the AEL is antenna research. Several projects under this category are ongoing.

One of these projects addresses a growing concern for many communities: the proliferation of antenna towers used for mobile voice and data communication. These towers are considered unsightly by many, resulting in municipalities pressuring wireless providers to offer alternatives to erecting new structures. For example, some wireless phone companies have put up towers disguised as trees or other structures. Such disguised base-station antennas still stand out, however, so many people consider these to be highly imperfect solutions.

In a project led by Stuart Long, professor and associate dean for educational activities at the college of engineering, and Jeffery Williams, professor of electrical and computer engineering, the AEL is researching the feasibility of using existing structures, such as buildings and billboards, as base-station antennas. This would eliminate the need to build new structures while allowing carriers to enhance their wireless voice and data services.

Long acknowledges that these "existing structure" base stations would likely have smaller ranges than traditional towers. This would not pose a serious problem, though, since these shorter ranges could be overcome by turning many existing structures into base-stations.

The AEL is also actively involved in the design of improved antennas for both commercial and military applications. Examples include microstrip and dielectric resonator antennas. These are small antennas that are easy to manufacture, and are used in applications ranging from satellite communications to police radar units.

Another project involves leaky-wave antennas, which are simple devices that can provide a very focused beam at high frequencies. Such a device, said Jackson, has both commercial and military applications. "A typical commercial application might be a collision-avoidance radar for automobiles. A beam could scan the highway back and forth, enabling the system to alert you to a possible hazard on the road ahead. Militarily, it could be used in systems where you want point-to-point communications, and don't want to broadcast information in all directions."

The AEL's third main research area involves high-frequency radiation and its effects. The lab, for instance, is studying the dangers of electromagnetic interference (EMI). This interference, in which electromagnetic radiation disrupts a device's circuitry, is a growing problem.

The AEL, therefore, is studying how electromagnetic interference enters an opening of a device, such as ventilation holes for a computer, and how it impacts circuitry. Understanding these process, said Jackson, will help researchers develop ways to reduce or eliminate the threat posed by EMI.

According to Jackson, while there were no new hires or large grant wins at the AEL in 2005, the lab's participants made significant strides in their research. Many of the grants that fund these projects expire in 2006, he added, so the current year should see a new round of funding for the lab's various research endeavors.

Center for Neuro-Engineering & Cognitive Science

Director:
Dr. Haluk Ogmen, *Electrical & Computer Engineering*

Associate Director:
Dr. A.J. Jacobson, *Philosophy*

Participating Faculty:
» Dr. H.E. Bedell, Dr. S. Chung, *College of Optometry*
» Dr. B.G. Breitmeyer, Dr. M. Hiscock, *Psychology*
» Dr. K. Josic, *Mathematics*
» Dr. J.R. Glover, Dr. B.H. Jansen, Dr. V. Kalatsky, Dr. S. Patel, Dr. B. Sheth, *Electrical & Computer Engineering*

The Center for Neuro-Engineering & Cognitive Science is dedicated to the study of the nervous system and the application of engineering principles, techniques and tools to neuroscience.

One of CNECS defining characteristics is its interdisciplinary structure, said Haluk Ogmen, director of the center, as well as professor and chair of the Department of Electrical & Computer Engineering.

This approach, he said, reflects the reality of how most significant scientific advances are achieved today.

"The structure of academia is designed for granting bachelors degrees. But when you do research, this structure doesn't always work," said Ogmen. "Now, it's very difficult to stay in a narrow field and have an impact with your research. Things are much more interdisciplinary now than they were, say, 20 years ago. The center provides a structure for people from different departments to work together."

In addition to providing this structure for research, the center seeks to provide education of an interdisciplinary nature, offering courses and a certificate program in cognitive science.

In 2005, perhaps the center's most significant development was the establishment of labs by its two newest faculty researchers.

Assistant Professor Valery Kalatsky joined the college in 2004 after a stint as a postdoctoral fellow with the University of California, San Francisco. His research focuses on optical brain imaging. In particular, he is developing devices that utilize changes in light reflection or minute changes in the color of blood in the brain to identify which sections of the brain perform which functions.

As muscles, organs and other tissues draw oxygen from blood, its color changes from red to blue. Areas of the brain that are working at a given moment require more oxygen than those areas that are not. By studying these changes in blood color, Kalatsky hopes to advance the scientific and medical communities' understanding of how the brain works and which areas control which functions.

Kalatsky, in collaboration with Hubert Dinse, a professor with Ruhr University in Bochum, Germany, recently received funding to conduct research into how "plastic," or adjustable, adult mammalian brains are. Kalatsky and Dinse received the three-year, $750,000 grant from the Human Frontiers Science Program, which seeks to encourage collaboration among scientists from different parts of the world.

The pair's research will be conducted primarily with an optical imaging device being developed by Kalatsky that can take create images of the brain 30-times faster than standard methods.

They will use this tool to take an image of an adult brain, and then stimulate an area of that brain, causing it to reorganize itself slightly. Kalatsky and Dinse will then take multiple images of the reorganization process, giving them a far more comprehensive understanding of how brains reorganize themselves.

Ultimately, Kalatsky hopes that his research will lead to a better understanding of brain damage and to the creation of a low-cost brain-imaging device that can be easily used in both research laboratories and operating rooms.

www.egr.uh.edu/cnecs/

Bhavin Sheth, the second new researcher with CNECS and also an assistant professor with the Department of Electrical & Computer Engineering, has made significant strides in establishing his research, as well.

Sheth, who came to the college in 2004 after working as a researcher at the California Institute of Technology, is researching the brain activity of people with autism.

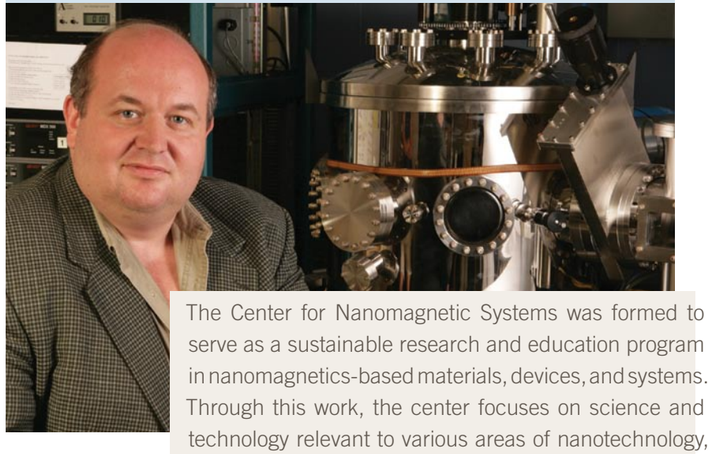
Specifically, he is studying how the brains of these individuals respond to physical sensation or touch. To do this, he will use a magneto-encephalogram (MEG) to map where, when and how an autistic brain produces electrical impulses in response to physical sensation.

The results, Sheth theorizes, should show that an autistic brain processes such stimulation in a different manner, in different places and at different time intervals than the brains of individuals without the condition. If this proves correct, Sheth said, it would imply that individuals with autism also process more complex stimuli, such as emotion and language, in different ways, places and at different time intervals than people without autism. He has hired one graduate student and plans to bring on two more to assist in his research efforts.

Despite the advanced research being conducted at UH, neuro-engineering is still a relatively new field. With further research, scientists' understanding and ability to manipulate the nervous system are certain to grow exponentially in the coming years.

Center for Nanomagnetic Systems

www.uh.edu/cns/



The Center for Nanomagnetic Systems was formed to serve as a sustainable research and education program in nanomagnetics-based materials, devices, and systems. Through this work, the center focuses on science and technology relevant to various areas of nanotechnology, including information technology, sensors, medical diagnostics and pharmaceutical instrumentation.

Director:
Dr. Dmitri Litvinov, *Electrical & Computer Engineering, Chemical & Biomolecular Engineering*

Participating Faculty:
» Dr. A. Bensaoula, *Physics, Electrical & Computer Engineering*
» Dr. S. Brankovic, Dr. F. Claydon, Dr. V. Kalatsky, Dr. P. Ruchhoeft, Dr. J. Wolfe, *Electrical & Computer Engineering*
» Dr. A. Ignatiev, *Physics, Chemistry, Electrical & Computer Engineering*
» Dr. T.R. Lee, *Chemistry, Chemical Engineering, Biomolecular Engineering*
» Dr. D. Luss, Dr. K. Martirosyan, Dr. R. Willson, *Chemical & Biomolecular Engineering*
» Dr. D. Stokes, *Physics*
» Dr. L. Sun, *Mechanical Engineering*

The CNS is led by of Dmitri Litvinov, associate professor of electrical & computer engineering and chemical & biomolecular engineering. Litvinov joined the University of Houston in the fall of 2003 from Seagate Technology, a developer of magnetic data storage systems, to develop a nanomagnetics research and education program.

The CNS is notable in part because there are only two other comprehensive programs/centers in the United States dedicated to the field of nanomagnetics: The Center for Micromagnetics and Information Storage Technologies at the University of Minnesota and the Data Storage Systems Center at Carnegie Mellon University.

According to the proposal that led to its official formation as a distinct organization within the Cullen College of Engineering, the CNS will "serve as a catalyst for future developments, help sustain and manage the existing activities, demonstrate to the funding agencies our long-term commitment to magnetics research, and bring additional prestige and recognition to the college and university."

Broadly speaking, research conducted under the CNS covers numerous fields such as terabyte data storage systems, biosensor arrays, magnetic random access memory, magnetic logic and ballistic magnetoresistive sensors.

One of the research projects being conducted at the CNS involves the creation of a medical tool that can be used to screen thousands of potential medications at a time or provide a foolproof cancer diagnosis without relying on invasive surgery to obtain biological samples.

Another project involves the creation of a nanomagnetics-based hard drive that can offer terabits (trillions of bits) of storage versus the current standard of gigabits (billions of bits). Historically, magnetic data storage capacity doubles every five years. The increase made possible by this research would enable growth to continue at that pace for up to a decade. As a practical matter, such growth would spur storage device miniaturization for emerging applications in mobile computing.

To support future growth, the CNS will conduct a campaign to raise funds to establish its research and administrative infrastructure. "Funding agencies have steadily promoted activities where researchers efficiently leverage each other's expertise and resources. The motivation is to abandon a highly inefficient model of a hundred individual investigators working in a hundred isolated labs on similar projects," Litvinov said. "The funding agencies would also like to see a long-term commitment to a specific research area that will enable sustainable programs and retention of expertise necessary for efficient execution. By officially forming this center, we demonstrate our commitment to the field."

Among the Center's near-term goals is the acquisition of several pieces of state-of-the-art device-fabrication instrumentation such as a dual-beam focused ion beam system for rapid device prototyping; a deep silicon etch for micro/nanofluidic systems fabrication; and a molecular beam epitaxy deposition system dedicated to magnetic materials research.

In addition, said Litvinov, the center will make use of facilities and equipment at a number of other research bodies at the university, including the Texas Center for Superconductivity at UH, the Nano-Manufacturing Center, the Texas Learning and Computation Center and the Center for Advanced Materials.

Nanosystem Manufacturing Center

The great strides scientists have made in the field of nanotechnology have yielded an array of new device technologies with the potential to revolutionize the computer and information processing industries. The goal of the Cullen College of Engineering's Nanosystem Manufacturing Center is to develop the manufacturing tools that are needed to produce, on a large scale, the complex integrated systems required to realize this potential.

Director:
Dr. Jack Wolfe,
Electrical & Computer Engineering

Participating Faculty:
» Dr. P. Ruchhoeft, Dr. D. Litvinov, *Electrical & Computer Engineering*

According to Jack Wolfe, professor of electrical and computer engineering at the college and director of the NMC, "We're dealing with not just how to make a few demonstration devices, but how to make them in a way that can lead to manufacturability down the road. I think what distinguishes our program from others is that we are very concerned about providing a route from demonstration to the real world."

In 2005, the NMC received two major grants from the National Science Foundation. The first, a three-year, $300,000 award, funds the creation of a new lithography tool that utilizes a beam of neutral atoms for nanosystem manufacturing.

According to Wolfe, the tool overcomes the problems caused by a buildup of electrostatic charge that plague lithography techniques that rely on charged particles. The charges these particles carry often cause the particle beam to sway slightly during the lithography process, blurring the imprints it creates. "Our goal", Wolfe says, "is to offer this tool to researchers in Texas and across the country. We are already working with Dr. Grant Willson at the University of Texas to fabricate masks for their nanoimprint tools."

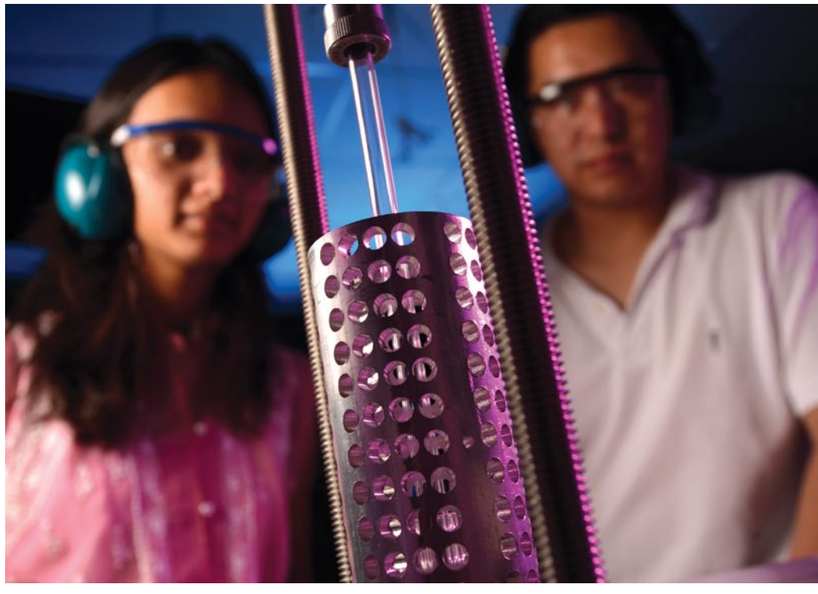
The University is supporting the effort with the construction of a new multi-million dollar clean room that will house a user-facility built around the lithography tool. "Anytime you build devices, defects are related to cleanliness. The yield, the number of devices that actually work, depends on a clean environment," said Wolfe.

The second of the two NSF grants is for $200,000 over three years. The grant was won in collaboration with Dr. Richard Liu with the UH ECE department and Fabrizzio Gabriani, a neuroscientist at the Baylor College of Medicine who serves as the lead investigator on the project.

The team is studying how the nervous system processes visual stimuli. Using grasshoppers as subjects, they are building a system involving tiny implantable sensors that will be coupled to a signal-processing and telemetry backpack that will enable the recording of the nerve impulses of free-living insects. "Ultimately, the technology may allow us to control the flight of these insects," says Wolfe.

In addition to the NSF projects, the NMC is partnering with an industrial sponsor to build a tool to remove photoresist during advanced semiconductor manufacturing. "Photoresist is used to define every level of an integrated circuit," says Wolfe; "its complete and efficient removal after use is critical to the continuing advance of the semiconductor industry."

Wolfe sees the role of NMC expanding in the year ahead with projects ranging from fuel cells to nano-optics. "Membership in NMC is open to all members of the University Community; I expect it to expand considerably this year," he said.



Sensor Technology and Well Logging Group

Director:
Dr. C. Richard Liu

Participating Faculty:
» Dr. J. Chen, Dr. L. Shieh, Dr. D. Wilton, *Electrical & Computer Engineering*

www.wellloggінglab.org

The Well-Logging Laboratory is dedicated to the science of recording the attributes of oil wells, often as they are being drilled. Understanding the characteristics of these wells allows companies to extract oil from them as efficiently as possible. Given the high cost of oil exploration, efficient drilling and pumping helps keep the price of gasoline, heating oil and numerous other petroleum-based products in check.

The lab and its associated consortium is funded largely by companies in the petroleum industry, which benefit from advances made by the lab's researchers.

Since the lab gets much of its funding from these companies, Richard Liu, professor of electrical & computer engineering and director of the Well Logging Laboratory, has strived to make working with the lab easier for these firms. For instance, in the past the consortium would hold formal meetings with its full membership twice a year. Beginning in 2006, however, only one such meeting will be held, reducing the resources companies expend to send their employees to these meetings.

To make-up for the cancelled meeting, the lab is now visiting its member companies in the Houston area, Liu stated, where graduate students working in the lab give many of the presentations. In addition to being of benefit to the companies themselves, these presentations help graduate students by giving them exposure to the petroleum industry.

The lab's most significant research development in 2005 was the creation of a system that relays information from the bottom of a well to the surface much faster than the present method.

One of well-logging's biggest obstacles is transmitting data from the down-hole during drilling to the surface where it can be analyzed and drilling decisions can be made. Neither wires nor standard wireless communication are viable due to the high temperatures and pressure encountered in oil wells, said Liu.

Instead, the current method of data transfer relies on a small pump near the bit of the drill that repeatedly expands and contracts. This movement causes vibrations in the mud at the top of the well, which are translated into data at the rate of about 10 bits per second. That rate, said. Liu, is simply not fast enough to relay all the pertinent information about the well to the people making drilling decisions.

At a meeting with consortium members last fall, however, researchers with the lab presented a new system utilizing micro-electrical-mechanical-system, or MEMS-based technology that could increase the data transfer rate to as much as one kilobit per second.

MEMS technology enables the creation of near-microscopic machines on silicon wafers. The lab's researchers used this technique to develop a series of MEMS-based radios, each no larger than a grain of sand.

During drilling, these radios will be distributed every six feet into the mud that fills the well, with the radio at the bottom of the well receiving data from the logging equipment. That information will then be transferred up the well from radio to radio until it reaches the people on the surface.

"[This technology] will allow for faster and more accurate drilling," said Liu. "When you get more information from down-hole, you have a better understanding of the well's formation. The drilling becomes more efficient."

So far, two companies have contacted the university about licensing the technology, noted Liu.

Successes such as this have further heightened the lab's stature as one of the oldest and most respected organizations of its kind. In recent months, four companies have expressed an interest in joining the consortium's membership roster, which presently includes ExxonMobil, Shell, Chevron, Saudi Aramco, ConocoPhillips, BP, Statoil, BakerHughes, Precision Energy Services, Schlumberger and Halliburton.

Southwest Public Safety Technology Center

Executive Director:
Dr. Steven Pei

Center Director:
G. Dilmore

Division Directors:
P. Bellamy, Dr. M. Massey, J. Peters

Participating Faculty:
» Dr. T. Assavapokee, Dr. T. Chen, Dr. A. Kamrani, Dr. M. Lahmar, Dr. H. Parsaei, *Industrial Engineering*
» Dr. I. Kakadiaris, *Computer Science*
» Dr. N. Karayiannis, Dr. H. Le, Dr. J. Williams, *Electrical & Computer Engineering*
» Dr. S. Wang, *Mechanical Engineering*

www.swtc.uh.edu

One of the newest research organizations under the Department of Electrical & Computer Engineering is the Southwest Public Safety Technology Center, a one-of-a-kind multi-disciplinary center designed to serve the whole first responder/public-safety workforce—from law enforcement and fire services to emergency medical and emergency management services.

While there are other public-safety technology centers in existence, said Steven Pei, professor of electrical and computer engineering and the center's executive director, SWTC distinguishes itself through a unique, closely coupled divisional structure that links research and development (R&D) to testing and evaluation, and delivers technical assistance to the public safety community, all with a comprehensive overlay of education and training. "We are the first technology center that is coming at public safety from all four directions with an integrated solution," said Pei.

The research projects center members are participating in include a computer system to predict the performance of new body armor designs, a real-time video-streaming system for public-safety vehicles, and an assessment tool to help emergency managers evaluate traffic patterns and manage contra-flow traffic during large-scale evacuations.

While all researchers aspire for their work to have real-world applications, the pressing issues of public safety and security require technological advances that can be employed in a matter of months, not years. "If what we develop is a technology that cannot be commercialized and purchased off the shelf, our task is not completed," Pei said. "Our task is really RD&D—research, development and deployment."

Of course, RD&D is only part of the mission of SWTC. Integrating state-of-the-art technology with education, training and technology assistance is key for a center of this nature, said Gordon Dilmore, center director of SWTC. "Educating the technology users and decision-makers in the public safety arena is also a primary objective of SWTC." "Police chiefs and law enforcement executives may have a degree in criminal justice or related area in social sciences," he said, "however, very few have an advanced degree in natural sciences or engineering." SWTC also plans to offer basic technology skills training activities for the law enforcement workforce.

Prior to the official launch of SWTC, its Technology Assistance Division, located at the Sheriffs' Association of Texas (SAT) in Austin, hit the ground running during Hurricane Rita. SWTC collaborated with SAT and the National Institute of Justice to serve as a mobilization agent, coordinating the effort to locate needed resources and available personnel around the state, and dispatching personnel and resources to the disaster area. "The partnering between UH and SAT makes SWTC uniquely positioned to serve the training and other technology needs of the public safety community in Texas," said Joe Peters of the Sheriffs' Association of Texas and director of the SWTC Technology Assistance Division in Austin.

SWTC is designed to be geographically dispersed to effectively integrate rural and urban issues, strategies and resources for maximum impact. It is establishing branch offices and initial testbeds in Houston, Austin, the Middle Rio Grande Border Region and in Del Rio. According to Pei, the training, as well as the technology assistance provided by the center, will initially focus on Texas, given the state's long border and coastline, as well as its status as the hub to the country's oil industry. Over time, said Pei, the center could expand to work with public safety agencies in other Mexican border and Gulf Coast states.

UH Opens *Science & Engineering Complex*

The University of Houston officially opened its new Science and Engineering Research and Classroom Complex (SERCC) in the fall of 2005, a 200,000-square-foot complex that includes classrooms, large lecture halls and about 40 laboratories.

One of SERCC's notable features is that its labs built for the exploration of related disciplines (such as biology and biomedical engineering) have been placed near each other. This close proximity is intended to encourage interaction among scientists and engineers—interaction that might not otherwise occur and could lead to scientific breakthroughs.

One area where such collaboration may be particularly beneficial is nanotechnology. According to a memo released by John Marburger, director of the federal government's Office of Science and Technology Policy, "Research at the nanoscale offers natural bridges to interdisciplinary collaboration, especially at the intersection of the life and physical sciences."

With this in mind, the SERCC was also designed with a state-of-the-art "clean room" used for experiments requiring stringent conditions, such the nanotechnology device fabrication performed by the Cullen College of Engineering's Nano-Manufacturing Center.

Among the first researchers to move their labs to the new complex, in fact, are nanotechnology-focused researchers from the ECE department, said Haluk Ogmen, the department chairman. Other researchers will eventually follow, he said.

Renderings by Cesar Pelli and Associates

ECE Alum *Signs Deal with Lucas Arts*

University of Houston Cullen College of Engineering Alumnus Mitch Bunnell (1985 BS EE) recently signed a contract to incorporate his company's Digital Molecular Matter (DMM) technology into video games developed by George Lucas' LucasArts.

Bunnell founded Pixelux Entertainment in October of 2003 to address the problem of skyrocketing video game production costs while at the same time improving the player's experience.

DMM provides a material physics simulation for objects in a game's environment. Items such as tables, walls and trees are simulated to behave in accordance with their real-world make-up. They bend and break in the game as they would in real life.

