



UH DEPARTMENT OF ELECTRICAL
& COMPUTER ENGINEERING

2004 ANNUAL REPORT

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ACKNOWLEDGEMENTS

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Produced April 2005



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

As the new Chair, I would like to welcome you to the Department of Electrical & Computer Engineering at the University of Houston! During the year 2004 the Department witnessed several changes. Dr. Fritz Claydon, who had been the Chair of the Department since 1999, assumed a new position as the Associate Dean for Undergraduate Programs and Computer Facilities. We would like to thank Fritz for his outstanding leadership and wish him success at his new position.

Two of our faculty members, Drs. Periklis Y. Ktonas and Liang C. Shen, retired. Peri Ktonas has been with our Department since 1974 and he was most famously known for his tireless support of bioengineering efforts at all levels from the Department to the Greater Houston Area. He achieved a distinguished record of research, service, and student mentoring during his 30 years and was recognized by several awards including the *IEEE Third Millennium Medal* in 2000. Liang Shen joined the faculty ranks here in 1967 and served as Chair of the Department from 1977 to 1981. He was elected as *Fellow of IEEE* "for contributions to antenna theory and the application of electromagnetics to geophysical exploration." Among the many awards and honors he received are the Fluor Daniel Faculty Excellence Award in 1999; and the SPWLA Gold Medal for Technical Achievement in 2001. His distinguished career continues to serve as a model to follow for many generations of researchers both in our Department and elsewhere.

During 2004, we hired three outstanding junior faculty members. Dr. Yuhua Chen joined us from Washington University in St. Louis in the area of computer engineering. Dr. Valery Kalatsky, from the University of California San Francisco, and Dr. Bhavin Sheth from the California Institute of Technology joined our Department in the area of neuro-engineering.

Our faculty published 53 articles in refereed journals by 30 different authors, one book by one faculty member, 4 book chapters by 4 faculty members, 7 U.S. patents by one faculty member,

114 conference presentations by 33 faculty members. The core faculty of the Department generated research expenditures of approximately \$4.2M during the year. Furthermore, 78 B.S.E.E., 15 B.S.Cp.E., 32 M.E.E., 5 M.S. (Computer and Systems), 44 M.S.E.E., and 11 Ph.D. degrees were awarded during 2004.

The excellence of our faculty members has been recognized by several awards during 2004:

- » Ji Chen, *Outstanding Teaching Award, Cullen College of Engineering*
- » David R. Jackson, *W. T. Kittenger Award for Outstanding Teaching, Cullen College of Engineering*
- » Stuart A. Long, *elected to IEEE Board of Directors, Division IV Director-Elect*
- » Haluk Ogmen, *Fellow of Hanse Wissenschaftskolleg (Hanse Institute for Advanced Study), Germany*
- » Paul Ruchhoeft, *Young Faculty Research Excellence Award, Cullen College of Engineering*
- » David P. Shattuck, *IEEE Student Branch Professor of the Year*
- » Leang S. Shieh, *Fluor-Daniel Faculty Excellence Award*

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, that 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. A 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.

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.

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.

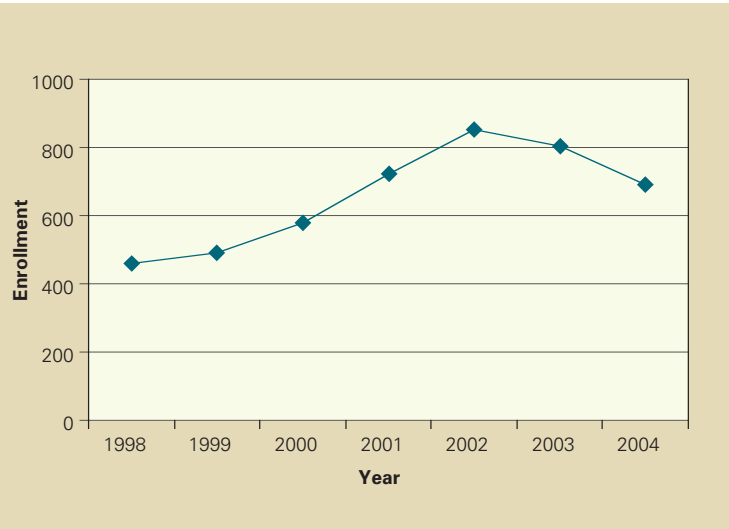
I thank you for your interest in our Department and would like to encourage you to visit us in person or online at www.egr.uh.edu/ece/.

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.

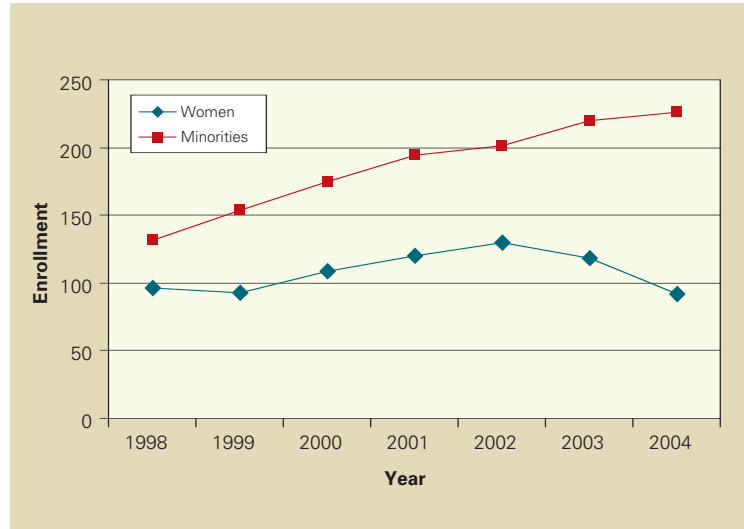
GRADUATE PROGRAM

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.

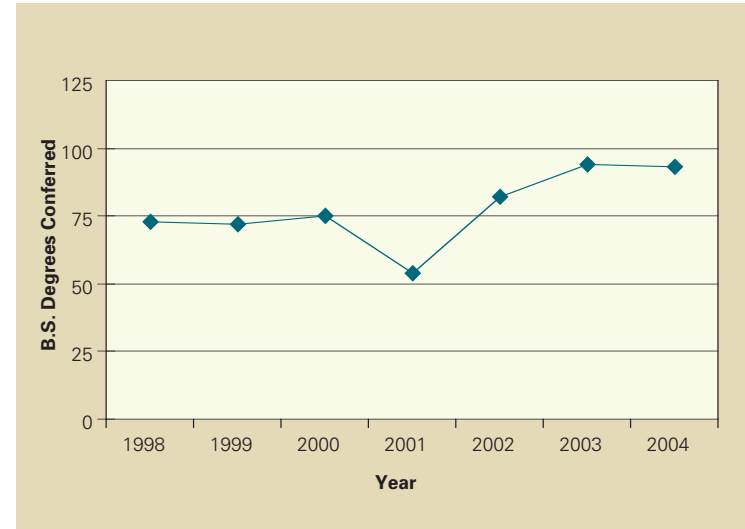
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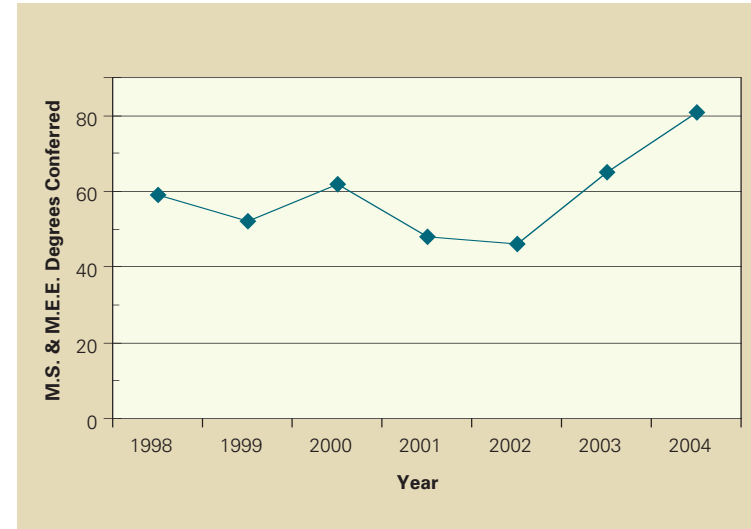
ECE UNDERGRADUATE WOMEN AND MINORITY ENROLLMENT



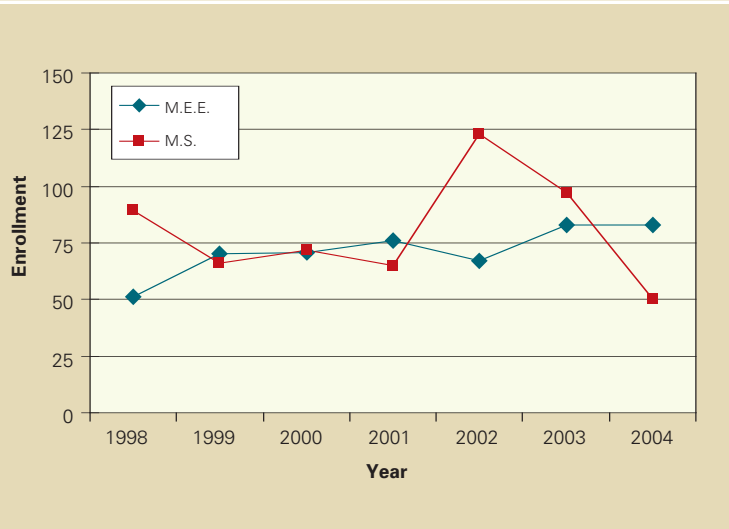
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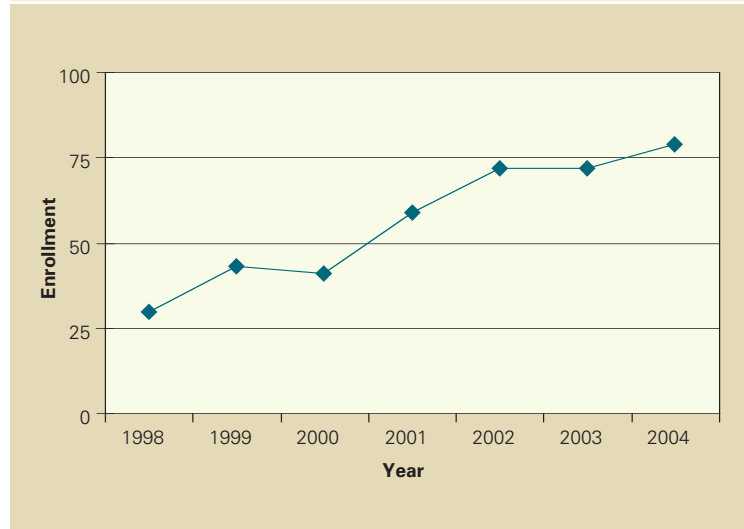
ECE M.E.E. AND M.S. DEGREES CONFERRED



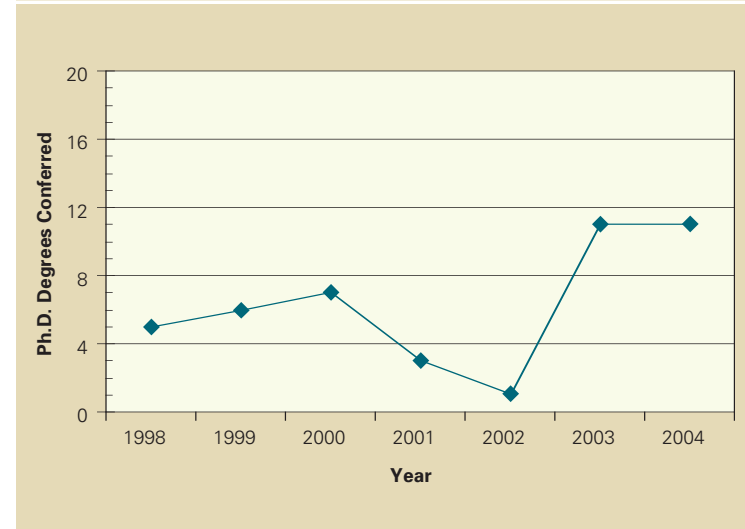
ECE M.E.E. AND M.S. ENROLLMENT



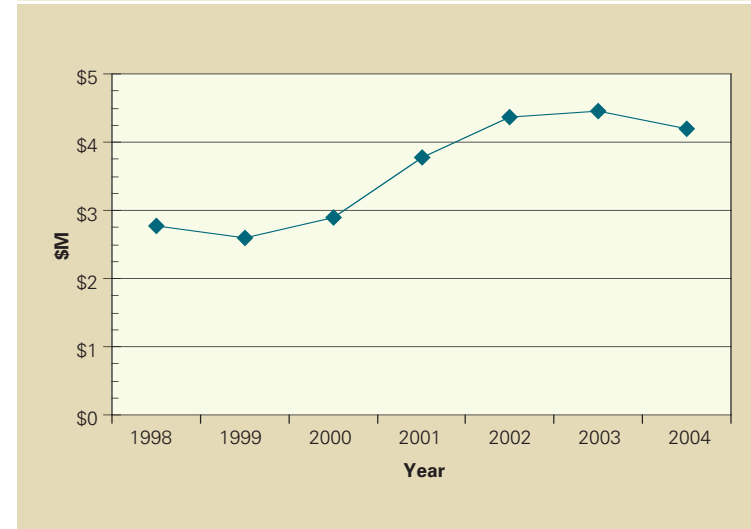
ECE PH.D. ENROLLMENT



ECE PH.D. DEGREES CONFERRED



ECE CORE FACULTY RESEARCH EXPENDITURES



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

- » 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



BARTON

RICHARD J. BARTON *Assistant Professor*
Ph.D., University of Illinois at Urbana-Champaign

HONORS & AWARDS

- » Member, Phi Beta Kappa
- » Member, Phi Kappa Phi
- » Early Career Development Award, NSF, 2000

RESEARCH INTERESTS

Communications and Statistical Signal Processing



CHARLSON

EARL J. CHARLSON *Professor*
Ph.D., Carnegie Mellon

HONORS & AWARDS

- » TMAC Champion Award (for service to Gulf Coast Texas Manufacturing Assistance Center)
- » Vice Chairman (2003–2004) and Chairman Elect (2004–2005), Graduate and Professional Studies Council

RESEARCH INTERESTS

Integrated Circuit Layout Design and Fabrications, Solid State Devices



J. CHEN



X. CHEN



Y. CHEN



CLAYDON

JI CHEN *Assistant Professor*
Ph.D., University of Illinois at Urbana-Champaign

HONORS & AWARDS

- » Outstanding Teacher Awards, Cullen College of Engineering, University of Houston, 2003–2004
- » Motorola Engineering Award, 2000

RESEARCH INTERESTS

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

XUEMIN CHEN *Research Assistant Professor*
Ph.D., Nanjing University of Science and Technology, P.R. China

RESEARCH INTERESTS

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

YUHUA CHEN *Assistant Professor*
D.Sc., Washington University in St. Louis

RESEARCH INTERESTS

Sensor Networks, Reconfigurable System-on-Chip (SoC), Networks-on-Chip (NoC), Reconfigurable Systems, Optical Networks, Heterogeneous Networks, Quality-of-Service (QoS), High Performance Routers, 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, *Electric Power Components And Systems*, Taylor & Francis Ltd. Publishing Corporation
- » Outstanding Student Branch Counselor Award, IEEE Region 5, 2003

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

Biomedical Signal Analysis and 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

Medical Imaging, Video/Image Processing, Adaptive Optics

DAVID R. JACKSON *Professor*
Ph.D., UCLA

HONORS & AWARDS

- » W.T. Kittinger Teaching Excellence Award, Cullen College of Engineering, University of Houston, 2003–2004
- » Best Presentation Award, ION GPS Conf, 2003, 2002



CRISAN



GLOVER



HEBERT



JACKSON

- » 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



JANSEN



KALATSKY

BEN H. JANSEN *Professor*

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

HONORS & AWARDS

- » Member of the Editorial Board, *Clinical Neurophysiology*
- » Member, Chronic Fatigue Syndrome/Fibromyalgia Syndrome Special Emphasis Panel (ZRG1 CFS), National Center for Complementary and Alternative Medicine (NCCAM), December 5, 2003
- » Member, Special Emphasis Panel ZAT1 DB11, Basic Science, National Center for Complementary and Alternative Medicine (NCCAM), October 20–21, 2003

RESEARCH INTERESTS

(Biomedical) Signal Analysis and Intelligent Systems

VALERY KALATSKY *Assistant Professor*
Ph.D., Texas A&M University

RESEARCH INTERESTS

Neuro-engineering, Optical Imaging of Intrinsic Signals, Neuro-biology, Brain Mapping, Representation of Sensory Modalities (Vision, Hearing, Somatosensation) in Mammalian Neocortex



KARAYIANNIS

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



KTONAS

PERIKLIS Y. KTONAS *Professor (retired 2004)*
Ph.D., University of Florida

HONORS & AWARDS

- » Associate Editor, *IEEE Transactions on Biomedical Engineering*, 2001–present
- » Chair, IEEE EMBS Technical Committee on Neuro-engineering, 2003–present
- » Third Millennium Medal, Houston Section of IEEE, 2000
- » Distinguished Service Award of the Houston Society for Engineering in Medicine and Biology, 1994

RESEARCH INTERESTS

Biomedical Signal Analysis with Clinical Applications in Neurology and Psychiatry



LE

HAN QUANG LE *Professor*
Ph.D., Massachusetts Institute of Technology

HONORS & AWARDS

- » Advisory Board of Applied Optoelectronics, Inc.
- » 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

RESEARCH INTERESTS

Semiconductor Optoelectronics, Lasers, Photonics, Multi-spectral Optical Sensing and Imaging, Optical System, Lidars



LI

JING LI *Research Assistant Professor*
Ph.D., Jiaotong University, China

RESEARCH INTERESTS

Subsurface Sensing, Sensors, Numerical Simulation in Electromagnetics, Modeling

DMITRI LITVINOV *Associate Professor*
Ph.D., University of Michigan

RESEARCH INTERESTS

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

RICHARD LIU *Professor*
Ph.D., Jiaotong University, China

RESEARCH INTERESTS

Sensor Technologies, Well Logging, and Wireless Communications

STUART A. LONG *Professor & Associate Dean for Education Development & Outreach*
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
- » IEEE-HKN Outstanding Electrical Engineering Teacher, 1994
- » Distinguished Lecturer, IEEE Antennas and Propagation Society, 1992–1994
- » Distinguished Engineering Faculty Award, Engineering Alumni Association, 1992
- » University Teaching Excellence Award, 1991
- » W.T. Kittinger Teaching Excellence Award, Cullen College of Engineering, University of Houston, 1983



LITVINOV



LIU



LONG

- » 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

Microstrip Antennas, Antenna Design, Electromagnetic, Measurements, Dielectric Resonator Antennas

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

- » 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

HONORS & AWARDS

- » NASA Faculty Fellowship, JSC-NASA, Summer 2003

RESEARCH INTERESTS

Optical Communications, High Power Fiber Lasers



MARKENSCOFF



OGMEN



PAI



PASKUSZ

GERHARD F. PASKUSZ *Professor*
Ph.D., UCLA

HONORS & AWARDS

- » Reginald H. Jones Distinguished Service Award, 1995
- » Outstanding Faculty Advisor, 1989
- » Mortar Board Outstanding Educator, 1980
- » UCLA Outstanding Teacher Award, 1954

RESEARCH INTERESTS

Circuit and Computer Simulation of Biological Systems, Circuit Theory



PATEL

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



PEI

STEVEN S. PEI *Professor & Associate Dean for Research*
Ph.D., State University of New York at Stony Brook

HONORS & AWARDS

- » Outstanding Achievement Award, The 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 Devices, Growth of Epitaxial Materials

PAUL RUCHHOEFT *Assistant Professor*
Ph.D., University of Houston

HONORS & AWARDS

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

RESEARCH INTERESTS

Micro- and Nano-fabrication, Lithography, Solid-liquid Separation, Thin-film Deposition, Reactive Ion Etching, Stencil Mask Technology, Micro- and Ultra-filtration Membrane Technology, Modeling of Resist Exposure and Development Processes for Electron, Ion, and Atom Beam Lithography

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-SiO₂ Interface Defect Generation, and Radiation Damage; Electron Device Physics, particularly Ultra-small MOSFETs; Wide Bandgap Semiconductor Materials; Quantum Transport Modeling in Nano-sized Electron 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 at 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



WILLIAMS



WILTON



WOLFE



WOSIK

- » 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*

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, High Temperature Superconducting Resonators

WANDA ZAGOZDZON-WOSIK *Associate Professor*

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

RESEARCH INTERESTS

Novel Materials for Nano-scale Integrated Circuits; Silicon Processing including VLSI Process Integration and Process/Device Simulation; Microelectromechanical Systems (MEMS) for Applications in Harsh Environment/High Temperature and Biomedical Sensors; Design and Fabrication of GaN Devices



RUCHHOEFT



SHATTUCK



SHETH



SHIEH



TROMBETTA



ZAGOZDZON-WOSIK

Nanosystem Manufacturing Center (NMC)

Director: Dr. J.C. Wolfe

Participating Faculty: Dr. Dmitri Litvinov and Dr. Paul Ruchhoeft

The Nanosystem Manufacturing Center (NMC) at the University of Houston combines core strengths in nanofabrication, nanomagnetics, optoelectronics, plasma systems, the chemistry of nanoparticles and self-assembly, and biochemistry to address the manufacturing needs of the emerging applications of nanotechnology. Current projects include applications in computing and data storage, energy conversion, biological sensing, and the environment. The center actively recruits graduate students from all segments of society and seeks to create an atmosphere where curiosity, discovery, and invention can flourish.

The NMC grew from a nanofabrication program led by Jack Wolfe for the last quarter century. In the early years (1979–85), he developed a record-setting scanning electron microscope (SEM) and used it to store data by melting 50 nm gold columns; thus converting 1's to 0's. The data density, 60 Gbits/in², achieved at that time is only now being surpassed in the hard disk industry, and the electron beam studies pointed the way for today's research grade SEM instruments for scientific study and integrated circuit manufacturing. In the late '80s, he began working in ion beam lithography, a high-throughput technique that uses light ions, protons or alpha particles to expose resist through a stencil mask. The masks are thin silicon membranes with a pattern of fine transmission windows that, when illuminated by an ion beam, define beamlets that transfer the mask pattern to resist on a substrate. In its simplest implementation, ion beam proximity (IPB) lithography, the wafer is positioned close to the mask and the image is transferred without a change in scale (see **Figure 1** on the right). A more sophisticated version is ion projection lithography (IPL) where the transmitted ion image is projected onto a wafer at a reduced size. In the mid-'90s, he partnered with EDTEK, Inc. (Kent, WA) to develop an IBP manufacturing process for 80 nm infrared filters that serves as the mainstay of their thermophotovoltaic (TPV) energy conversion program. IPL was the subject of intense worldwide development program led by Infineon Technologies, GmbH, in the late '90s as a potential replacement for optical lithography in integrated circuit manufacturing. Working

with the Infineon mask shop, the UH team made key contributions to long life, low distortion, large area stencil mask technology.

The major advance came in 2000, when Jack Wolfe and Paul Ruchhoeft, then a Ph. D. student, discovered that the atom beam formed as a byproduct of ion production, is actually far better than the ion beam for lithography. **Figure 1** shows the atom beam lithography (ABL) system, essentially an IBP system with an electrostatic deflector to sweep the ions out of the beam. Being neutral, the atoms pass through the deflector and impinge on a stencil mask. As in IBP, the transmitted beamlets transfer the mask pattern to the substrate. **Figure 2** illustrates the amazing resolution of this technique. The shadow of a carbon nanotube (a), just 20 nm in diameter, has been printed in resist and engraved in silicon dioxide (b).

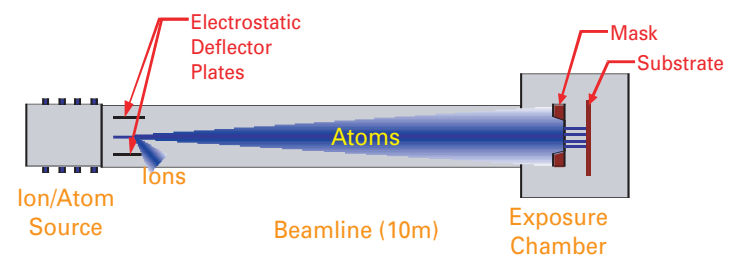


Figure 1: In atom beam lithography (ABL), a broad beam of energetic (30 keV) helium atoms illuminates a stencil mask (a thin membrane with etched windows) and the beamlets of transmitted atoms transfer the mask pattern to resist on a substrate.

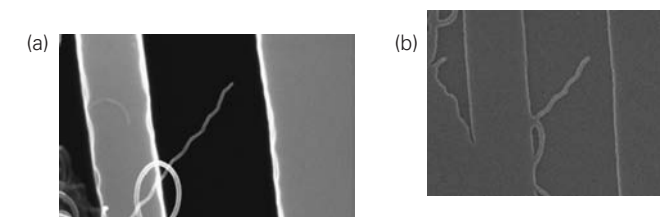


Figure 2: a) A carbon nanotube, 20 nm in diameter, extends across the opening of a silicon stencil mask, b) image of the nanotube printed in resist and engraved into SiO₂.



The ECE department moved quickly to add faculty expertise in an application area that could capitalize on this unique capability. After a national search, we hired Dmitri Litvinov from Seagate Technology, where he was a key contributor to the development of the latest generation of data storage products. The match was perfect; after a stunning initial success in capturing a prestigious NIRT award from NSF, he is building teams and developing ideas for nanomagnetic computer logic and biosensing. Ray Flumerfelt then took the initiative to secure Paul Ruchhoeft, ABL co-inventor for the ECE faculty. Dr. Ruchhoeft applied the technology in new and clever ways, winning development contracts for nanostructured water filtration and thermophotovoltaic energy conversion. Dr. Wolfe's work continues to push the limits of ABL technology with new linewidth standards for the semiconductor industry.

NMC Outreach: Dr. Litvinov is the Co-Founder and Co-Chair, with Prof. Sakhrat Khizroev (U. Miami), of the Nanoscale Device and System Integration (NDSI) Conference that was held in Miami (2004) and Houston (2005). NMC sponsors this event and Dr. Wolfe serves as local arrangements committee Chair.

NMC members have sponsored the following college students and high school teachers under the ECE Department's NSF supported Research Experience for Undergraduates (REU) and Research Experience for Teachers (RET) programs.

REU:

1. Scott White (University of Rochester), *Development of a reactive ion etching system*, J.C. Wolfe—advisor (2004).
2. Julia Litvinov (UH) and Andrew Drayer (Duke Univ.), *Novel wet/dry process for nanopatterning of magnetic thin films*, J.C. Wolfe—advisor (2004).
3. Lillian Allison (Trinity University), *Fabrication of Microfiltration Membranes Using Aperture Array Lithography*, Paul Ruchhoeft—advisor (2004).
4. Rehan M. Safiullah (UH), *Fabrication of Stencil Masks for Aperture Array Lithography*, Paul Ruchhoeft—advisor (2004).
5. Darren Smith and Long Chang (UH), *Electrodeposition of Magnetic Thin Films and Nanoscopic Structures*, Dmitri Litvinov—advisor (2004).

RET:

1. Mr. Chris Garside (West Side High School, Houston, TX), *Neuronal sensing and the visual response of locusts* (2004), J.C. Wolfe—advisor (2004).
2. Ms. Melissa Staiger-Brignac (Houston Independent School District, Houston, TX), *Electro-deposition of Magnetic Thin Films and Nanoscopic Structures*, Dmitri Litvinov—advisor (2004).

Center for Neuro-Engineering and Cognitive Science (CNECS)

Director: Dr. H. 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. P.Y. Ktonas, Dr. S.S. Patel, Dr. B. Sheth, *Electrical & Computer Engineering*
URL: <http://www.egr.uh.edu/cnecs>

What is neuro-engineering? The textbook definition has two parts: 1) the study of nervous systems to develop new engineering design principles and tools and application of these principles and tools to the intelligent systems area, and 2) the development and application of engineering principles to problems in neuroscience. To break neuro-engineering down to an understandable level for his students, Dr. Haluk Ogmen, ECE Department Chair and Director of the Center for Neuro-Engineering and Cognitive Science (CNECS), gives this simple analogy. Ogmen teaches, “When people desired the ability to fly, they naturally studied birds and tried to replicate a bird’s wings, including the flapping motion. Although the original approach was unsuccessful, it led to a better understanding of aerodynamics and of the different functions of the wings—lift and propulsion. Technologically, it has been more efficient to implement these functions through a combination of engines and largely rigid wings. Neuro-engineering is essentially the same thing. As engineers, we must understand the brain at a functional level so that our designs or inventions can be flexible according to the prevailing constraints.”

The UH Cognitive Science Initiative (now known as CNECS) was founded in 1996 by a group of faculty led by Dr. Anne Jacobson, who was the founding director, as a structure for responding to the emerging area of cognitive science and to encourage connections across departments and colleges. The official mission of the CNECS is to provide a coherent multi-disciplinary infrastructure for internationally distinctive research in one of the most significant emerging areas of pure and applied science. The Center’s objectives include conducting basic and applied research in neuro-engineering and cognitive science, educating students in a multi-disciplinary

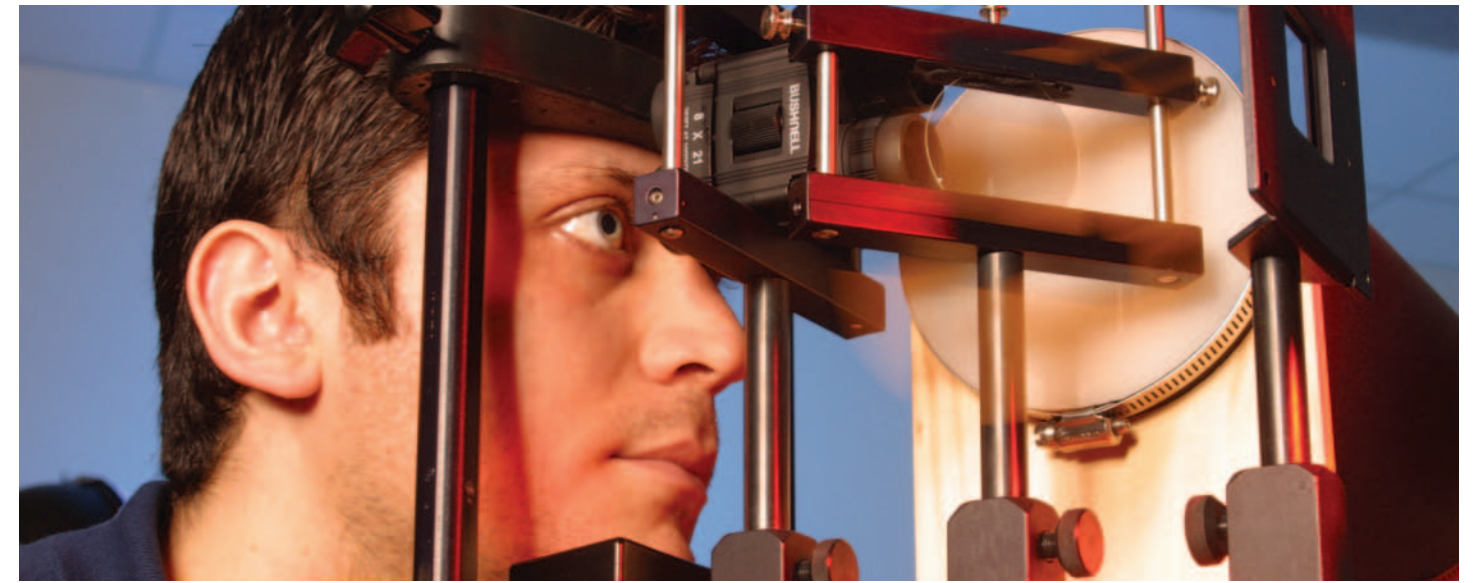


approach to topics relevant to neuro-engineering and cognitive science, and fostering research alliances with Houston and Galveston educational institutions and medical centers.

The three major research areas of the CNECS are: 1) Brain wave analysis, 2) Visual perception, and 3) Cognition and behavior. In the area of brain wave analysis, a large amount of work is focused on neonatal EEG analysis, and auditory evoked potentials analysis in schizophrenia.

In the area of neonatal EEG analysis, a project is underway to develop techniques for the reliable automated detection of electrographic seizures in the neonatal EEG. While significant progress has been made in the automated detection of seizures in the adult population, relatively little work has been done in the neonatal area. Collaborators on the project, Drs. Eli M. Mizrahi, James D. Frost, Jr., and Richard A. Hrachovy from the Dept. of Neurology, Baylor College of Medicine, serve as the expert electroencephalographers and also provide data recorded from infants in the Clinical Research Center for Neonatal Seizures, The Methodist Hospital.

The EP-related work concerns the development of advanced digital signal analysis tools for single trial EP analysis. Typically, EPs are obscured by the spontaneous brain activity (electroencephalogram, or EEG). Therefore, current practice involves ensemble averaging, resulting in a time-resolution of minutes at best. The methods proposed are specifically designed to take advantage of the newly emerging viewpoint that EPs are at least in part due to a phase reorganization of the ongoing EEG, rather than an independent component superimposed on the EEG. One such method, the Piece-wise Prony Method (PPM) has resulted from this work and is used to assess auditory information processing differences between



normal volunteers and patients suffering from schizophrenia. Another study examines the EP generation mechanisms through the use of aforementioned signal analysis tools and neural modeling. The development of a brain-machine interface (BMI) to provide a communication option for those with severe neuromuscular impairments is also underway. The BMI will utilize the P300 component of the event related potential (ERP, the brain’s electrical response to external sensory stimuli).

Research at the Center covers various areas of visual perception and oculomotor control. There is a high degree of collaboration between the members of the group. One project is evaluating whether visual sensitivity and the perception of target clarity are the same when retinal image motion is produced by movements of the eyes vs. physical motion of a target. A related question is how the visual system determines the location and movement of targets during different types of normal and abnormal eye movements. One of the important tasks of the visual system is to generate a three-dimensional perception of the visual world from information obtained from two two-dimensional sensors. Researchers are investigating how this stereovision system is organized and built in humans. Computational modeling plays a fundamental role in many of the research projects. Experimental data are modeled at a variety of levels including networks of neurons that mimic neurons found in the primate brain.

Another major focus of current research interest is visual masking, with emphasis on the mechanisms contributing to paracontrast and metacontrast masking and how these relate to various levels and types of unconscious and conscious processing in the visual system. An investigation of early visual processing and attention in

schizophrenics is being conducted in collaboration with Drs. Michael Green and Keith Nuechterlein of the UCLA Neuropsychiatric Institute. Researchers at the Center also focus on the understanding of how the visual system works in people with uncorrectable sub-normal vision. Uncorrectable sub-normal vision can occur as a result of an eye disease (e.g., macular degeneration) or even in the absence of an eye disease (amblyopia).

The Center is growing with the addition of two new faculty members, Valery Kalatsky and Bhavin Sheth. Both Kalatsky and Sheth have backgrounds in visual and auditory cortex research. Kalatsky plans to focus his work on optical imaging of the brain using the new technique for optical imaging of intrinsic signal he developed while at University of California, San Francisco. Sheth is interested in exploring the areas of Autism Spectrum Disorder (ASD), the connection between ASD, epilepsy, and Attention Deficit Disorder (ADD), and the cognitive process of insight.

What does the future hold for neuro-engineering? UH’s Haluk Ogmen notes that although the university has been at the leading edge of neuro-engineering research for some time, “theory wise, the field is really in its infancy. But with better tools, functional imaging, and new ways to collect and analyze data, the possibilities are endless.”

On a broader scale, the overall vision for the future of neuroscientific research is best explained by the Society for Neuroscience. “The complexity of the brain coupled with the greatly accelerated rate of information flow will demand novel tools to integrate and advance knowledge of neural function.” (Society for Neuroscience FY2004 Annual Progress Report).

Applied Electromagnetics Laboratory (AEL)

Participating Faculty: Drs. David R. Jackson, Stuart A. Long, Jeffery T. Williams, and Donald R. Wilton

URL: <http://www.egr.uh.edu/ael>

The research of the Applied Electromagnetics Laboratory (AEL) encompasses a wide array of topics including:

- » computational electromagnetics
- » dielectric resonator antennas
- » electromagnetic interference and compatibility
- » electromagnetic measurements
- » high-frequency effects in integrated circuit structures
- » electronically tuned patch antennas
- » reduced surface wave antennas
- » leaky-wave antennas
- » microstrip antennas
- » utilization of existing structures as antennas

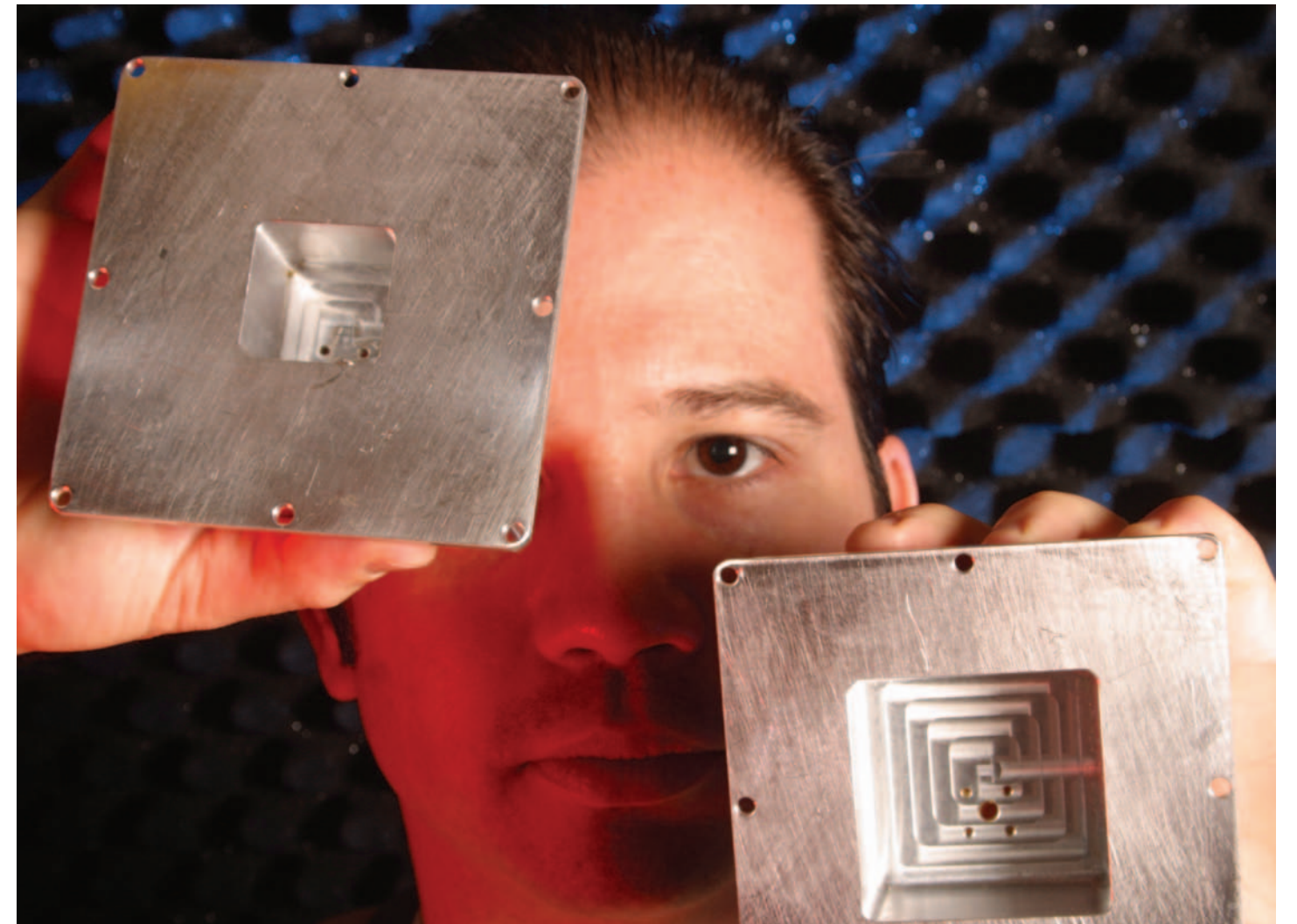
Growing demand for wireless communication systems, such as cell phones, has created a proliferation of communication or base-station towers. However, opposition to increasing the numbers of cellular towers is also on the rise. Dr. Stuart Long, associate dean for educational activities and participating faculty member of the AEL group explains, “The very same people who demand continuous cellphone coverage are also the ones most opposed to having cellular towers in their neighborhoods due to their unsightly appearance.” In fact, in some cases such towers may be legally restricted or prohibited. “Others are trying to camouflage the towers by making them look like a pine tree, for example. But you basically end up with a pine tree that is uglier than a cell phone tower.”