This approach cuts game production costs by automating a large portion of the most expensive part of the video game production process, the art asset generation. DMM enables the game environment to respond to a player's actions in real time, instead of having this interaction pre-animated by artists. As a result, thousands of hours of animator time (and the costs associated with that time) can be saved.

"In the old games you couldn't interact with the environment, such as walls, tables and other inanimate objects," said Bunnell. "You shoot them and nothing happens or you couldn't put a hole in the wall or could maybe break one table because that was pre-animated by artists but another wouldn't. With our technology everything in the video game acts like its real material. All wooden things break like wood and all glass breaks like glass; the entire environment is much more interactive."

While developing the DMM technology Pixelux was contacted by LucasArts, the video game division of LucasFilm. "LucasArts had seen an early non-real-time animation that we had created and they were impressed," said Bunnell. Pixelux had planned to have the technology ready for real-time use in two years; however, LucasArts wanted the production time shortened to four months. To enable Pixelux to accomplish this, LucasArts gave the company money and office space in San Francisco.

Pixelux completed the DMM technology on time and presented a demo "with brick walls, concrete pillars, rebar-reinforced concrete pillars, glass windows, rubbery plants, and wood beams that would all bend and break realistically in real time," said Bunnell. "When LucasArts saw the demo we received a standing ovation."

Pixelux then signed a multi-year contract with LucasArts that granted the game developer the exclusive rights to DMM technology for one year for the entertainment market. It will be incorporated into their next ten games, including games from the Indiana Jones and Star Wars franchises, both to be released in 2007, Bunnell said.

"We expect that in a few years there won't be action games without our technology. Once you play a game where your entire environment interacts with you and is realistic, it's almost impossible to go back," said Bunnell.

Bunnell's company Pixelux Entertainment developed Digital Molecular Matter (DMM), technology that simulates how objects behave in real-world environments. This real-time technology eliminates the need for costly pre-animation production and will be incorporated into the next ten games produced by LucasArts, including Indiana Jones and Star Wars. In the below Indiana Jones frame, the animated wood splinters and breaks as it would in real life.

Ogmen Serving on *NIH Grant Review Team*

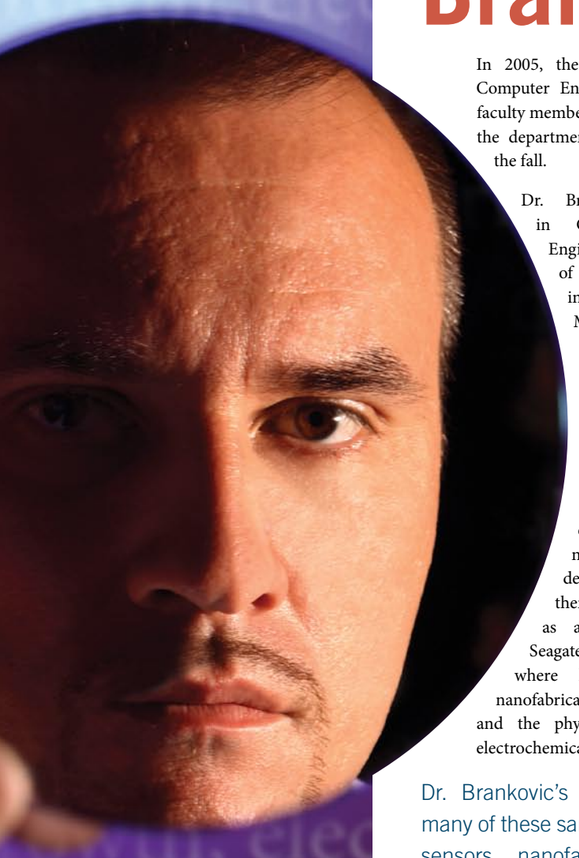
Haluk Ogmen, department chair and professor of electrical and computer engineering, is serving on a National Institute of Health group that evaluates grant proposals for research involving visual processing.

Ogmen began his four-year term on the Central Visual Processing (CVP) Study Section on July 1, 2005. The section falls under the NIH's Center for Scientific Review (CSR), which organizes peer review groups that evaluate most of the research grant applications organization. Thee CSR's primary goal is to ensure that each application receives a fair, independent, expert and timely review, allowing the NIH to fund the most promising research.

Members of the CVP Study Section review basic, applied and clinical research on development, aging, structure, function and disorders associated with portions of the brain, eye and extraocular muscle system that deal with brightness, color, space and form, motion, depth, accommodation, pupil contraction and eye movements. Studies range broadly from those that examine visual neurosensory disorders to those that provide a better understanding of normal vision.

With more than 170 study sections, the CSR brings together a number of experts to make funding recommendations based on priorities set by Congress and The Department of Health and Human Services, as well as the public. Support from the scientific community is critical to this peer review system to identify research that is in the best interest of advancing public health and to assure the quality of the process.

Stanko Brankovic *Joins ECE Department*



In 2005, the Department of Electrical & Computer Engineering added one full-time faculty member, Stanko Brankovic, who joined the department as an assistant professor in the fall.

Dr. Brankovic obtained his B.S. in Chemical and Biochemical Engineering from the University of Belgrade in 1994 and his Ph.D. in Science and Engineering of Materials from Arizona State University in 1999.

Before joining the ECE department, he spent two years (2000–2001) as a post-doctoral research associate at Brookhaven National Laboratory in Upton, N.Y., where he focused on electrocatalysis, surface nanostructuring and the development of fuel cells. He then spent four years (2001–2005) as a research staff member at Seagate Research Center in Pittsburgh, where his work revolved around nanofabrication, magnetic materials, sensors, and the physics and thermodynamics of electrochemical interfaces.

Dr. Brankovic's research at UH covers many of these same topics including novel sensors, nanofabrication, self-assembly of nanostructures, thin film growth, electro-catalysis, magnetic materials, nanofabrication and physics, and the thermodynamics of electrified interfaces.

These fields, Dr. Brankovic admits, cover a wide range of topics and intersect with many disciplines. Such an approach is necessary, however, because of the current trends in research and technology development.

"In the sciences, you cannot work in one field for thirty years anymore," he said. "The honeymoon when people could get established and stay funded by doing that is over… Now, most researchers explore difficult problems that involve multidisciplary approaches. So you have to combine all that you know in order to establish a research direction that is original."

Though these fields cover a wide area of knowledge, he said, they are bound by a similar approach to research: utilizing natural processes to achieve desired results.

For example, the most established processes of nanofabrication, such as etching and lithography, rely on costly tools and equipment to build nanoscale devices, in essence, "forcing" materials to act a certain way, Dr. Brankovic stated.

The less-explored field of self-assembly, however, uses natural processes and phenomenon, such as adsorption and electro-chemical interactions, to allow nanostructures to come together in a desired formation and, essentially, build themselves.

This approach is beneficial, said Dr. Brankovic, because it is not limited by tools or man-made processes.

"Self-assembly is limited by nature. It could have atomic resolution, it could have molecular resolution; it doesn't matter. What's important is that this approach doesn't involve expensive fabrication tools. It's something that works on a level that could be used by anybody who understands how these processes work."

Similarly, Dr. Brankovic is studying corrosion, not to find a way to slow it down, but to utilize its underlying processes for new purposes, such as high surface area metal structure, he said.

"If you know how the natural processes work you can put them in a place and situation where you want them to work how you know they will. [Much of this research involves] taking the natural process that you understand and making them work for you," he stated.

Brankovic is affiliated with two research centers at UH: the Center for Nanosystems Manufacturing and the Center for Nanomagnetic Systems. More details about his research can be found on his web page, www.egr.uh.edu/ece/faculty/brankovic.

Gerhard Paskusz, *EE Professor and PROMES Founder, Retires*

After 25 years with the University of Houston Cullen College of Engineering, Dr. Gerhard Paskusz has retired as a faculty member of the Department of Electrical & Computer Engineering and as the director of PROMES, the Program for Mastery in Engineering Studies.

Early in his career at UH, which began in 1961, Dr. Paskusz focused his research on creating early computer languages based on Fortran, a mathematical formula translating system created by IBM.

He was also a pioneer in the area of using computers and circuitry to simulate biological systems.

"I did some research on representing the inner ear with an electric circuit. I was trying to optimize an operation that was used at the time to relieve deafness," he said.

His most significant contribution to the college, however, came in his role as founding director of PROMES, which for decades has helped minority engineering students succeed in their studies.

Dr. Paskusz, who joined UH after earning his Ph.D. from the University of California, Los Angeles, started PROMES in 1974 after hearing an address from the then-CEO of General Electric, Reginald Jones.

"[Jones] stressed that if we were going to get minorities into the economic mainstream, engineering is the way to go, and so we ought to have programs that get minorities into engineering," Dr. Paskusz said. "Our goals were always to graduate minority students in engineering, and if not in engineering, to make sure they graduated from college because a degree in something was better than nothing."

The problem these students face, has never been a lack of ability, said Dr. Paskusz, but that their prior academic experiences had not sufficient prepared them for engineering studies.

"The students who need PROMES come from inner-city schools where higher math courses are not offered," Dr. Paskusz said. "They don't have the academic background to have a good chance of succeeding."

One of Dr. Paskusz's remedies was to link PROMES students together through study groups and outside workshops. In addition, the students were grouped together in the same sections of their math, science, and freshman- and sophomore-level engineering classes.

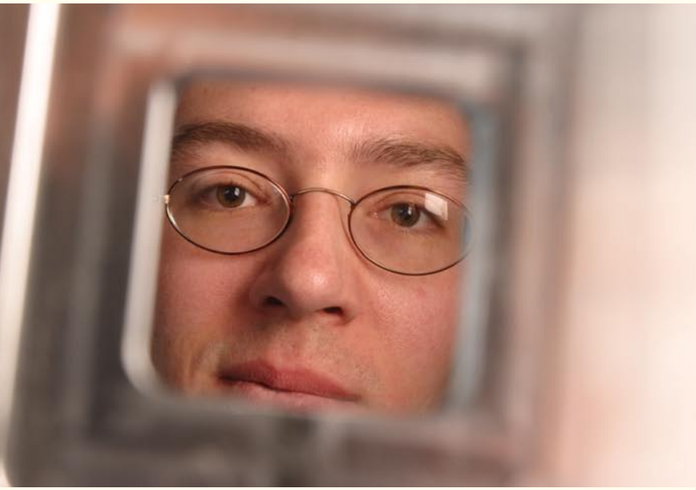
The program, of course, has encountered challenges over the years. The 1996 Hopwood court ruling on affirmative action in higher education could have spelled the end for PROMES, then called the Program for Minorities in Engineering Studies. Dr. Paskusz, however, merely changed "Minorities" to "Mastery" and used the case as an occasion to expand the program's scope.

"This affected the effectiveness of the program because now students were no longer confined to a minority group but are operating in an integrated group to start with, which is obviously helpful for when they go out in industry," Dr. Paskusz said. "The Hopwood case, which was supposed to throw a monkey wrench into the program, has actually helped us."

The court ruling and financial shortfalls from a lack of outside funding are obstacles that PROMES has overcome in its history and will continue to face, said Dr. Paskusz. In spite of these challenges, PROMES has proven itself a hugely successful program.

"We have the same percentage of students as the College of Engineering on the Dean's List," Dr. Paskusz said. "Our graduation rates are comparable, and our four-year retention is usually slightly better than that of the college as a whole. Our major accomplishment is that we are able to do what we set out to do—graduate minority engineering students."

At a dinner in honor of his retirement, Gerhard Paskusz celebrated with co-workers and friends. Pictured are (front) Reagan Flowers, Sharon Gates, Paskusz, Jenny Bennett, Merion Luckett, Mamie Moy, (back) Dean Raymond Flumerfelt, UH Vice President Elwyn Lee, Tom Cummings, Richard Price and John Matthews.



NSF-Navy Civilian Service Fellowship Program Established

ECE graduate students were among the first to participate in the National Science Foundation (NSF)—Navy Civilian Service Fellowship Program.

The program is supported by an NSF grant totaling more than $226,000, which funds research and tuition-related costs for students.

The program's research focuses on the development of nanomagnetic biosensors, which can be used for the detection of biological warfare agents, such as anthrax, as well as for civilian applications, such as food and water safety monitoring; magnetic random access memory (MRAM) that can withstand the effects of ionizing radiation and severe electromagnetic pulses; and ultra-sensitive magnetic sensors for detection of landmines, to improve detection for U.S. military personnel while on foreign land.

"Not only is this a great opportunity for the students, who may potentially receive job offers from these labs, but the collaboration allows the college and university to work closely with Navy research and development centers," said Dmitri Litvinov, associate professor of electrical and computer engineering and principal investigator for the nanomagnetic aspects of the project.

UH Sweeps IEEE Region V Conference for Second Consecutive Year

The Cullen College of Engineering student branch of the Institute of Electrical and Electronics Engineers (IEEE) received high honors at the organization's Region Five Conference in 2005. For the second consecutive year, the UH chapter won all four awards for which it was eligible.

Individual awards went to David Jackson for the Outstanding Educator of the Year, advisor Ovidiu Crisan for the Outstanding Student Branch Counselor of the Year and Wahad Mehmood for Outstanding Student Member of the year. The UH chapter also took home the award for Outstanding Large Student Branch of the Year.

Among the branch's most notable achievements in 2005 were improved relations with alumni and industry, strong recruitment efforts for new members and improved student-instructor relations.

"We really have a wonderful student branch here, and I'm really proud of them," said Jackson.

Crisan has worked with the student group for almost a decade, and said that institutions rarely win more than one or two of the awards. Prior to sweeping the competition last year, Crisan said the group still made impressive showings, winning two or three awards each year.

First Graduate Research Conference Deemed a Success for ECE

The University of Houston Cullen College of Engineering's Department of Electrical and Computer Engineering (ECE) held its first Graduate Research Conference in 2005. Approximately 40 students presented their work while 51 graduate students and 27 faculty members attended.

The purpose of the one-day conference was to promote research activities and encourage interaction within the department by creating a forum for the exposition of graduate student research.

"The idea was to give graduate students the opportunity to present their technical work in front of their peers, which is always a good experience, and also to make faculty and graduate students aware of other research that was going on in the department," said Len Trombetta, one of four ECE faculty members who helped organize the event.

Graduate students also played a role in setting up the conference, which was formatted to simulate a professional conference so students could develop their presentation skills.

"Participation in this conference has given me more confidence in my ability to effectively communicate to a group of professional the objectives, procedures and the results of my research," said graduate student Chidiogo Madubike.

FACULTY AND STAFF LIST

Professors

Anderson, W.L.
Charlson, E.J.
Claydon, F.J. Associate Dean for Undergraduate Programs & Computer Facilities
Crisan, O.
Glover, J.R.
Jackson, D.R.
Jansen, B.H.
Karayiannis, N.B.
Le, H.Q.
Liu, C.R.
Long, S.A. Associate Dean for Educational Activities
Ogmen, H. Department Chair
Pei, S.S.
Shieh, L.S.
Williams, J.T.
Wilton, D.R.
Wolfe, J.C.

Associate Professors

Barr, B.J. Director of Undergraduate Studies
Hebert, T.J.
Litvinov, D.
Markenscoff, P.
Pai, D.M.
Shattuck, D.P.
Trombetta, L.P.
Zagozdzon-Wosik, W.

Assistant Professors

Brankovic, S.R.
Chen, J.
Chen, Y.
Kalatsky, V.A.
Ruchhoeft, P.
Sheth, B.R.

Research Professors

Wosik, J.

Research Assistant Professors

Chen, X.
Li, J.
Patel, S.S.

Emeritus Faculty; Joint and Adjunct Appointments; Lecturers

Bilgen, M. Adjunct Assistant Professor
Brandt, M. Adjunct Professor
Chen, G. Adjunct Professor
De la Rosa-Pohl, D. Lecturer
Hartley, C. Adjunct Associate Professor
Ignatiev, A. Professor (joint appointment Physics)
Jacobson, A. Professor (joint appointment Philosophy)
Johnsson, L. Professor (joint appointment Computer Science)
Kakadiaris, I. Associate Professor (joint appointment Computer Science)
Ktonas, P. Professor Emeritus
Larin, K. Assistant Professor (joint appointment Biomedical Engineering)
Narayana, P. Adjunct Professor
Ophir, J. Adjunct Professor
Schneider, W. Professor Emeritus
Subhlok, J. Associate Professor (joint appointment Computer Science)
Zouridakis, G. Associate Professor (joint appointment Computer Science)

Staff

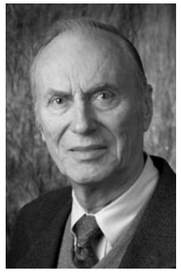
Andress, J. Supervisor Electronic Shop
Baccam, M. Graduate Admissions Academic Advisor
Chen, P. Electronics Technician
Herbek, L. Secretary to the Chairman
Jordan, K. Financial Assistant II
Ollivierre, U. Department Business Administrator
Ray, S. Financial Assistant
Rose, Z. Department Secretary
Ruchhoeft, J. National Science Foundation Texas Engineering Technical Consortium Infrastructure Coordinator
Young, M. Supervisor, Lab Machinist

ECE Student Advisory Committee

Eloisa Avalos
Krisstell Bonilla
Chinenyeze Enwereuzoh
Tyson E. Horsley
Ying Hu
Diane Lindsey
Chukwudi Opurum (Chair)
Maria G. Paez (Vice-Chair)
Frank Permenter
Robert Pinder
Christina Siller
Maricruz Silva
Darren Smith
Stephen Stock
Ignacio Torres Jr.

ECE Industrial Advisory Board

Scott Askew, *NASA/JSC*
Ken Comeaux, *Mustang Engineering, L.P.*
Danny Erdeljac, *Studio Works LLC*
Teo Galvan, P.E., *El Paso Global Networks*
Alan Goodrum, *Hewlett Packard*
Mike Mathena, *Fluor*
Jim Mayes, *Schlumberger SPC*
James N. Ortiz (Chair), *NASA/JSC*
Perna Pierre, *Landmark Graphics Corp.*
David Rice, *General Electric*
Tammy Savoie, *Siemens PT & D*
Tom Sofka, *Macro Enterprises Ltd.*
Bill Wormington, *KBR*
Keith Lancaster, *Compiled Logic Corp.*
Jeff Whitney, *Berkana Resources Corp.*



Wallace L. Anderson

Professor

Sc.D., University of New Mexico

Research Interests

Coherent Optics, Signal Processing, Pattern Recognition, Communications, Estimation Theory

Betty Barr

Associate Professor & Director of Undergraduate Studies

Ph.D., University of Houston

Honors & Awards (2005)

» Abraham E. Dukler Distinguished Engineering Faculty Award

Research Interests

Numerical Analysis

Funded Research Programs (2005)

» Texas Technology Workforce Development Grant Program

» Texas Higher Education Coordinating Board, Undergraduate Retention & Recruiting of ECE Students at the University of Houston

Professional Service (2005)

» Faculty Advisor, UH Section Society of Women Engineers

» Faculty Advisor, Texas Epsilon Chapter Tau Beta Pi

Stanko R. Brankovic

Assistant Professor

Ph.D., Arizona State University

Research Interests

Electrochemical Thin Film Growth, Magnetic Materials and Sensors, Nanofabrication, Electrocatalysis and Interfacial Electrochemistry

Professional Service (2005)

» Co-organizer, the 9th International Symposium on Magnetic Materials Processes and Devices, *210th Electrochemical Society Meeting*, Cancun, Mexico, October 2–6, 2005.

» Co-chair, "Science, Technology, and Tools for Electro-deposition, form Lab to Factory," *208th Electrochemical Society Meeting*, Los Angeles, CA, October 16–21, 2005.

» Co-chair, "Surfactant Effect of the Thin Films and Particle Growth," *207th Electrochemical Society Meeting*, Quebec City, Canada, May 15–19, 2005.

» Co-editor, *Proceedings on Magnetic Materials*, Processes and Devices VIII, ECS, 2004, in press.

» Referee of Manuscripts for *Electrochemical and Solid State Letters*, *Journal of the Electrochemical Society*, *Electrochimica Acta*, *Surface Science*, *Journal of Magnetism and Magnetic Materials* and *IEEE Transactions on Magnetics*.

» Member, Material Research Society (MRS)

» Member, Electrochemical Society (ECS)

» Member, Serbian Chemical Society (SHD)

Refereed Journal Publications Published (2005)

» Brankovic, S.R., N. Vasiljevic, T. Klemmer, and E.C. Johns, "Influence of Additive Adsorption on Properties of Pulse Deposited CoFeNi Alloys," *Journal of Electrochemical Society*, Vol. 152, pp. C196–C202, 2005.

Conference Proceedings and Presentations (2005)

» Brankovic, S.R., X.M. Yang, T.J. Klemmer, and M. Siegler, "Electrodeposition of 2.4 T Co37Fe63 Alloys at Nanoscale for Magnetic Recoding Application," *2005 TMRC*, Stanford, CA., August 13–17, 2005, (Invited).

» Brankovic, S.R., F. Wiatrowski, K. Trumbull, and M. Seigler, "Saccharin Incorporation during the Electrodeposition of Co40Fe60 Films; Consequences for Magnetic and Corrosion Properties," *Electrochemical Society Meeting*, Quebec City, Canada, May 15–20, 2005.

» Brankovic, S.R., F. Wiatrowski and K. Trumbull, "Influence of Fe3+ on Magnetic Moment and Nanostructure Morphology of 2.4 T CoFe Alloys," *Electrochemical Society Meeting*, Los Angeles, CA, October 16–20, 2005.

Earl J. Charlson

Professor

Ph.D., Carnegie Mellon

Honors & Awards (2005)

» Chairman, Graduate and Professional Studies Council

Research Interests

Integrated Circuit Layout Design and Fabrication, Solid State Devices

Professional Service (2005)

» Advisory Board, Texas Manufacturing Assistance Center

Conference Proceedings and Presentations (2005)

» Mathews, F. and E.J. Charlson, "Numerical Modeling of NMOS Inverters," *AGEP Conference*, Rice University, August 11, 2005.

Funded Research Programs (2005)

» National Science Foundation, Alliance for Graduate Education and the Professorate

Ji Chen

Assistant Professor

Ph.D., University of Illinois at Urbana-Champaign

Honors & Awards (2005)

» Junior Faculty Research Award, Cullen College of Engineering,University of Houston

» IEEE Electromagentic Compatibility Symposium Best Student Paper Award, Advisor

Research Interests

Computer Engineering, Computational Electromagnetics, Micro- and Nano-Electromagnetics, Biomedical Instruments

Refereed Journal Publications Published (2005)

» Qiang, R., J. Chen, T. Zhao, S. Wang, P. Ruchhoeft, and M. Morgan, "Modeling of Infrared Bandpass Filters using a Three-dimensional FDTD Method," *IEE Electronics Letters*, Vol. 41, No. 16, pp. 43–44, August 2005.

» Wang, S. and J. Chen, "Pre-iterative ADI FDTD Method for Conductive Medium," *IEEE Transaction on Microwave Theory and Techniques*, Vol. 53, No. 6, Part 1, pp. 1913–1918, June 2005.

» Wang, S. and J. Chen, "A Performance Study on the Iterative ADI-FDTD Method," *IEEE Transactions on Antennas and Propagation*, Vol. 53, No. 10, pp. 3413–3417, October 2005.

» Wang, S., J. Chen and P. Ruchhoeft, "An ADI-FDTD Method for Periodic Structures," *IEEE Transactions on Antenna and Propagation*, Vol. 53, No. 7, pp. 2343–2346, July 2005.