An alternative currently being researched by the AEL group and in its third year of support by a grant from the National Science Foundation, is an innovative approach to developing radiation systems for wireless networks in which the antennas are effectively indiscernible from their local environment. It seeks to examine

how both exterior and interior parts of existing buildings and structures might be used as transmitting and receiving systems for various wireless applications.

Timothy Kennedy, a doctoral student working in the AEL group, was chosen from 135 entries from around the world to present his paper entitled “Modification and Control of Currents on an Electrically Long Monopole Using Magnetic Bead Loading” in the student paper competition at the 2003 IEEE International Symposium on Antennas and Propagation. His paper and corresponding research within the AEL group working with Long and Dr. Jeffery Williams advocates using existing structures such as parts of buildings, billboards or other metal structures as alternatives to stand-alone towers. “The idea is that if you can turn any building in an area into a tower, you will be able to increase the number of antennas available and make cellular reception better without ugly new towers,” Kennedy says. The impact of the successful implementation of such antenna systems on the world of telecommunications would be immense.

Another project currently underway in the AEL group focuses on guided waves. William Langston, also a doctoral student in the AEL group under the direction of Drs. David Jackson and Jeffery Williams, is conducting research in the area of guided waves. “I am pretty much doing the opposite of Tim,” he says. “Instead of wanting something to radiate, I want to keep a signal on a waveguide.” If a signal does not remain a guided wave, Langston explains, “it can cause distortion, loss of signal, or crosstalk with components nearby.” Langston’s research has many potential applications in the computer field. As circuits get smaller and operate at higher frequencies, unwanted radiation of the signal away from the planar transmission lines increases, and knowledge of these radiation characteristics becomes more important. Langston



was named a semi-finalist in the student paper competition connected to the IEEE’s Microwave Theory and Techniques Society’s annual International Microwave Symposium in 2003 and presented a paper titled “Fundamental Properties of Radiation from a Leaky Mode Excited on a Planar Transmission Line.”

Research in the AEL group also focuses on antenna research, specifically leaky-wave antennas, microstrip antennas, and reduced surface wave antennas. Pinpointing locations is critical to high-precision Global Positioning Systems (GPS) applications. One current project investigates an innovative reduced surface wave antenna for GPS applications. Reduced surface wave antennas offer significantly improved performance for high-precision GPS applications due to their ability to reduce undesirable interference from reflections off the ground or other structures. Dr. Jackson points out that reduced surface wave antennas have many military

applications and have been chosen as the type of antennas for the International Space Station’s GPS.

Dr. Donald Wilton’s work within the AEL group involves the use of the EIGER (Electromagnetic Interactions GeneRalized) system, a generalized computational electromagnetics modeling framework. The EIGER system is noted for its ability to handle high degrees of complexity, its power in analyzing radiation, and its applicability to a wide variety of electromagnetic problems. For example, Navy ships are like floating antennas. With so many electromagnetic devices on board, there is a critical need to know how all devices can work together with minimal interference. EIGER has the ability to handle this complexity concisely and efficiently. Ongoing efforts in the AEL group are directed at extending the EIGER software and adding new capabilities in algorithm abstraction, analytical techniques, and numerical methods.

Sensor Technology and Well Logging Group

Director: Dr. C. Richard Liu
Participating Faculty: Dr. X. Chen, Dr. K. Li
URL: <http://www2.egr.uh.edu/~elee52c>
<http://www.welllogginglab.org>

When asked to describe the work of this research group, Dr. Richard Liu, UH professor of electrical and computer engineering, must cover a list of projects that is both large in number and wide in scope. However, when describing the number one priority of the group, the answer is simple. “Priority number one is to keep making advances in research,” says Liu.

In the process of making these research advances, the group has also provided many solutions to current real-world engineering problems.

For example, the sensor technology side of the research group has a long-standing relationship with the Texas Department of Transportation (TXDoT). One of the responsibilities of TXDoT is to make sure every highway meets the proper construction standards—15 inches of concrete must be laid on the road surface to meet the thickness standard. As Dr. Liu points out, “Every lane mile of interstate highway is a \$6 million project, so monitoring the thickness used by contractors is very important.” But in the past engineers faced a tough problem: Once the road is constructed, how do you check the thickness of the concrete? Drilling a core sample is time-consuming and costly, about \$700 per sample. So the TXDoT agency approached UH’s Liu and asked him to develop a non-destructive testing device. Liu and his team of researchers and students responded by creating a ground-penetrating radar, or GPR, in the UH sensor technology lab. Now, thanks to this research, TXDoT’s task of measuring concrete thickness can be completed without so much as scratching the road surface, and with no human intervention necessary.

There are many other similar stories. When the city of San Marcos experienced the problem of water coming through the surface of

one of the runways at their municipal airport, they called on Liu to solve the problem that other experts and service companies could not resolve. Once again, the GPR developed in the sensor technology lab was successful by discovering the root cause of the problem—subsurface moisture—that meant the only resolution was to completely rebuild the runway. The city had their answer.

Liu points out that UH is in a leading position in ground penetrating radar research, with more than 15 years experience in the field. When developing a GPR device, UH researchers do not buy any part of the device from a commercial source. “We develop everything, from beginning to end, including hardware, software, high-frequency antennae, and design,” says Liu. “This is what distinguishes us from other GPR research groups. We can customize every part of the process—from building hardware to applying new antenna research findings (also conducted at UH in the Applied Electromagnetics Laboratory).”

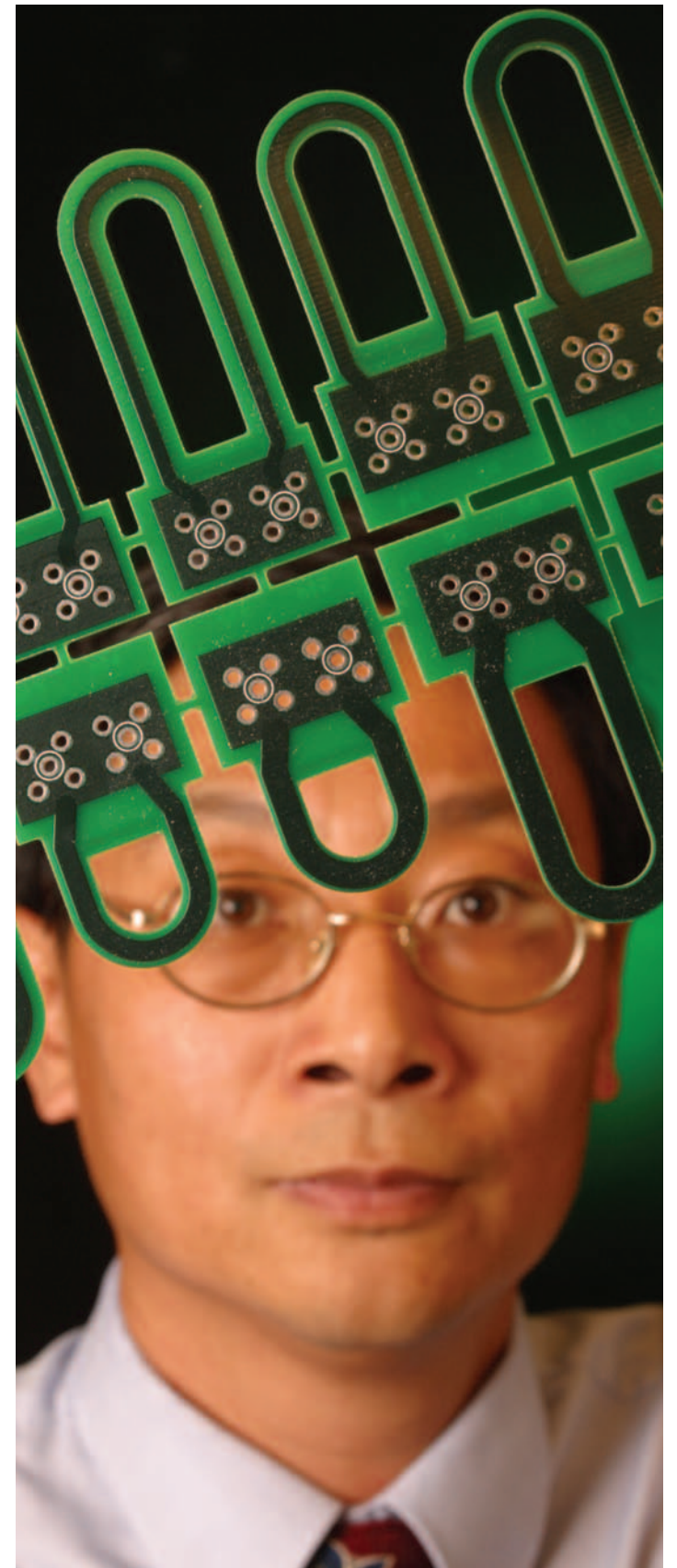
In addition to GPR, the sensor technology lab conducts research with many other types of sensors. For example, laser sensors are used to scan the surface of a material to measure smoothness (used in the lumber industry and to measure pavement texture of road surfaces). Image sensors can measure surface cracks of a wide variety of materials—marble, metal, concrete, pavement, wood, etc.—to test the strength and quality of the material. Weigh-in-motion sensors are vital to a current project with TXDoT that will deploy approximately 360 weighing stations on U.S. highways to take the place of costly and less effective weigh stations for passing trucks and trailers. These weight sensors will transmit weight data via the Internet for monitoring by the agency. Weight and motion sensors are also critical to projects relating to homeland security.

The sensor technology research projects of UH’s Sensor Technology and Well Logging Group continue to receive notoriety. In 2003, three projects from the group were nominated for the Texas Department of Transportation’s Most Innovative Research Award. In 2004, another project designed to measure the thickness of reflective paint on Texas roads was nominated for the award as well.

In addition to sensor technology research, well logging research is another component of the group’s efforts. Initiated and formerly headed by Society of Professional Well Log Analysts (SPWLA) Gold Medal for Technical Achievement winner, Dr. Liang Shen (now retired), the group is supported by a consortium of 11 oil and service companies. Following Dr. Shen’s lead the well logging group, now directed by Dr. Richard Liu, lists its objectives as improving interpretation of logs obtained with existing tools, understanding the limitations of existing tools, and designing new tools.

One of the current focus areas of the well logging group is termed “measuring while drilling” (MWD) research. The idea is to develop a tool, or set of tools, housed within the drill bit, that can constantly measure the resistivity of the drilling surface and transmit the data to the surface at high speed to replace mud-pulse signaling. High resistivity indicates the presence of oil, and being able to detect high resistivity areas means greater drilling efficiency and well productivity. This approach has applications in traditional drilling as well as horizontal drilling.

In all of the research conducted in the Sensor Technology and Well Logging Group, students get hands-on training on projects with very practical applications. Dr. Liu explains, “They start the project from theoretical study. Then they conduct numerical simulations, and ultimately design the system themselves, from laying out the electronics to sautering circuit boards and building the prototype. They learn the process from A to Z. This hands-on approach to learning makes it very easy for our students to be recruited after graduation because they know every stage of an engineering project.”



YUHUA CHEN

Yuhua Chen joined the ECE faculty in June 2004 as an Assistant Professor. She received a B.S. in Electronic Engineering from Fudan University, an M.S. in Computer Science and an M.S. and D.Sc. in Electrical Engineering from Washington University in St. Louis. Her research experience includes work as a Research Associate/Hardware Engineer in the Washington University Applied Research Laboratory—which was named in the top four U.S. research labs in networking by Business Week. Her work in this lab included the development and prototyping of multiple ASIC- and FPGA-based network routers that can scale to multi-terabits per second.

Dr. Chen says that her research is a blend of analytical and experimental work. Of special interest to her is the development of new technologies that enable the future Internet to maintain and configure itself autonomously with minimal human intervention. She is also interested in the design methodology for System-on-Chip (SoC). She quotes the International Technology Roadmap for Semiconductors saying, “With 50 nm technology, SoCs will grow to 4 billion transistors running at 10 GHz by the end of this decade.” She illustrates the magnitude of this technology boom by comparing current technology as “a single building contained on a chip to future technology where a whole city could be housed on a chip.” Her other research areas include hardware reconfigurable systems with a special emphasis on prototype implementation. She sees “system prototyping as an indispensable part of effective system research, where proposed solutions can be evaluated in real-world settings.” Haluk Ogmen, ECE Department Chair, notes, “We were fortunate to be able to recruit Dr. Chen. She is an invaluable addition to the computer engineering area.”



VALERY KALATSKY

Dr. Valery Kalatsky joined the ECE faculty as an Assistant Professor in Fall 2004. He obtained a B.S. and M.Sc. in Applied Physics and Mathematics from Moscow Institute of Physics and Technology and his Ph.D. in Physics from Texas A&M University. His research experience includes a postdoctoral fellowship in Theoretical Neurobiology at the Keck Center for Integrative Neuroscience, University of California, San Francisco, and a research fellowship in the UCSF Department of Physiology.

The focus of his research during these fellowships was the study of the functional architecture of the visual and auditory cortex. He developed a new paradigm for optical imaging of intrinsic signal—temporally encoded maps of intrinsic signal—and built an imaging system using this new approach. Advantages of the new technique include the removal of heart, respiration, and vasomotor artifacts, a dramatic increase in spatial resolution, and a 30-fold greater reduction in acquisition time.

Dr. Kalatsky sees his research having many potential applications, from new understanding of how the visual and auditory cortex of the brain processes signals to efficient mapping of the human brain to aid neurosurgeons in safely removing brain tumors without adversely affecting surrounding visual, auditory, or motor cortex regions.

In his new position in the ECE Department, he will be expanding the existing Neuro-Engineering team and continuing his research work on optical imaging of the brain. ECE Department Chair Haluk Ogmen says Kalatsky brings to the department “solid training in physical science, engineering, and neuroscience, along with research efforts that are both innovative and highly inter-disciplinary in nature.”



BHAVIN SHETH

Dr. Bhavin Sheth joined the ECE Department as an Assistant Professor in Fall 2004. His educational background includes a B.S. in Computer Science, an M.S. in Electrical Engineering, and an M.S. in Computer Science from the University of Southern California. He received a Ph.D. in Cognitive Neuroscience from the Massachusetts Institute of Technology (MIT). His postdoctoral research work includes fellowships at MIT, University of Washington, and California Institute of Technology (Caltech). Dr. Haluk Ogmen, ECE Department Chair, says Dr. Sheth’s work is “cutting-edge innovative research that is inter-disciplinary and fits well with plans for the future of the ECE Department.”

Along with his teaching duties at UH, Sheth has a list of topics he plans to pursue in his work with the ECE Department’s Neuro-Engineering lab. Through human research he plans to investigate Autism Spectrum Disorder (ASD), the connection between epilepsy, ASD, and Attention Deficit Disorder (ADD), and the brain activity that affects insight or out-of-the-box thinking. In addition, Dr. Sheth plans to continue his work in sleep research that he began while at Caltech. The focus of this research in his postdoctoral fellowship was the role of sleep in learning, memory, and insight. His future sleep research will focus specifically on the effects of sleep on procedural memory.

Dr. Sheth feels being part of the ECE Department at UH is the perfect place for his research, with many possibilities for collaboration with other researchers and the Texas Medical Center. He says, “I am really very excited to be here.”



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Dr. Liang Shen, UH Well Logging Lab Founder, Retires

Liang C. Shen, professor of electrical engineering and director of the UH Well Logging Laboratory, retired from the university in April 2004. Shen received the Gold Medal for Technical Achievement Award from the Society of Professional Well Log Analysts in 2001. It is the highest honor the organization bestows on an individual for outstanding achievements in the science of formation evaluation that result in significant and enduring contributions to technology. His research focused on problems related to electromagnetic wave propagation and antennas, and well logging and electromagnetic subsurface sensing. In 1979, Shen established the Well Logging Laboratory, which has been continuously supported by a consortium of oil and oil service companies for over 25 years.

“Dr. Shen has been a model researcher and teacher for 37 years,” says Stuart Long, associate dean for educational activities. “He developed the well logging consortium to support important research that partnered with industry in a unique way. He has also made an indelible contribution to the academic quality of our college. After he arrived at UH from Harvard in 1967, and while he was Chair of the Department from 1977–1981, he made changes that were fundamental to the development of serious graduate-level research in what is now the college’s largest department, the Department of Electrical and Computer Engineering.”

Dr. Shen received his Ph.D. in applied physics from Harvard University in

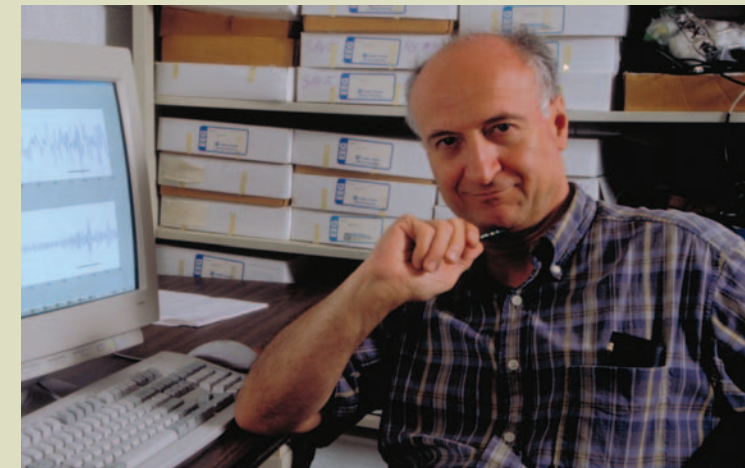
1967. He then joined the faculty of the University of Houston in the Department of Electrical & Computer Engineering. He served as department chairman from 1977–81. He was a full-time research consultant at Gulf Oil Exploration and Production Company in 1981–82, and at ARCO Oil and Gas Company in 1990–91.

Shen has received the Excellence in Research Award from the UH Cullen College of Engineering and the Dukler Distinguished Faculty Award from the UH Engineering Alumni Association. In 1987, he was elected as fellow of the Institute of Electrical and Electronics Engineers (IEEE) “for contributions to antenna theory and the application of electromagnetics to geophysical exploration.” He has served as an Associate Editor for Geophysics, Radio Science, and IEEE Transactions on Geoscience and Remote Sensing. He has published a textbook and more than 90 technical papers. He is a professional engineer in Texas.



Ktonas Retires After 30 Years of Service to UH ECE Department

Periklis Ktonas retired from the University of Houston in 2004 and is currently serving in Athens, Greece as a Senior Research Scientist at the University of Athens Department of Psychiatry and the Greek Center for Neurosurgery Research. During Dr. Ktonas’ long tenure at UH, his research has primarily been involved with developing methods for the accurate and efficient automated analysis and quantification of bioelectrical signals (electroencephalograms-EEG, electrooculograms-EOG, electrocardiograms-ECG, and electromyograms-EMG). The objective of his



research has been to develop quantitative diagnostic methodologies with clinical applications in neurology, psychiatry and cardiology. Specifically, his research involved detecting and quantifying epileptogenic EEG activity, rapid eye movement (REM) patterns via EOG recordings during sleep, ECG patterns during sleep, EMG patterns in spinal cord injury, as well as various EEG patterns having specific importance for neurologists and sleep researchers. His research work involved interactions with colleagues from the Texas Medical Center in Houston, as well as from Europe (France, Holland, Italy and Greece).

Dr. Ktonas was a driving force behind many biomedical engineering activities at the local, national and international level. For example, he was a founding member of the Bioengineering Research Center in the UH Cullen College of Engineering, and served as its Director from 1986. He was actively involved in the formation of the Houston Society for Engineering in Medicine and Biology (HSEMB) as a member of the Steering

Committee and he was the Program Chairman of the 24th Annual Conference of the IEEE Engineering in Medicine and Biology Society, which took place in Houston in 2002. He continues to serve as Associate Editor of the IEEE Transactions on Biomedical Engineering, and as Chair of the IEEE EMBS Technical Committee on Neuroengineering. As recognition of these activities, he received the Distinguished Service Award of the Houston Society for Engineering in Medicine and Biology, and the IEEE Third Millennium Medal.

Dr. Ktonas received his Ph.D. in electrical engineering from the University of Florida in 1974 and immediately began his service at UH as a visiting assistant professor. Over the course of his career at UH, Dr. Ktonas also served intermittently as a visiting professor at the University of Amsterdam and the University of Florence, Italy. He served as a visiting scientist at the National Institute of Health and Medical Research (INSERM), Paris, France, and at the Sleep Research Center of the University of Athens, Greece.



UH IEEE Student Branch Sets Record for Most Awards

The collection of awards in 2004 sets a record for the most awards received by a university student branch during a one-year time period. These award-winning accomplishments are a direct result of the coordination efforts of Professor Ovidiu Crisan, department of electrical and computer engineering and IEEE student branch counselor, and a well-organized Student Executive Committee. Dr. Crisan and his students work together to create innovative ways of promoting the IEEE Society.

Throughout the year, student officers and members work diligently to prepare and maintain the on-campus IEEE facilities. One such facility is the newly created Electronics Lab that features six workstations available to IEEE student members for use with ECE-related lab coursework. A study lounge is also available for chapter members. The student branch organizes informative meetings during the academic year featuring industry guest speakers and hosts a “Make-a-Friend at IEEE Day” open house to attract new members. Other activities include the Spring Chili Cook-off that gives students the opportunity to interact with companies, alumni, faculty, and staff, and provides funding for other chapter activities. The 2004 Chili Cook-off achieved the highest attendance number of companies in IEEE UH history.

The UH Student Branch of the Institute of Electrical and Electronics Engineers (IEEE) continues to build on the successes of 2002 and 2003 by adding a record-breaking number of awards to its collection.

2002 » UH IEEE student chapter membership grew by more than 300-percent and as a result the chapter received the IEEE-Houston Section Award for most student participation at 2002 section meetings

2003 » Outstanding Large Student Branch Award from IEEE Region 5
 » Student Branch Membership Growth Award from the IEEE Regional Activities Board
 » Engineering Alumni Association Award
 » Hewlett-Packard Award

2004 » Outstanding Large Student Branch from IEEE Region 5
 » Outstanding Student Member—Nnamdi Nnabuihe, branch vice-chairman
 » Outstanding Student Branch Counselor—Ovidiu Crisan
 » Outstanding Engineering Educator—David P. Shattuck
 » IEEE Region 5 Conference Robotics Competition—UH teams won second, fourth, and sixth places



FACULTY AND STAFF LIST

PROFESSORS

Anderson, W.L.
Charlson, E.J.
Claydon, F., Associate Dean, College of Engineering
Crisan, O.
Glover, J.R.
Jackson, D.R.
Jansen, B.H.
Karayiannis, N.B.
Ktonas, P.Y. (retired 2004)
Le, H.Q.

Liu, R.C.
Long, S.A., Associate Dean, College of Engineering
Ogmen, H., Chairman
Paskusz, G.F.
Pei, S.S., Associate Dean, College of Engineering
Shen, L.C. (retired 2004)
Shieh, L.S.
Williams, J.T.
Wilton, D.R.
Wolfe, J.C.

ASSOCIATE PROFESSORS

Barr, B.J.
Hebert, T.J.
Litvinov, D.
Markenscoff, P.

Pai, D.M.
Shattuck, D.P.
Trombetta, L.P.
Zagozdzon-Wosik, W.

ASSISTANT PROFESSORS

Barton, R.
Chen, J.
Chen, Y.

Kalatsky, V.
Ruchhoeft, P.
Sheth, B.

RESEARCH PROFESSORS

Wosik, J.

RESEARCH ASSISTANT PROFESSORS

Chen, X.
Li, J.

Patel, S.

EMERITUS FACULTY; JOINT AND ADJUNCT APPOINTMENTS; AND 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)
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)

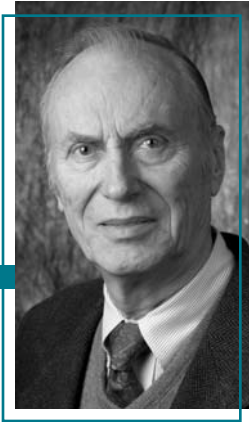
STAFF

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

Professor

WALLACE L. ANDERSON *Email: wanderson@uh.edu*



:: Education

Sc.D., University of New Mexico

:: Research Interests

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

Associate Professor & Director of Undergraduate Studies

BETTY J. BARR *Email: barr@uh.edu*



:: Education

Ph.D., University of Houston

:: Research Interests

Numerical Analysis

:: Professional Service (2004)

- » Faculty Advisor, UH Student Section Society of Women Engineers
- » Faculty Advisor, Texas Epsilon Chapter Tau Beta Pi

:: Funded Research Programs (2004)

- » Texas Technology Workforce Development Grant Program
- » Texas Higher Education Coordinating Board, Undergraduate Retention & Recruiting of ECE Students at the University of Houston

Assistant Professor

RICHARD J. BARTON Email: rbarton@uh.edu



:: Education

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

:: Honors & Awards (2004)

- » Member, Phi Beta Kappa
- » Member, Phi Kappa Phi

:: Research Interests

Communications and Statistical Signal Processing

:: Professional Service (2004)

Reviewer for:

- » *IEEE Journal on Selected Areas in Communications*
- » *IEEE Transactions on Communications*
- » *IEEE Communications Letters*
- » *IEEE Transactions on Information Theory*
- » *IEEE Transactions on Signal Processing*
- » *IEEE Transactions on Neural Networks*
- » *Mathematics of Control, Signals and Systems*
- » *Machine Vision and Applications*
- » NSF Communications Research Program, Signal Processing Systems Program, and SBIR program

:: Journal Publications (2004)

- » Court, T.V., M. Herbordt and R.J. Barton, "Case Study of a Functional Genomics Application for an FPGA-Based Coprocessor," *Microprocessors and Microsystems*, Vol. 28, No. 5–6, pp. 213–222, August 2004.

:: Conference Proceedings and Presentations (2004)

- » Barton, R.J., "The Capacity of Spread-Spectrum Rayleigh Fading Channels in the Presence of Channel Uncertainty," *Proceedings of the 38th Annual Conference on Information Science and Systems*, pp. 1190–1195, Princeton, NJ, March 17–19, 2004.
- » Barton, R.J., "The Capacity of Spread-Spectrum Rayleigh Fading Channels in the Presence of Channel Uncertainty," *Proceedings of the 2004 IEEE International Symposium on Information Theory*, pp. 415, Chicago, IL, Jun 27–July 2, 2004.

:: Funded Research Programs (2004)

- » University of Houston—GEAR, Performance Capabilities for Ultrawideband Wireless Communication Systems

Professor

E. J. CHARLSON Email: jcharlson@uh.edu



:: Education

Ph.D., Carnegie Mellon

:: Honors & Awards (2004)

- » Vice Chairman (2003–2004) and Chairman Elect (2004–2005), Graduate and Professional Studies Council

:: Research Interests

Integrated Circuit Layout Design and Fabrication, Solid State Devices

:: Professional Service (2004)

- » Advisory Board, Texas Manufacturing Assistance Center

:: Conference Proceedings and Presentations (2004)

- » Motamarri, S., H.A. Malki, E. Barbieri, and E.J. Charlson, "Exercise Machine Controller Design," *Proceedings of the 2004 International Symposium on Measurement, Control, and Robotics*, p. B21, September 2004.

Assistant Professor

JI CHEN Email: jchen18@uh.edu



:: Education

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

:: Honors & Awards (2004)

» Outstanding Teacher Award, Cullen College of Engineering, University of Houston, 2003–2004

:: Research Interests

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

:: Journal Publications (2004)

- » Qiang, R., R. Chen and J. Chen, “Modeling Electrical Properties of Gold films at Infrared Frequency using FDTD Method,” *International Journal of Infrared and Millimeter Waves*, Vol. 25, No. 8, pp. 1263–1270, August 2004.
- » Wang, Z., J. Chen and Y.C. Chen, “Dispersion Analyses of ADI-FDTD and Higher Order ADI-FDTD Methods,” *Chinese Journal of Electronics*, Vol. 13, No. 2, pp. 205–209, April 2004.
- » Chen, R. and J. Chen, “Radiation Effects on via Coupling in Power-Return Plane Structures,” *Microwave and Optical Technology Letters*, Vol. 41, No. 2, pp. 117–119, April 2004.
- » Wu, D. and J. Chen, “An Efficient Simulation Technique for Lossy Substrate Interconnects Characterization,” *Microwave and Optical Technology Letters*, Vol. 4, pp. 305–308, February 2004.

:: Conference Proceedings and Presentations (2004)

- » Foor, J., D. Wu and J. Chen, “Modeling and Simulation of Signaling Channel Loss on Printed Circuit Board,” *IEEE EMC Symposium*, Santa Clara, CA, 2004.
- » Chen, J., “Method of Moment,” *Tutorial in IEEE Electromagnetic Compatibility Symposium*, 2004.
- » Qiang, R., J. Chen, C. Wang, and J. Drewniak, “A Hybrid FDTD and CN-FDTD Scheme and its Application to VLSI Interconnects/Substrate Modeling,” *IEEE EMC Symposium*, Santa Clara, CA, 2004.

- » Chen, R., J. Chen, T. Hubing, and W. Shi, “Analytical Model for the Rectangular Power-Ground Structure Including Radiation Loss,” *IEEE EMC Symposium*, Santa Clara, CA, 2004.
- » Wu, H.C. and J. Chen, “Reliable Indoor Geometric OFDM Quality-of-Service Analysis using Sparse Channel Estimation,” *IEEE GlobeCom Conference*, Dallas, TX, 2004.
- » Wu, H.-C. and J. Chen, “A Novel Approach for Indoor Geometric OFDM Quality-of-Service Analysis,” *IEEE Vehicular Technology Conference*, Los Angeles, CA, 2004.
- » Qiang, R., D. Wu and J. Chen, “Some Considerations on Using Implicit FDTD Method,” *IEEE Antennas and Propagation Society Symposium*, Monterey, CA, 2004.
- » Wu, D. and J. Chen, “Perfectly Matched Layer for Crank-Nicolson (CN) FDTD Method,” *IEEE Antennas and Propagation Society Symposium*, Monterey, CA, 2004.
- » Qiang, R. and J. Chen, “AMG Enhanced CN-FDTD Method for Low Frequency Electromagnetic Applications,” *IEEE Antennas and Propagation Society Symposium*, Monterey, CA, 2004.
- » Chen, R.L., J. Chen, K. Han, A. Ruiz, and P. Ruchhoeft, “Nano-Scale Frequency Selective Surfaces for Thermophotovoltaic Energy Conversion,” *IEEE Antennas and Propagation Society Symposium*, Monterey, CA, 2004.

:: Funded Research Programs (2004)

- » Texas Higher Education Coordinating Board, Parallel Interconnects Modeling Engine for Wireless SOC Applications
- » 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

Research Assistant Professor

XUEMIN CHEN Email: xchen@uh.edu



:: Education

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

:: Research Interests

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

:: Journal Publications (2004)

- » He, X., C. Liu, X. Chen, and J. Li, “Simulation of a Multi-Frequency Continuous-Wave Reconstruction Technique for Subsurface Conductivity and Dielectric-Constant Profiles,” *Subsurface Sensing Technologies and Application*, Vol. 5, No. 3, pp. 99–120, July 2004.
- » Lin, J., C. Liu, J. Li, and X. Chen, “Measurement of Concrete Highway Rough Surface Parameters by an X-Band Scatterometer,” *IEEE Geoscience and Remote Sensing*, Vol. 42, No. 6, pp. 1188–1196, June 2004.

:: Conference Proceedings and Presentations (2004)

- » Chen, X., J. Li, R. Liang, Y. Sun, C. Liu, R. Rogers, and G. Claros, “Microstrip Transmission Line for Soil Moisture Measurement,” *Proceedings of SPIE, Sensors for Harsh Environments, OpticsEast*, Philadelphia, Pennsylvania, pp. 84–91, October 2004.
- » Li, J., H. Xing, X. Chen, Y. Sun, C. Liu, H. Chen, E. Oshinski, M. Won, and G. Claros, “Extracting Rebar’s Reflection from Measured GPR Data,” *Tenth International Conference on Ground Penetrating Radar*, Delft, The Netherlands, June 21–24, 2004.

- » Li, J., H. Xing, X. Chen, C. Liu, H. Chen, E. Oshinski, M. Won, and G. Claros, “GPR Reflection Position Identification by STFT,” *Tenth International Conference on Ground Penetrating Radar*, Delft, The Netherlands, June 21–24, 2004.
- » Guo, L., Y. Tang, J. Yu, J. Li, X. Chen, and R. Liu, “Weigh-in-Motion System Design with Piezoelectric Sensor,” *Proceedings of Engineering, Construction, and Operations in Challenging Environments: Earth & Space*, Houston, pp. 540–545, 2004.

:: Funded Research Programs (2004)

- » Texas Department of Transportation (TxDOT), Development of Laser Skit Systems
- » TxDOT, Investigation of FCC Compliant GPR Systems
- » TxDOT, Remote Monitoring Moisture Content in Waco and Bryan Districts
- » TxDOT, Laser Pavement Profiler and Other Instruments
- » TxDOT, A Method of Determining the Thickness and Uniformity of Application for Thermoplastic Pavement Markings
- » TxDOT, Pilot Implementation of Concrete Thickness Measurement GPR
- » TxDOT, Laser Texture Measurement Device
- » TxDOT, Non-contact Skid System

Assistant Professor

YUHUA CHEN Email: yuhua.chen@mail.uh.edu



:: Education

D.Sc., Washington University in St. Louis

:: Research Interests

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

:: Professional Service (2004)

» Reviewer for *International Journal of Computers and Applications*

Professor & Associate Dean for Undergraduate Programs and Computer Facilities

FRANK J. "FRITZ" CLAYDON Email: fclaydon@uh.edu



:: Education

Ph.D., Duke University

:: Research Interests

Cardiac Electrophysiology, Undergraduate Education

:: Professional Service (2004)

» NSF Review Panels

:: Funded Research Programs (2004)

- » 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

Professor

OVIDIU CRISAN Email: ocrisan@uh.edu



:: Education

Ph.D., Polytechnic Institute of Timisoara, Romania

:: Honors & Awards (2004)

» Member of the Editorial Board, *Electric Power Components And Systems*, Taylor & Francis Ltd. Publishing Corporation

:: Research Interests

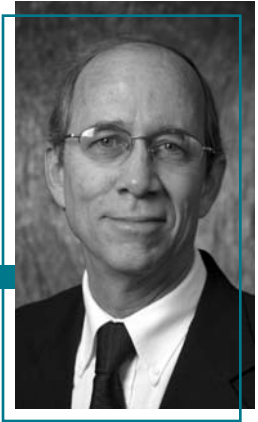
Power Systems Operation Optimization, Control and Available Transfer Capability (ATC) within the Deregulated Environment

:: Professional Service (2004)

» Reviewer for "Electric Power Components And Systems," Taylor & Francis Ltd. Publishing Corporation, Prentice Hall

Professor

JOHN R. GLOVER Email: glover@uh.edu



:: Education

Ph.D., Stanford University

:: Research Interests

Biomedical Signal Analysis and Intelligent Systems

:: Professional Service (2004)

» Reviewer for the *IEEE Transactions on Biomedical Engineering*
» Reviewer for the *Journal of Neural Engineering*

:: Conference Proceedings and Presentations (2004)

» Mitra, J., J.R. Glover, P.Y. Ktonas, J.D. Frost, Jr., R.A. Hrachovy, and E.M. Mizrahi, "Spatio-Temporal Clustering in the Detection of Epileptic Seizures in Neonatal EEG," *21st Annual Houston Conference on Biomedical Engineering Research*, Houston, Texas, p. 179, February 12–13, 2004.
» Mukherjee, A., J.R. Glover, N.B. Karayiannis, J.D. Frost, Jr., R.A. Hrachovy, and E.M. Mizrahi, "Improvement of Narrowband Epileptic Seizure Detection in Neonates Using Neural Networks," *21st Annual Houston Conference on Biomedical Engineering Research*, Houston, Texas, p. 193, February 12–13, 2004.
» Sachanandani, H., J.R. Glover, J.D. Frost, Jr., R.A. Hrachovy, and E.M. Mizrahi, "Artifact Removal in Neonatal Seizure EEG Data Using Adaptive Noise Canceling and Independent Component Analysis," *21st Annual Houston Conference on Biomedical Engineering Research*, Houston, Texas, p. 194, February 12–13, 2004.

» Karayiannis, N.B., A. Mukherjee, J.R. Glover, P.Y. Ktonas, J.D. Frost, Jr., R.A. Hrachovy, and E.M. Mizrahi, "Quantifying and Visualizing Uncertainty in EEG Data of Neonatal Seizures," *Proceedings of 26th Annual International Conference of the Engineering in Medicine and Biology Society*, San Francisco, CA, pp. 423–42, September 1–5, 2004.
» Mitra, J., J.R. Glover, P.Y. Ktonas, J.D. Frost, Jr., R.A. Hrachovy, and E.M. Mizrahi, "Enhanced Spatio-Temporal Clustering in the Detection of Neonatal Seizures using Context-Based Rules," *Proceedings of 26th Annual International Conference of the Engineering in Medicine and Biology Society*, San Francisco, CA, pp. 4717–4720, September 1–5, 2004.

:: Funded Research Programs (2004)

» National Institute 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

Associate Professor

THOMAS J. HEBERT

Email: thebert@uh.edu



:: Education

Ph.D., University of Southern California

:: Research Interests

Medical Imaging, Video/Image Processing, Adaptive Optics

:: Professional Service (2004)

» Tau Beta Pi Faculty Advisory Board, 1997–2004

:: Journal Publications (2004)

» Hebert, T.J., J. Africano and E.G. Stansbery, "Automated Detection of Orbital Debris in Digital Video from a Telescope," *Acta Astronautica*, Vol. 54, No. 6, pp. 455–461, 2004.

:: Conference Proceedings and Presentations (2004)

- » Venkateswaran, K., F. Romero-Borja, S. Poonja, T.J. Hebert, J. Martin, and A. Roorda, "Improved Three Dimensional Imaging of Living Human Retina Using the Adaptive Optics Scanning Laser Ophthalmoscope," *Focus on Microscopy Conference*, Drexel Univ., PA, April 4–7, 2004.
- » Hebert, T.J., "Reconstruction of the in Vivo Retina from Scanning-Laser Data Collected in an Extremely Low SNR Environment," *Center for Adaptive Optics*, Santa Cruz, CA, April 7, 2004.

:: Funded Research Programs (2004)

- » NSF—Center for Adaptive Optics, Adaptive Optics with Adaptive Signal Processing: Hardware and Software
- » NIH-NEI Biomedical Research Partnership Sub-award, 2nd Generation Adaptive Optics Scanning Laser Ophthalmoscope
- » University Of Houston, FDIP-A, Audio/video Compression for Interactive Exercises in Engineering

Professor

DAVID R. JACKSON

Email: djackson@uh.edu



:: Education

Ph.D., UCLA

:: Honors & Awards (2004)

» W. T. Kittenger Award for Outstanding Teaching, Cullen College of Engineering, University of Houston, 2003–2004

:: Research Interests

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

:: Professional Service (2004)

- » Chair, IEEE Antennas and Propagation Society Transnational Committee
- » Vice Chair, U.S. Commission B of the International Union of Radio Science
- » Vice Chair, MTT IMS Sub-Committee 1 (Field Analysis and Guided Waves)
- » Member, Technical Committee MTT-15 (Microwave Field Theory)
- » Member, IEEE Electromagnetics Award Committee
- » Member of Editorial Board, *IEEE Trans. Microwave Theory and Techniques*
- » Member of Editorial Board, *IEEE Microwave and Optical Technology Letters*

:: Books and Articles in Books (2004)

- » Jackson, D.R., J.T. Williams and D.R. Wilton, "Antennas-II," Chapter 9 of *Handbook of Engineering Electromagnetics*, Rajeev Bansal, Editor, Marcel Decker, 2004.
- » Jackson, D.R., "Plane Wave Propagation and Reflection," Chapter 5.3 in the *Electrical Engineering Handbook*, Academic Press/Elsevier Science, 2004.
- » Capolino, F., D.R. Jackson, D.R. Wilton, and L.B. Felsen, "Representation of the Field Excited by a Line Source near a 2D Periodic Artificial Material," in *Fields, Networks, Computational Methods, and Systems in Modern Electrodynamics: A Tribute to Leopold B. Felsen*, Springer Proceedings in Physics, P. Russer, and M. Mongiardo, Eds., Springer-Verlag, Berlin, Vol. 97, pp. 13–24, 2004.