» Wang, S., F.L. Teixeira and J. Chen, "An Iterative ADI-FDTD with Reduced Splitting Error," *IEEE Microwave and Wireless Components Letters*, Vol. 15, No. 2, pp. 92–94, February 2005.

» Chen, R.L., J. Chen, T.H. Hubing, and W. Shi, "Analytical Model for the Rectangular Power-ground Structure including Radiation Loss," *IEEE Transaction on EMC*, Vol. 47, No. 1, pp. 10–16, February 2005.

» Chen, J., "Grid Computing for Electromagnetics: Parallel Computing and Beyond," *Applied Computational Electromagnetics Society News Letter*, pp. 17–19, March 2005.

Conference Proceedings and Presentations (2005)

» Qiang, R. and J. Chen, "Investigations of Manufacture Artifacts on Nanoscale FSS Performance," *IEEE Antenna and Propagation Symposium*, 2005.
» Barton, R.J., J. Chen and K. Huang, "Cooperative Time Reversal for Communication in Power-constrained Wireless Sensor Networks," *43rd Annual Allerton Conference on Communications, Control, and Computing*, 2005.
» Wu, D., F. Yang, J. Chen, and C. Liu, "MWD Tool/ Small Antenna Analysis using Cylindrical Unconditional Stable FDTD Method," *Asian-Pacific Microwave Conference*, (invited), December 2005.
» Huang, K., D. Wu, R. Barton, and J. Chen, "Cooperative Time-reversal Communication in Wireless Sensor Networks," *2005 IEEE Workshop on Statistical Signal Processing*, 2005.
» Wang, S., F.L. Teixeira and J. Chen, "An Iterative ADI-FDTD Method for Spatially Oversampled Problems," *IEEE Antenna and Propagation Symposium*, 2005.
» Wang, S. and J. Chen, "A Periodic ADI Method by the Sherman-Morrison Formula," *IEEE Antenna and Propagation Symposium*, 2005.
» Wu, D., R. Qiang, J. Chen, W. Kainz, and H. Bassen, "Safety Evaluation of Walk-through Metal Detectors," *IEEE Electromagnetic Compatibility Conference* (The best student paper award), 2005.
» Kainz, W., T. Kellom, R. Qiang, and J. Chen, "Development of Pregnant Woman Models for Nine Gestational Ages and Calculation of Fetus Heating during Magnetic Resonance Imaging (MRI)," *Bioelectromagnetics*, 2005.
» Kainz, W., S. Seidman, R. Qiang, J. Chen, and H. Bassen,"The Future of Anatomical Models—Anatomical CAD Models for Numerical Dosimetry and Implant Evaluations," *Bioelectromagnetics*, 2005.
» Qiang, R., R.L. Chen, S. Wang, J. Chen, K. Han, A. Ruiz, P. Ruchhoeft, and M. Morgan, "FDTD Modeling of Nanoscale Frequency Selective Surface for Thermophotovoltaic Energy Conversion," *IEEE Compumag 2005*, Shenyang, China, June 2005.
» Wang, S. and J. Chen, "Iterative ADI-FDTD Method for Conductive Medium," *IEEE Compumag 2005*, Shenyang, China, June 2005.
» Qiang, R., D. Wu, J. Chen, and W. Kainz, "An Efficient Two-dimensional FDTD Method for Bioelectromagnetic Applications," *IEEE Compumag 2005*, Shenyang, China, June 2005.
» Wang S. and J. Chen, "A Multigrid-enhanced Iterative ADI Method," *IEEE Microwave Theory and Techniques Symposium*, Long Beach, CA, 2005.
» Qiang, R., J. Chen, K. Han, P. Ruchhoeft, and M. Morgan, "Modeling of Infrared Frequency Selective Surfaces with Nanoscale Structures," *Nanoscale Devices & System Integration (NDSI 2005)*, Houston, April 2005.
» Kainz, W., A. Christ and J. Chen "Current and Future Needs for Computational Methods for m Edical Applications," *General URSI Assembling*, (invited), 2005.

Funded Research Programs (2005)

» National Science Foundation, Computer Modeling of EM Energy Deposition within Human Subjects under Various RF Sources
» NASA, Thermophotovoltaic Radioisotope Power Conversion Technology
» Texas Space Grant Consortium, Electrical and Thermal Modeling and Simulations for Mixed-signal SOC Applications
» Sun Microsystems (equipment grant), Acquisition for a Sun V-880 Server

Xuemin Chen

Research Assistant Professor

Ph.D., Nanjing University of Science and Technology (NUST), P.R. China

Honors & Awards (2005)

» Top Research Innovations and Findings, Texas Department of Transportation

Research Interests

Advanced Sensor Development, Signal Processing, RF and Microwave Circuit Design, Control and Measurement System Design

Professional Service (2005)

» Member of Program Committee, *IEEE International Conference on Networking, Sensing and Control*, 2006
» Reviewer for *IEEE Transactions on Systems, Man, and Cybernetics—Part C: Applications and Reviews*

Research Centers & Laboratories (2005)

» Subsurface Sensing Laboratory

Conference Proceedings and Presentations (2005)

» Guo, L., X. Chen, J. Yu, Y. Tang, and R. Liu, "Pavement Deflection Vehicle Weighing Method with Embedded Piezoelectric Sensor, Smart Structures and Materials," *Proceedings of SPIE*, Vol. 5758, pp. 471–478, San Diego, May 2005.

Funded Research Programs (2005)

» Texas Department of Transportation (TxDOT), Laser Texture Measurement Device
» TxDOT, Investigation of a New Generation of FCC Compliant NDT Devices for Pavement Layer Information Collection
» TxDOT, Feasibility Study of Non Contact High Speed Elastic Property Measurement of Pavements
» TxDOT, Moisture Sensor, Laser Profiler for SH114
» TxDOT, Evaluation of Innovative Sensors and Techniques for Measuring Traffic Loads
» TxDOT, Development of Vehicle Mounted Measuring Device utilizing a Non-Contact Method to Determine the Thickness and Uniformity of Application of Thermoplastic Pavement Marking Material
» TxDOT, Nanotechnology Synthesize Study
» TxDOT, The Evaluation of a System for Measuring Seal Coat Quality
» TxDOT, Laser Texture Measurement Devices
» TxDOT, LED Lighting Control System

Yuhua Chen

Assistant Professor

D.Sc., Washington University in St. Louis

Research Interests

Optical Networks, FPGA-based Reconfigurable Systems, Intelligent Sensor Networks, Reconfigurable System-on-Chip (SoC), Networks-on-Chip (NoC), Quality-of-Service (QoS), Heterogeneous Networks, High Performance Routers and System Prototyping

Research Centers & Laboratories (2005)

» System Research Laboratory (SRL)

Conference Proceedings and Presentations (2005)

» Chen, Y. and X. Yuan, "Collaborative Decision Making for Hazardous Substance Monitoring," *Proc. INSS*, San Diego, June 2005.

Funded Research Programs (2005)

» Grant to Enhance and Advance Research (GEAR), FPGA-based Sensor Network Testbed for Hazardous Substance Monitoring and Response
» New Faculty Research Program, University of Houston, Seamless Delivery Service for Network-on-Chip
» Small Grants Program, University of Houston, Evolvable Router for Ever Evolving Internet

Frank J. "Fritz" Claydon

Professor & Associate Dean for Undergraduate Programs & Computer Facilities

Ph.D., Duke University

Research Interests

Cardiac Electrophysiology, Undergraduate Education

Professional Service (2005)

» National Science Foundation Review Panel

Conference Proceedings and Presentations (2005)

» Glover, J.G., J.L. Ruchhoeft, J.M. Trenor, S.A. Long, and F.J. Claydon, "Girls Reaching and Demonstrating Excellence (G.R.A.D.E.) Camps: An Innovative Recruiting Strategy at the University of Houston to Increase Female Representation in Engineering," *American Society of Engineering Education Annual Conference and Exhibition*, Portland, Oregon, June 2005.
» Shattuck, D.P., B.J. Barr, J.L. Ruchhoeft, J.M. Trenor, S.A. Long, and F.J. Claydon, "Collaborative Learning as a Tool for Retention of Engineering Students: An Update on the Success of Engineering 'Redshirt' Camps and Collaborative Learning Workshops at the University of Houston Cullen College of Engineering," *American Society of Engineering Education Annual Conference and Exhibition*, Portland, Oregon, June 2005.

Funded Research Programs (2005)

» Texas Higher Education Coordinating Board, Retention of Female Undergraduates ECE Students at the University of Houston
» Texas Higher Education Coordinating Board, Undergraduate Recruiting and Retention of ECE Students at the University of Houston: Best Practices
» Texas Higher Education Coordinating Board, Undergraduate Recruiting and Retention of ECE Students at the University of Houston
» National Science Foundation, RET Site: Research Experiences for Greater Houston High School Science and Math Teachers
» National Science Foundation, Research Experiences for Undergraduates in Electrical and Computer Engineering
» National Science Foundation, STEP-AHEAD: Access to Higher Education through Academic Retention and Development at the University of Houston

Ovidiu Crisan

Professor

Ph.D., Polytechnic Institute of Timisoara, Romania

Honors & Awards (2005)

» Senior Member of IEEE
» Member of CIGRE

Research Interests

Power Systems Operation Optimization, Control and Available Transfer Capability (ATC) within the Deregulated Environment

Professional Service (2005)

» Reviewer, "Electric Power Components and Systems," Taylor & Francis Ltd. Publishing Corporation, Prentice Hall.
» Advisor, MEE-Industrial Power Systems Graduate Program

Research Centers & Laboratories (2005)

» Power Systems and Control Equipment Laboratory

John R. Glover

Professor

Ph.D., Stanford University

Research Interests

Adaptive Signal Processing, Biomedical Signal Analysis, Intelligent Systems

Professional Service (2005)

» Reviewer, *IEEE Transactions on Biomedical Engineering*, *Journal of Neural Engineering*

Research Centers & Laboratories (2005)

» Center for Neuro-Engineering and Cognitive Science
» Bio-Signal Analysis Laboratory

Conference Proceedings and Presentations (2005)

» Mitra, J., J.R. Glover, P.Y. Ktonas, J.D. Frost, Jr., R.A. Hrachovy, and E.M. Mizrahi, "Using Context-based Rules to Reject Artifacts in the Detection of Neonatal Seizures," *22nd Annual Houston Conference on Biomedical Engineering Research*, p. 27, Houston, Texas, February 10–11, 2005.
» Glover, J.R., J.L. Ruchhoeft, J.M. Trenor, S.A. Long, and F.J. Claydon, "Girls Reaching and Demonstrating Excellence (G.R.A.D.E.) Camps: An Innovative Recruiting Strategy at the University of Houston to Increase Female Representation in Engineering," *Proceedings of the 2005 Annual American Society of Engineering Education Annual Conference and Exhibition*, Portland, Oregon, June 2005.

Funded Research Programs (2005)

» National Institutes of Health, Epileptic Seizures in the Neonatal EEG
» Texas Higher Education Coordinating Board, Undergraduate Recruiting and Retention of ECE Students at the University of Houston

Thomas J. Hebert

Associate Professor

Ph.D., University of Southern California

Research Interests

3-D Medical Imaging, Video/Image Processing, Bayesian Estimation, Adaptive Optics

Professional Service (2005)

» Reviewer, *IEEE Transactions on Medical Imaging*, *European Journal of Signal Processing*, *Physics in Medicine and Biology*, *Inverse Problems*

Research Centers & Laboratories (2005)

» Medical Image Processing Laboratory

Refereed Journal Publications Published (2005)

» Romero-Borja, F., K. Venkateswaran, A.J. Roorda, and T.J. Hebert, "Optical Slicing of Human Retinal Tissue *in vivo* with the Adaptive Optics Scanning Laser Ophthalmoscope," *Applied Optics*, Vol. 44, pp. 4032–4040, 2005.

Conference Proceedings and Presentations (2005)

» Gallardo, V.J. and T.J. Hebert, "Monte-Carlo Simulation of Time-varying Aberrations in an Adaptive Optics Imagining System," *Conference in Image Processing and Optics (CIMAT)*, Guanajuato, Mexico, November 21–22, 2005.

David R. Jackson

Professor

Ph.D., UCLA

Honors & Awards (2005)

» IEEE Region V Conference Best Educator Award

Research Interests

Microstrip Antennas, Leaky-wave Antennas, Periodic Structures, High-frequency Effects in Microwave Integrated Circuits, Electromagnetic Interference and Compatibility

Professional Service (2005)

» Chair, IEEE Antennas and Propagation Society Transnational Committee
» Chair, USNC Commission B of the International Union of Radio Science
» Vice Chair, MTT IMS Sub-Committee 1 (Field Analysis and Guided Waves)
» Vice Chair, Technical Committee MTT-15 (Microwave Field Theory)
» Member, IEEE Electromagnetics Award Committee
» Member of Editorial Board, *IEEE Transactions Microwave Theory and Techniques*
» Member of Editorial Board, *IEEE Microwave and Optical Technology Letters*
» Reviewer, *IEEE Transactions Antennas and Propagation*
» Reviewer, *IEEE Antennas and Wireless Propagation Letters*
» Reviewer, *Radio Science*
» Director of Graduate Admissions, Department of Electrical and Computer Engineering
» Member of Graduate and Professional Studies Council, University of Houston
» Library Liaison, Department of Electrical and Computer Engineering
» Member of ABET Committee, Department of Electrical and Computer Engineering
» Member of Graduate Research Conference Committee, Department of Electrical and Computer Engineering
» Member of Graduate Curriculum Committee, Department of Electrical and Computer Engineering

Research Centers & Laboratories (2005)

» Applied Electromagnetics Laboratory

Books and Articles in Books Published (2005)

» Mesa, F. and D.R. Jackson, "Leaky Modes and High-frequency Effects in Microwave Integrated Circuits," *Encyclopedia of RF and Microwave Engineering*, John Wiley, 2005.

Refereed Journal Publications Published (2005)

» Capolino, F., D.R. Jackson and D.R. Wilton, "Fundamental Properties of the Field at the Interface between Air and a Periodic Artificial Material Excited by a Line Source," *IEEE Transactions Antennas and Propagation*

(special issue on Artificial Magnetic Conductors, Soft/Hard Surfaces, and Other Complex Surfaces), Vol. 53, pp. 91–99, January 2005.

» Capolino, F., D.R. Jackson and D.R. Wilton, "Mode Excitation from Sources in Two-dimensional EBG Waveguides using the Array Scanning Method," *IEEE Microwave and Wireless Components Letters*, Vol. 15, pp. 49–51, February 2005.

» Paknys, R. and D.R. Jackson, "The Relation between Creeping Waves, Leaky Waves, and Surface Waves," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 898–907, March 2005.

» Chen, R.L., D.R. Jackson, J.T. Williams, and S.A. Long, "Scan Impedance of RSW Microstrip Antennas in a Finite Array," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 1098–1104, March 2005.

» Mesa, F. and D.R. Jackson, "A Novel Approach for Calculating the Characteristic Impedance of Printed-circuit Lines," *IEEE Microwave and Wireless Components Letters*, Vol. 4, pp. 283–285, April 2005.

» Xu, H., D.R. Jackson and J.T. Williams, "Comparison of Models for the Probe Inductance for a Parallel Plate Waveguide and a Microstrip Patch," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 3229–3235, October 2005.

» Jackson, D.R., A.A. Oliner, T. Zhao, and J.T. Williams, "The Beaming of Light at Broadside through a Subwavelength Hole: Leaky-wave Model and Open Stopband Effect," *Radio Science*, Vol. 40, pp. 1–12, 2005.

» Lertsirimit, C., D.R. Jackson and D.R. Wilton, "Time-domain Coupling to a Device on Printed Circuit Board inside a Cavity," *Radio Science*, Vol. 40, pp. 1–12, 2005.

» Lertsirimit, C., D.R. Jackson and D.R. Wilton, "An Efficient Hybrid Method for Calculating the EMC Coupling to a Device on a Printed Circuit Board inside a Cavity by a Wire Penetrating an Aperture," *Electromagnetics*, Vol. 25, nos. 7–8, pp. 637–654, October–December 2005.

» Zhao, T., D.R. Jackson, J.T. Williams, H.Y. Yang, and A.A. Oliner, "2-D Periodic Leaky-wave Antennas—Part I: Metal Patch Design," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 3505–3514, November 2005.

» Zhao, T., D.R. Jackson and J.T. Williams, "2-D Periodic Leaky-wave Antennas—Part II: Slot Design," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 3515–3524, November 2005.

» Zhao, T., D.R. Jackson and J.T. Williams, "General Formulas for 2-D Leaky Wave Antennas," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 3525–3533, November 2005.

» Basilio, L.I., J.T. Williams, D.R. Jackson, and M.A. Khayat, "A Comparative Study of a New GPS Reduced-surface-wave Antenna," *Antennas and Wireless Propagation Letters*, Vol. 4, pp. 233–236, 2005.

» Baccarelli, P., P. Burghignoli, G. Lovat, S. Paulotto, F. Mesa, and D.R. Jackson, "Direct Modal Transition from Space-wave to Surface-wave Leakage on Microstrip Lines," *Radio Science*, Vol. 40, pp. 1–14, December 2005.

Conference Proceedings and Presentations (2005)

» Lertsirimit, C., D.R. Jackson and D.R. Wilton, "Time-domain Coupling to a Device on a Printed Circuit Board inside a Cavity," *URSI National Radio Science Conference*, Boulder, CO, January 5–8, 2005 (Abstracts, p. 45).

» Oroskar, S., D.R. Jackson and D.R. Wilton, "The Best Choice of the Splitting Parameter in the Ewald Method," *URSI National Radio Science Conference*, Boulder, CO, January 5–8, 2005 (Abstracts, p. 94).

» Baccarelli, P., S. Paulotto, D.R. Jackson, and A.A. Oliner, "Analysis of Printed Periodic Structures on a Grounded Substrate: A New Brillouin Dispersion Diagram," *IEEE Intl. Microwave Symp.*, Long Beach, CA, June 12–17, 2005 (Symp. Digest CD).

» Rodríguez-Berral, R., F. Mesa and D.R. Jackson, "High-frequency Excitation of a Microstrip Line by a Probe," *IEEE Intl. Microwave Symp.*, Long Beach, CA, June 12–17, 2005 (Symp. Digest CD).

» Lovat, G., P. Burghignoli, F. Capolino, D.R. Jackson, and D.R. Wilton, "High-directivity Effects in Artificial Materials," *PECS-VI International Symposium on Photonic and Electromagnetic Crystal Structures*, Aghia Pelaghia, Crete, Greece, June 19–24, 2005 (Abstract).

» Capolino, F., D.R. Jackson, D.R. Wilton, and L.B. Felsen, "Representation of the Field Excited by a Dipole near a 2D-Periodic Artificial Material," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (URSI Abstract).

» Burghignoli, P., G. Lovat and D.R. Jackson, "Leaky-wave Radiation at Broadside from One-dimensional Open Periodic Structures," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (AP-S Digest).

» Kanlioglu, O., D.R. Jackson and J.T. Williams, "Analysis of a Circular Array of Vias," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (AP-S Digest).

» Ravipati, C.B., D.R. Jackson and H. Xu, "Center-fed Microstrip Antennas with Shorting Vias for Miniaturization," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (AP-S Digest).

» Paknys, R. and D.R. Jackson, "Leakage Effects and Creeping Waves on Cylindrical Structures," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (URSI Abstract).

» Lertsirimit, C., D.R. Jackson, D.R. Wilton, and D. Erricolo, "Transient Coupling to a Device on a Printed Circuit Board inside a Cavity," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (URSI Abstract).

» Hu, Y., E. Lundgren, D.R. Jackson, J.T. Williams, and S.A. Long, "A Study of the Input Impedance of the Inset-fed Rectangular Microstrip Antenna as a Function of Notch Depth and Width," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (AP-S Digest).

» Bernal, J., F. Mesa and D.R. Jackson, "The Current Spectrum Excited by a Source on a Lossy Printed-circuit Line," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (URSI Abstract).

» Lovat, G., P. Burghignoli, F. Capolino, D.R. Jackson, and D.R. Wilton, "Directive Radiation from a Line Source in a Metamaterial Slab with Low Permittivity," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (AP-S Digest).

» Capolino, F., G. Lovat, P. Burghignoli, D.R. Jackson, and D.R. Wilton, "Directivity Enhancement Effects in Artificial Materials: A Comparison between Low- and High-impedance Materials," *Intl. Conference on Electromagnetics in Advanced Applications (ICEAA)*, September 12–16, 2005 (Digest).

» Baccarelli, P., S. Paulotto and D.R. Jackson, "Broadside Radiation Properties of 1-D Periodic Microstrip Leaky-wave Antennas," *Intl. Conference on Electromagnetics in Advanced Applications (ICEAA)*, September 12–16, 2005 (Digest).

» Dong, W., L.I. Basilio, J.T. Williams, and D.R. Jackson, "Positional Errors in GPS due to the Effective Point of Reception of Microstrip Patch Antennas," *Intl. Conference on Electromagnetics in Advanced Applications (ICEAA)*, September 12–16, 2005 (Digest).

» Burghignoli, P., G. Lovat and D.R. Jackson, "An Investigation of Radiation at Broadside from Leaky Plasmon Waves on Periodic Structures," *Intl. Conference on Electromagnetics in Advanced Applications (ICEAA)*, September 12–16, 2005 (Digest).

» Basilio, L.I., W.A. Johnson, D.R. Jackson, and D.R. Wilton, "Numerical Modeling of Finite-size Plasmon Structures with Enhanced Optical Transmission using EIGER," *Intl. Conference on Electromagnetics in Advanced Applications (ICEAA)*, September 12–16, 2005 (Digest).

» Baccarelli, P., P. Burghignoli, G. Lovat, S. Paulotto, F. Mesa, and D.R. Jackson, "Novel Modal Transition for Leaky Modes on Microstrip Lines," *URSI General Assembly*, New Delhi, India, October 23–29, 2005 (Digest).

» Lertsirimit, C., D.R. Jackson, D.R. Wilton, and D. Erricolo, "Coupling to a Device on a Printed Circuit Board inside of a Cavity," *URSI General Assembly*, New Delhi, India, October 23–29, 2005 (Digest).

» Mesa, F., R. Rodríguez-Berral and D.R. Jackson, "High-frequency Excitation of Microstrip Lines by Gap Sources and Probes," *URSI General Assembly*, New Delhi, India, October 23–29, 2005 (Digest).

» Lovat, G., P. Burghignoli and D.R. Jackson, "Fundamental Properties of Broadside Radiation from Uniform Leaky-wave Antennas," *URSI General Assembly*, New Delhi, India, October 23–29, 2005 (Digest).

» Lovat, G., P. Burghignoli, F. Capolino, D.R. Jackson, and D.R. Wilton, "A Comparative Study of Conventional and Metamaterial-based Planar Leaky-wave Antennas for Directive Radiation at Broadside," *URSI General Assembly*, New Delhi, India, October 23–29, 2005 (Digest).