:: Journal Publications (2004)

- » Baccarelli, P., P. Burghignoli, F. Frezza, A. Galli, G. Lovat, and D.R. Jackson, "Uniform Analytical Representation of the Continuous Spectrum Excited by Dipole Sources in a Multilayer Dielectric Structure through Weighted Cylindrical Leaky Waves," *IEEE Trans. Antennas and Propagation*, Vol. 52, pp. 653–665, March 2004.
- » Bernal, J., F. Mesa and D.R. Jackson, "Crosstalk Between Two Microstrip Lines Excited by a Gap Voltage Source," *IEEE Trans. Microwave Theory and Techniques*, Vol. 52, pp. 1770–1780, August 2004.
- » Langston, W.L. and D.R. Jackson, "Impedance, Axial-Ratio, and Receive-Power Bandwidths of Microstrip Antennas," *IEEE Trans. Antennas and Propagation*, Vol. 52, pp. 2769–2773, October 2004.
- » Fasenfest, B.J., F. Capolino, D.R. Wilton, D.R. Jackson, and N.J. Champagne, "A Fast MoM Solution for Large Arrays: Green's function Interpolation with FFT," *Antennas and Wireless Propagation Letters*, Vol. 3, No. 9, pp. 161–164, 2004.
- » Zhao, T., D.R. Jackson, J.T. Williams, and A.A. Oliner, "Simple CAD Model for a Dielectric Leaky-Wave Antenna," *IEEE Antennas and Wireless Propagation Letters*, Vol. 3, pp. 243–245, December 2004.

:: Conference Proceedings and Presentations (2004)

- » Wilton, D.R., D.R. Jackson, W.A. Johnson, M.A. Khayat, and C. Lertsirimit, "Validation as a Process," *URSI National Radio Science Conference*, Boulder, CO, January 5–8, 2004 (Abstracts, p. 63).
- » Capolino, F., D.R. Jackson, D.R. Wilton, and B. Fasenfest, "The Green's Function Method to Analyze Scatterers Near EBG materials," *27th ESA Antenna Workshop on Innovative Periodic Antennas*, Santiago, Spain, March 2004.
- » Capolino, F., D.R. Jackson and D.R. Wilton, "Power Leakage in Two-Dimensional EBG Waveguides," *Progress in Electromagnetic Research Symp.*, Pisa, Italy, March 2004.
- » Capolino, F., D.R. Jackson and D.R. Wilton, "Numerical Evaluation of Spectral Integral Representations for the Field Excited by a Line Source in 2D EBG Materials," *Progress in Electromagnetic Research Symp.*, Pisa, Italy, March 2004.

Professor

BEN H. JANSEN Email: bjansen@uh.edu



- » Jackson, D.R., A.A. Oliner, F. Mesa, and J.T. Williams, "High-Frequency Radiation and Leakage Effects on Planar Transmission Lines," *URSI Intl. Symp. on Electromagnetic Theory*, Pisa, Italy, May 24–27, 2004 (Proc., pp. 54–56).
- » Fasenfest, B.J., F. Capolino, D.R. Wilton, D.R. Jackson, and N. Champagne, "MoM Solutions for Large Planar Arrays of Three-Dimensional Elements: a Faster AIM Method," *URSI Intl. Symp. on Electromagnetic Theory*, Pisa, Italy, May 24–27, 2004 (Proc., pp. 144–146).
- » Capolino, F., D.R. Jackson and D.R. Wilton, "The Nature of the Field Excited by a Source over a Half-Space of 2D EBG Material Made of Impedance Layers," *URSI Intl. Symp. on Electromagnetic Theory*, Pisa, Italy, May 24–27, 2004 (Proc., pp. 197–199).
- » Lertsirimit, C., D.R. Jackson and D.R. Wilton, "EMI Coupling to a Device on a Printed Circuit Board Inside a Cavity From a Wire Penetrating an Aperture," *URSI Intl. Symp. on Electromagnetic Theory*, Pisa, Italy, May 24–27, 2004 (Proc., pp. 816–818).
- » Oliner, A.A., D.R. Jackson, T. Zhao, and J.T. Williams, "The Influence of the Open Stopband on the Beaming of Light at Broadside Through a Subwavelength Hole," *URSI Intl. Symp. on Electromagnetic Theory*, Pisa, Italy, May 24–27, 2004 (Proc., pp. 897–899).
- » Capolino, F., D.R. Jackson, D.R. Wilton, and L.B. Felsen, "Source-Excited Field Representations for 2D EBG Materials," *Symp. on Fields, Networks and Computations: A Modern View of Engineering Electrodynamics*, Munich, Germany, June 1–2, 2004.
- » Mesa, F., D.R. Jackson and R. Rodríguez-Berral, "A High-Frequency Equivalent Circuit for a Gap Source on a Microstrip Line," *IEEE Intl. Microwave Symp.*, Fort worth, TX, June 6–11, 2004 (Digest, pp. 503–506).
- » Lertsirimit, C., D.R. Jackson, D.R. Wilton, D. Erricolo, and D.H.Y. Yang, "EMC Coupling to a Circuit Board from a Wire Penetrating a Cavity Aperture," *IEEE AP-S/URSI Intl. Symp.*, Monterey, CA, June 20–25, 2004 (AP-S Digest).
- » Xu, X., D.R. Jackson, J.T. Williams, R.L. Chen, and L.I. Basilio, "A Stacked-Patch Reduced Surface Wave Antenna," *IEEE AP-S/URSI Intl. Symp.*, Monterey, CA, June 20–25, 2004 (AP-S Digest).
- » Capolino, F., D.R. Jackson and D.R. Wilton, "Fundamental Properties of Source-Excited Field at the Interface of a 2D EBG Material," *IEEE AP-S/URSI Intl. Symp.*, Monterey, CA, June 20–25, 2004 (AP-S Digest).
- » Basilio, L.I., J.T. Williams and D.R. Jackson, "The Effective Point of Radiation for a Microstrip Patch Antenna," *IEEE AP-S/URSI Intl. Symp.*, Monterey, CA, June 20–25, 2004 (URSI Abstract).
- » Fasenfest, B.J., F. Capolino, D.R. Wilton, D.R. Jackson, and N. Champagne, "A Fast MoM Solver for Large Arrays of Printed Antennas: a Preconditioned GIFFT (Green's Function Interpolation and FFT)," *XV RiNEM*, Cagliari, Italy, September 13–16, 2004.
- » Donzelli, G., F. Capolino, D.R. Jackson, and D.R. Wilton, "Efficient Numerical Evaluation of the Field Excited by a Line Source on Top of a Slab of 2D EBG Material," *XV RiNEM*, Cagliari, Italy, September 13–16, 2004.
- » Oliner, A.A. and D.R. Jackson, "A Theory for the Dramatic Enhancement of Optical Transmission through a Subwavelength Hole and the Radiation of a Sharply Directive Beam from it," *Intl. Topical Meeting on Microwave Photonics (MWP 2004)*, Ogunquit, MA, October 4–6, 2004.
- » Fasenfest, B.J., F. Capolino, D.R. Wilton, D.R. Jackson, and N. Champagne, "A Fast MoM Solver for Large Arrays of Printed Antennas: a Preconditioned GIFFT (Green's Function Interpolation and FFT)," *JINA 2004 (Journé Internationale de Nice sur les Antennes)*, Nice, France, November 8–10, 2004.

:: Funded Research Programs (2004)

- » Sandia National Laboratories, Studies in Modeling Finite and Infinite Periodic Structures
- » 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

:: Education

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

:: Honors & Awards (2004)

- » Member of the Editorial Board, *Clinical Neurophysiology*

:: Research Interests

(Biomedical) Signal Analysis and Intelligent Systems

:: Professional Service (2004)

- » Reviewer for *IEEE Transactions on Biomedical Engineering*, *Int. J. of Psychophysiology*, *Journal of Neuroscience Methods*, and *Neuroscience Letters*
- » External PhD Examiner: University of Texas Medical Branch, Galveston, Texas: Objective Assessment of Upper Limb Function in Individuals with Acquired Brain Injury, by Takayuki Nakamura, 2004
- » Organizer and Chair, Conference Session "Neural Signal Processing," *21st Annual Houston Conference on Biomedical Engineering Research*, 2004

:: Books and Articles in Books (2004)

- » Jansen, B.H., V. Garoosi, G. Agarwal, D. Iyer, A. Hegde, R. Jacob, and N.N. Boutros, "Digital Signal Processing and Single Trial Evoked Potentials: Accomplishments, Limitations and Promises," in *Brainwaves and Mind: Recent Advances*, N.C. Moore and M.K. Arkan (Eds.), Kjellberg, Inc., Wheaton, Illinois, pp. 33–40, 2004.

:: Journal Publications (2004)

- » Jansen, B.H., A. Hegde and N.N. Boutros, "Contribution of Different EEG Frequencies to Auditory Evoked Potential Abnormalities in Schizophrenia," *Clinical Neurophysiology*, Vol. 115, No. 3, pp. 523–533, 2004.
- » Jansen, B.H., A. Allam, P. Kota, K. Lachance, A. Osho, and K. Sundaresan, "An Exploratory Study of Factors Affecting Single Trial P300 Detection," *IEEE Transactions on Biomedical Engineering*, Vol. 51, No. 6, pp. 975–978, 2004.
- » Boutros, N.N., O. Korzyukov, B.H. Jansen, A. Feingold, and M. Bell, "Sensory-Gating Deficits During the Mid-Latency Phase of Information Processing in Medicated Schizophrenia Patients," *Psychiatry Research*, Vol. 126, No. 3, pp. 203–215, 2004.
- » Boutros, N.N., O. Korzyukov, G. Oliwa, A. Feingold, D. Campbell, D. McClain-Furmanski, F. Struve, and B.H. Jansen, "Morphological and Latency Abnormalities of the Mid-Latency Auditory Evoked Responses in Schizophrenia: a Preliminary Report," *Schizophrenia Research*, Vol. 70, pp. 303–313, 2004.
- » Boutros, N.N., O. Korzyukov, G. Oliwa, F. Struve, and B.H. Jansen, "Auditory Evoked Responses in a Comparison Between Schizophrenia Patients With and Without Premorbid History of Drug Abuse: Report of Pilot Results," *Clinical EEG and Neurosciences*, Vol. 35, No. 4, pp. 193–197, 2004.

:: Conference Proceedings and Presentations (2004)

- » Kota, P., K. Sundaresan and B.H. Jansen, "P300-Based Brain Machine Interface," *21st Annual Houston Conference on Biomedical Engineering Research*, February 12–13, 2004.
- » Jansen, B.H., H. Doshi, L. Hu, and N.N. Boutros, "Inter- and Intra-Individual Gating Differences and Psychophysiological State," *12th World Congress of Psychophysiology*, Porto Carras, Chalkidiki, Greece, September 18–23, 2004 (abstract published in: *International Journal of Psychophysiology*, vol. 54, no. 1–2, p 39, 2004).
- » Boutros, N.N., B.H. Jansen and O. Korzyukov, "Sensory-Gating Deficit in Schizophrenia Extends Beyond the P50 to the N100 and P200 Auditory Evoked Responses," *12th World Congress of Psychophysiology*, Porto Carras, Chalkidiki, Greece, September 18–23, 2004 (abstract published in: *International Journal of Psychophysiology*, vol. 54, no. 1–2, p 40, 2004).
- » Hu, L., B.H. Jansen and N.N. Boutros, "An Evaluation of the Usefulness of the N100 and P200 Component as Measures of Sensory Gating," *Sixth Annual Meeting of the EEG and Clinical Neuroscience Society (ECNS)*, Irvine, California, USA, September 29–October 2, 2004 (abstract published in: *Clinical EEG and Neuroscience*, vol. 35, no. 4, p 230–231, 2004).
- » Jansen, B.H., "Event Related Activity: Applications to Diagnosis and Brain-Machine Control," *UT-Health Science Center*, April 27, 2004.
- » Jansen, B.H., "Towards a Mental Prosthesis," *City University of Hong Kong*, Hong Kong, May 14, 2004 (co-sponsored by the IEEE Hong Kong Section).

:: Funded Research Programs (2004)

- » 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
- » NIH/MH and Yale University, Phase Resetting and Sensory Inhibition in the CNS
- » University of Houston Grant to Enhance and Advance Research, The Mental Prosthesis

Assistant Professor

VALERY A. KALATSKY Email: vkalatsky@uh.edu



:: Education

Ph.D., Texas A&M University

:: Research Interests

Neuro-engineering, Optical Imaging of Intrinsic Signals, Neuro-biology, Brain Mapping, Representation of Sensory Modalities (Vision, Hearing, Somatosensation) in Mammalian Neocortex

:: Conference Proceedings and Presentations (2004)

- » Kalatsky, V.A., Lecturer in "Imaging Structure & Function in the Nervous System," topic "Intrinsic Imaging," *Cold Spring Harbor Laboratory summer course*, Cold Spring Harbor, NY, July 27–August 16, 2004.
- » Kalatsky, V.A., Panelist in "How Physicists Can Work in the Physics/Biology Interface and Survive," *American Physical Society Conference on "Opportunities in Biology for Physicists"*, San Diego, CA, January 30–February 1, 2004.

Professor

NICOLAOS B. KARAYIANNIS

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:: Education

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 (2004)

- » Associate Editor, *Journal of Applied Functional Analysis*, 2004–present
- » Member of the Neural Networks Committee, IEEE Neural Networks Society, 1998–present
- » Associate Editor, *IEEE Transactions on Neural Networks*, 1997–present
- » Associate Editor, *IEEE Transactions on Fuzzy Systems*, 1996–present
- » Member of the Editorial Board, *International Journal of Smart Engineering System Design*, 1996–present

:: Journal Publications (2004)

- » Malki, H., N.B. Karayiannis and M. Balasubramanian, “Short-Term Electric Power Load Forecasting using Feed-Forward Neural Networks,” *Expert Systems*, Vol. 21, No. 3, pp. 157–167, 2004.
- » Karayiannis, N.B. and J. Chookiarti, “Indirectly Estimated Adaptive Detectors for Code-Division Multiple-Access Signals,” *IEEE Transactions on Signal Processing*, Vol. 52, No. 10, pp. 2677–2689, 2004.

:: Conference Proceedings and Presentations (2004)

- » Karayiannis, N.B., A. Sami, J.D. Frost, Jr., M.S. Wise, and E.M. Mizrahi, “Quantifying Motion in Video Recordings of Neonatal Seizures by Feature Trackers Based on Predictive Block Matching,” *Proceedings of 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, San Francisco, CA, pp. 1447–1450, September 1–5, 2004.
- » Karayiannis, N.B., G. Tao, B. Varughese, J.D. Frost, Jr., M.S. Wise, and E.M. Mizrahi, “Discrete Optical Flow Estimation Methods and Their Application in the Extraction of Motion Strength Signals from Video Recordings of Neonatal Seizures,” *Proceedings of 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, San Francisco, CA, pp. 1718–1721, September 1–5, 2004.
- » Karayiannis, N.B., A. Mukherjee, J.R. Glover, P.Y. Ktonas, J.D. Frost, Jr., R.A. Hrachovy, and E.M. Mizrahi, “Quantifying and Visualizing Uncertainty in EEG Data of Neonatal Seizures,” *Proceedings of 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, San Francisco, CA, pp. 423–426, September 1–5, 2004.
- » Sami, A., N.B. Karayiannis, J.D. Frost, Jr., M.S. Wise, and E.M. Mizrahi, “Automated Tracking of Multiple Body Parts in Video Recordings of Neonatal Seizures,” *Proceedings of 2004 IEEE International Symposium on Biomedical Imaging*, Arlington, VA, pp. 312–315, April 15–18, 2004.

:: Funded Research Programs (2004)

- » National Institutes of Health, Video Technologies for Neonatal Seizures

Professor

HAN LE

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:: Education

Ph.D., Massachusetts Institute of Technology

:: Honors & Awards (2004)

- » Advisory Board of Applied Optoelectronics, Inc.
- » Technology Council of the Gerson-Lehrman Investment Group
- » Member of focus study group, U.S. Department of Homeland Security, 2004

:: Research Interests

Semiconductor Optoelectronics, Lasers, Photonics, Multi-spectral Optical Sensing and Imaging, Optical System, Lidars

:: Professional Service (2004)

- » Proposal Reviewer Army Research Office, U.S. DoE.
- » Paper Reviewer for *Optics Letters*, *IEEE Photonics Technology Letter*, *Optics Express*, *Applied Physics Letters*
- » Member of a Focus Group for U.S. Department of Homeland Security Advanced Research Project Agency
- » Expert Witness Advisor for American Dental Laser
- » Provided Interview for Telemundo

:: Journal Publications (2004)

- » Guo, B., Y. Wang, C. Peng, H.L. Zhang, G.P. Luo, H.Q. Le, C. Gmachl, D.L. Sivco, M.L. Peabody, and A.Y. Cho, “Laser-Based Mid-Infrared Reflectance Imaging of Biological Tissues,” *Opt. Express*, Vol. 12, pp. 208–219, 2004.
- » Wang, Y., C. Peng, H.L. Zhang, and H.Q. Le, “Wavelength Modulation Imaging with Tunable Mid-Infrared Semiconductor Laser: Spectroscopic and Geometrical Effects,” *Opt. Express*, Vol. 12, pp. 5243–5257, 2004.
- » Wang, Y., Y. Wang, C. Peng, H.L. Zhang, A. Seetheraman, and H.Q. Le, “Concepts for Scalable, CDMA-Networked, M/LWIR Semiconductor Laser Standoff Chemical Detection System,” *SPIE*, Vol. 5617, pp. 179–189, 2004.

:: Conference Proceedings and Presentations (2004)

- » Guo, B., Y. Wang, C. Peng, H.L. Zhang, G.-P. Luo, and H.Q. Le, “Mid-IR Diffuse Reflectance Imaging with Quantum Cascade Semiconductor Lasers,” *Photonics West*, BIOS, San Jose, CA, January 2004.

- » Le, H.Q., “Multi-Spectral Sensing and M/LWIR Photonics,” *Air Force Research Laboratory Kirtland Air Force Base*, Albuquerque, NM, April 1, 2004.
- » Wang, Y., C. Peng, H.L. Zhang, and H.Q. Le, “Remote Spectral Imaging with Multi-Wavelength and Tunable, Wavelength-Modulation Lasers,” *Conference on Laser and Electro-Optics*, San Francisco, CA, May 2004.
- » Zhang, H.L., G.P. Luo, A. Seetharaman, P. Johnson, and H.Q. Le, “Grating-Coupled Surface Emitting Quantum Cascade Semiconductor Optical Pre-Amplifier,” *Conference on Laser and Electro-Optics*, San Francisco, CA, May 2004.
- » Le, H.Q., “Multi-Spectral, Polarimetric Lidars and Generalized Concept of Network-Centric Optical Sensing,” *Graduate Engineering Research Center (invited seminar)*, University of Florida and Eglin Air Force Base, Fort Walton Beach, FL, June 18, 2004.
- » Le, H.Q., “Multi-Spectral Laser-Based Optical Sensing,” *Jet Propulsion Laboratory (invited seminar)*, California Institute of Technology, Pasadena, CA, August 4, 2004.
- » Wang, Y., Y. Wang, C. Peng, H.L. Zhang, A. Seetheraman, and H.Q. Le, “Concepts for Scalable CDMA-Networked M/LWIR Semiconductor Laser Standoff Chemical Detection System,” *Conference on Optically Based Biological and Chemical Sensing for Defence*, London, UK, October 25–27, 2004.

:: Funded Research Programs (2004)

- » U.S. Air Force Research Laboratory/Sensor Directorate, Optical Preamplifiers for Receivers in Multifunction Electro-Optical System
- » Defense Advanced Research Project Agency/U.S. Army, Compact Broadband Wavelength Agile Mid-infrared Semiconductor Lasers for Spectroscopic Sensing
- » AFOSR-MURI, Phonon Enhancement of Electronic and Photonic Devices

Research Assistant Professor

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:: Education

Ph.D., Xian Jiaotong University, China

:: Research Interests

Sensors, Sensor Data Processing, Sensing System Modeling, GPR Radar, and EMC

:: Professional Service (2004)

» Reviewer for *IEEE T-EMC*, *IEEE T-GRS*, and *IEE Electronics Letters*

:: Journal Publications (2004)

- » He, X., C. Liu, X. Chen, and J. Li, "Simulation of a Multi-Frequency Continuous-Wave Reconstruction Technique for Subsurface Conductivity and Dielectric-Constant Profiles," *Subsurface Sensing Technologies and Applications*, Vol. 5, No. 3, pp. 99–120, July 2004.
- » Lin, J., C. Liu, J. Li, and X. Chen, "Measurement of Concrete Highway Rough Surface Parameters by X-Band Scatterometer," *IEEE Trans. on Geoscience and Remote Sensing*, Vol. 42, No. 6, pp. 1188–1196, June 2004.

:: Conference Proceedings and Presentations (2004)

- » Chen, X., J. Li, R. Liang, Y. Sun, C. Liu, R. Rogers, and G. Claros, "Microstrip Transmission Line for Soil Moisture Measurement," *Proceedings of SPIE, Sensors for Harsh Environments, OpticsEast*, Philadelphia, Pennsylvania, October 25–28, 2004.
- » Guo, L., Y. Tang, J. Yu, J. Li, X. Chen, and C. Liu, "Weigh-in-Motion System Design with Piezoelectric Sensor," *Proceedings of Engineering, Construction, and Operations in Challenging Environments: Earth & Space*, pp. 540–545, Houston, 2004.
- » Li, J., H. Xing, X. Chen, and C. Liu, "Extracting Rebar's Reflection from Measured GPR Data," *10th International Conference on Ground Penetrating Radar*, Delft, The Netherlands, June 21–24, 2004.
- » Xing, H., J. Li, X. Chen, and C. Liu, "GPR Reflection Position Identification by STFT," *10th International Conference on Ground Penetrating Radar*, Delft, The Netherlands, June 21–24, 2004.

:: Funded Research Programs (2004)

- » Texas Department of Transportation, Investigation of FCC Compliant GPR Systems
- » Texas Department of Transportation, Remote Monitoring Moisture Content in Waco and Bryan Districts
- » Texas Department of Transportation, Pilot Implementation of Concrete Thickness Measurement GPR
- » Texas Department of Transportation, Laser Texture Measurement Device

Associate Professor

DMITRI LITVINOV Email: dlitvinov@uh.edu



:: Education

Ph.D., University of Michigan

:: 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 (2004)

- » Co-chair, *3rd North American Perpendicular Magnetic Recording Conference*, Boulder, CO, August 2004
- » Co-chair, *Conference on Nanoscale Devices and System Integration*, Miami, FL, February 2004
- » Program Committee Member, *Perpendicular Magnetic Recording Conference*, Akita, Japan, May 2004
- » Program Committee Member, *The Magnetic Recording Conference*, Boulder, CO, August 2004
- » Editor, *NDSI Issue of Nanotechnology*
- » Editor, *NAPMRC Issue of IEEE Transactions on Magnetics*
- » Panelist at Two NSF Panels: *IGERT*, *Molecular Electronics*

:: Books and Articles in Books (2004)

- » Khizroev, S. and D. Litvinov, *Perpendicular Magnetic Recording*, (book), Kluwer, pp. 1–174, 2004.

:: Journal Publications (2004)

- » Khizroev, S. and D. Litvinov, "Perpendicular Magnetic Recording: Writing Process," *Applied Physics Reviews in Journal of Applied Physics*, 95 (9), 4521–4537, 2004.
- » Khizroev, S. and D. Litvinov, "Focused-Ion-Beam-Based Rapid Prototyping of Nanoscale Magnetic Devices," *Review in Nanotechnology*, Vol. 14, pp. R7–R15, 2004.
- » Litvinov, D., J. Wolfe, E. Svedberg, T. Ambrose, K. Howard, F. Chen, E. Schlesinger, and S. Khizroev, "Ion Implantation of Magnetic Thin-Films and Nanostructures," *Journal of Magnetism and Magnetic Materials*, Vol. 283, No. 1, pp. 128–132, 2004.

- » Candocia, F., E. Svedberg, D. Litvinov, and S. Khizroev, "Deconvolution Processing for Increasing the Resolution of Magnetic Force Microscopy Measurements," *Nanotechnology*, Vol. 15, pp. S575–S584, 2004.
- » Mukherjee, S., D. Litvinov and S. Khizroev, "Atomic Scale Modeling of Nanoconstrictions," *IEEE Trans. Magn.* Vol. 40, No. 4, pp. 2143–2145, 2004.

:: Conference Proceedings and Presentations (2004)

- » Chunsheng, E., S. Khizroev, D. Weller, and D. Litvinov, "Perpendicular Recording on Patterned Media: System Design Considerations," *Conference on Magnetism and Magnetic Materials*, Jacksonville, FL, November 2004.
- » Litvinov, D. and S. Khizroev, "Differential Magnetoresistive Playback Heads for Ultra-High Density Perpendicular Magnetic Recording Applications," *Conference on Magnetism and Magnetic Materials*, Jacksonville, FL, November 2004.
- » Khizroev, S., R. Cameron, R. Chomko, S. Mukherjee, R. Chantrell, and D. Litvinov, "Focused Ion-Beam Fabricated Ballistic Magnetoresistive Sensors," *Conference on Magnetism and Magnetic Materials*, Jacksonville, FL, November 2004.
- » Chomko, R., D. Litvinov and S. Khizroev, "Near-Field Light Heat Source Considerations in Heat Assisted Magnetic Recording," *Conference on Magnetism and Magnetic Materials*, Jacksonville, FL, November 2004.
- » Nair, R., H. Arjomandi, V. Renugopalakrishnan, D. Litvinov, R. Chomko, and S. Khizroev, "Read/Write Mechanisms for Protein-Based Data Storage Systems," *2004 Conference on Nanoscale Devices and System Integration (NDSI-2004)*, Miami, FL, February 15–19, 2004.
- » Lavrenov, A., R. Chomko, D. Litvinov, and S. Khizroev, "Near-Field Optical Systems for Heat-Assisted Magnetic Recording," *2004 Conference on Nanoscale Devices and System Integration (NDSI-2004)*, Miami, FL, February 15–19, 2004.

:: Patents (2004)

- » Shukh, A.M., E.W. Singleton, S. Khizroev, and D. Litvinov, “Perpendicular Recording Medium with Antiferromagnetic Exchange Coupling in Soft Magnetic Underlayers,” US patent 6,818,330, issued November 16, 2004.
- » Litvinov, D. and S. Khizroev, “Perpendicular Magnetic Recording Head with Longitudinal Magnetic Field Generator to Facilitate Magnetization Switching,” US patent 6,816,339, issued November 9, 2004.
- » Litvinov, D., S. Khizroev and B. Crue, “Perpendicular Recording Head with Return Poles Which Reduce Flux Antenna Effect,” US patent 6,798,615, issued September 28, 2004.
- » Khizroev, S., D. Litvinov and M.H. Kryder, “Perpendicular Recording Head Including Concave Tip,” US patent 6,771,462, issued August 3, 2004.
- » Khizroev, S., D. Litvinov, R. Gustafson, and N. Shukla, “Perpendicular Magnetic Recording Head with a Magnetic Shield to Reduce Side Reading,” US patent 6,738,233, issued May 18, 2004.
- » Litvinov, D., S. Khizroev and B.W. Crue, “Composite Write Pole for a Magnetic Recording Head,” US patent 6,721,131, issued April 13, 2004.
- » Crue, B.W., S. Khizroev, D. Litvinov, and T.M. Crawford, “Perpendicular Magnetic Recording Head Having a Flux Focusing Main Pole,” US patent 6,693,768, issued February 17, 2004.

:: Funded Research Programs (2004)

- » National Science Foundation, NIRT: Nanomanufacturing Strategy and System Design for Nanoscale Patterned Magnetic Recording Medium
- » National Science Foundation, MRI: Spinstand for Developing Next Generation Data Storage Systems
- » Information Storage Industry Consortium, Materials for Patterned Magnetic Recording Medium
- » Texas Center for Superconductivity, Development of a Cold-cathode Electron-emitter Based Hybrid Magnetic Recording Head Designed for Heat-assisted Magnetic Recording

Professor

C. RICHARD LIU Email: cliu@uh.edu



:: Education

Ph.D., Jiaotong University, China

:: Research Interests

Sensor Technologies, Well Logging and Wireless Communications

:: Professional Service (2004)

» Member, Technical Advisory Committee, Texas Department of Transportation

:: Journal Publications (2004)

- » Zhang, Y., L. Shieh and C. Liu, “Digital PID Controller Design for Multivariable Analogue Systems with Computational Input-Delay,” *IMA Journal of Mathematical Control and Information*, Vol. 21, pp 433–456, 2004.
- » He, X., C. Liu, X. Chen, and J. Li, “Simulation of a Multi-Frequency Continuous-Wave Reconstruction Technique for Subsurface Conductivity and Dielectric-Constant Profiles,” *Subsurface Sensing Technologies and Application*, Vol. 5, No. 3, pp 99–120, July 2004.
- » Lin, J., C. Liu, J. Li, and X. Chen, “Measurement of Concrete Highway Rough Surface Parameters by an X-Band Scatterometer,” *IEEE Geoscience and Remote Sensing*, Vol. 42, No. 6, pp 1188–1196, June 2004.

:: Conference Proceedings and Presentations (2004)

- » Chen, X., J. Li, R. Liang, Y. Sun, C. Liu, R. Rogers, and G. Claros, “Microstrip Transmission Line for Soil Moisture Measurement,” *Proceedings of SPIE, Sensors for Harsh Environments, OpticsEast*, Philadelphia, Pennsylvania, October 25–28, 2004.
- » Li, J., H. Xing, X. Chen, Y. Sun, C. Liu, H. Chen, E. Oshinski, M. Won, and G. Claros, “Extracting Rebar’s Reflection from Measured GPR Data,” *10th International Conference on Ground Penetrating Radar*, Delft, The Netherlands, June 21–24, 2004.

- » Li, J., H. Xing, X. Chen, C. Liu, H. Chen, E. Oshinski, M. Won, and G. Claros, “GPR Reflection Position Identification by STFT,” *10th International Conference on Ground Penetrating Radar*, Delft, The Netherlands, June 21–24, 2004.

:: Funded Research Programs (2004)

- » Texas Higher Education Coordinating Board, Development of a Non-contact Sensor for Measurement of Highway Pavement Skid Number
- » Texas Department of Transportation, Development of Laser Skit Systems
- » Texas Department of Transportation, Investigation of FCC Compliant GPR Systems
- » Texas Department of Transportation, Remote Monitoring Moisture Content in Waco and Bryan Districts
- » Texas Department of Transportation, Laser Pavement Profiler and Other Instruments
- » Texas Department of Transportation, A Method of Determining the Thickness and Uniformity of Application for Thermoplastic Pavement Markings
- » Texas Department of Transportation, Pilot Implementation of Concrete Thickness Measurement GPR
- » Texas Department of Transportation, Laser Texture Measurement Device
- » Texas Department of Transportation, Non-contact Skid System
- » Consortium of 12 Oil and Service Companies, Well Logging Projects
- » API Calibration System, Nuclear Logging Calibration Projects

Professor & Associate Dean for Education Development & Outreach

STUART A. LONG Email: long@uh.edu



:: Education

Ph.D., Harvard University

:: Honors & Awards (2004)

» Elected to IEEE Board of Directors, 2005–2006

:: Research Interests

Microstrip Antennas, Antenna Design, Electromagnetic, Measurements, Dielectric Resonator Antennas

:: Professional Service (2004)

- » IEEE Fellows Committee, 2002–present
- » Liaison Member, IEEE Women in Engineering Committee, 2002–present
- » *IEEE Spectrum* Editorial Board, 1999–present
- » Antennas and Propagation Society Awards Committee, 1989–present
- » IEEE Antennas and Propagation Society National Meetings Coordinator, 1988–present
- » Director-Elect, IEEE Division IV, 2004
- » Joint Antennas and Propagation Society/URSI International Meetings Committee, 2002–2004

:: Journal Publications (2004)

» Kennedy, T.F., S.A. Long and J.T. Williams, “Modification of Properties of Long Monopole Antennas Using Dielectric and Magnetic Beads,” *IEEE Antennas and Wireless Propagation Letters*, Vol. 3, pp. 165–168, May 2004.

:: Conference Proceedings and Presentations (2004)

» Kennedy, T.F., S.A. Long and J.T. Williams, “Dielectric Bead Loading for Control of Currents on Electrically Long Dipole Antennas,” *Proceedings of the IEEE AP-S International Symposium*, Monterey, CA, pp. 4420–4423, June 2004.

:: Funded Research Programs (2004)

- » Texas Higher Education Coordinating Board, Undergraduate Recruiting and Retention of ECE Students at the University of Houston
- » Texas Advanced Research Program, Dielectric Resonator Antenna Applications in Wireless Communications
- » 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

Associate Professor

PAULINE MARKENSCOFF Email: markenscoff@uh.edu



:: Education

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 (2004)

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

:: Journal Publications (2004)

» Youssef, B.B., P. Markenscoff and K. Zygorakis, “Parallelization of a 3-D Computational Model for Wound Healing,” *WSEAS Transactions on Computers*, Vol. 3, No. 4, pp. 993–998, 2004.

:: Conference Proceedings and Presentations (2004)

- » Cheng, G., P. Markenscoff and K. Zygorakis, “A Hybrid Three-Dimensional Model for Early Tumor Invasion,” *Procs. 2004 AIChE Meeting*, 503f, Austin, TX, November 7–12, 2004.
- » Cheng, G., P. Markenscoff and K. Zygorakis, “A Hybrid Three-Dimensional Model for Tissue Growth in a Perfusion System,” *Procs. 2004 AIChE Meeting*, 440e, Austin, TX, November 7–12, 2004.
- » Youssef, B.B., P. Markenscoff and K. Zygorakis, “Parallelization of a 3-D Computational Model for Wound Healing,” *3rd WSEAS International Conference on Software Engineering, Parallel & Distributed Systems*, Saltzburg, Austria, February 2004.



:: Education

Ph.D., Université Laval, Québec, Canada

:: Honors & Awards (2004)

» Fellow, Hanse Wissenschaftskolleg (Hanse Institute for Advanced Studies), 2004

:: Research Interests

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

:: Professional Service (2004)

- » Director, University of Houston Center for Neuro-Engineering and Cognitive Science
- » Temporary member, NIH Central Visual Processing (CVP) Study Section
- » Specialty Editor (current events), *Neural Networks*
- » Member of Steering Committee, *The 2nd International IEEE EMBS Conference on Neural Engineering*, Arlington, VA, USA March, 2005
- » Track Co-chair, *Houston Society for Engineering in Medicine and Biology Annual Meeting*, Houston, TX, February 2005
- » Reviewer for *Visual Neuroscience*
- » Reviewer for *IEEE Transactions on BME*
- » Chair, Department Tenure and Promotion Committee
- » Chair, Department Post-tenure Review Committee
- » Chair (Neuro-engineering), Department Faculty Search Committee
- » Member, Biomedical Engineering Faculty Search Committee
- » Member, Biomedical Engineering Curriculum Committee
- » Member, Department Graduate Curriculum Committee
- » Member, Engineering Dean's Review Committee
- » Member, University Animal Care Committee

:: Journal Publications (2004)

- » Ogmen, H., S.S. Patel, H.E. Bedell, and K. Camuz, "Differential Latencies and the Dynamics of the Position Computation Process for Moving Targets, Assessed with the Flash-Lag Effect," *Vision Research*, Vol. 44, pp. 2109–2128, 2004.
- » Breitmeyer, B.G., T. Ro and H. Ogmen, "A Comparison of Masking by Visual and Transcranial Magnetic Stimulation: Implications for the Study of Conscious and Unconscious Visual Processing," *Consciousness and Cognition*, Vol. 13, pp. 829–843, 2004.
- » Breitmeyer, B.G., H. Ogmen and J. Chen, "Unconscious Priming by Color and Form: Different Processes and Levels," *Consciousness and Cognition*, Vol. 13, pp. 138–157, 2004.

:: Conference Proceedings and Presentations (2004)

- » Aydin, M., S. Subramaniam, H. Ogmen, and H.E. Bedell, "The Effect of Nearby Targets on Perceived Motion Smear," *Texas Systems Day Conference*, Houston, TX, 2004.
- » Kafaligonul, H., H. Ogmen and H.E. Bedell, "Effect of Exposure Duration and Contrast on Human Blur Perception," *Texas Systems Day Conference*, Houston, TX, 2004.
- » Koc, A., B.G. Breitmeyer and H. Ogmen, "Automatic Unconscious Information Processing Stages in the Brain: Metacontrast Masking is after Binocular Rivalry," *Texas Systems Day Conference*, Houston, TX, 2004.
- » Ogmen, H. and M.H. Herzog, "Perceptual Grouping Induces Real-time Remapping of Retinotopy in Human Vision," *Society for Neuroscience 2004 Annual Meeting*, San Diego, CA, 2004.

- » Ogmen, H., B.G. Breitmeyer, S. Todd, and L. Mardon, "Double Dissociation in Target Recovery: Effect of Contrast," *VSS'04: Vision Sciences Society Conference*, Sarasota, FL, 2004.
- » Breitmeyer, B.G., T. Ro and H. Ogmen, "Similarities and Differences between Visual and TMS Masks in the Study of Conscious and Unconscious Processes in Human Vision," *Association for the Scientific Study of Consciousness (ASSC8) Conference*, Antwerp, Belgium, 2004.
- » Aydin, M., S. Subramaniam, S.S. Patel, and H. Ogmen, "The Effect of Nearby Targets and Eye Movements on Perceived Motion Smear," *21st Annual Houston Conference on Biomedical Engineering Research*, Houston, TX, 2004.
- » Koc, A., H. Ogmen and B.G. Breitmeyer, "Temporal Dynamics of Extrinsic Focal Visual Attention," *21st Annual Houston Conference on Biomedical Engineering Research*, Houston, TX, 2004.
- » Breitmeyer, B.G., H. Ogmen and T. Ro, "Form and Chromatic Processing by the Visual 'Zombie' and Homunculus," *Toward a Science of Consciousness 2004*, Tucson, AZ, 2004.

:: Funded Research Programs (2004)

- » National Institute of Mental Health, Neural Correlates of Moving Boundary Perception
- » National Science Foundation, Temporal Dynamics of Unconscious and Conscious Perception in Visual Processing

Associate Professor

DAVID M. PAI Email: dpai@uh.edu



:: Education

Ph.D., University of British Columbia, Canada

:: Research Interests

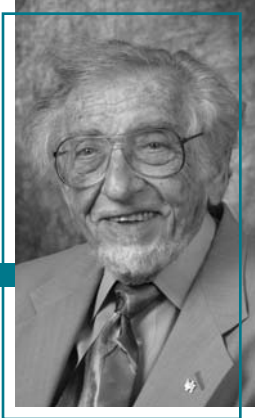
Optical Communications, High Power Fiber Lasers

:: Funded Research Programs (2004)

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

Professor

GERHARD F. PASKUSZ Email: paskusz@uh.edu



:: Education

Ph.D., UCLA

:: Research Interests

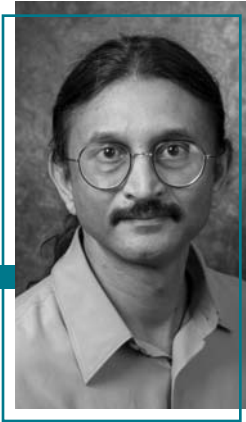
Circuit and Computer Simulation of Biological Systems,
Circuit Theory

:: Professional Service (2004)

» Treasurer of the MIND Division, ASEE
» Initiated Organizing an IEEE Education Society Houston Chapter

Research Assistant Professor

SAUMIL S. PATEL Email: spatel10@uh.edu



:: Education

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 (2004)

» Reviewer for *IEEE Transactions on Biomedical Engineering; Vision Research, Perception, Optometry and Vision Science*

:: Journal Publications (2004)

- » Ogmen, H., S.S. Patel, H.E. Bedell, and K. Camuz, "Differential Latencies and the Dynamics of the Position—Computation Process for Moving Targets, Assessed with the Flash-Lag Phenomenon," *Vision Res.*, Vol. 44, pp. 2109–2128, 2004.
- » Bedell, H.E., S.T.C. Chung and S.S. Patel, "Attenuation of Perceived Motion Smear during Vergence and Pursuit Tracking," *Vision Res.*, Vol. 44, pp. 895–902, 2004.

:: Conference Proceedings and Presentations (2004)

- » Poonja, S.G., S.S. Patel and A.J. Roorda, "Dynamic Visual Stimulus Presentation in and Adaptive Optics Scanning Laser Ophthalmoscope," *Annual Meeting of Optical Society of America*, New York, 2004.
- » Aydin, M., S. Subramaniam, S.S. Patel, H. Ogmen, and H.E. Bedell, "The Effect of Nearby Targets and Eye Movements on Perceived Motion Smear," *21st Annual Houston Conference on Biomedical Engineering Research*, Houston, TX, 2004.
- » Patel, S.S., S.T.C. Chung and H.E. Bedell, "Motion-Induced Position Shifts are Limited by Conflicting Relative Position Information," *Annual Conference of the Vision Sciences Society*, Sarasota, FL, 2004.
- » Bedell, H.E., K. Nguyen and S.S. Patel, "The Relationship between Visual Frame-of-Reference Effects for Perceived Size and Speed," *Annual Conference of the Vision Sciences Society*, Sarasota, FL, 2004.
- » Sampat, P., S.S. Patel and H.E. Bedell, "The Effect of Simulated Spherical and Astigmatic Blur on Stereothresholds," *Annual Meeting of American Academy of Optometry*, Tampa, FL, 2004.