Funded Research Programs (2005)

» Texas Higher Education Coordinating Board, Reconfigurable Antenna Systems for Next-generation Wireless Communications

» Air Force MURI, Electromagnetic Effects of Radio-frequency Pulses on Electronic Circuits and Systems

Ben H. Jansen

Professor

Ph.D., Free University, Amsterdam, The Netherlands

Research Interests

(Biomedical) Signal Analysis and Intelligent Systems, Neural Engineering

Professional Service (2005)

» Member, Technical Program Committee; Theme Chair (with Dr. Ogmen), Cognitive Engineering and Science Track; Chairman, Brain Activity and Cognition Session, *2nd International IEEE Conference on Neuroengineering*, Washington, D.C., 2005.
» Member, Program Committee; Organizer and Chairman (with Dr. Zouridakis), Technical Sessions on EEG and ERP Analysis, *22nd Annual Houston Conference on Biomedical Engineering Res.*, Houston, 2005.
» Track Chair, Neural Signal Processing, *27th IEEE EMBS Annual International Conference (EMBC05)*, Shanghai, China, September 1–4, 2005.
» Member, Steering Committee, *3rd International IEEE Conference on Neuroengineering*, Hawaii, 2007.
» Reviewer, *Journal of Neuroscience Methods*, *Neuroscience Letters*, *EURASIP Journal on Applied Signal Processing, Cerebral Cortex, Neural Computation*, *Journal of Computational Neuroscience*, *IEEE Transactions on Biomedical Engineering*, *Clinical Neurophysiology*

Research Centers & Laboratories (2005)

» Bio-signal Analysis Laboratory

Conference Proceedings and Presentations (2005)

» DeLeon, R., M. Hiscock, B.H. Jansen, M. McHenry, and G. Zouridakis, "EEG Analysis of Ear Advantage," *22nd Annual Houston Conference on Biomedical Engineering Res.*, Houston, Texas, February 10–11, 2005.
» Hu, L., B.H. Jansen and N.N. Boutros, "The Usefulness of the Auditory N100 and P200 Evoked Potential Components as Measures of Sensory Gating," *22nd Annual Houston Conference on Biomedical Engineering Res.*, Houston, Texas, February 10–11, 2005.
» Bonala, B.K., B.H. Jansen and N.N. Boutros, "Single Trial Analysis of P300 in Normal and Schizophrenia Subjects," *22nd Annual Houston Conference on Biomedical Engineering Res.*, Houston, Texas, February 10–11, 2005.
» Hu, L., B.H. Jansen and N.N. Boutros, "The Usefulness of the Auditory N100 and P200 Evoked Potential Components as Measures of Sensory Gating," *22nd International IEEE EMBS Conference on Neural Engineering*, Arlington, Virginia, March 16–19, 2005.
» Bonala, B.K., K. Prashant, K. Sundaresan, N.N. Boutros, and B.H. Jansen, "Auditory P300 Differences between Healthy and Schizophrenia Subjects Revealed by Single Trial Analysis," *2nd International IEEE EMBS Conference on Neural Engineering*, Arlington, Virginia, March 16–19, 2005.
» Kota, P., K. Sundaresan and B.H. Jansen, "Artifacts, Habituation and P300-based Brain Machine Interfaces," *27th Annual International Conference, IEEE Eng. Med. Biol. Soc.*, Shanghai, China, September 1–4, 2005.
» Hu, L., B.H. Jansen and N.N. Boutros, "Is P50 an Epiphenomenon?" *27th Annual International Conference, IEEE Eng. Med. Biol. Soc.*, Shanghai, China, September 1–4, 2005.

Funded Research Programs (2005)

» University of Texas Medical School at Houston, Elastography: Clinical and Basic Science
» University of Texas Medical School at Houston, Magnetic Resonance of Spinal Cord Injury
» University of Texas Medical School at Houston, Elasticity Imaging
» National Institutes of Health and Yale University, Phase Resetting and Sensory Inhibition in the CNS

Valery A. Kalatsky

Assistant Professor

Ph.D., Texas A&M University

Honors & Awards (2005)

» Alfred P. Sloan Research Fellow, Neuroscience
» New Faculty Research Program, University of Houston

Research Interests

Neuro-engineering, Optical Imaging of Intrinsic Signals, Neuro-biology, Brain Mapping, Representation of Sensory Modalities in Mammalian Neocortex

Professional Service (2005)

» Reviewer, *Journal of Neuroscience*, *PNAS*, *European Journal of Neuroscience*

Research Centers & Laboratories (2005)

» Center for Neuro-Engineering and Cognitive Science

Refereed Journal Publications Published (2005)

» Cang, J., V.A. Kalatsky, S. Löwel, and M.P. Stryker, "Optical Imaging of the Intrinsic Signal as a Measure of Cortical Plasticity in the Mouse," *Vis. Neurosci.*, Vol. 22, pp. 685–691, 2005.
» Jha, S.K., B.E. Jones, T. Coleman, N. Steinmetz, C.T. Law, G. Griffin, J. Hawk, N. Dabbish, V.A. Kalatsky, and M.G. Frank, "Sleep-dependent Plasticity Requires Cortical Activity," *J. Neurosci.*, Vol. 25, pp. 9266–9274, 2005.
» Kalatsky, V.A., D.B. Polley, M.M. Merzenich, C.E. Schreiner, and M.P. Stryker, "Fine Functional Organization of Auditory Cortex Revealed by Fourier Optical Imaging," *Proc. Natl. Acad. Sci. USA*, Vol. 102, pp. 13325–13330, 2005.

Conference Proceedings and Presentations (2005)

» Kalatsky, V.A., "Properties of Mouse Visual Cortex Revealed by Temporally Encoded Maps of Intrinsic Signals," *22nd Annual Houston Conference on Biomedical Engineering Research, University of Houston*, Houston, Texas, Februray 10–11, 2005.

Funded Research Programs (2005)

» UH New Faculty Research Program, Hierarchal Information Processing in Mammalian Auditory Cortex
» Alfred P. Sloan Foundation Research Grant

Nicolaos B. Karayiannis

Professor

Ph.D., University of Toronto

Research Interests

Medical Imaging and Diagnostic Video, Computational Intelligence (Neural Networks and Neuro-fuzzy Systems), Pattern Recognition, Wireless Communications, Image and Video Compression

Professional Service (2005)

» Associate Editor, *IEEE Transactions on Neural Networks*
» Associate Editor, *Journal of Applied Functional Analysis*
» Member of the Editorial Board, *International Journal of Smart Engineering System Design*
» Member of the Neural Networks Committee, IEEE Neural Networks Society
» Chair, 2005 ECE Graduate Research Conference

Refereed Journal Publications Published (2005)

» Karayiannis, N.B. and J. Chookiarti, "Regularized Adaptive Detectors for Code-division Multiple-access Signals," *IEEE Transactions on Wireless Communications*, Vol. 4, No. 4, pp. 1749–1758, 2005.
» Canelon, J.I., L.S. Shieh and N.B. Karayiannis, "A New Approach for Neural Control of Nonlinear Discrete Dynamic Systems," *Information Sciences*, Vol. 174, No. 3–4, pp. 177–196, 2005.
» Karayiannis, N.B., B. Varughese, G. Tao, J.D. Frost, Jr., M.S. Wise, and E.M. Mizrahi, "Quantifying Motion in Video Recordings of Neonatal Seizures by Regularized Optical Flow Methods," *IEEE Transactions on Image Processing*, Vol. 14, No. 7, pp. 890–903, 2005.
» Karayiannis, N.B., G. Tao, Y. Xiong, A. Sami, B. Varughese, J.D. Frost, Jr., M.S. Wise, and E.M. Mizrahi, "Computerized Motion Analysis of Videotaped Neonatal Seizures of Epileptic Origin," *Epilepsia*, Vol. 46, No. 6, pp. 901–917, 2005.
» Karayiannis, N.B., Y. Xiong, J.D. Frost, Jr., M.S. Wise, and E.M. Mizrahi, "Quantifying Motion in Video Recordings of Neonatal Seizures by Robust Motion Trackers Based on Block Motion Models," *IEEE Transactions on Biomedical Engineering*, Vol. 52, No. 6, pp. 1065–1077, 2005.

» Karayiannis, N.B., Y. Xiong, J.D. Frost, Jr., M.S. Wise, and E.M. Mizrahi, "Improving the Accuracy and Reliability of Feature Tracking Methods used for Extracting Temporal Motor Activity Signals from Video Recordings of Neonatal Seizures," *IEEE Transactions on Biomedical Engineering*, Vol. 52, No. 4, pp. 747–749, 2005.
» Karayiannis, N.B., A. Sami, J.D. Frost, Jr., M.S. Wise, and E.M. Mizrahi, "Automated Extraction of Temporal Motor Activity Signals from Video Recordings of Neonatal Seizures Based on Adaptive Block Matching," *IEEE Transactions on Biomedical Engineering*, Vol. 52, No. 4, pp. 676–686, 2005.
» Karayiannis, N.B., M. Balasubramanian and H. Malki, "Short-term Electric Power Load Forecasting Based on Cosine Radial Basis Function Neural Networks: An Experimental Evaluation," *International Journal of Intelligent Systems*, Vol. 20, No. 6, pp. 591–605, 2005.
» Karayiannis, N.B. and M.M. Randolph-Gips, "Soft Learning Vector Quantization and Clustering Algorithms Based on Non-Euclidean Norms: Single-norm Algorithms," *IEEE Transactions on Neural Networks*, Vol. 16, No. 2, pp. 423–435, 2005.
» Karayiannis, N.B and J. Chookiarti, "Directly Estimated Adaptive Detectors for Code-division Multiple-access Signals," *IEEE Transactions on Communications*, Vol. 53, No. 2, pp. 356–365, 2005.

Conference Proceedings and Presentations (2005)

» Karayiannis, N.B. and Y. Xiong, "Training Reformulated Radial Basis Function Neural Networks Capable of Identifying Uncertainty in the Recognition of Videotaped Neonatal Seizures," *Proceedings of 2005 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology*, pp. 447–454, La Jolla, CA, November 14–15, 2005.
» Mukherjee, A., P. Modur and N.B. Karayiannis, "Patient-specific Seizure Detection using Progressively Trained Quantum Neural Networks," *Epilepsia*, Vol. 46, Suppl. 8, pp. 319, 2005. (Abstract, *59th Annual Meeting of the American Epilepsy Society*, Washington, D.C., 2005).

Funded Research Programs (2005)

» National Institutes of Health, Video Technologies for Neonatal Seizures

Han Le

Professor

Ph.D., Massachusetts Institute for Technology

Research Interests

Semiconductor Optoelectronics, Lasers, Photonics, Optical Sensing and Imaging, Optical System, Lidars, Smart Sensing Systems

Professional Service (2005)

» Proposal Reviewer, U.S. DoE.
» Paper Reviewer, *Optics Letters*, *IEEE Photonics Technology Letter*, *Optics Express*, *Applied Physics Letters*
» DARPA/OIDA workshop

Research Centers & Laboratories (2005)

» Photonic Device and System Laboratory

Refereed Journal Publications Published (2005)

» Zhang, H.L., C. Peng, A. Seetharaman, G.P. Luo, H.Q. Le, C. Gmachl, D.L. Sivco, and A.Y. Cho, "External-cavity Tunable Mid-infrared Laser using Off-band Surface-emitting Bragg Grating Coupler," *Appl. Phys. Lett.*, Vol. 86, pp. 111112-1–111112-3, 2005.
» Zhang, H.L., A. Seetharaman, P. Johnson, G.P. Luo, and H.Q. Le, "High-gain Low-noise Mid-infrared Quantum Cascade Optical Preamplifier for Receiver," *IEEE Photon. Technol. Lett.*, Vol. 17, No. 1, pp. 13–15, 2005.
» Wang, Y., Y. Wang and H.Q. Le, "Multi-spectral Mid-infrared Laser Stand-off Imaging," *Opt. Express*, Vol. 13, pp. 6572–6586, 2005.

Conference Proceedings and Presentations (2005)

» Le, H.Q., Y. Wang and Y. Wang, "Optical Wireless Surveillance and Access Control Network," *Optical Society of America and Optoelectronic Industry Development Association Joint Meeting and Workshop*, Washington D.C., December 2005.
» Le, H.Q., "Multi-spectral Sensing Imaging with Mid-IR Semiconductor Lasers," (Joint invited seminar), *IEEE LEOS Dallas and Photodigm*, Dallas, October 2005.
» Wang, Y., (Advisor: H.Q. Le), "Multi-spectral Imaging with Mid-infrared Semiconductor Lasers," *Sigma Xi Graduate Engineering Research Conference at University of Houston (Poster Award)*, April 8, 2005.

Funded Research Programs (2005)

» Department of Justice, National Institute of Justice, Phonon Enhancement of Electronic and Photonic Devices

Jing Li

Research Assistant Professor

Ph.D., Jiaotong University, Xian, China

Honors & Awards (2005)

» Top Research Innovations and Findings, Texas Department of Transportation

Research Interests

Ground Penetrating Radar, GPR Modeling and Signal Processing, Ultra Wide Band Antennas, EM Numerical Simulation, Sensor Design, Electromagnetic Interference and Compatibility

Professional Service (2005)

» Senior Member, Institute of Electrical and Electronic Engineer (IEEE)
» Reviewer, *IEEE T-EMC*, *IEEE T-GRS*, *IEEE T-MTT*, *IEE P-RSN*, *IEE Electronics Letters*

Research Centers & Laboratories (2005)

» Subsurface Sensing Laboratory
» Well Logging Laboratory

Conference Proceedings and Presentations (2005)

» Kao, C.P., J. Li and R. Liu, "Measurement of Layer Thickness and Permittivity using a New Multi-layer Model from GPR Data," *Progress in Electromagnetics Research Symposium (PIERS 2005)*, Hangzhou, China, August 22–26, 2005.
» Xing, H., J. Li and R. Liu, "2.4GHz On-board Parallel Plate Soil Moisture Sensor System," *Sensors for Industry Conference 05*, Houston, February 8–10, 2005.

Funded Research Programs (2005)

» Texas Department of Transportation, Laser Texture Measurement Device
» Texas Department of Transportation, Investigation of a New Generation of FCC Compliant NDT Devices for Pavement Layer Information Collection
» Texas Department of Transportation, Feasibility Study of Non-contact High Speed Elastic Property Measurement of Pavements
» Texas Department of Transportation, Moisture Sensor, Laser Profiler for SH114
» Texas Department of Transportation, Evaluation of Innovative Sensors and Techniques for Measuring Traffic Loads
» Texas Department of Transportation, Development of Vehicle Mounted Measuring Device utilizing a Non-contact Method to Determine the Thickness and Uniformity of Application of Thermoplastic Pavement Marking Material
» Texas Department of Transportation, Nanotechnology Synthesize Study
» Texas Department of Transportation, Evaluation of a System for Measuring Seal Coat Quality
» Texas Department of Transportation, Laser Texture Measurement Devices
» University of Texas at Austin, LED Lighting Control System

Dmitri Litvinov

Associate Professor

Ph.D., University of Michigan, Ann Arbor

Research Interests

Nanomagnetics: Magnetic Computing, Single-molecule Biosensors, Terabit Data Storage Systems Based on Patterned Magnetic Recording Medium, Scalability Issues in Magnetoelectronics, Nanofabrication

Professional Service (2005)

» NSF Panelist at IHCS, NER, NIRT Review Panels and PREM Site Visit to the University of Puerto Rico in Mayaguez

Books and Articles in Books Published (2005)

» Litvinov, D. and S. Khizroev, "Nanomaterials and Nanodevices Synthesized by Ion-beam Technology," *Dekker Encyclopedia of Nanoscience and Nanotechnology*, ISBN 0-8247-4797-6, DOI: 10.1081/E-ENN-120040386, pp. 1–11, 2005.

» Khizroev, S., R. Chomko and D. Litvinov, "Nanoscale Magnetic Devices," *Handbook of Semiconductor Structures and Devices*, American Scientific Publishers, ISBN:158883-073-X, 2005.

Refereed Journal Publications Published (2005)

» Litvinov, D. and S. Khizroev, "Perpendicular Magnetic Recording: Playback," *Applied Physics Reviews in Journal of Applied Physics*, Vol. 97, No. 7, pp. 1–12, 2005.

» Smith, D., Ch. E, S. Khizroev, and D. Litvinov, "Magnetoresistive Playback Heads for Bit-patterned Medium Recording Applications," *Journal of Applied Physics*, Vol. 99, Art. No. 014503, pp. 1–7, 2005.

» Chomko, R., D. Litvinov and S. Khizroev, "A Nanoscale Transducer for Perpendicular Magnetic Recording," *Applied Physics Letters*, Vol. 87, Art. No. 162503, pp. 1–3, 2005.

» Chunsheng E., D. Smith, S. Khizroev, D. Weller, J. Wolfe, and D. Litvinov, "Physics of Patterned Medium Recording: Design Considerations," *Journal of Applied Physics*, Vol. 98, No. 2, Art. No. 024505, pp. 1–8, 2005.

» Khizroev, S., Y. Hijazi, R. Chomko, S. Mukherjee, R. Chantrell, X. Wu, R. Carley, and D. Litvinov, "Focused-ion-beam-fabricated Nanoscale Magnetoresistive Ballistic Sensors," *Applied Physics Letters*, Vol. 86, No. 4, Art. No. 042502, pp. 1–3, 2005.

Patents (2005)

» Khizroev, S., D. Litvinov, B. Crue, N. Amin, and R.E. Rottmayer, "Perpendicular Recording Head with Trackwidth Defined by Plating Thickness," US patent 6,898,053, issued May 24, 2005.

» Litvinov, D. and S. Khizroev, "Perpendicular Magnetic Recording Apparatus for Improved Playback Resolution Having Flux Generating Elements Proximate the Read Element," US patent 6,888,700, issued May 3, 2005.

» Litvinov, D., N. Shukla, E.B. Svedberg, S. Khizroev, and D.K. Weller, "Selective Annealing of Magnetic Recording Films," US patent 6,884,328, issued April 26, 2005.

» Litvinov, D. and S. Khizroev, "Magnetic Recording Head including Background Magnetic Field Generator," US patent 6,876,519, issued April 5, 2005.

» Khizroev, S., D. Litvinov and B.W. Crue, "Perpendicular Magnetic Recording Head," US patent 6,876,518, issued April 5, 2005.

» Khizroev, S., D. Litvinov, and E.C. Johns, "Gapless Longitudinal Magnetic Recording Head with Flux Cavity," US patent 6,865,057, issued March 8, 2005.

» Khizroev, S., D. Litvinov, M.H. Kryder, and J.A. Bain, "Longitudinal Magnetic Recording Heads with Variable-length Gap," US patent 6,685,056, issued March 8, 2005.

Funded Research Programs (2005)

» National Institutes of Health, Development of Nanomagnetic Sensor Array for High Throughput Molecular Screening

» Alliance for Nanohealth, Nanomagnetic Biosensor Array for Few-cell Cancer Diagnostics

» Office of Naval Research, Design and Scalability Physics of Nanomagnetic Device Structures for Magnetoelectronics, Magnetic Field Sensors, and Biosensor

» National Science Foundation, Nanomagnetic Device Structures for Data Storage, MRAM, and Sensor Applications

» National Science Foundation, NIRT: Nanomanufacturing Strategy and System Design for Nanoscale Patterned Magnetic Recording Medium

» National Science Foundation, MRI: Development of an Energetic Atom Beam Lithography System for Nanosystem Prototyping and Manufacturing

» National Science Foundation, MRI: Spinstand for Developing Next Generation Data Storage Systems

» Information Storage Industry Consortium, Materials for Patterned Magnetic Recording Medium

» University of Houston, TcSUH Seed Grant, Magnetic Cellular Logic for Next Generation Computing Systems

» University of Houston, GEAR, Nanomagnetic Detector Array for Biomolecular Recognition

C. Richard Liu

Professor

Ph.D., Jiaotong University, Xian, China

Honors & Awards (2005)

» Most Innovative Research Project, Texas Department of Transportation

» Device Provides Concrete Answers, Houston Chronicle Article, November 14, 2005

Research Interests

Sensor Technologies, Well Logging and Wireless Communications

Professional Service (2005)

» Member, Technical Advisory Committee, Texas Department of Transportation

Research Centers & Laboratories (2005)

» Subsurface Sensing Laboratory

» Well Logging Laboratory

Conference Proceedings and Presentations (2005)

» Guo, L., X. Chen, J. Yu, Y. Tang, and R. Liu, "Pavement Deflection Vehicle Weighing Method with Embedded Piezoelectric Sensor, Smart Structures and Materials," *Proceedings of SPIE*, Vol. 5758, pp. 471–478, San Diego, May 2005.

» Kao, C.P., J. Li and R. Liu, "Measurement of Layer Thickness and Permittivity using a New Multi-layer Model from GPR Data," *Progress in Electromagnetics Research Symposium (PIERS 2005)*, Hangzhou, China, August 22–26, 2005.

» Xing, H., J. Li and R. Liu, "2.4GHz On-board Parallel Plate Soil Moisture Sensor System," *Sensors for Industry Conference 05*, Houston, February 8–10, 2005.

» Zhou, H.Q., L.S. Shieh, C.R. Liu, and Q.G. Wang, "State-space Digital PID Controller Design for Linear Stochastic Multivariable Systems with Input Delay," *5th International Conference on Control and Automation, Hungarian Academy of Science*, Budapest, Hungary, June 26–29, 2005.

» Wu, D., F. Yang, J. Chen, and R. Liu, "MWD Tool/Small Antenna Analysis using Cylindrical Unconditional Stable FDTD Method," (invited), *Asian-Pacific Microwave Conference*, December 2005.

Funded Research Programs (2005)

» National Science Foundation, Role of Neuronal Activity in Visually Guided Escape Behaviors

» Texas Department of Transportation, Laser Texture Measurement Device

» Texas Department of Transportation, Investigation of a New Generation of FCC Compliant NDT Devices for Pavement Layer Information Collection

» Texas Department of Transportation, Feasibility Study of Non Contact High Speed Elastic Property Measurement of Pavements

» Texas Department of Transportation, Moisture Sensor, Laser Profiler for SH114

» Texas Department of Transportation, Evaluation of Innovative Sensors and Techniques for Measuring Traffic Loads

» Texas Department of Transportation, Development of Vehicle Mounted Measuring Device utilizing a Non-contact Method to Determine the Thickness and Uniformity of Application of Thermoplastic Pavement Marking Material

» Texas Department of Transportation, Nanotechnology Synthesize Study

» Texas Department of Transportation, Evaluation of a System for Measuring Seal Coat Quality

» Texas Department of Transportation, Laser Texture Measurement Devices

» Texas Department of Transportation, Technical Advisor Pannel, RMC and Tech Pannel

» University of Texas at Austin, LED Lighting Control System

» Oil and Service Companies (12), Well Logging Projects

» API Calibration System, Nuclear Logging Calibration Projects

Stuart Long

Professor & Associate Dean for Educational Activities

Ph.D., Harvard University

Honors & Awards (2005)

» Elected to the IEEE Board of Directors

Research Interests

Dielectric Resonator and Microstrip Antennas, Wireless Communications Antennas, High Temperature Superconducting Antennas, Electromagnetic Measurements

Professional Service (2005)

» IEEE Antennas and Propagation Society National Meetings Coordinator, 1988–present
» IEEE Spectrum Editorial Board, 1999–present
» IEEE Women in Engineering Committee, Liaison Member, 2002–2005
» IEEE Fellows Committee, 2002–present
» IEEE Board of Directors, Director Division IV, 2005–2006
» IEEE Audit Committee, 2005–present
» IEEE Region 5 Society Liaison, 2005–present
» IEEE RAB/TAB Section Chapter Support Committee, 2005–present
» Reviewer for *IEEE Transactions on Antennas and Propagation*, *Electronics Letters*, *Journal of Electromagnetic Waves and Applications*, *IEE Proceedings—Microwaves and Antennas and Propagation*, *IEEE Antennas and Wireless Propagation Letters*, *Microwave and Wireless Components Letters*
» University Honors College Council, 1982–present
» Committee of Associate Deans, 2000–present
» Athletics Advisory Committee, 2000–present
» NCAA Athletics Department Self-study Committee, 2005–2006
» Associate Dean for Educational Activities, 2002–present
» Academic Advisor to Honor's Program Students, 1983–present

Research Centers & Laboratories (2005)

» Applied Electromagnetics Laboratory

Refereed Journal Publications Published (2005)

» Chen, R.L., D.R. Jackson, J.T. Williams, and S.A. Long, "Scan Impedance of RSW Microstrip Antennas in a Finite Array," *IEEE Transactions Antennas and Propagation*, Vol. AP-53, No. 3, pp. 1098–1104, March 2005.