Professor & Associate Dean for Research

STEVEN S. PEI Email: spei@uh.edu



:: Education

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

:: Research Interests

Optoelectronic Materials and Devices, High Speed and High Band Width Electronic Devices, Growth of Epitaxial Materials

:: Professional Service (2004)

- » Board of Directors and Technical Program Committee, *SETS Conference*
- » Technical Program Committee and Session Chair, *ACAP Fuel Cell Workshop*
- » Technical Program Committee and Session Chair, *SPIE's International Symposium on Optoelectronics*
- » Scientific Advisory Board, Applied Optoelectronics Inc., Sugar Land, TX
- » Reviewer for *IEEE Transactions on Electron Devices, IEEE Journal of Quantum Electronics, Applied Physics Letters*
- » City of Houston Tower Commission

:: Journal Publications (2004)

- » Mu, Y.M. and S.S. Pei, "Effects of Anisotropic k·p Interactions on Energy Bands and Optical Properties of Type-II Interband Cascade Lasers," *J. Appl. Phys.*, Vol. 96, pp. 1866–1879, 2004.

:: Conference Proceedings and Presentations (2004)

- » Peng, P., Y.M. Mu and S.S. Pei, "Self-Consistent Calculation of Band Diagram and Carrier Distribution of Type-II Interband Cascade Lasers," *27th International Conference on the Physics of Semiconductors*, Flagstaff, AZ, July 26–30, 2004 and published in *Proceedings of the 27th International Conference on the Physics of Semiconductors*.
- » Zhu, Z., Y.M. Mu and S.S. Pei, "Loss Effect on 2D Photonic Crystal Band Structure," *SPIE's International Symposium on Optoelectronics, Proceedings of SPIE Vol. 5722, "Physics and Simulation of Optoelectronic Devices XIII"*.

:: Funded Research Programs (2004)

- » THECB-ATP, Integrated TE Microcooler and Mid-IR Laser for Chemical Sensing Applications
- » AFSOR-MURI Program, Phonon Enhancement of Electronic and Photonic Devices
- » National Institute of Justice, In-car Law Enforcement Technology
- » U.S. Air Force Research Laboratory/Sensor Directorate/DARPA SPO, Develop Free-space Optically Amplified Receivers for Ladars and Wireless Communications
- » DARPA/ARO—PWSSP Program, Compact Broad-band Wavelength-agile Mid-IR Semiconductor Spectroscopic Sensing



:: Education

Ph.D., University of Houston

:: Honors & Awards (2004)

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

:: Research Interests

Micro- and Nano-fabrication, Lithography, Solid-liquid Separation, Thin-film Deposition, Reactive Ion Etching, Stencil Mask Technology, Micro- and Ultra-filtration Membrane Technology, Modeling of Resist Exposure and Development Processes for Electron, Ion, and Atom Beam Lithography

:: Professional Service (2004)

- » Reviewer, *Journal of Vacuum Science and Technology*

:: Journal Publications (2004)

- » Racz, Z., J. He, S. Srinivasan, W. Zhao, A. Seabaugh, K. Han, P. Ruchhoeft, and J. Wolfe, "Nanofabrication Using Nanotranslated Stencil Masks and Lift Off," *J. Vac. Sci. Technol. B*, Vol. 22, No. 1, pp. 74–76, 2004.

:: Conference Proceedings and Presentations (2004)

- » Ruchhoeft, P., J.L. Torres and J.C. Wolfe, "Atom Beam Lithography: a New Printing Technology for the Sub-10 nm Domain," *International Conference on Nanoscale Devices and System Integration*, Miami, February 16–18, 2004.
- » Chen, R.L., J. Chen, K. Han, A. Ruiz, P. Ruchhoeft, and M. Morgan, "Frequency Selective Surfaces For Thermophotovoltaic Energy Conversion," *IEEE Antenna and Propagation Society Symposium*, Montorey, CA, June 2004.
- » Willson, R. and P. Ruchhoeft, "Biochemical Processes: Looking at New Signals," *Texas/UK Research Collaboration meeting*, George Bush Presidential Library, College Station, TX, October 25, 2004.
- » Bannerot, R., R. Kastor and P. Ruchhoeft, "One Semester Capstone Design Courses: Issues, Problems and Solutions," *Proceedings of the 2004 Annual Conference of the ASEE Gulf Southwest Section*, Texas Tech University, Lubbock, TX, March 10–12, 2004.

- » Ruchhoeft, P., G. Song, R. Bannerot, and R. Kastor, "Introducing Emerging Technology, into the Engineering Curriculum Through Capstone Projects," *Proceedings of the 2004 Annual Conference of the ASEE Gulf Southwest Section*, Texas Tech University, Lubbock, TX, March 10–12, 2004.
- » Terry, J., P. Ruchhoeft, R. Bannerot, and R. Kastor, "Integrating the Teaching of Technical Communication into a Multidisciplinary, Capstone Design Course," *Proceedings of the 2004 Annual Conference of the ASEE Gulf Southwest Section*, Texas Tech University, Lubbock, TX, March 10–12, 2004.
- » Terry, J., P. Ruchhoeft, R. Bannerot, and R. Kastor, "A Just-in-Time Model for Teaching Technical Communications and the Use of Grading Rubrics in a Multidisciplinary Capstone Design Course," *Proceedings of the 2004 ASEE Annual Conference and Exposition of the ASEE*, Salt Lake City, UT, June 20–23, 2004.
- » Ruchhoeft, P., R. Bannerot and R. Kastor, "Adapting the Studio Critique to Large Capstone Design Courses," *Proceedings of the 2004 ASEE Annual Conference and Exposition of the ASEE*, Salt Lake City, UT, June 20–23, 2004. (One of three papers nominated by the Design in Engineering Education Division, of the more than 75 accepted DEED papers, for best paper at the conference (1429 papers)).
- » Bannerot, R., R. Kastor, G. Song, and P. Ruchhoeft, "Introducing Emerging Technology into the Mechanical Engineering Curriculum," *Proceedings of the 2004 ASEE Annual Conference and Exposition of the ASEE*, Salt Lake City, UT, June 20–23, 2004.
- » Bannerot, R., R. Kastor, G. Song, P. Ruchhoeft, and J. Terry, "Experience with the One Semester, Interdisciplinary, Capstone Design Course at the University of Houston," *Printed proceedings of Integrating Practice into Engineering Education Conference and Posted on the Conference Website: <http://www.engin.umd.umich.edu/ceep/conference/>*, Dearborn, MI, October 3–5, 2004.

- » Bannerot, R., R. Kastor, G. Song, P. Ruchhoeft, and M. Beasley, "Multi-Disciplinary Design Projects in a Capstone Design Course," *Proceedings of the International Conference on Engineering Education 2004: Global Excellence in Engineering Education*, Gainesville, FL, October 16–21, 2004.
- » Bannerot, R., R. Kastor, P. Ruchhoeft, and J. Terry, "Challenges and Solutions in Developing a Three Department, Interdisciplinary, Capstone Design Course at the University of Houston," *Proceedings of the International Conference on Engineering Education 2004: Global Excellence in Engineering Education*, Gainesville, FL, October 16–21, 2004.

:: Funded Research Programs (2004)

- » Texas Higher Education Coordinating Board, Atom-beam Nanolithography for Manufacturing Large Areas of Highly Permeable Membrane Filters
- » National Science Foundation, NIRT: Nano-pantography
- » NASA (EDTEK, Inc.), Thermophotovoltaic Radioisotope Power Conversion Technology
- » Texas Higher Education Coordinating Board, Nanofabrication and Performance Evaluation of a New Class of Membrane Filters for Water Purification

Associate Professor

DAVID P. SHATTUCK Email: shattuck@uh.edu



:: Education

Ph.D., Duke University

:: Honors & Awards (2004)

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

:: Research Interests

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

:: Professional Service (2004)

- » Department of ECE Curriculum Committee
- » Department of ECE ABET Committee
- » College of Engineering ABET Steering Committee
- » College of Engineering Convocation Marshall
- » University of Houston Farfel Award Committee
- » University of Houston Academic Honesty Task Force
- » University of Houston Rhodes Scholarship Committee
- » University of Houston Teaching Excellence Award Committee

Assistant Professor

BHAVIN R. SHETH Email: brsheth@uh.edu



:: Education

Ph.D., Massachusetts Institute of Technology

:: Research Interests

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

:: Professional Service (2004)

» Reviewer for the Journals *Vision Research*, *Experimental Brain Research*, *Visual Cognition*

:: Journal Publications (2004)

- » Sheth, B.R. and S. Shimojo, "Sound Aided Recovery from and Persistence Against Filling-In," *Vision Research*, Vol. 44, pp. 1907–1917, 2004.
- » Kanai R., B.R. Sheth and S. Shimojo, "Stopping the Motion and Sleuthing the Flash-Lag Effect: Spatial Uncertainty is the Key to Perceptual Mislocalization," *Vision Research*, Vol. 44, pp. 2605–2619, 2004.
- » Sheth, B.R. and S. Shimojo, "Extrinsic Cues Suppress the Encoding of Intrinsic Cues," *Journal of Cognitive Neuroscience*, Vol. 16, pp. 339–350, 2004.

:: Conference Proceedings and Presentations (2004)

- » Sheth, B.R., J. Bhattacharya and D.J. Wu, "On the Neural Track of Eureka," *Annual Meeting of the Society for Neuroscience*, San Diego, CA, October 24–28, 2004.
- » Sheth, B.R. and D.J. Wu, "Adapting to Perceived Color," *Vision Sciences Society Meeting*, Sarasota, FL, May 4–8, 2004.



:: Education

Ph.D., University of Houston

:: Honors & Awards (2004)

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

:: Research Interests

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

:: Professional Service (2004)

» Reviewers of *Army Research Proposal* and Various Refereed Journals

:: Journal Publications (2004)

- » Dunn, A.C., L.S. Shieh and S.M. Guo, “Digital Redesign of Analog Smith Predictor for Systems with Input Time-Delays,” *ISA Transactions*, Vol. 43, No. 1, pp. 33–47, January 2004.
- » Lin, J.Y., J.S.H. Tsai, L.S. Shieh, and S.M. Guo, “A New Conditioning Dual-Rate Observer-Based Tracker for Hybrid Chaotic Systems with Saturating Actuators,” *International Journal of Systems Science*, Vol. 35, No. 1, pp. 25–47, January 2004.
- » Wang, H.P., J.S.H. Tsai, Y.I. Yi, and L.S. Shieh, “Lifted Digital Redesign of Observer-Based Tracker for Sample-Data System,” *International Journal of Systems Science*, Vol. 35, No. 4, pp. 255–271, April 2004.
- » Lu, Z., L.S. Shieh and J. Chandra, “Tracking Control of Nonlinear Systems: A Sliding Mode Design via Chaotic Optimization,” *International Journal of Bifurcation and Chaos*, Vol. 14, No. 4, pp. 1343–1355, April 2004.

- » Wang, H.P., J.S.H. Tsai, Y.I. Yi, and L.S. Shieh, “Lifted Digital Redesign of Prediction-Based Digital Controller for Hybrid Chaotic System,” *International Journal of Bifurcation and Chaos*, Vol. 14, No. 7, pp. 2295–2320, July 2004.
- » Barajas-Ramirez, J.G., G. Chen and L.S. Shieh, “Fuzzy Chaos Synchronization via Sampled Driving Signals,” *International Journal of Bifurcation and Chaos*, Vol. 14, No. 8, pp. 2721–2733, August 2004.
- » Lu, Z., L.S. Shieh, G. Chen, and N.P. Coleman, “Simplex Sliding Mode Control for Nonlinear Uncertain Systems via Chao Optimization,” *Chaos, Solitons & Fractals*, Vol. 23, No. 3, pp. 747–755, 2004.
- » Chen, C.W., J.S.H. Tsai and L.S. Shieh, “Discretized Sub-optimal Tracker for Nonlinear Continuous Two-dimensional Systems,” *Asian Journal of Control*, Vol. 6, No. 3, pp. 317–340, September 2004.
- » Zhang, Y., L.S. Shieh and A.C. Dunn, “PID Controller Design for Disturbed Multivariable Systems,” *IEEE Proceedings, Control Theory and Applications*, Vol. 151, No. 5, pp. 567–576, September 2004.
- » Zhang, Y.P., L.S. Shieh, C.R. Liu, and S.M. Guo, “Digital PID Controller Design for Multivariable Analog Systems with Computational Input-Delay,” *IMA Journal of Mathematical Control & Information*, Vol. 21, No. 4, pp. 433–456, December 2004.
- » Zhang, Y.P., L.S. Shieh, C.M. Akujuobi, and A. Warsame, “Digital PID Controller Design for Delayed Multivariable Systems,” *Asian Journal of Control*, Vol. 6, No. 4, pp. 483–495, December 2004.

:: Conference Proceedings and Presentations (2004)

- » Malki, H., J. Canelon, L.S. Shieh, and S. Jacklin, “Neural Network-Based Frequency-domain Vibration Modeling for Black Hawk Helicopter,” *45th AIAA Structure and Structural Dynamics and Materials Conference*, Palm Springs, CA, April 20–23, 2004.
- » Malki, H., J. Canelon, L.S. Shieh, and S. Jacklin, “A Neural Network-Based Approach for Control of Vibration in a Blackhawk Helicopter,” *The World Automation Congress*, Seville, Spain, June 28–July 1, 2004.
- » Canelon J.I., H. Malki and L.S. Shieh, “A Neural Network-Based Approach for Control of Vibration in a Blackhawk Helicopter,” *14th International Symposium on Measurement and Control in Robotics*, NASA/JSC Houston, Texas, September 16–18, 2004.
- » Dunn, A.C., L.S. Shieh and J.S.H. Tsai, “Input Saturated Systems: A Digital Redesign Approach to Controller Synthesis for a Class of Nonlinear Systems,” *14th International Symposium on Measurement and Control in Robotics*, NASA/JSC Houston, Texas, September 16–18, 2004.

:: Funded Research Programs (2004)

- » Dept. of the Army, Army Research Office, Evolutionary Computation and Control of Hybrid Uncertain Systems
- » National Science Foundation, Graduate Research Fellowship Program
- » Texas Prairie View A & M University, Brushless DC Motor Direct Drive with DSP
- » NASA/Johnson Space Center, Development of an Adaptive Self-Tuning Global Positioning Filter for the NASA/JSC Navigation Systems and Technology Laboratory

Associate Professor

LEONARD TROMBETTA Email: ltrombetta@uh.edu



:: Education

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-SiO₂ Interface Defect Generation, and Radiation Damage; Electron Device Physics, particularly Ultra-small MOSFETs; Wide Bandgap Semiconductor Materials; Quantum Transport Modeling in Nano-sized Electron Devices

:: Professional Service (2004)

- » Proposal Review for US Civilian Research and Development Foundation (CRDF)
- » Journal Article Review for *J. Appl. Phys.*

:: Journal Publications (2004)

- » Zagozdzon-Wosik, W., C. Darne, D. Radhakrishnan, I. Rusakova, P. van der Heide, Z.-H. Zhang, J. Bennett, L. Trombetta, P. Majhi, and D. Matron, "Applications of Metallic Borides for Gate Electrodes in CMOS Integrated Circuits," *Reviews on Advanced Materials Science*, Vol. 8, pp. 34–40, 2004. (<http://www.ipme.ru/e-journals/RAMS/index.html>)
- » Mouffak, Z., A. Bensaoula and L. Trombetta, "The effects of nitrogen plasma on RIE-induced damage in GaN," *J. Appl. Phys.*, 95 (2), pp. 727–730, 2004.

:: Conference Proceedings and Presentations (2004)

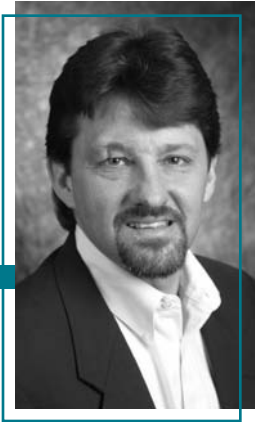
- » Zagozdzon-Wosik, W., D. Radhakrishnan, C. Darne, I. Rusakova, P. van der Heide, Z.-H. Zhang, J. Bennett, L. Trombetta, and P. Majhi, "Refractory Metal Borides Used for Gate Electrode Applications in CMOS Integrated Circuits," *European Mater. Res. Society Meeting*, Warsaw, Poland, September 6–10, 2004.

:: Funded Research Programs (2004)

- » UH GEAR Program, Reliability of Alternative Insulators for SiC MIS Electronics
- » Texas Higher Education Coordinating Board, Metal Gate Electrodes for High-K Dielectric Stacks

Professor

JEFFERY T. WILLIAMS Email: jwilliams@uh.edu



:: Education

Ph.D., University of Arizona

:: Research Interests

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

:: Professional Service (2004)

- » Chairman, *IEEE AP-S/URSI Symposium Session on Microstrip Antennas*, Monterey, CA, June 2004
- » Chairman, *IEEE AP-S/URSI Symposium Session on Frequency Independent Antennas*, Monterey, CA, June 2004
- » Chairman, IEEE Multi-Group (AP/MTT/MAG/ED/EMC) Chapter, Houston

:: Books and Articles in Books (2004)

- » Jackson, D.R., J.T. Williams and D.R. Wilton, "Antennas-II," Chapter 9 of *Handbook of Engineering Electromagnetics*, Rajeev Bansal, Editor, Marcel Decker, 2004.

:: Journal Publications (2004)

- » Kennedy, T.F., S.A. Long and J.T. Williams, "Modification of Properties of Long Monopole Antennas Using Dielectric and Magnetic Beads," *IEEE Antennas and Wireless Propagation Letters*, Vol. 3, pp. 165–168, May, 2004.
- » Zhao, T., D.R. Jackson, J.T. Williams, and A.A. Oliner, "Simple CAD Model for a Dielectric Leaky-Wave Antenna," *IEEE Antennas and Wireless Propagation Letters*, Vol. 3, pp. 243–245, Dec. 2004.

:: Conference Proceedings and Presentations (2004)

- » Kennedy, T.F., S.A. Long and J.T. Williams, "Dielectric Bead Loading for Control of Currents on Electrically Long Dipole Antennas," *Proceedings of the IEEE AP-S International Symposium*, pp. 4420–4423, Monterey, CA, June 2004.
- » Oliner, A.A., D.R. Jackson, T. Zhao, and J.T. Williams, "The Influence of the Open Stopband on the Beaming of Light at Broadside Through a Subwavelength Hole," *URSI Intl. Symp. on Electromagnetic Theory*, Pisa, Italy, May 24–27, 2004 (Proc., pp. 897–899).
- » Xu, X., D.R. Jackson, J.T. Williams, R.L. Chen, and L.I. Basilio, "A Stacked-Patch Reduced Surface Wave Antenna," *IEEE AP-S/URSI Intl. Symp.*, Monterey, CA, June 20–25, 2004 (AP-S Digest).
- » Basilio, L.I., J.T. Williams and D.R. Jackson, "The Effective Point of Radiation for a Microstrip Patch Antenna," *IEEE AP-S/URSI Intl. Symp.*, Monterey, CA, June 20–25, 2004 (URSI Abstract).
- » Jackson, D.R., A.A. Oliner, F. Mesa, and J.T. Williams, "High-Frequency Radiation and Leakage Effects on Planar Transmission Lines," *URSI Intl. Symp. on Electromagnetic Theory*, Pisa, Italy, May 24–27, 2004 (Proc., pp. 54–56).
- » Morrow, J.D. and J.T. Williams, "Analysis of Antennas for Ultra-Wideband Pulse Radiation," *Antennas and Propagation Society Symposium, 2004, IEEE*, Vol. 2, pp. 1760–1763, June 20–25, 2004.

:: Funded Research Programs (2004)

- » NASA, Development of RSW Antennas for the NASA/JSC NSTL
- » National Science Foundation, Control and Modification of Electric Currents on Existing Structures for Use as Effective Antennas in Wireless Communications Systems



:: Education

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

:: Research Interests

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

:: Professional Service (2004)

- » Department Post Tenure Review Committee
- » Chair, Raj Mittra Travel Grant Committee, IEEE Antennas and Propagation Society and U.S. URSI Commission B, 1995–present

:: Journal Publications (2004)

- » Fasnfest, B.J., F. Capolino, D.R. Wilton, D.R. Jackson, and N.J. Champagne, “A Fast MoM Solution for Large Arrays: Green’s function Interpolation with FFT,” *Antennas and Wireless Propagation Letters*, Vol. 3, No. 9, pp. 161–164, 2004.