Conference Proceedings and Presentations (2005)

» Glover, J.R., J.L. Ruchhoeft, J.M. Trenor, S.A. Long, and F.J. Claydon, "Girls Reaching and Demonstrating Excellence (GRADE) Camps: An Innovative Recruiting Strategy at the University of Houston to Increase Female Representation in Engineering," *Proceedings of the 2005 American Society for Engineering Education Annual Conference and Exhibition*, p. 129, Portland, Oregon, June 15, 2005.
» Shattuck, D.P., B.J. Barr, J.L. Ruchhoeft, J.M. Trenor, S.A. Long, and F.J. Claydon, "Collaborative Learning as a Tool for Retention of Engineering Students: An Update on the Success of Engineering 'Redshirt' Camps and Collaborative Learning Workshops at the University of Houston Cullen College of Engineering," *Proceedings of the 2005 American Society for Engineering Education Annual Conference and Exhibition*, p. 125, Portland, Oregon, June 15, 2005.
» De Young, C.S. and S.A. Long, "Investigation of Dual Mode Wideband Rectangular and Cylindrical Dielectric Resonator Antennas," *Proceedings of the IEEE AP-S International Symposium*, Washington, D.C., July 2005.
» Akkerman, K.D., T.F Kennedy, S.A. Long, and J.T. Williams, "Characteristic Modes for Planar Structure Feed Design," *Proceedings of the IEEE AP-S International Symposium*, Washington, D.C., July 2005.
» Hu, Y., E.J. Lundgren, D.R. Jackson, J.T. Williams, and S.A. Long, "A Study of the Input Impedance of the Inset-fed Rectangular Microstrip Antenna as a Function of Notch Depth and Width," *Proceedings of the IEEE AP-S International Symposium*, Washington, D.C., July 2005.
» Kennedy, T.F., K.D. Akkerman, S.A. Long, and J.T. Williams, "Modification and Control of the Radiation Properties of Electrically Large Conducting Structures using Dielectric Loads," *Proceedings of the IEEE AP-S International Symposium*, Washington, D.C., July 2005.

Funded Research Programs (2005)

» Texas Higher Education Coordinating Board, Undergraduate Recruiting and Retention of ECE Students at the University of Houston
» National Science Foundation, Research Experience for Undergraduates in Electrical and Computer Engineering at the University of Houston
» National Science Foundation, RET Site: Research Experiences for Greater Houston High School Science and Math Teachers
» National Science Foundation, Control and Modification of Electric Currents on Existing Structures for Use as Effective Antennas in Wireless Communications Systems
» National Science Foundation, STEP-AHEAD: Access to Higher Education through Academic Retention and Development at the University of Houston
» Texas Higher Education Coordinating Board, Undergraduate Recruiting and Retention of ECE Students at the University of Houston
» Texas Higher Education Coordinating Board, Infinity and Beyond: Integrated Physics and Chemistry Professional Development Project for High School Teachers
» Texas Higher Education Coordinating Board, Undergraduate Recruiting and Retention of ECE Students at the University of Houston: Best Practices
» Texas Higher Education Coordinating Board, Retention of Female Undergraduates ECE Students at the University of Houston

Pauline Markenscoff

Associate Professor

Ph.D., University of Minnesota

Research Interests

Cellular Automata—Modeling of Biological Systems using Cellular Automata, Development and Implementation of Parallel Algorithms based on Cellular Automata; Parallel Processing—Task Scheduling Problems on Parallel Processors, Modeling and Performance Evaluation of Computer Systems

Professional Service (2005)

» Director of the Computer and Systems Engineering Program, University of Houston
» Reviewer for Various Scientific Journals
» Member of IEEE

Research Centers & Laboratories (2005)

» Computational Tissue Engineering Laboratory

Conference Proceedings and Presentations (2005)

» Feng, J., P. Markenscoff and K. Zygourakis, "Dynamics of Heterogeneous Cell Populations Growing Under Transport Limitations: A Hybrid, Multi-scale Model," *Procs. 2005 Annual Meeting of the AIChE*, ISBN 0-8169-0996-2, Paper 576c, Cincinnati, OH, October 30–November 4, 2005.
» Feng, J., K. Zygourakis and P. Markenscoff, "Mass Transfer Rates and Initial Conditions Modulate the Growth Rates and Structure of Bioartificial Tissues," *Procs. 2005 Annual Meeting of the AIChE*, ISBN 0-8169-0996-2, Paper 191a, Cincinnati, OH, October 30–November 4, 2005.
» Cheng, G., K. Zygourakis and P. Markenscoff, "A 3-D Algorithm Simulating Acid-mediated Growth of Solid Tumors," *Proc. 2005 Annual Meeting of the American Institute of Chemical Engineers*, ISBN 0-8169-0996-2, Paper 248c, Cincinnati, OH, October 30–November 4, 2005.

Haluk Ogmen

Department Chair & Professor

Ph.D., Université Laval, Québec, Canada

Honors & Awards (2005)

» Member, Central Visual Processing Study Section (CVP), Center for Scientific Review, National Institutes of Health, 2005–2009
» Honorary Visiting Professor of Computational Neuroscience, University of Bradford, Bradford, U.K.

Research Interests

Visual Perception, Visual Psychophysics, Neural Modeling, Neuro-Engineering, Computational Neuroscience

Professional Service (2005)

» Director, University of Houston Center for Neuro-Engineering and Cognitive Science
» Member, NIH Central Visual Processing (CVP) Study Section
» Specialty Editor (current events), *Neural Networks*
» Member of Steering Committee, *2nd International IEEE EMBS Conference on Neural Engineering*, Arlington, VA, March 2005.
» Track Co-chair, *Houston Society for Engineering in Medicine and Biology Annual Meeting*, Houston, TX, February 2005.
» External Tenure and Promotion Referee for Two Universities
» External Reviewer, Estonian Science Foundation
» Mail reviewer, NIH Special Emphasis Panels
» Member of Planning Committee, TMH-UH Neuroscience Colloquium
» Reviewer, *Biological Cybernetics*, *IEEE Transactions on Information Technology in BioMedicine*, *Psychonomic Bulletin & Review*, *Neuropsychologia*, *Wiley Encyclopedia for Biomedical Engineering*, *IJCNN 2005 Conference*

Research Centers & Laboratories (2005)

» Center for Neuro-Engineering and Cognitive Science
» Perceptual and Cognitive Dynamics Laboratory

Books and Articles in Books Published (2005)

» Ogmen, H., "Spatio-temporal Dynamics of Visual Perception across Neural Maps and Pathways," *Handbook of Geometric Computing: Applications in Pattern Recognition, Computer Vision, Neural Computing, and Robotics*, E. Bayro-Corrochano (Ed), Chapter 1, pp. 3–27, Springer Verlag, 2005.

Refereed Journal Publications Published (2005)

» Breitmeyer, B.G., H. Ogmen, J. Ramon, and J. Chen, "Unconscious Priming by Form and their Parts," *Visual Cognition*, Vol. 12, pp. 720–736, 2005.

Conference Proceedings and Presentations (2005)

» Ogmen, H., "Double Dissociation in Target Recovery and the Functional Roles of Primate Afferent Retino-cortical Pathways," *3rd Annual Conference on Theoretical and Computational Neuroscience*, Houston, TX, 2005.
» Aydin, M., M.H. Herzog and H. Ogmen, "Motion Induced Grouping Guides Feature Attribution," *3rd Annual Conference on Theoretical and Computational Neuroscience*, Houston, TX, 2005.
» Kafaligonul, H., B.G. Breitmeyer, H. Ogmen, L. Mardon, S. Todd, and R. Ziegler, "The Dynamics of Contour and Surface Processing in Human Vision," *3rd Annual Conference on Theoretical and Computational Neuroscience*, Houston, TX, 2005.
» Herzog, M.H. and H. Ogmen, "Where Features Go to in Human Vision," *European Conference on Visual Perception (ECVP '2005)*, Coruna, Spain, 2005.
» Ogmen, H., "Neural Processing Dynamics and Visual Perception," *2005 IEEE International Symposium on Neural Networks*, Chongqing, China, 2005, (invited plenary talk).
» Ogmen, H. and B.G. Breitmeyer, "Dissociation Phenomena in Masking Reveal Real-time Interactions between Visual Pathways," *Proceedings of the 6th Asian-Pacific Conference on Medical and Biological Engineering*, Tsukuba, Japan, 2005, (invited).
» Ogmen, H. and M.H. Herzog, "Spatio-temporal Integration in Grouping-based Feature Attribution," *VSS '05: Vision Sciences Society Conference*, Sarasota, FL, 2005.
» Herzog, M.H. and H. Ogmen, "Perceptual Grouping Induces Real-time Remapping of Retinotopy," *VSS '05: Vision Sciences Society Conference*, Sarasota, FL, 2005.
» Breitmeyer, B.G., H. Ogmen and A. Koc, "Metacontrast and Binocular Rivalry Suppression Reveal Hierarchies of Unconscious Visual Processing," *VSS '05: Vision Sciences Society Conference*, Sarasota, FL, 2005.
» Ogmen, H., B.G. Breitmeyer, S. Todd, and L. Mardon, "Contributions of Parvocelular and Magnocellular Pathways to Metacontrast and Target Recovery," *2nd International IEEE EMBS Conference on Neural Engineering*, Arlington, VA, 2005.

Funded Research Programs (2005)

» National Institute of Mental Health, Neural Correlates of Moving Boundary Perception

David M. Pai

Associate Professor

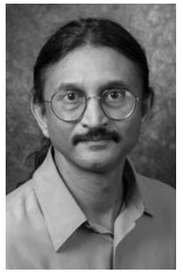
Ph.D., University of British Columbia, Canada

Research Interests

Optical Communications, High Power Fiber Lasers

Funded Research Programs (2005)

» Johnson Space Center, NASA, Photonic Distribution of Microwave Reference Phase Signals



Saumil S. Patel

Research Assistant Professor

Ph.D., University of Houston

Research Interests

Sensorimotor Systems, Visual Perception, Computational Modeling of Neural Systems, Neuro-engineering, Artificial Vision Systems and Biomedical Instrumentation

Professional Service (2005)

» Reviewer, *Vision Research*, *Journal of Experimental Psychology—General*

Research Centers & Laboratories (2005)

» Perceptual and Cognitive Dynamics Laboratory
» Center for Neuro-Engineering and Cognitive Science

Refereed Journal Publications Published (2005)

» Poonja, S., S.S. Patel, L. Henry, and A. Roorda, "Dynamic Visual Stimulus Presentation in an Adaptive Optics Scanning Laser Ophthalmoscope," *Journal of Refractive Surgery*, Vol. 21, pp. S575–80, 2005.
» Bedell, H.E. and S.S. Patel, "Attenuation of Perceived Motion Smear during the Vestibulo-ocular Reflex," *Vision Res.*, Vol. 45, pp. 2191–2200, 2005.
» Tong, J., S.S. Patel and H.E. Bedell, "Asymmetry of Perceived Motion Smear during Head and Eye Movements: Evidence for a Dichotomous Neural Categorization of Retinal Image Motion," *Vision Res.*, Vol. 45, pp. 1519–1524, 2005.
» Ramamurthy, M., H.E. Bedell and S.S. Patel, "Stereothresholds for Moving Line Stimuli for a Range of Velocities," *Vision Res.*, Vol. 45, pp. 789–799, 2005.

Conference Proceedings and Presentations (2005)

» Bedell, H.E., T.C. Lien, J. Tong, P.M. Cisarik, and S.S. Patel, "Motion Sensitivity and Fixation Variability along Individual Meridians," *Annual Meeting of Vision Sciences Society*, 2005.
» Patel, S.S. and H.E. Bedell, "Non-horizontal Disparities Enhance Sensitivity of the Human Stereovision System," *Annual Meeting of Vision Sciences Society*, 2005.
» Patel, S.S. and H.E. Bedell, "Role of Non-vertical Disparities in the Perception of Stereoscopic Depth," *Annual Meeting of Houston Society for Engineering in Medicine and Biology*, 2005.

Shin-Shem Steven Pei

Professor

Ph.D., State University of New York at Stony Brook

Research Interests

Optoelectronic Materials and Devices, High Speed and High Band Width Electronic Materials and Devices, Sensors and Tracking Devices for Public Safety, Homeland Security and Health Care Applications

Professional Service (2005)

» City of Houston Wireless Tower Commission
» 18th Congressional District Homeland Security Task Force

Research Centers & Laboratories (2005)

» Texas Center for Advanced Materials (CAM)
» Southwest Public Safety Technology Center (SWTC)

Conference Proceedings and Presentations (2005)

» Zhu, Z., Y. Mu and S.S. Pei, "Loss Effect on 2-D Photonic Crystal Band Structure," *Proceedings of SPIE Vol. #5722*, "Physics and Simulation of Optoelectronic Devices XIII," pp. 108–114, 2005.
» Peng, P., Y.M. Mu and S.S. Pei, "Numerical Calculation of the Energy-band Diagram of Mid-infrared Quantum Cascade Semiconductor Lasers by Self-consistent Method," *Proc. 3rd International Conference on Computing, Communications and Control Technologies*, 1, pp. 20–24, 2005.

Funded Research Programs (2005)

» National Institute of Justice, Proposal to Establish the Southwest Public Safety Technology Center
» National Institute of Justice, In-car Law Enforcement Technology
» NASA, NASA Research Partnership Center Cooperative Agreement Renewal
» AFSOR-MURI, Phonon Enhancement of Electronic and Photonic Devices
» Texas Center for Advanced Materials, Mid-IR Technology for Spectroscopy Applications

Paul Ruchhoeft

Assistant Professor

Ph.D., University of Houston

Honors & Awards (2005)

» Outstanding Teacher Award, Cullen College of Engineering, University of Houston

Research Interests

Nanofabrication, Microfabrication, Lithography, Solid-liquid Separation, Thin-film Deposition, Reactive Ion Etching, Modeling of Resist Exposure and Development

Professional Service (2005)

» NSF Review Panel Member

Research Centers & Laboratories (2005)

» Nanosystem Manufacturing Center

Refereed Journal Publications Published (2005)

» Han, K., W. Xu, A. Ruiz, P. Ruchhoeft, and S. Chellam, "Fabrication and Characterization of Polymeric Microfiltration Membranes using Aperture Array Lithography," *Journal of Membrane Science*, Vol. 249, No. 1–2, pp. 193–206, 2005.
» Wang, S., J. Chen and P. Ruchhoeft, "An ADI-FDTD Method for Periodic Structures," *IEEE Transactions on Antennas and Propagation*, Vol. 53, No. 7, pp. 2343–2346, 2005.
» Qiang, R., J. Chen, T. Zhao, S. Wang, P. Ruchhoeft, and M. Morgan, "Modeling of Infrared Bandpass Filters using a Three-dimensional FDTD Method," *Electronics Letters*, Vol. 41, No. 16, pp. 914–915, 2005.
» Xu, L., D.J. Economou, V.M. Donnelly, and P. Ruchhoeft, "Extraction of a Nearly Monoenergetic Ion Beam using a Pulsed Plasma," *Applied Physics Letters*, Vol. 87, p. 041502, 2005.
» Han, K., M. Morgan, A. Ruiz, V.S. Charan, and P. Ruchhoeft, "Rapid Prototyping of Infrared Bandpass Filters using Aperture Array Lithography," *J. Vac. Sci. Technol. B*, Vol. 23, No. 6, pp. 3158–3163, 2005.
» Xu, L., S.C. Vemula, M. Jain, S.K. Nam, V.M. Donnelly, D.J. Economou, and P. Ruchhoeft, "Nanopantography: A New Method for Massively Parallel Nanopatterning over Large Areas," *Nano Letters*, Vol. 5, No. 12, pp. 2563–2568, 2005.

Conference Proceedings and Presentations (2005)

» Han, K., W. Xu, A. Ruiz, P. Ruchhoeft, and S. Chellam, "Fabrication and Characterization of Polymeric Microfiltration Membranes using Aperture Array Lithography," *AWWA Membrane Technology Conference*, Phoenix, AZ, March 6–9, 2005.
» Ruiz, A., W. Xu, K. Han, B.A. Raju, P. Ruchhoeft, and S. Chellam, "Fabrication of Ultrafiltration Membranes with Highly Ordered, Lithographically-defined Pores," *Conference on Nanoscale Devices and System Integration*, Houston, TX, April 4–6, 2005.
» Qiang, R., J. Chen, K. Han, A. Ruiz, V.S. Charan, P. Ruchhoeft, and M. Morgan, "A Three-dimensional Model for Evaluating the Spectral Response of IR Frequency Selective Surfaces," *Conference on Nanoscale Devices and System Integration*, Houston, TX, April 4–6, 2005.
» Craver, B., M. Bhargava, V. Parekh, A. Ruiz, D. Litvinov, P. Ruchhoeft, and J. Wolfe, "Atom Beam Lithography: A High-resolution Massively Parallel Approach," *Conference on Nanoscale Devices and System Integration*, Houston, TX, April 4–6, 2005.
» Han, K., A. Ruiz, S. Vemula, P. Ruchhoeft, and M. Morgan, "Rapid Prototyping of Infrared Bandpass Filters using Aperture Array Lithography," *49th International Symposium on Electron, Ion and Photon Beam Technology and Nanofabrication*, Orlando, FL, 2005.
» Craver, B., D. Litvinov, P. Ruchhoeft, and J.C. Wolfe, "The Shadow of a Carbon Nanotube," *49th International Symposium on Electron, Ion and Photon Beam Technology and Nanofabrication*, Orlando, FL, 2005.
» Han, K., W. Xu, A. Ruiz, P. Ruchhoeft, and S. Chellam, "Fabrication of Polymeric Micro- and Ultra-filtration Membrane Filters using Aperture Array Lithography," *Association of Environmental Engineering and Science Professors' Research and Education Conference, Session O4a*, Potsdam, NY, July 24–27, 2005.

Funded Research Programs (2005)

» National Science Foundation, NIRT: Nano-pantography
» NASA (by way of EDTEK, Inc.), Thermophotovoltaic Radioisotope Power Conversion Technology
» Texas Higher Education Coordinating Board, Atom-beam Nanolithography for Manufacturing Large Areas of Highly Permeable Membrane Filters

David P. Shattuck

Associate Professor

Ph.D., Duke University

Research Interests

Development of Computer-based Tools for Effective Instruction in Circuit Analysis and Electronics

Professional Service (2005)

» Department of ECE Curriculum Committee
» Department of ECE ABET Committee
» Department of ECE Post-tenure Review Committee
» College of Engineering ABET Steering Committee
» College of Engineering Convocation Marshall
» University of Houston Rhodes Scholarship Committee
» University of Houston Teaching Excellence Award Committee

Conference Proceedings and Presentations (2005)

» Shattuck, D.P., B.J. Barr, J.L. Ruchhoeft, J.M. Trenor, S.A. Long, and F.J. Claydon, "Collaborative Learning as a Tool for Retention of Engineering Students: An Update on the Success of Engineering 'Redshirt' Camps and Collaborative Learning Workshops at the University of Houston Cullen College of Engineering," *ASEE Annual Conference*, Portland, Oregon, June, 2005.

Bhavin R. Sheth

Assistant Professor

Ph.D., Massachusetts Institute of Technology

Research Interests

Visual Perception, Multisensory Integration, Functions of Sleep, Autism and Related Developmental Disorders, Neural Basis of Insight

Research Centers & Laboratories (2005)

» Center for Neuro-Engineering and Cognitive Science

Refereed Journal Publications Published (2005)

» Sheth, B.R., "Memory Consolidation during Sleep: A Form of Brain Restitution," *Behavioral and Brain Sciences*, Vol. 28, pp. 81–82, 2005.

Conference Proceedings and Presentations (2005)

» Sheth, B.R., S. Shimojo and R. Kanai, "Time-varying Perception of Audiovisual Simultaneity," *Annual Meeting of the Society for Neuroscience*, Washington, D.C., November 12–16, 2005.

» Kanai, R., S. Shimojo and B.R. Sheth, "A Transient Change in a Feature of a Moving Stimulus Gets Harder to Detect Over Time Following Motion Onset," *Annual Meeting of the Society for Neuroscience*, Washington, D.C., November 12–16, 2005.

» Nieman, D.R., B.R. Sheth and S. Shimojo, "Mutually Incompatible Percepts of Motion and Position of a Single Visual Stimulus," *Annual Meeting of the Society for Neuroscience*, Washington, D.C., November 12–16, 2005.

Leang S. Shieh

Professor

Ph.D., University of Houston

Research Interests

Digital Control, Optimal Control, Self-tuning Control, Hybrid Control of Uncertain Systems, Soft Computing

Professional Service (2005)

» Reviewers for Army Research Proposal and Various Refereed Journals

Research Centers & Laboratories (2005)

» Control and Power Systems Laboratory

Refereed Journal Publications Published (2005)

» Tsai, J.S.H., H. Chen, M.M. Moussighi, and L.S. Shieh, "Digital Redesign of Observer-based Weighting Switch Controller for Cascaded Analog Systems with State Saturation and External Loads," *ISA Transactions*, Vol. 44, pp. 93–115, January 2005.

» Tsai, J.S.H., J.M. Yu, J.I. Canelon, and L.S. Shieh, "Extended-Kalman Filter-based Chaotic Communication," *IMA Journal of Mathematical Control & Information*, Vol. 22, No. 1, pp. 58–79, March 2005.

» Caneon, J.I., L.S. Shieh, S.M. Guo, and H.A. Malki, "Neural Network-based Digital Redesign Approach for Control of Unknown Continuous-time Chaotic Systems," *International Journal of Bifurcation and Chaos*, Vol. 15, No. 8, pp. 2433–2455, August 2005.

» Caneon, J.I., L.S. Shieh and N.B. Karayiannis, "A New Approach for Neural Control on Nonlinear Discrete Dynamic Systems," *International Journal of Information Sciences*, Vol. 174, No. 3–4, pp. 177–196, August 2005.

» Lee, Y.Y., J.S.H. Tsai, L.S. Shieh, and G. Chen, "Equivalent Linear Observer-based Tracker for Stochastic Chaotic System with Delays and Disturbances," *IMA Journal of Mathematical Control & Information*, Vol. 22, No. 3, pp. 266–284, September 2005.

» Tsai, J.S.H., K.M. Chen, J.M. Madsen, L.S. Shieh, and S.M. Guo, "Evolutionary-programming-based Tracker for Hybrid Chaotic Interval Systems," *IMA Journal of Mathematical Control & Information*, Vol. 22, No. 3, pp. 285–309, September 2005.

» Tsai, J.S.H., J.Y. Lin, A.C. Dunn, and L.S. Shieh, "Observer-based Tracker for Analog Systems with Saturating Actuators and State Constraints using Digital Redesign and a Weighted Switching Strategy," *Circuits, Systems, and Signal Processing*, Vol. 24, No. 1, pp. 53–82, 2005.

» Tsai, J.S.H., M.C. Wu, A.C. Dunn, and L.S. Shieh, "Digital Redesign Tracker for Cascaded Analog Systems with State Saturation and External Loads," *Journal of the Franklin Institute*, Vol. 342, No. 7, pp. 852–876, November 2005.

» Canelon J., H. Malki, S. Jacklin, and L.S. Shieh, "An Adaptive Neural Network Model for Vibration Control in Blackhawk Helicopter," *Journal of Helicopter*, Vol. 50, No. 4, pp. 349–353, 2005.

Conference Proceedings and Presentations (2005)

» Zhou, H.Q., L.S. Shieh, C.R. Liu, and Q.G. Wang, "State-space Digital PID Controller Design for Linear Stochastic Multivariable Systems with Input Delay," *5th International Conference on Control and Automation*, Hungarian Academy of Science, Budapest, Hungary, June 26–29, 2005.

» Zhang, Y.P., A. Cajetan, L.S. Shieh, and X. Gu, "Observer-based Load Disturbance Compensation for Motor Drive with DSP Implementation," *IEEE Industrial Electronics Conference (IECON) 2005*, Raleigh, North Carolina, November 6–10, 2005.

Funded Research Programs (2005)

» Department of the Army, Army Research Office, Evolutionary Computation and Control of Hybrid Uncertain Systems

» NASA/JSC, Development of an Adaptive Self-tuning Global Positioning Filter for the NASA/JSC Navigation Systems and Technology Laboratory

» ISSO/UH, PWM Control of Formation Flying Space Vehicle

Leonard P. Trombetta

Associate Professor

Ph.D., Lehigh University

Research Interests

Dielectric Materials for Advanced CMOS Devices, including High-K Materials; MOS Insulator Defect Studies, especially Hot Carrier Induced Defects, Si-SiO_2 Interface Defect Generation, and Radiation Damage; Electron Device Physics, particularly Ultra-small MOSFETs; Quantum Transport Modeling in Electron Nano-devices

Professional Service (2005)

» Journal article reviews for *J. Vac. Sci. Tech A* and *Applied Physics Letters*

» NSF Phase I Review panel, March 2005

Research Centers & Laboratories (2005)

» Microelectronics Laboratory

Jeffery T. Williams

Professor

Ph.D., University of Arizona, Tucson

Research Interests

Microstrip Antennas, Antenna Design, Electromagnetic Measurements, Leaky Wave Effects, RF and Microwave Circuits

Professional Service (2005)

» Chairman, IEEE AP-S/URSI Symposium Session on Microstrip Antennas, Washington D.C., July 2005.

» Chairman, IEEE Multi-group (AP/MTT/MAG/ED/EMC) Chapter, Houston.

» Reviewer, *IEEE Transactions on Antennas and Propagation*, *IEEE Antennas and Wireless Propagation Letters*, *Microwave and Wireless Components Letters*

» University of Houston Faculty Senator; Member of Academic Standards Committee, Department of Electrical and Computer Engineering

Research Centers & Laboratories (2005)

» Applied Electromagnetics Laboratory

Refereed Journal Publications Published (2005)

» Chen, R.L., D.R. Jackson, J.T. Williams, and S.A. Long, "Scan Impedance of RSW Microstrip Antennas in a Finite Array," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 1098–1104, March 2005.

» Xu, H., D.R. Jackson and J.T. Williams, "Comparison of Models for the Probe Inductance for a Parallel Plate Waveguide and a Microstrip Patch," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 3229–3235, October 2005.
» Jackson, D.R., A.A. Oliner, T. Zhao, and J.T. Williams, "The Beaming of Light at Broadside through a Subwavelength Hole: Leaky-wave Model and Open Stopband Effect," *Radio Science*, Vol. 40, pp. 1–12, 2005.
» Zhao, T., D.R. Jackson, J.T. Williams, H.Y. Yang, and A.A. Oliner, "2-D Periodic Leaky-wave Antennas—Part I: Metal Patch Design," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 3505–3514, November 2005.
» Zhao, T., D.R. Jackson and J.T. Williams, "2-D Periodic Leaky-wave Antennas—Part II: Slot Design," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 3515–3524, November 2005.
» Zhao, T., D.R. Jackson and J.T. Williams, "General Formulas for 2-D Leaky-wave Antennas," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 3525–3533, November 2005.
» Basilio, L.I., J.T. Williams, D.R. Jackson, and M.A. Khayat, "A Comparative Study of a New GPS Reduced-surface-wave Antenna," *Antennas and Wireless Propagation Letters*, Vol. 4, pp. 233–236, 2005.

Conference Proceedings and Presentations (2005)

» Kanlioglu, O., D.R. Jackson and J.T. Williams, "Analysis of a Circular Array of Vias," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (AP-S Digest).
» Hu, Y., E. Lundgren, D.R. Jackson, J.T. Williams, and S.A. Long, "A Study of the Input Impedance of the Inset-fed Rectangular Microstrip Antenna as a Function of Notch Depth and Width," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (AP-S Digest).
» Akkerman, K.D., T.F Kennedy, S.A. Long, and J.T. Williams, "Characteristic Modes for Planar Structure Feed Design," *Proceedings of the IEEE AP-S International Symposium*, Washington, D.C., July 2005.
» Kennedy, T.F., K.D. Akkerman, S.A. Long, and J.T. Williams, "Modification and Control of the Radiation Properties of Electrically Large Conducting Structures using Dielectric Loads," *Proceedings of the IEEE AP-S International Symposium*, Washington, D.C., July 2005.
» Dong, W., L.I. Basilio, J.T. Williams, and D.R. Jackson, "Positional Errors in GPS due to the Effective Point of Reception of Microstrip Patch Antennas," *Intl. Conference on Electromagnetics in Advanced Applications (ICEAA)*, September 12–16, 2005 (Digest).

Funded Research Programs (2005)

» National Institute of Justice, Southwest Public Safety Technology Center
» National Institute of Justice, In-car Law Enforcement Vehicle Technology
» National Science Foundation, Control and Modification of Electric Currents on Existing Structures for Use as Effective Antennas in Wireless Communications Systems

Donald R. Wilton

Professor

Ph.D., University of Illinois, Urbana-Champaign

Research Interests

Computational Electromagnetics, Antennas, Scattering, Electromagnetic Theory and Compatibility Well Logging

Professional Service (2005)

» Chair, Raj Mittra Travel Grant Committee, IEEE Antennas and Propagation Society and US URSI Commission B, 1995–present.

Research Centers & Laboratories (2005)

» Applied Electromagnetics Laboratory
» Well Logging Laboratory

Refereed Journal Publications Published (2005)

» Capolino, F., D.R. Jackson and D.R. Wilton, "Fundamental Properties of the Field at the Interface between Air and a Periodic Artificial Material Excited by a Line Source," *IEEE Transactions Antennas and Propagation, Special Issue on Artificial Magnetic Conductors, Soft/Hard Surfaces, and Other Complex Surfaces*, Vol. 53, pp. 91–99, January 2005.
» Capolino, F., D.R. Jackson and D.R. Wilton, "Mode Excitation from Sources in Two-dimensional PBG Waveguides using the Array Scanning Method," *IEEE Microwave on Wireless Components Letters*, Vol. 15, No. 2, pp. 49–51, February 2005.
» Capolino, F., D.R. Wilton and W.A. Johnson, "Efficient Computation of the 2-D Green's Function for 1-D Periodic Arrays using the Ewald Method," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 2977–2984, September 2005.
» Lertsirimit, C., D.R. Jackson and D.R. Wilton, "Time-domain Coupling to a Device on Printed Circuit Board inside a Cavity," *Radio Science*, Vol. 40, pp. 1–12, 2005.
» Lertsirimit, C., D.R. Jackson and D.R. Wilton, "An Efficient Hybrid Method for Calculating the EMC Coupling to a Device on a Printed Circuit Board inside a Cavity by a Wire Penetrating an Aperture," *Electromagnetics*, Vol. 25, pp. 637–654, October–December 2005.
» Khayat, M.A. and D.R. Wilton, "Numerical Evaluation of Singular and Near-singular Potential Integrals," *IEEE Transactions Antennas and Propagation*, Vol. 53, pp. 3180–3190, October 2005.

Conference Proceedings and Presentations (2005)

» Lertsirimit, C., D.R. Jackson, D.R. Wilton, and D. Erricolo, "Time-domain Coupling to a Device on a Printed Circuit Board inside a Cavity," *URSI National Radio Science Conference*, p. 94, Boulder, CO, January 8–11, 2005.
» Oroskar, S., D.R. Jackson and D.R. Wilton, "The Best Choice of the Splitting Parameter in the Ewald Method," *URSI National Radio Science Conference*, p. 45, Boulder, CO, January 8–11, 2005.
» Lovat, G., P. Burghignoli, F. Capolino, D.R. Jackson, and D.R. Wilton, "High-directivity Effects in Artificial Materials," *PECS-VI International Symposium on Photonic and Electromagnetic Crystal Structures*, Aghia Pelaghia, Crete, Greece, June 19–24, 2005.
» Fasenfest, B.J., F. Capolino and D.R. Wilton, "A Fast MOM Solver (GIFFT) for Large Arrays of Microstrip and Cavity-backed Antennas," invited paper, *IEEE AP-S Symp. and USNC/URSI Meeting*, Washington, D.C., July 3–8, 2005 (AP Digest).
» Lovat, G., P. Burghignoli, F. Capolino, D.R. Jackson, and D.R. Wilton, "Directive Radiation from a Line Source in a Metamaterial Slab with Low Permittivity," invited paper, *IEEE AP-S Symp. and USNC/URSI Meeting*, Washington, D.C., July 3–8, 2005 (AP Digest).
» Capolino, F., D.R. Jackson, D.R. Wilton, and L.B. Felsen, "Representation of the Field Excited by a Dipole near a 2D-periodic Artificial Material," invited paper, *IEEE AP-S Symp. and USNC/URSI Meeting*, Washington, D.C., July 3–8, 2005 (Radio Science Digest).
» Fasenfest, B., L. Basilio, D. Wilton, and F. Capolino, "Efficient Numerical Modeling of Truncation Effects and Defects in Finite Periodic Structures," invited paper, *IEEE AP-S Symp. and USNC/URSI Meeting*, Washington, D.C., July 3–8, 2005.
» Lertsirimit, C., D.R. Jackson, D.R. Wilton, and D. Erricolo, "Transient Coupling to a Device on a Printed Circuit Board inside a Cavity," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (URSI Abstract).
» Champagne, N.J., V. Jandhyala, B.J. Fasenfest, J.D. Rockway, and D.R. Wilton, "Time Domain Analysis using Higher-order Wires," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (AP Digest).
» Graglia, R.D., G. Lombardi, D.R. Wilton, and W.A. Johnson, "Modeling Edge Singularities in the Method of Moments," *IEEE AP-S/URSI Intl. Symp.*, Washington, D.C., July 3–8, 2005 (AP Digest).
» Capolino, F., G. Lovat, P. Burghignoli, D.R. Jackson, and D.R. Wilton, "Directivity Enhancement Effects in Artificial Materials: A Comparison between Low- and High-impedance Materials," *Intl. Conference on Electromagnetics in Advanced Applications (ICEAA)*, September 12–16, 2005 (Digest).
» Basilio, L.I., W.A. Johnson, D.R. Jackson, and D.R. Wilton, "Numerical Modeling of Finite-size Plasmon Structures with Enhanced Optical Transmission using EIGER," invited paper, *Intl. Conference on Electromagnetics in Advanced Applications (ICEAA)*, September 12–16, 2005 (Digest).
» Fink, P., D.R. Wilton and M. Khayat, "Issues and Methods Concerning the Evaluation of Hypersingular and Near-hypersingular Integrals in BEM Formulations," invited paper, *Intl. Conference on Electromagnetics in Advanced Applications (ICEAA)*, September 12–16, 2005 (Digest).
» Capolino, F., G. Lovat, P. Burghignoli, D.R. Jackson, and D.R. Wilton, "A Comparative Study of Conventional and Metamaterial-based Planar Leaky-wave Antennas for Directive Radiation at Broadside," invited paper, *URSI General Assembly*, New Delhi, October 23–29, 2005.
» Capolino, F., P. Burghignoli, G. Lovat. D.R. Jackson, and D.R. Wilton, "Broadside Directivity Enhancement by using Metamaterial Substrates," invited, *Workshop on Metamaterials for Microwave and Opt. Technologies*, San Sebastian, Spain, July 18–20, 2005.

» Lertsirimit, C., D.R. Jackson, D.R. Wilton, and D. Erricolo, "Coupling to a Device on a Printed Circuit Board inside of a Cavity," *URSI General Assembly*, New Delhi, India, October 23–29, 2005 (Digest).
» Lovat, G., P. Burghignoli, F. Capolino, D.R. Jackson, and D.R. Wilton, "A Comparative Study of Conventional and Metamaterial-based Planar Leaky-wave Antennas for Directive Radiation at Broadside," *URSI General Assembly*, New Delhi, India, October 23–29, 2005 (Digest).

Funded Research Programs (2005)
» Air Force MURI, Electromagnetic Effects of Radio-frequency Pulses on Electronic Circuits and Systems
» Sandia National Laboratories, Modeling Finite Periodic Structures with Defects
» Texas Higher Education Coordinating Board, Reconfigurable Antenna Systems for Next-generation Wireless Communications

John C. Wolfe

Professor

Ph.D., University of Rochester

Honors & Awards (2005)
» Member of the Advisory Committee, *International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication*
» Member of the Advisory Committee, *International Conference on Micro- and Nano- Engineering*

Research Interests
Nanofabrication, Advanced Lithography, Charged Particle Optics, Thin Film Technology, Reactive Ion Etching

Professional Service (2005)
» Reviewer, *Journal of the American Vacuum Society*
» Member of the Advisory Committee, *International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication*
» Member of the Advisory Committee, *International Conference on Micro- and Nano- Engineering*
» NSF SBIR Review
» Reviewer, *Microelectronic Engineering*
» Chair, Local Arrangements Committee: Nanoscale Device and System Integration Conference

Research Centers & Laboratories (2005)
» Director, Nanosystem Manufacturing Center

Refereed Journal Publications Published (2005)
» Chunsheng E, D. Smith, S. Khizroev, D. Weller, J. Wolfe, and D. Litvinov, "Physics of Patterned Medium Recording: Design Considerations," *Journal of Applied Physics*, Vol. 98, No. 2, pp. 1–8, 2005.

Conference Proceedings and Presentations (2005)
» Craver, B., P. Ruchhoeft, D. Litvinov, and J.C. Wolfe, "The Shadow of a Carbon Nanotube," *48 the Int. Conf. EIPBN.*, Orlando, FL, May 30–June 3, 2005, (Invited).

Funded Research Programs (2005)
» NSF, NIRT: Nanomanufacturing Strategy and System Design for Nanoscale Patterned Magnetic Recording Medium
» NASA, Thermophotovoltaic Radioisotope Power Conversion Technology
» Information Storage Industry Consortium, Materials for Patterned Magnetic Recording Medium
» NSF, MRI: Development of an Energetic Atom Beam Lithography System for Nanosystem Prototyping and Manufacturing
» Axcelis Technologies, Surface Wave Plasma Ashing Studies
» NSF, Collaborative Research: Role of Neuronal Activity in Visually Guided Escape Behaviors
» NIH, Nanomagnetic Detector for Molecular Recognition

Jarek Wosik

Research Professor

Ph.D., Institute of Physics, Polish Academy of Science, Warsaw, Poland

Research Interests
Design and Fabrication of Magnetic Resonance Imaging Surface and Intravascular Single Probes and Arrays for Biomedical Research and Clinical Applications, High Frequency Bio-sensors and Dielectric Spectroscopy, Bio-sensors for Microwave and mm-wave Spectroscopy

Professional Service (2005)
» Reviewer, *Physical Review B*, *Physical Review Letters*, *IEEE Transactions on Applied Superconductivity*, *Applied Physics Letters*, *Measurement Science and Technology*

Research Centers & Laboratories (2005)
» Texas Center for Superconductivity High Frequency Bioengineering Laboratory

Conference Proceedings and Presentations (2005)
» Wosik, J., M. Kamel, L. Xue, L.-M. Xie, K. Nesteruk, and J. Bankson, "Superconducting Coil Array for Parallel Imaging," *Proceedings of the 13th Annual Meeting of the International Society for Magnetic Resonance in Medicine*, Miami, Florida, May 7–13, 2005.
» Xue L., M. Kamel, L.-M Xie, J. Wosik, P. Narayana, "SNR Limit for Cryogenic Arrays," *Proceedings of the 13th Annual Meeting of the International Society for Magnetic Resonance in Medicine*, Miami, Florida, May 7–13, 2005.

Funded Research Programs (2005)
» NIH/UP, Structural MRI of Trabecular Bone for Therapy Response Monitoring
» TCSUH, Cryogenic Receiver System for High Resolution MRI
» TCSUH, High Frequency Biosensors, Dielectric Response of Bacterial Spores and Live Cells
» DARPA, Dielectric Spectroscopy for the Detection of Biological and Chemical Warfare Agents
» ISSO, Magnetic Microscopy Studies of Magnetotactic Fossils on Martian Meteorite ALH84001 and Related Earthbound Analog Systems
» NASA-ISSO Postdoctoral Aerospace Fellowship Program, Martian Soil Biosensors based on Dielectric Spectroscopy

Wanda Zagozdzon-Wosik

Associate Professor

Ph.D., Warsaw University of Technology, Warsaw, Poland

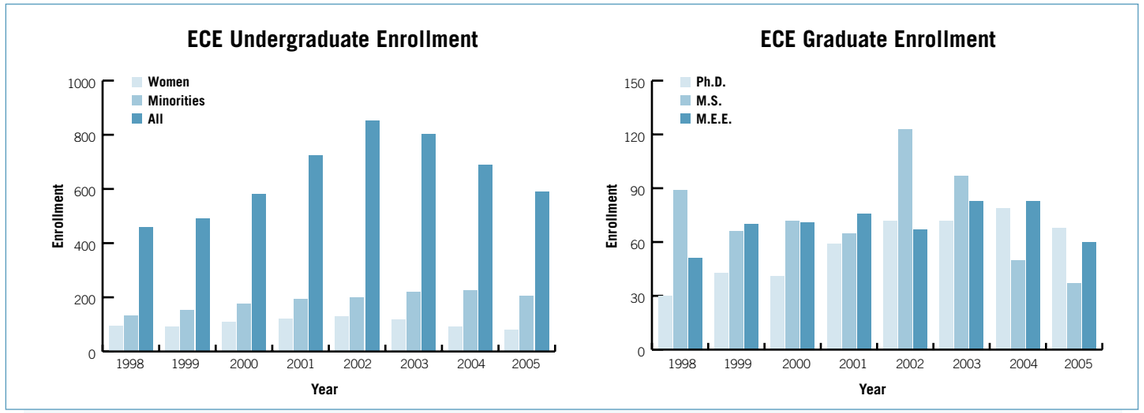
Research Interests
Novel Materials for Nanoscale Integrated Circuits, Silicon Processing including VLSI Process Integration and Process/Device Simulation, Nano- and Micro-Electromechanical Systems (NEMS/MEMS) for Applications in Biomedical Sensors

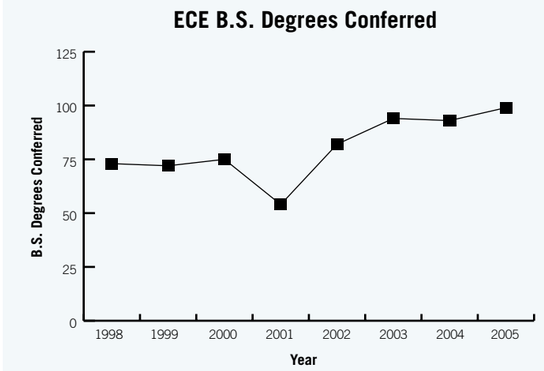
Research Centers & Laboratories (2005)
» Microelectronics

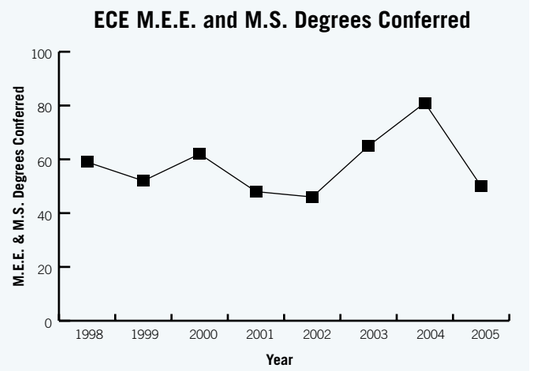
Conference Proceedings and Presentations (2005)
» Rusakova, I., W. Zagozdzon-Wosik, C. Darne, Z.-H. Zhang, P. Van der Heide, and P. Majhi, "Microstructure and Electrical Properties of Diborides Modified by Rapid Thermal Annealing," *XII International Conference on Electron Microscopy of Solids*, Kazimierz Dolny, Poland, June 5–9, 2005.

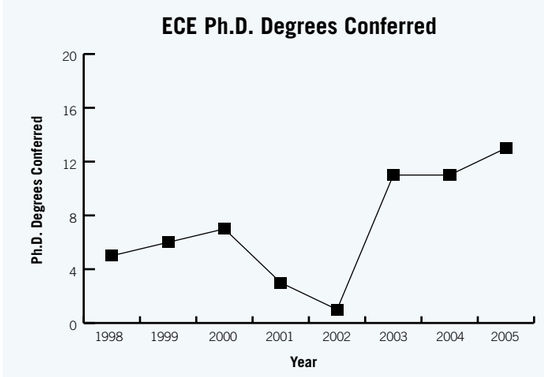
Funded Research Programs (2005)
» TcSUH, Integrated BioMEMS for Biophysical Applications in Living Cells

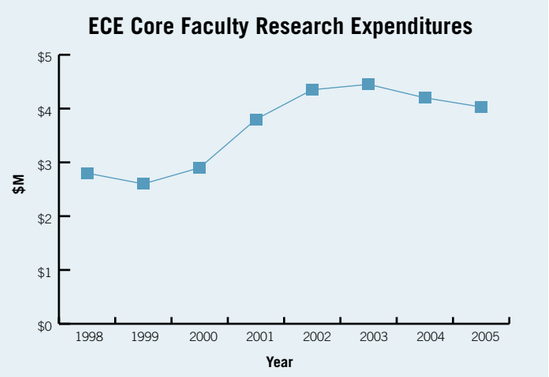
STATISTICS











FUNDED RESEARCH PROGRAMS

Principal Investigator	Agency	Period of time	Amount Awarded	Title
J. Charlson	National Science Foundation	2005–2010	$ 2,325,000	Alliance for Graduate Education and the Professorate
J. Charlson	MOSIS	2005	$ 17,400	
J. Chen	Sun Microsystems (equipment grant)	2004–2005	$ 130,000	Acquisition of a Sun V-880 server
J. Chen	National Science Foundation	2004–2007	$ 98,000	Computer Modeling of EM Energy Deposition within Human Subjects under Various RF Sources
J. Chen	Texas Space Grant Consortium	2004–2006	$ 10,000	Electrical and Thermal Modeling and Simulations for Mixed-signal SOC Applications
Y. Chen	Grant to Enhance and Advance Research (GEAR), University of Houston	Sept. 2005–Aug. 2006	$ 25,274	FPGA-based Sensor Network Testbed for Hazardous Substance Monitoring and Response
Y. Chen	New Faculty Research Program, University of Houston	Feb. 2005–Aug. 2005	$ 6,000	Seamless Delivery Service for Network-on-Chip
Y. Chen	Small Grants Program, University of Houston	Dec. 2004–Aug. 2005	$ 2,112	Evolvable Router for Ever Evolving Internet
F. Claydon, S.A. Long	Texas Higher Education Coordinating Board	May 2005–Aug. 2007	$ 79,176	Retention of Female Undergraduates ECE Students at the University of Houston
F. Claydon, S.A. Long	Texas Higher Education Coordinating Board	May 2005–Aug. 2007	$ 372,561	Undergraduate Recruiting and Retention of ECE Students at the University of Houston: Best Practices
F. Claydon, S.A. Long	National Science Foundation	Oct. 2003–Sept. 2006	$ 435,530	RET Site: Research Experiences for Greater Houston High School Science and Math Teachers
F. Claydon, S.A. Long	National Science Foundation	Mar. 2003–Feb. 2007	$ 320,236	Research Experiences for Undergraduates in Electrical and Computer Engineering
F. Claydon; Co-investigators: B. Barr, S.A. Long, D. Shattuck	Texas Technology Workforce Development Grant Program, Texas Higher Education Coordinating Board	May 2002–Mar. 2007	$ 604,450	Undergraduate Retention and Recruiting of ECE Students at the University of Houston
F. Claydon; Co-investigators: B. Barr, S.A. Long, D. Shattuck, J. Glover	Texas Technology Workforce Development Grant Program, Texas Higher Education Coordinating Board	Sept. 2004–Aug. 2006	$ 331,449	Undergraduate Retention and Recruiting of ECE Students at the University of Houston
J. Glover	National Institutes of Health	Sept. 2001–July 2006	$ 600,000	Epileptic Seizures in the Neonatal EEG
D.R. Jackson, D.R. Wilton	Texas Higher Education Coordinating Board	2004–2005	$ 170,000	Reconfigurable Antenna Systems for Next-generation Wireless Communications
B.H. Jansen	University of Texas Medical School at Houston	June 2004–May 2005	$ 27,202	Elastography: Clinical and Basic Science
B.H. Jansen	University of Texas Medical School at Houston	June 2004–May 2005	$ 24,179	Elastography: Clinical and Basic Science
B.H. Jansen	University of Texas Medical School at Houston	Aug 2004–Mar. 2005	$ 10,554	Magnetic Resonance of Spinal Cord Injury
B.H. Jansen	University of Texas Medical School at Houston	Apr. 2005–Mar. 2006	$ 18,631	Magnetic Resonance of Spinal Cord Injury
B.H. Jansen	University of Texas Medical School at Houston	June 2004–May 2005	$ 19,647	Elasticity Imaging
B.H. Jansen	University of Texas Medical School at Houston	June 2004–Dec. 2005	$ 11,412	Elasticity Imaging
B.H. Jansen	National Institutes of Health and Yale University	May 2002–Apr. 2006	$ 400,000	Phase Resetting and Sensory Inhibition in the CNS

Principal Investigator	Agency	Period of time	Amount Awarded	Title
B.H. Jansen	University of Texas Medical School at Houston	June 2004–May 2005	$ 27,202	Elastography: Clinical and Basic Science
V.A. Kalatsky	New Faculty Research Program, University of Houston	2005	$ 6,000	Hierarchal Information Processing in Mammalian Auditory Cortex
V.A. Kalatsky	Alfred P. Sloan Foundation	2005–2007	$ 45,000	(Research Grant)
N.B. Karayiannis	National Institutes of Health	2002–2005	$ 602,775	Video Technologies for Neonatal Seizures
D. Litvinov (PI), R. Willson, J.C. Wolfe	National Institutes of Health	2005–2008	$ 891,000	Development of Nanomagnetic Sensor Array for High Throughput Molecular Screening
D. Litvinov (PI), R. Willson, M. Kapoor, J.C. Wolfe	Alliance for Nanohealth	2006–2007	$ 148,500	Nanomagnetic Biosensor Array for Few-cell Cancer Diagnostics
D. Litvinov (PI), J.C. Wolfe	Office of Naval Research	2006–2008	$ 150,000	Design and Scalability Physics of Nanomagnetic Device Structures for Magnetoelectronics, Magnetic Field Sensors, and Biosensor Applications
D. Litvinov (PI), J.C. Wolfe	National Science Foundation	2005–2007	$ 226,630	Nanomagnetic Device Structures for Data Storage, MRAM, and Sensor Applications
D. Litvinov (PI), R. Lee, D. Weller, C.G. Willson, J.C. Wolfe	National Science Foundation	2004–2008	$ 1,099,808	NIRT: Nanomanufacturing Strategy and System Design for Nanoscale Patterned Magnetic Recording Medium
D. Litvinov, S. Khizroev (PI)	National Science Foundation	2004–2007	$ 220,896	MRI: Spinstand for Developing Next Generation Data Storage Systems
D. Litvinov (PI), J.C. Wolfe	Information Storage Industry Consortium	2004–2006	$ 62,000	Materials for Patterned Magnetic Recording Medium
D. Litvinov, J.C. Wolfe	University of Houston, TcSUH Seed Grant	2005–2006	$ 20,000	Magnetic Cellular Logic for Next Generation Computing Systems
D. Litvinov (PI), J.C. Wolfe	University of Houston, GEAR	2005–2006	$ 25,500	Nanomagnetic Detector Array for Biomolecular Recognition
C. Liu, F. Gabbiani (PI), J.C. Wolfe	National Science Foundation	2005–2007	$ 205,211	Role of Neuronal Activity in Visually Guided Escape Behaviors
C. Liu	12 Oil and Service Companies	2004–2006	$ 450,000	Well Logging Projects
C. Liu	API Calibration System	2004–2005	$ 40,000	Nuclear Logging Calibration Projects
C. Liu	TxDOT Technical Advisor Pannel	2004–2006	$ 3,000	RMC and Tech Panel
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2005–2007	$ 100,000	Laser Texture Measurement Device
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2004–2005	$ 60,000	Investigation of a New Generation of FCC Compliant NDT Devices for Pavement Layer Information Collection
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2004–2005	$ 150,000	Feasibility Study of Non Contact High Speed Elastic Property Measurement of Pavements
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2004–2005	$ 50,000	Moisture Sensor, Laser Profiler for SH114
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2004–2005	$ 60,000	Evaluation of Innovative Sensors and Techniques for Measuring Traffic Loads
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2004–2006	$ 80,000	Development of Vehicle Mounted Measuring Device utilizing a Non-contact Method to Determine the Thickness and Uniformity of Application of Thermoplastic Pavement Marking Material
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2005–2006	$ 111,000	Nanotechnology Synthesize Study
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2005–2006	$ 100,000	The Evaluation of a System for Measuring Seal Coat Quality

Principal Investigator	Agency	Period of time	Amount Awarded	Title
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2005–2007	$ 240,000	Laser Texture Measurement Devices
C. Liu (PI), X. Chen, J. Li	University of Texas at Austin	2005	$ 3,000	LED Lighting Control System
S.A. Long, J.T. Williams	National Science Foundation	2002–2006	$ 300,000	Control and Modification of Electric Currents on Existing Structures for Use as Effective Antennas in Wireless Communications Systems
S.A. Long, F. Claydon	National Science Foundation	Dec. 2003–Nov. 2008	$ 1,511,236	STEP-AHEAD: Access to Higher Education through Academic Retention and Development at the University of Houston
S.A. Long, A. Foster (PI), E. Chiappetta	Texas Higher Education Coordinating Board	2004–2005	$ 300,000	Infinity and Beyond: Integrated Physics and Chemistry Professional Development Project for High School Teachers
H. Ogmen, H.E. Bedell	National Institutes of Health	2000–2006	$ 762,500	Neural Correlates of Moving Boundary Perception
D.M. Pai	NASA, Johnson Space Center	Aug. 2004–Aug. 2005	$ 16,000	Photonic Distribution of Microwave Reference Phase Signals
S.S. Pei, H.Q. Le	AFSOR-MURI	2000–2005	$ 824,500	Phonon Enhancement of Electronic and Photonic Devices
S.S. Pei	Texas Center for Advanced Materials	2003–2005	$ 329,122	Mid-IR Technology for Spectroscopy Applications
S.S. Pei	National Institute of Justice	2003–2005	$ 1,982,977	In-car Law Enforcement Technology
Ignatiev, S.S. Pei	NASA	2004–2006	$ 1,651,000	NASA Research Partnership Center Cooperative Agreement Renewal
S.S. Pei	National Institute of Justice	2005–2007	$ 2,959,929	Proposal to Establish the Southwest Public Safety Technology Center
P. Ruchhoeft, S. Chellam	Texas Higher Education Coordinating Board	2004–2006	$ 170,000	Atom-beam Nanolithography for Manufacturing Large Areas of Highly Permeable Membrane Filters
P. Ruchhoeft, V. Donnelly, D. Economou	National Science Foundation	2003–2007	$ 1,000,000	NIRT: Nano-Pantography
P. Ruchhoeft, J. Chen	NASA (by way of EDTEK, Inc.)	2003–2005	$ 958,740	Thermophotovoltaic Radioisotope Power Conversion Technology
L.S. Shieh	Department of the Army, Army Research Office	2002–2005	$ 250,000	Evolutionary Computation and Control of Hybrid Uncertain Systems
L.S. Shieh	NASA, Johnson Space Center	2004–2007	$ 90,000	Development of an Adaptive Self-tuning Global Positioning Filter for the NASA/JSC Navigation Systems and Technology Laboratory
L.S. Shieh	ISSO/UH	2005	$ 14,952	PWM Control of Formation Flying Space Vehicle
D.R. Wilton	Sandia National Laboratories	May 2005–Sept. 2005	$ 29,526	Modeling Finite Periodic Structures with Defects
D.R. Wilton, D.R. Jackson	Air Force MURI	2001–2006	$ 550,000	Electromagnetic Effects of Radio-frequency Pulses on Electronic Circuits and Systems
J.C. Wolfe	Axcelis Technologies	2005	$ 140,000	Surface Wave Plasma Ashing Studies
J.C. Wolfe (PI), V. Donnelly, D. Economou, D. Litvinov, P. Ruchhoeft	National Science Foundation	2005–2008	$ 298,336	MRI: Development of an Energetic Atom Beam Lithography System for Nanosystem Prototyping and Manufacturing
J.C. Wolfe, F. Gabbiani (PI), C. Liu	National Science Foundation	2005–2008	$ 207,141	Collaborative Research: Role of Neuronal Activity in Visually Guided Escape Behaviors

Principal Investigator	Agency	Period of time	Amount Awarded	Title
J. Wosik	National Institutes of Health/UP	Sept. 2005–June 2010	$ 486,000	Structural MRI of Trabecular Bone for Therapy Response Monitoring
J. Wosik	TSUH	Sept. 2005–Aug. 2006	$ 147,000	Cryogenic Receiver System for High Resolution MRI
J. Wosik	TSUH	Sept. 2004–Aug. 2005	$ 144,400	High Frequency Biosensors; Dielectric Response of Bacterial Spores and Live Cells
J. Wosik, J. Miller	DARPA	Nov. 2003–Oct. 2005	$ 250,000	Dielectric Spectroscopy for the Detection of Biological and Chemical Warfare Agents
J. Wosik	ISSO	May 2005–Aug. 2005	$ 11,300	Magnetic Microscopy Studies of Magnetotactic Fossils on Martian Meteorite ALH84001 and Related Earthbound Analog Systems
J. Wosik, J. Miller	NASA-ISSO Postdoctoral Aerospace Fellowship Program	Sept. 2004–Aug. 2007	$ 60,000	Martian Soil Biosensors based on Dielectric Spectroscopy
W. Zagozdzon-Wosik	TSUH	Sept. 2005–Aug. 2006	$ 20,000	Integrated BioMEMS for Biophysical Applications in Living Cells

PH.D. DISSERTATION ABSTRACTS

Chen, Yuanhang, "Integrated Laser 2-D Surface Imaging System for Thickness Measurement of Thermoplastic Pavement Marking Materials"

Advisor: R. Liu

Thermoplastic pavement marking materials (TPMM) provide delineation on highways around the world. The thickness of TPMM on pavement is a very important parameter to control the quality of TPMM, calculate durability of TPMM, and provide information for the maintenance and replacement of TPMM. Traditionally, the thickness measurement is conducted by using pre-embedded plates and measuring the thickness of TPMM after spraying of the marking materials. This method is labor intensive and cannot obtain a continuous-thickness profile. Developing an automatic thickness measurement system for marking materials is critical to pavement management and public safety.

The measurement system developed in this dissertation uses laser devices to detect the thickness of TPMM. A dedicated digital laser signal processing circuit is developed to restore thickness information. Both optical and electrical filtering techniques are applied in the design. The thickness measurement system includes two versions: (1) a pushcart measurement device and (2) a vehicle-mounted measurement device, which provide continuous real-time thickness measurement of TPMM. Both devices consist of two major parts: a hardware system to measure the thickness of marking materials using a laser triangulation technique, and a software package to analyze and process the measured data in real time.

Lab and field tests under various conditions with marking materials on real pavement surfaces were conducted. The test results showed that the measurement system is capable of reaching the resolution of 5 mils on pavement. The developed system for thickness measurement of TPMM has a 267 KHz working frequency, which is the highest among similar devices. The high speed allows the system to provide higher accuracy and more flexibility in various applications.

Feng, Jian, "Tissue Growth in 3-D: A New Computational Model that Integrates Cell Heterogeneity and Diffusional Limitations and its Parallel Implementation"

Advisor: P. Markenscoff

We present a new computational model that can be used in the study of tissue growth and wound healing processes. It consists of a discrete cellular automata (CA) model that governs the proliferation, migration and death of heterogeneous populations of cells, and a continuous PDE model that describes the convection, diffusion, and consumption of nutrients and/or growth factors (GFs) inside the tissue scaffold. The domain of the PDE model is mapped to the domain of the CA model such that at any particular time step, the local concentrations of nutrients/GFs at every cell site of the CA domain can be uniquely determined by solving a transient, three-dimensional PDE. Then the obtained concentration profile inside the tissue takes part in modulating cell functions through a series of intracellular processes. In our model, each cell population has its own proliferation, migration and death characteristics, as well as different metabolic properties such as the consumption rate of nutrients or growth factors. Our study suggests that under the diffusional limitations of nutrients/GFs, cell heterogeneity can have significant impact on the growth rate and pattern of the tissue.

Two different implementations of the model were developed on high performance computers. The NUT version considers nutrients (e.g., glucose) only and uses a static load balancing (SLB) scheme; the MGF version takes into account mitogenic growth factors only and employs a new dynamic load balancing (DLB) scheme. Performance analysis showed high speedup and excellent scalability for both implementations. For the MGF version, our results indicate that the DLB scheme resulted in better performance than the SLB scheme.

Guo, Lianhe, "Study of Weigh-In-Motion Sensors"

Advisor: R. Liu

The Weigh-in-Motion (WIM) system is a promising technology to weigh moving vehicles. The study was started as early as the 1950's with the research of sensors measuring the mechanical strain induced in load cells and highway bridges. Then, the WIM sensors embedded in pavement were introduced and evaluated widely. But no satisfactory WIM sensor was found.

To evaluate WIM sensors and techniques, the WIM system standard was introduced and available WIM sensors in the market such as load cells, bending plates and piezoelectric sensors were reviewed in this dissertation. Then, a remote WIM system was designed and installed to conduct the sensor evaluation. The designed system could be accessed remotely and was capable of conducting the data acquisition from multiple sensors. With the acquired field data, a pavement deflection weight determination algorithm was developed and its result was compared with the integration algorithm. The analysis showed that pavement deflections could be used for the vehicles' weight measurements and the conclusion was helpful for the nondestructive WIM system design. In addition to the evaluation of WIM sensors, an innovative microwave WIM sensor was developed in this dissertation. It was an active sensor based on the perturbation theory of microwave resonant cavities. The microwave signal generated by a circuit was coupled into the sensor and the returned signal was measured to determine the load applied on the sensor. The microwave WIM sensor was designed, simulated and tested in the lab. The TE1,1,L cavity mode of the sensor was found to be a good mode for WIM applications. Furthermore, the sensor showed an excellent linearity, uniformity and measurement accuracy from the results of the lab test.

Iyer, Darshan, "Improved Evoked Potential Estimation using Iterative Independent Component Analysis"

Advisors: G. Zouridakis, B.H. Jansen

The structure of the sources underlying surface recordings of brain activity is very complex, but it is possible to study the dynamical characteristics of brain activation by analyzing responses to external sensory stimulation. Typically, single-trial responses are buried into the more prominent background activity, and thus advanced procedures are needed to extract the activity of the cortical generators activated only by the experimental task under study. We have developed an iterative procedure that is based on independent component analysis to obtain single-trial estimates of the auditory N100 component, which was acquired using auditory stimulation and a whole-head, 256-channel, dense array recording system. The technique was applied to N100 source localization and normal-schizophrenia classification study based on P50 and N100 components.

Our results show that the proposed methodology can effectively extract only the activity related to the experimental task, while removing artifacts and background activity, and that it can provide improved response estimates when compared to plain ensemble averaging and wavelet transform analysis. Additionally, the sources of the N100 component that were typically localized on the floor of the Sylvian fissure were primarily due to the in-phase responses, whereas the contribution from the out-of-phase responses had an antagonistic effect. Finally, when the same methodology was applied to N100 data from schizophrenia patients, normals could be separated from patients with 93% accuracy, and a sensitivity and specificity of 93% and 92%, respectively. With P50 data, normals could be separated from patients with 97% accuracy, and a sensitivity and specificity of 97% and 96%, respectively.

The above results suggest that the new methodology can serve as a valuable tool in the analysis of brain activity.

Koc, Alpay, "Functional Hierarchy and Temporal Dynamics of Conscious and Unconscious Processes in Human Vision"

Advisor: H. Ogmen

Despite the fact that the human visual system is one the most extensively studied sensory systems, very little is known about its functional architecture and temporal dynamics. The broad, long term goal of our research is to understand the mechanisms and dynamics underlying conscious and unconscious registration of a visual stimulus. In order to address this question, we have used three paradigms where the degree of conscious registration of a stimulus can be controlled

systematically: 1) Binocular rivalry, 2) Visual masking, and 3) Visual attention. In each paradigm, the strategy was either to suppress or enhance the conscious registration of a stimulus by a secondary stimulus and to probe the functional hierarchy or the dynamics of this interaction by varying stimulus parameters.

Our results identify a functional hierarchy of unconscious processes in the brain starting with disinhibition in metacontrast followed by binocular rivalry, which in turn is followed by metacontrast masking. Moreover, our electroencephalography (EEG) results suggest that the parietal areas constitute one of the neural loci where metacontrast interactions take place during a period of 200–400 ms after stimulus onset. Under the framework of a model of masking (RECOD; Ogmen et al., 2003), our results suggest that the transient activity of a stimulus is suppressed mainly by inter-channel inhibition. Our results also suggest that a peripheral cue, which facilitates conscious registration of a stimulus through the deployment of attention mechanisms, also generates feature-based priming. Taken together, these results reveal a functional hierarchy of conscious and unconscious processing in the visual system and characterize some of the dynamics taking place within this hierarchy.

Langston, William, "Time-Domain Current Propagation on a Microstrip Line Excited by a Finite Source"

Advisors: J.T. Williams, D.R. Jackson

Time-domain pulse propagation on microstrip transmission lines excited by a finite-gap voltage source is investigated with special attention given to the dispersive effects associated with the individual components of the transmission-line current.

The electromagnetic analysis is first developed in the frequency domain including material losses. Phase and attenuation constant results from the subsequent model show that, for structures that support a leaky mode, the leaky-mode loss is the dominant loss factor when it is physical. The frequency-domain results for total current show that the leaky mode causes severe signal loss and oscillations in the total current due to interference between the bound mode and the continuous spectrum.

The time-domain analysis, an extension of the frequency-domain analysis using Fourier theory, is applied to three open and covered microstrip structures for two different pulses to show a broad range of dispersive effects. It is shown that for structures supporting a strong leaky mode there is significant distortion including broadening (and eventual splitting) of the pulse as it propagates and a loss of signal energy. Distortion early in time (near the leading edge of the pulse) is primarily due to the continuous spectrum but late-time distortion (near the lagging edge of the pulse) is primarily associated with the bound mode. When a leaky mode is strongly excited, the leaky-mode response makes up a large portion of the continuous-spectrum response and radiates energy as it propagates. It is also shown that for structures that support a leaky mode only at very high frequencies (relative to the frequency spectrum of the pulse), the distortion is almost exclusively due to the bound mode and hence is accounted for by CAD formulas based on the bound mode, when such are available.

Lee, Iljeong, "Multi-band Quantum Transport in a Si Nanowire"

Advisor: L. Trombetta

We present the effect of bulk Si contacts on Si nanowire transport properties and local density of states using a non-equilibrium Green's function formalism. Using nearest-neighbor $sp^3d^5s^*$ empirical tight binding, a realistic Si nanowire electronic structure was calculated. Using the Si nanowire Hamiltonian from the tight-binding method, we solved the Green's function equations for nanowire surface states and bulk Si surface states. The retarded and advanced Green's functions were calculated using a recursive algorithm for effective calculation of the inverse matrix. From knowledge of the retarded and advanced Green's functions, we can easily calculate the local density of states and transport properties of the free-standing Si nanowire. We also calculated the band offset arising from contact between the Si nanowire and bulk Si. Finally, we studied the effect of the bulk Si contact on the transport properties of the Si nanowire and on its local density of states using the self-energy technique.

Lertsirimit, Chatrpol, "Electromagnetic Coupling to a Device on a Printed Circuit Board"

Advisor: D.R. Wilton

An efficient hybrid method for calculating the electromagnetic coupling to a device on a printed circuit board (PCB) inside a cavity by a wire penetrating an aperture is presented. The hybrid method separates the printed circutit board analysis from the cavity analysis for numerical efficiency. The method allows a Thevenin equivalent circuit to be obtained at any point on the circuit board (a definable "port"), such as a point where a conductor trace meets a circuit component on the board. Hence the voltage level at the input to a device on the PCB that results from an exterior incident field can be calculated.

A transient electromagnetic pulse coupling into the syustem under inverstigation can have a significant impact on a digital device. The time-domian electromagnetic pulse coupling to the device can be calcuclated from the frequency-domain response using the Fourier transform. The system reponse in the frequency domain may be caculated by the hybrid method. The investigation in the time domain focuses on pulses comprising a sinsusoidal carrier wave modulated by an envelope function. A damped sinusoidal pusle is investigated in detail to explore how the output signal may be maximized.

In the frequency domain, the system response consists of many different types of resonant modes. The characterizing parameters of each mode are important in understanding the behaviour of the response and in aiding with the numerical calculations. A CAD fomrula for extracting these parameters is developed and presented here.

Nounu, Hatem, "Mask Development for Nano-Scale Atom Beam Lithography"

Advisor: J.C. Wolfe

Lithography, the process of transferring the image of a master pattern into a polymeric resist, has provided the foundation for advances in integrated circuit technology for the past half-century; soon, it will enable chips with over 2.5 billion transistors. Atom beam lithography (ABL) is a proximity printing technique where a broad, collimated beam of energetic helium atoms floods a stencil mask and the transmitted beamlets transfer the mask pattern to resist on a substrate. This promising technique shares the extremely small diffraction and resist scattering of light ions, yet is immune to the charging artifacts and line edge roughness that plague charged particle lithography at the nanoscale. However, helium atoms implanted into the stencil mask are known to cause compressive stress and mask wrinkling after a few tens of exposures. In this dissertation, we describe the development of an ion absorbing coating that allowed us to use a silicon stencil mask for nanoscale ABL.

Righetti, Raffaella, "Poroelastography: Ultrasonic Imaging of the Poroelastic Behavior of Phantoms and Tissues"

Advisor: P. Ktonas

Elastography is a well-established imaging modality that utilizes an applied quasi-static compression to estimate and image the mechanical properties of ultrasonically scanned tissues. In the last decade, many studies have been carried out to understand the fundamental tradeoffs in elastographic imaging and to demonstrate the feasibility of generating quality elastograms of tissues *in vitro* and *in vivo*. The majority of these studies were aimed at investigating the mechanical response of tissues to rapid loading under the assumption that the response occurred immediately after the application of the load, so that the tissue could be modeled as a linearly elastic and incompressible solid material. Presently, there still exists a paucity of work on estimating and imaging the Poisson's ratio, compressibility, permeability and time-dependent mechanical behavior of tissues. Due to pathological conditions or simply due to their inherent structure, some hydrated soft tissues are characterized by a high water content that is free to move in the interstitial spaces. These tissues may be modeled as poroelastic materials, and their mechanical behavior is primarily controlled by their elastic and permeability properties. It is expected that an investigation of the spatial and temporal poroelastic behavior of biological tissues could provide a better understanding of their complex mechanical behavior and might be useful for assessing the degree of pathological involvement and monitoring their treatment. The fundamental hypothesis at the basis of the research reported in this dissertation is that it is feasible to use ultrasound elastography to estimate and create quality images of the poroelastic behavior of phantoms and some tissues in unconfined uniaxial compression, which is related to the dynamics of the fluid flow and to the elastic and permeability properties of the materials. This study involved the generation of Poisson's ratio elastograms and poroelastograms from homogeneous and non-homogeneous poroelastic materials in unconfined compression. From the poroelastograms, new types of elastograms, called Poisson's ratio time constant elastograms and permeability elastograms, were generated to obtain information about the underlying permeability distribution of the materials that ostensibly causes the time-dependent changes observed in the poroelastograms. Independent mechanical measurements, simulations, and studies of the major issues related to image quality analysis, such as signal-to-noise ratio, contrast-to-noise ratio, and resolution, were performed and used for designing the poroelastography experiments and interpreting the results. The work reported in this dissertation led to the conclusion that it is feasible to use elastographic techniques to generate quality images of the spatial and temporal poroelastic behavior of certain materials and tissues *in vitro* and *in vivo*.

Sun, Yijie, "A High-Resolution Sequential Sampling Ground Penetrating Radar System"

Advisor: R. Liu

Ground Penetrating Radar (GPR) is used for detecting and surveying the integrity of underground structures. The objective of this dissertation is to focus on the highway pavement thickness measurement. The present method is the core sampling method for obtaining pavement layer parameters. That method calls for drilling a hole into the highway pavement. The process is destructive, time consuming, labor intensive and provides limited coverage. GPR is a non-destructive, efficient and cost effective instrument that can measure the pavement layer parameters as accurately as the core sampling method with full coverage.

As is well known, the highway pavement usually contains rebars. For rebar-reinforced concrete pavement, the rebar's effect is an important factor that influences the determination of concrete pavement thickness from GPR data. Although some features of rebar's reflection have been studied, how to extract the rebar's scattering fields from the measured

GPR data and cancel rebar's influence on pavement thickness estimation have not been reported. In this dissertation, a new algorithm for extracting the rebar's reflection fields from the measured GPR data is developed. The developed algorithm not only extracts the rebar's reflection fields, but also solves other pavement parameters.

The commercial GPR available today does not provide methods to remove the rebar's effect; therefore a professional staff is needed to interpret data. Consequently, the total operation cost is expensive. We have developed a high-resolution GPR system using a sequential sampling technique, and the rebars' effect is automatically removed by the software in real-time. Furthermore, a new type of balance-to-unbalance device, "balun", with an over 3GHz bandwidth, has been designed and proven to decrease the reflection of the antenna.

The new GPR has been designed, implemented and tested in the lab and in the field. The test results show that the tolerance of the highway pavement thickness measurement is less than 5%. The total cost of the GPR system is much lower than the present commercial version.

Tao, Guozhi, "Recognition of Neonatal Seizures from Video Recordings Based on Motion Segmentation Methods"

Advisor: N.B. Karayiannis

This dissertation presents several motion segmentation methods to quantify motion information from video recordings of neonatal seizures in the form of temporal motion strength signals. The first motion segmentation method relied on the frame difference to detect the motion and vector clustering followed by morphological filtering to segment the moving body part. Further study indicated that this kind of motion segmentation method was not robust enough to quantify the motion characteristic of neonatal seizures from video recording. So other motion segmentation methods that rely on the pre-computed optical flow field were then presented. In order to estimate the optical flow field accurately, a general formulation of optical flow computation was presented and a mathematical framework for the development of practical tools for computing optical flow was outlined. In addition, an alternative formulation of the optical flow problem that relies on a discrete approximation of a family of quadratic functionals was also presented. The moving body parts were segmented by a variety of approaches that employ direct thresholding on the pre-computed flow field, clustering of the velocity vectors and clusteering of motion parameters obtained by fitting an affine model to a pre-computed flow field. The quantitative features that convey some unique behavioral characteristics of neonatal seizures were extracted from the motion strength signals produced by different segmentation mthods. Different kinds of neural network including the traditional feed-forward neural networks, cosine radial basis functions neural networks and quantum neural networks were used to identify the seizure and non-seizure. The experiments indicated that the best among the motion segmentation methods developed in this dissertation produced quantitative features that constitute a reliable basis for recognizing neonatal seizures.

Wang, Yi, "Multispectral Laser Based Optical Sensing"

Advisor: H.Q. Le

Multispectral laser sensing is a growing research area with applications in robotic/ machine vision, nondestructive testing, environmental monitoring, military remote (stand-off) sensing, and medical imaging and diagnostics. Lasers of diverse wavelengths beyond the human visible spectrum can be used to acquire object spectral signatures, i.e. "colors" that are far more distinctive and informative than the object natural emission.

A 7-λ near-IR and a 4-λ mid-IR imaging sensing systems using semiconductor lasers have been developed for this research. Unlike the conventional one-transmitter (Tx)/one receiver (Rx) design, the system is based on the scalable network concept, in which multiple transmitters and receivers can be deployed with arbitrary any-to-any connectivity to allow NxM information scaling rather than linear N scaling. For signaling, the code-division-multiple-access (CDMA) architecture was used to allow ease of scaling as well as robustness against interference. Wavelength-division-multiplexing technique was used to combine the multi-spectral beams. An optical galvanometric scanner was used to generate 2D rasters on the target. A digital signal processor was built to perform all-digital signal and image acquisition and processing.

Experimental results include fast detection of contaminants in turbid media, simultaneous multispectral and multi-perspective acquisition of a scene, detection of an invisible gas that is rendered visible with image fusion, and various target spectral discrimination in the mid-infrared. In particular, wavelength modulation imaging (WMI) experiments employing a tunable mid-infrared laser theoretically and experimentally demonstrated the importance of both spectroscopic and geometrical aspects of a target signature. A synthetic imaging approach combining 2nd order WMI of CO gas and passive imaging technique allows chemical visualization with clutter rejection capability. Application of WMI to low-spectroscopic targets shows its capability to reveal features in higher order images not evident in the 0th order image. For the mid-infrared region, which is rich of molecular spectral fingerprints, the system was capable to resolve and distinguish small spectral differences among a diverse group of targets that consisted of both man-made and natural materials and objects at a stand-off distance from 13–40 m. Colorless (black or transparent) objects in the visible become "colorful" in the mid-IR. A demonstration of 3D multispectral imaging was also obtained. The results suggest that laser-based multispectral imaging can be a unique and powerful technology for target discrimination and visualization.

PH.D. STUDENT ROSTER

Student	Field	Tentative Title	Advisor	Exp. Comp.
Kavian, Nasrollah	Solid State		E.J. Charlson	2006
Joseph, Clement	Solid State		E.J. Charlson	2006
Troha, Donald	Solid State		E.J. Charlson	2007
Bhaskaran, Shivakumar	Solid State		E.J. Charlson	2008
Wu, Dagang	Computer Engineering	"Biomedical Instruments"	J. Chen	2006
Qiang, Rui	Computer Engineering	"Modeling of Nano-Meter FSS Structures"	J. Chen	2006
Hames, Kevin	Computer Engineering	"Fault Tolerant Circuit Designs for Radiation Hardened Circuits"	J. Chen	2007
Zhou, Jianjun	Well Logging	"Modeling Techniques for Well-logging"	J. Chen, R. Liu	
Zhai, Zhi	Networking	"Adaptive Overlay Networks"	Y. Chen	2009
Mitra, Joyeeta	Intelligent Systems	"A Multi-stage Rule-based System for the Detection of Epileptic Seizures in the Neonatal EEG"	J. Glover	May 2006
Kanlioglu, Osman	Applied Electromagnetics	"Analysis of a Circular Via Array"	D.R. Jackson, J.T. Williams	Dec. 2006
Weixin, Dong	Applied Electromagnetics	"Time-Delay Characterization of Microstrip Antennas"	J.T. Williams, D.R. Jackson	Dec. 2007
Xu, Hao	Applied Electromagnetics	"Analysis and Design of Microstrip Antennas with Improved Performance"	D.R. Jackson, J.T. Williams	May 2006
Dang, Lien	Applied Electromagnetics	"Research Topic in Applied Electromagnetics"	Applied EM Group	Dec. 2008
Komanduri, Varadarajan	Applied Electromagnetics	"Research Topic in Applied Electromagnetics"	Applied EM Group	Dec. 2008
Miller, Vonda	Intelligent Systems	"Invariance in Spatio-temporal Patterns"	B.H. Jansen	May 2004
Hu, Lingli	Neuro-Engineering	"Gating in Normal and Schizophrenia Populations"	B.H. Jansen	Dec. 2006
Kumar, Arun	Signal Processing	"Echography"	B.H. Jansen and J. Ophir, (UT-Houston)	May 2007
Xiong, Yaohua	Biomedical Engineering	"Recognition of Neonatal Seizures from Video Recordings based on Motion Tracking Methods"	N.B. Karayiannis	May 2006
Jung, Il Mo	Signals and Communications	"Video Coding and Streaming"	N.B. Karayiannis	May 2008
Liu, Rui	Signals and Communications	"Video Surveillance"	N.B. Karayiannis	May 2008
Wang, Yi	Optical Sensing	"Multi-spectral Laser-based Optical Sensing"	H. Le	May 2005
Wang, Yang	Optical Sensing and Lidars	"Optical Stand-off Networked Sensing System for 3-D Target Surveillance and Identification"	H. Le	May 2007
Manapuram, Ravikiran	Microscopic Spectroscopic Imaging		H.Q. Le	Dec. 2006
Hu, Bian	Optical Sensor		H.Q. Le	May 2007
Gallardo, Victor	Video Processing	"Real-time Processing of Video Data from an Adaptive Optics Retinal Imaging System"	T.J. Hebert	Aug. 2007
Chunsheng, E.		"Patterned Medium System Design"	D. Litvinov	May 2007
Parekh, Vishal		"Fabrication of Nanoscale Patterned Magnetic Recording Medium"	D. Litvinov	May 2006
Smith, Darren		"Design and Characterization of Nanomagnetic Sensor Arrays"	D. Litvinov	May 2009
Namuduri, Divya		"Biomolecular Functionalization of Nanomagnetic Sensor Arrays"	D. Litvinov	May 2010
Sun, Wei	Subsurface Sensing	"Development of a Scanning Laser Surface Imaging Device"	R. Liu	Fall 2006
Wu, Min	Subsurface Sensing	"Fast Image Processing Algorithms for CCD Image Processing"	R. Liu	Spring 2007
Zhang, Zhibing	Subsurface Sensing	"Non-contact Distance Measurement Instruments"	R. Liu	Spring 2008

Student	Field	Tentative Title	Advisor	Exp. Comp.
Wang, Ying	Subsurface Sensing	“High Speed, Real-time and Sequential Sampling Methods Applied to GPR Systems”	R. Liu	Fall 2007
Xing, Huichun	Subsurface Sensing	“Imaging Subsurface using GPR Data”	R. Liu	Fall 2006
Nasari, Hamid	Well Logging	“Relay Based Wireless Telemetry System for LWD Systems”	R. Liu	Fall 2008
Tang, Yumei	Well Logging	“Parallel Computing of Well Logging Problems”	R. Liu	Fall 2007
Xie, Jiabin	Sensor Technology	“Extracting Skid Number Form Texture Laser Data”	R. Liu	Spring 2007
Zhong, Rui	Sensor Technology	“MEMS Radio for Applications in High Temperature and Pressure Environments”	R. Liu	Spring 2008
Kao, Chienping	Sensor Technology	“Extracting Layer Information using a New Inversion Algorithm from GPR Data”	R. Liu	Fall 2006
Li, Jing	Well Logging	“3-D Mixing Law for Electrical Properties of Sediment Rocks”	R. Liu	Spring 2007
Kennedy, Timothy	Applied Electromagnetics	“Modification of Current Distributions on Existing Conducting Structures”	S.A. Long, J.T. Williams	May 2006
Jian, Feng	Computational Bioengineering	“Tissue Growth in 3-D: A New Computational Model that Integrates Cell Heterogeneity and Diffusional Limitations and its Parallel Implementation”	P. Markenscoff	2005
Madubike, Chidiogo	Computational Bioengineering	“Computer-aided Design of Bioerodible Devices with Optimal Release Characteristics: A Cellular Automata Approach”	P. Markenscoff	2006
Alissa, Yazan	Neuro-Engineering	“Neural Correlates of Visual Masking and Attention”	H. Ogmen	Dec. 2007
Aydin, Murat	Neuro-Engineering	“Grouping-based Real-time Feature Attribution in Human Vision”	H. Ogmen	Aug. 2007
Kafaligonul, Hulusi	Neuro-Engineering,	“Real-time Dynamics of Surface and Boundary Processes for Moving Objects in Human Vision”	H. Ogmen	May 2008
Yilmaz, Ozgur	Neuro-Engineering	“Perception of Trajectories in Human Vision”	H. Ogmen	May 2008
Peng, Peng	Microelectronics	“Carrier Transport in Mid-infrared Type-II Quantum Cascade Lasers”	S.S. Pei	2005
Wang, Xue	Microelectronics	“Antimonide-based Quantum Dots”	S.S. Pei	2005
Singh, Cynthia	Microelectronics	“Planar Long Wavelength Infrared Photodetector based on Type-II Superlattices”	S.S. Pei	2005
Yu, Qingkai	Microelectronics	“Selective and Directional Growth of Single Wall Carbon Nanotubes”	S.S. Pei	2005
Ruiz, Ariel	Microelectronics	“Fabrication and Characterization of Single Magnetic Domain Memory Cells”	P. Ruchhoeft	May 2008
Varghese, Larry			B.R. Sheth	
Provence, R.S.	Control Systems	“State-space Self-tuning Control of Nonlinear GPS”	L.S. Shieh	2006
Madsen, J.M.	Control Systems	“Digital PID Control of Hybrid Multivariable Systems with Multiple Time Delays”	L.S. Shieh	2006
Zhou, H.	Control Systems	“Digital PID Control of Nonlinear Uncertain Systems”	L.S. Shieh	2006
Wang, S.P.	Control Systems	“Adaptive Nonlinear Control Systems”	L.S. Shieh	2008
Gu, X.	Control Systems	“Nonlinear Filtering for GPS”	L.S. Shieh	2007
Sun, M.	Control Systems	“Nonlinear Controller Design”	L.S. Shieh	2007
Cofie, P.	Control Systems	“Anti-wind-up Controller Design”	L.S. Shieh	2007
Darne, Chinmay	MEMS/Microelectronics	“Design and Fabrication of Si Based Microprobes for Biosensors”	W. Zagozdzon-Wosik	2007
Tan, I-Chih	Biomedical Engineering	“Magnetic Nanoparticles in Medical Diagnostics”	A. Brezdeikis, W. Zagozdzon-Wosik	2007
Ip, Flora		“MEMS based Biosensors; Simulation, Fabrication and Measurements”	W. Zagozdzon-Wosik	2008

Student	Field	Tentative Title	Advisor	Exp. Comp.
Xue, Lian	Bio-Engineering	“Cryogenic Receiver Coils for High SNR MRI”	J. Wosik, H. Ogmen	Summer 2005
Kamel, Maged	Microwave Engineering	“RF MRI Sensors for Parallel Imaging”	J. Wosik, S. Long	Dec. 2006
Kennedy, Timothy	Applied Electromagnetics	“Modification of Current Distributions on Existing Conducting Structures”	S.A. Long, J.T. Williams	May 2006
Kanlioglu, Osman	Applied Electromagnetics	“Analysis of a Circular via Array”	D.R. Jackson, J.T. Williams	Dec. 2006
Weixin, Dong	Applied Electromagnetics	“Time-delay Characterization of Microstrip Antennas”	J.T. Williams, D.R. Jackson	Dec. 2007
Xu, Hao	Applied Electromagnetics	“Analysis and Design of Microstrip Antennas with Improved Performance”	D.R. Jackson, J.T. Williams	May 2006
Dang, Lien	Applied Electromagnetics	“Research Topic in Applied Electromagnetics”	Applied EM Group	Dec. 2008
Komanduri, Varadarajan	Applied Electromagnetics	“Research Topic in Applied Electromagnetics”	Applied EM Group	Dec. 2008
Lertsirimit, Chatrpol		“Electromagnetic Coupling to a Device on a Printed Circuit Board”	D.R. Wilton	May 2005
Rong, Qingyi		“Integral Equation Approach to Modeling Well Logging Tools in Slanted Boreholes”	D.R. Wilton	Dec. 2006
Yao, Manwen	Microelectronics	“Fluorescence Based Biosensor”	J.C. Wolfe	2005
Craver, Barry	Microelectronics	“Atom Beam Lithography”	J.C. Wolfe	2008
Barghava, Mansi	Microelectronics	“Surface Wave Plasma Etching”	J.C. Wolfe	2008

MASTER THESES COMPLETED

Student	Title	Advisor
Ganji, Tulsi	“Design, Fabrication and Testing of 64-Bit DRAM”	E.J. Charlson
Sathyamoorthy, Srivatsan	“IC Implementation of a General Purpose Current-Voltage Plotter”	E.J. Charlson
Suriyanarayanan, Aravind	“VLSI Implementation for Vehicle Control”	E.J. Charlson
Oroscar, Siddharth	“Investigation and Optimization of the Ewald Method for Calculating the Periodic Free-space Green’s Function”	D.R. Jackson, D.R. Wilton
Ng, Akbar	“Design of Conformal Antennas for Next-generation Integrated Mobile Communication Systems”	J.T. Williams, D.R. Jackson
Chandrasekhar, Rajah M.	“Practical Tradeoffs between Elastographic Aquisition Speed and Image Quality *in vivo*”	J. Ophir (UT-Medical School, Houston), B.H. Jansen
Li, Jing	“Measurement of Electrical Properties of Rocks over 10 KHz–1.1 GHz”	R. Liu
Ekbote, Adytia	“Measurement of Elastic Properties of Asphalt Pavement using Ground Penetrating Radar”	R. Liu
Akkerman, Kathleen	“Modification of Currents on Existing Structures”	S.A. Long, J.T. Williams
De Young, Christopher	“An Investigation of Wideband Dielectric Resonator Antennas”	S.A. Long
Cilingiroglu, Emre	“Hardware/software System for Experimental Investigation of Oscillatory Metacontrast Functions”	H. Ogmen
Fong, Michael	“Effect of Attention on Metacontrast Functions”	H. Ogmen
Mehta, N.M.	“An Adaptive Kalman Innovation Filter Approach for Receiver Position Estimation based on GPS Pseudorange Measurements”	L.S. Shieh
Spradlin, G.T.	“An Exploration of Parameter Identification Techniques: CMG Temperature Prediction Theory and Results”	L.S. Shieh
Patil, A.V.	“Quantitative Comparison of 2-D and 3-D Elastograms: A Simulation Study”	L.S. Shieh, J. Ophir

M.S. STUDENT ROSTER

Student	Field	Tentative Title	Advisor	Exp. Comp.
Nene, Hrishekesh	Telecommunications		W.L. Anderson	May 2006
Sen, Sudipta	Systems Engineering		W.L. Anderson	May 2006
Ganji, Tulsi	Solid State		E.J. Charlson	2005
Sathymoorthy, Srivatsan	Solid State		E.J. Charlson	2005
Jayavaman, Swaminathan	Solid State		E.J. Charlson	2005
Suriyanarayanan, Arvind	Solid State		E.J. Charlson	2005
Batista, Rafiel	Computer Engineering		E.J. Charlson	2007
Korth, David	Computer Engineering	"Hardware-based Neural Network for Space Exploration"	Y. Chen	2006
Mo, Pu-Fan	Optical Networks	"Constant Time Burst Resequencing for Optical Burst System"	Y. Chen	2007
Rusu, Vlad C.		"Available Transfer Capability defined for Large Power Pools"	O. Crisan	2006
Chakravarthy, Ramya	Biomedical Signal Analysis	"Analysis of Epileptic Seizures in the Neonatal EEG"	J. Glover	May 2006
Sheikh, Abalhassan	Intelligent Systems	"A Software Architecture for Intelligent Signal Interpretation"	J. Glover	Aug. 2006
Lau, Anthony	Applied Electromagnetics	"Research Topic in Applied Electromagnetics"	Applied EM Group	Dec. 2007
Shete, Vikram	Applied Electromagnetics	"Research Topic in Applied Electromagnetics"	Applied EM Group	Dec. 2007
Bonala, Bharat	Neuro-Engineering	"Single Trial P300 Analysis"	B.H. Jansen	May 2006
Ramu, Jaivijay	Neuro-Engineering	"Magnetic Resonance of Spinal Cord Injury"	B.H. Jansen, P. Narayana (UT-Houston)	May 2006
Martinez, Rebecca	Image/Video Processing	"Compression of 4-D Digital Seismic Data"	T. Hebert	Dec. 2006
Bhardwaj, Ashutosh	Well Logging	"Simulation of Eccentricity of Induction Logging Tools"	R. Liu	Spring 2007
Xiao, Yi		"Development of Portable Pulsed Ground Penetrating Radar Transceivers"	R. Liu	Fall 2006
Chopra, Pankaj	Sensor Technology	"Microwave Reflectrometry"	R. Liu	Spring 2007
Navarro, David	Well Logging	"Effects of Mud Diffusion to Induction and MWD Logs"	R. Liu	Spring 2007
Charan, Vemula Sri	Microelectronics	"Fabrication of Nano-scale Electrostatic Immersion Lenses for a Nanopantography System"	P. Ruchhoeft	May 2006
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