:: Conference Proceedings and Presentations (2004)

- » Wilton, D.R., D.R. Jackson, W.A. Johnson, M.A. Khayat, and C. Lertsirimit, “Validation as a Process,” *URSI National Radio Science Conference*, Boulder, CO, January 5–8, 2004 (Abstracts, p. 63).
- » Capolino, F., D.R. Jackson, D.R. Wilton, and B. Fasnfest, “The Green’s Function Method to Analyze Scatterers Near EBG materials,” *27th ESA Antenna Workshop on Innovative Periodic Antennas*, Santiago, Spain, March 2004.
- » Capolino, F., D.R. Jackson and D.R. Wilton, “Power Leakage in Two-Dimensional EBG Waveguides,” *Progress in Electromagnetic Research Symp.*, Pisa, Italy, March 2004.
- » Capolino, F., D.R. Jackson and D.R. Wilton, “Numerical Evaluation of Spectral Integral Representations for the Field Excited by a Line Source in 2D EBG Materials,” *Progress in Electromagnetic Research Symp.*, Pisa, Italy, March 2004.
- » Fasnfest, B.J., F. Capolino, D.R. Wilton, D.R. Jackson, and N. Champagne, “MoM Solutions for Large Planar Arrays of Three-Dimensional Elements: a Faster AIM Method,” *URSI Intl. Symp. on Electromagnetic Theory*, Pisa, Italy, May 24–27, 2004 (Proc., pp. 144–146).

- » Capolino, F., D.R. Jackson and D.R. Wilton, “The Nature of the Field Excited by a Source over a Half-Space of 2D EBG Material Made of Impedance Layers,” *URSI Intl. Symp. on Electromagnetic Theory*, Pisa, Italy, May 24–27, 2004 (Proc., pp. 197–199).
- » Lertsirimit, C., D.R. Jackson and D.R. Wilton, “EMI Coupling to a Device on a Printed Circuit Board Inside a Cavity From a Wire Penetrating an Aperture,” *URSI Intl. Symp. on Electromagnetic Theory*, Pisa, Italy, May 24–27, 2004 (Proc., pp. 816–818).
- » Wilton, D.R. and M.A. Khayat, “Evaluation of Singular and Hypersingular Integrals for 2D Geometries Using a Singularity Cancellation Technique,” *2004 URSI Intl. Symp. on EM Theory*, Pisa, Italy, May 2004 (Proc., p. 828–830).
- » Capolino, F., D.R. Jackson, D.R. Wilton, and L.B. Felsen, “Source-Excited Field Representations for 2D EBG Materials,” *Symp. on Fields, Networks and Computations: A Modern View of Engineering Electrodynamics*, Munich, Germany, June 1–2, 2004.
- » Graglia, R.D., G. Lombardi and D.R. Wilton, “Singular Higher Order Models of Surface Integral Problems,” *USNC/URSI Radio Science Meeting*, Monterey, CA, June 2004 (URSI Abstracts, p. 281).
- » Fasnfest, B.J. and D.R. Wilton, “Preconditioned MoM Solutions for Complex Planar Arrays,” *IEEE Antennas and Propagation Society Intl. Symp.*, Monterey, CA, June 2004 (Digest, p. 543).
- » Wilton, D.R. and M.A. Khayat, “Electromagnetic Scattering by Thin Dielectric Sheets Using Integral Equation Techniques,” *IEEE Antennas and Propagation Society Intl. Symp.*, Monterey, CA, June 2004 (Digest, p. 3879).
- » Lertsirimit, C., D.R. Jackson, D.R. Wilton, D. Erricolo, and D.H.Y. Yang, “EMC Coupling to a Circuit Board from a Wire Penetrating a Cavity Aperture,” *IEEE AP-S/URSI Intl. Symp.*, Monterey, CA, June 20–25, 2004 (AP-S Digest).

- » Capolino, F., D.R. Jackson and D.R. Wilton, “Fundamental Properties of Source-Excited Field at the Interface of a 2D EBG Material,” *IEEE AP-S/URSI Intl. Symp.*, Monterey, CA, June 20–25, 2004 (AP-S Digest).
- » Fasnfest, B.J., F. Capolino, D.R. Wilton, D.R. Jackson, and N. Champagne, “A Fast MoM Solver for Large Arrays of Printed Antennas: a Preconditioned GIFFT (Green’s Function Interpolation and FFT),” *XV RiNEm*, Cagliari, Italy, September 13–16, 2004.
- » Donzelli, G., F. Capolino, D.R. Jackson, and D.R. Wilton, “Efficient Numerical Evaluation of the Field Excited by a Line Source on Top of a Slab of 2D EBG Material,” *XV RiNEm*, Cagliari, Italy, September 13–16, 2004.
- » Fasnfest, B.J., F. Capolino, D.R. Wilton, D.R. Jackson, and N. Champagne, “A Fast MoM Solver for Large Arrays of Printed Antennas: a Preconditioned GIFFT (Green’s Function Interpolation and FFT),” *JINA 2004 (Journé Internationale de Nice sur les Antennes)*, Nice, France, November 8–10, 2004.

:: Funded Research Programs (2004)

- » U.S. Air Force MURI, Electromagnetic Effects of Radio-Frequency Pulses on Electronic Circuits and Systems
- » Sandia National Laboratories, Reconfigurable Antenna Systems for Next-Generation Wireless Communications
- » Texas Higher Education Coordinating Board, Reconfigurable Antenna Systems for Next-Generation Wireless Communications

Professor

JOHN C. WOLFE Email: wolfe@uh.edu



:: Education

Ph.D., University of Rochester

:: Honors & Awards (2004)

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

:: Research Interests

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

:: Professional Service (2004)

- » Reviewer, *Journal of the American Vacuum Society*
- » Member of the Advisory Committee, *International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication*

:: Journal Publications (2004)

- » Wolfe, J.C., D. Litvinov and E.B. Svedberg et al, "Ion Implantation of Magnetic Thin Films and Nanostructures," *Journal of Magnetism and Magnetic Materials*, Vol. 283, pp. 128–132, 2004.

:: Conference Proceedings and Presentations (2004)

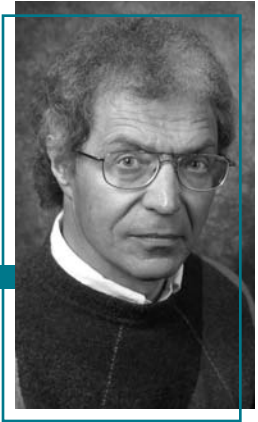
- » Wolfe, J.C., P. Ruchhoeft, J.L. Torres, and J.C. Wolfe, "Atom Beam Lithography: a New Printing Technology for the Sub-10 nm Domain," *International Conference on Nanoscale Devices and System Integration*, Miami, February 16–18, 2004 (Invited).

:: Funded Research Programs (2004)

- » National Security Agency, Development of High Voltage, Focused Ion Beam Implantation Technology for MOS-integrated Circuits on Spherical Substrates
- » Texas ATP, Surface Wave Plasmas for Next-Generation Integrated Circuit Manufacturing
- » NSF, NIRT: Nanomanufacturing Strategy and System Design for Nanoscale Patterned Magnetic Recording Medium
- » NASA, Thermophotovoltaic Radioisotope Power Conversion Technology

Research Professor

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:: Education

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 Bio-Medical Research and Clinical Applications, High Frequency Bio-sensors and Dielectric Spectroscopy, High Temperature Superconducting Resonators

:: Professional Service (2004)

- » Member of the Organizing Committee, *Applied Superconductivity Conference* (Jacksonville, Florida), 2004
- » One of Technical Editors, *Applied Superconductivity Conference (IEEE Tr. on Applied Superconductivity)*, 2004
- » Reviewer for *Physical Review B*; *Physical Review Letters*; *IEEE Transactions on Applied Superconductivity*; *Applied Physics Letters*; *Measurement Science and Technology*

:: Conference Proceedings and Presentations (2004)

- » Wosik, J., M. Kamel, L. Xue, L.-M. Xie, and J. Bankson, "HTS Array for Parallel Imaging," *Proceeding of Second Workshop on MRI Parallel Imaging*, Zurich, Switzerland, October 15–17, 2004.
- » Wosik, J., "Single and Multiple Cryogenic Coils for MRI Applications; Perspectives and Recent Developments," *Seventh Symposium on HTS in High Frequency Fields*, Barcelona, Spain, May 25–29, 2004.

- » Wosik, J., K. Nesteruk, L.-M Xie, J.A. Bankson, M. Kamel, and J.D. Hazle, "Superconducting Phased Array," *Proceedings of the 12th Annual Meeting of the International Society for Magnetic Resonance in Medicine*, Kyoto, Japan, May 15–19, 2004.
- » Xue, L., L.-M. Xie, M. Kamel, and J. Wosik, "SNR Gain Dependence on Coil Parameters," *Proc. of the 12th Annual Meeting of the International Society for Magnetic Resonance in Medicine*, Kyoto, Japan, May 15–19, 2004.

:: Funded Research Programs (2004)

- » NIH, MRI of Spine Injury
- » TCSAM, Superconducting Phased Arrays for MRI Clinical Applications
- » TCSAM, High Frequency Biosensors; Dielectric Response of Bacterial Spores and Live Cells
- » DARPA, Dielectric Spectroscopy for the Detection of Biological and Chemical Warfare Agents
- » ISSO, High Frequency Dielectric and Magnetic Susceptibility Measurements of Martian Soil Simulants
- » NASA-ISSO Postdoctoral Aerospace Fellowship Program, Martian Soil Biosensors Based on Dielectric Spectroscopy

Associate Professor

WANDA ZAGOZDZON-WOSIK Email: wwosik@uh.edu



:: Education

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

:: Research Interests

Novel Materials for Nano-scale Integrated Circuits; Silicon Processing including VLSI Process Integration and Process/Device Simulation; Microelectromechanical Systems (MEMS) for Applications in Harsh Environment/High Temperature and Biomedical Sensors; Design and Fabrication of GaN Devices

:: Professional Service (2004)

- » Member of IEEE and Electrochemical Society
- » Reviewer, *IEEE Transactions on Electron Devices Letters*
- » Member of the Board of Electrochemical Society, South Texas Section, 2002–2003 Treasurer, 2001–2002 Secretary
- » Member of Process/Technology Subcommittee, Session Chair in IEEE Bipolar/BiCMOS Circuit and Technology Meetings, 1995–1999
- » Member of the Technical Program Subcommittee, Rapid Thermal Processing Symposium in European Material Research Society, 1998
- » Member of the Program Committee, International Rapid Thermal Processing Conference, 1994–1997

:: Journal Publications (2004)

- » Zagodzdon-Wosik, W., C. Darne, D. Radhakrishnan, I. Rusakova, P. van der Heide, Z.-H. Zhang, J. Bennett, L. Trombetta, P. Majhi, and D. Matron, “Applications of Metallic Borides for Gate Electrodes in CMOS Integrated Circuits,” *Reviews on Advanced Material Science*, Vol. 8, No. 2, pp. 185–194, 2004.
- » Ranjit, R., W. Zagodzdon-Wosik, I. Rusakova, P. van der Heide, Z.-H. Zhang, J. Bennett, and D. Marton, “Formation of Contacts and Integration with Shallow Junctions Using Diborides of Ti, Zr and Hf,” *Reviews on Advanced Material Science*, Vol. 8, No. 2, pp. 176–184, 2004.

:: Conference Proceedings and Presentations (2004)

- » Zagodzdon-Wosik, W., D. Radhakrishnan, C. Darne, I. Rusakova, P. van der Heide, Z.-H. Zhang, H., J. Bennett, L. Trombetta, and P. Majhi, “Refractory Metallic Borides Used for Gate Electrode Applications in CMOS Integrated Circuits,” *European Material Research Soc. Fall Mtg.*, Warsaw, Poland, Abstract p. 284, September 6–10, 2004.
- » Ranjit, R., W. Zagodzdon-Wosik, I. Rusakova, P. van der Heide, Z.-H. Zhang, and J. Bennett, “Formation of Contacts and Ultra Shallow Junctions Using Diborides of Ti, Zr and Hf,” *European Material Research Soc. Fall Mtg.*, Warsaw, Poland, Abstract p. 285, September 6–10, 2004.
- » Zagodzdon-Wosik, W., C. Darne, I. Rusakova, P. van der Heide, Z.-H. Zhang, J. Bennett, and D. Marton, “Application of Ti-, Zr- and Hf-Diborides for Fabrication of Metal Gates in MOS Transistors,” *The Electrochem. Soc. Texas Sec. Mtg.*, 23 November 2004.

Funded Research Programs

PRINCIPAL INVESTIGATOR	AGENCY	TIME PERIOD	AMOUNT AWARDED	RESEARCH TITLE
R.J. Barton	University of Houston—GEAR	2004–2005	\$ 28,471	Performance Capabilities for Ultrawideband Wireless Communication Systems
J. Chen	Texas Higher Education Coordinating Board	2002–2004	\$ 150,000	Parallel Interconnects Modeling Engine for Wireless SOC
J. Chen	National Science Foundation	2004–2006	\$ 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
J. Chen	Sun Microsystems (Equipment Grant)	2004	\$ 130,000	Acquisition for a Sun V-880 Server
F. Claydon	National Science Foundation	Oct. 2003–Sept. 2006	\$ 435,530	RET Site: Research Experiences for Greater Houston High School Science and Math Teachers
F. Claydon	National Science Foundation	Mar. 2003–Feb. 2006	\$ 320,236	Research Experiences for Undergraduates in Electrical and Computer Engineering
F. Claydon; Co-investigators: B. Barr, S. Long, D. Shattuck	Texas Technology Workforce Development Grant Program, Texas Higher Education Coordinating Board	May 2002–Mar. 2007	\$ 604,450	Undergraduate Recruiting & Retention of ECE Students at the University of Houston
F. Claydon; Co-investigators: B. Barr, S. Long, D. Shattuck, J. Glover	Texas Technology Workforce Development Grant Program, Texas Higher Education Coordinating Board	Sept. 2004–Aug. 2006	\$ 331,449	Undergraduate Recruiting & Retention of ECE Students at the University of Houston
F. Claydon, S. Long	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
J. Glover	NIH	9/15/2001–7/31/2005	\$ 600,000	Epileptic Seizures in the Neonatal EEG
T.J. Hebert	NSF—Center for Adaptive Optics	Nov. 2003–Oct. 2004	\$ 42,200	Adaptive Optics with Adaptive Signal Processing: Hardware and Software
T.J. Hebert	NIH-NEI Biomedical Research Partnership Sub-award	Mar. 2003–Feb. 2004	\$ 58,900	2nd Generation Adaptive Optics Scanning Laser Ophthalmoscope
T.J. Hebert	University of Houston, FDIP-A	Sept. 2003–Aug. 2004	\$ 4,000	Audio/video Compression for Interactive Exercises in Engineering
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	06/01/03–05/31/04	\$ 24,551	Elastography: Clinical and Basic Science
B.H. Jansen	University of Texas Medical School at Houston	06/01/04–05/31/05	\$ 71,029	Elastography: Clinical and Basic Science

PRINCIPAL INVESTIGATOR	AGENCY	TIME PERIOD	AMOUNT AWARDED	RESEARCH TITLE
B.H. Jansen	University of Texas Medical School at Houston	08/01/04–03/31/05	\$ 10,554	Magnetic Resonance of Spinal Cord Injury
B.H. Jansen	NIH/MH and Yale University	5/1/2002–4/3/2006	\$ 400,000	Phase Resetting and Sensory Inhibition in the CNS
B.H. Jansen	University of Houston Grant to Enhance and Advance Research	9/1/2003–8/31/2004	\$ 16,200	The Mental Prosthesis
N.B. Karayiannis	National Institutes of Health	2002–2005	\$ 602,775	Video Technologies for Neonatal Seizures
H.Q. Le, S.S. Pei	Air Force Research Laboratory/Sensor Directorate	2002–2004	\$ 299,718	Optical Preamplifiers for Receivers in Multifunction Electro-Optical System
H.Q. Le, S.S. Pei	Defense Advance Research Project Agency/Army	2000–2004	\$ 1,741,000	Compact Broadband Wavelength Agile Mid-infrared Semiconductor Lasers for Spectroscopic Sensing
D. Litvinov (PI), R. Lee, D. Weller, C.G. Willson, J. 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. Wolfe	Information Storage Industry Consortium	2004–2005	\$ 30,000	Materials for Patterned Magnetic Recording Medium
D. Litvinov (PI), A. Bensaoula	Texas Center for Superconductivity	2004–2005	\$ 40,000	Development of a Cold-cathode Electron-emitter Based Hybrid Magnetic Recording Head Designed for Heat-assisted Magnetic Recording
C. Liu	Texas Higher Education Coordinating Board	2001–2004	\$ 99,733	Development of a Non-contact Sensor for Measurement of Highway Pavement Skid Number
C. Liu	12 Oil and Service Companies	2004–2005	\$ 250,000	Well Logging Projects
C. Liu	API Calibration System	2004–2005	\$ 16,000	Nuclear Logging Calibration Projects
C. Liu (PI), X. Chen	Texas Department of Transportation	2002–2004	\$ 221,400	Development of Laser Skid Systems
C. Liu (PI), X. Chen	Texas Department of Transportation	2003–2004	\$ 112,000	A Method of Determining the Thickness and Uniformity of Application for Thermoplastic Pavement Markings
C. Liu (PI), X. Chen	Texas Department of Transportation	2003–2004	\$ 30,000	Non-contact Skid System
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2003–2004	\$ 111,000	Investigation of FCC Compliant GPR Systems

PRINCIPAL INVESTIGATOR	AGENCY	TIME PERIOD	AMOUNT AWARDED	RESEARCH TITLE
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2002–2004	\$ 160,000	Remote Monitoring Moisture Content in Waco and Bryan Districts
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2002–2003	\$ 70,000	Laser Pavement Profiler and Other Instruments
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2002–2004	\$ 130,000	Pilot Implementation of Concrete Thickness Measurement GPR
C. Liu (PI), X. Chen, J. Li	Texas Department of Transportation	2003–2004	\$ 50,000	Laser Texture Measurement Device
S.A. Long, J.T. Williams	National Science Foundation	2002–2005	\$ 300,000	Control and Modification of Electric Currents on Existing Structures for Use as Effective Antennas in Wireless Communications Systems
S.A. Long, D.P. Shattuck	Texas Advanced Research Program	2002–2003	\$ 160,000	Dielectric Resonator Antenna Applications in Wireless Communications
S.A. Long, A. Foster, E. Chiappetta	Texas Higher Education Coordinating Board	2004	\$ 300,000	Infinity and Beyond: Integrated Physics and Chemistry Professional Development Project for High School Teachers
H. Ogmen, H.E. Bedell	National Institute of Mental Health	2000–2005	\$ 762,500	Neural Correlates of Moving Boundary Perception
H. Ogmen, B.G. Breitmeyer	National Science Foundation	2001–2004	\$ 236,648	Temporal Dynamics of Unconscious and Conscious Perception in Visual Processing
D.M. Pai	Johnson Space Center—NASA	Aug. 2005	\$ 16,000	Photonic Distribution of Microwave Reference Phase Signals
S.S. Pei	THECB-ATP	2001–2004	\$ 237,320	Integrated TE Microcooler and Mid-IR Laser for Chemical Sensing Applications
S.S. Pei	National Institute of Justice	2003–2005	\$ 1,987,000	In-car Law Enforcement Technology
S.S. Pei, H.Q. Le	AFOSR-MURI	2000–2005	\$ 828,417	Phonon Enhancement of Electronic and Photonic Devices
P. Ruchhoeft, J. Chen	NASA (by way of EDTEK, Inc.)	2003–2006	\$ 958,740	Thermophotovoltaic Radioisotope Power Conversion Technology
P. Ruchhoeft, V. Donnelly, D. Economou	National Science Foundation	2003–2007	\$ 1,000,000	NIRT: Nano-pantography
P. Ruchhoeft, S. Chellam	Texas Higher Education Coordinating Board	2004–2005	\$ 170,000	Atom-beam Nanolithography for Manufacturing Large-areas of Highly Permeable Membrane Filters
P. Ruchhoeft, S. Chellam	Texas Higher Education Coordinating Board	2002–2004	\$ 175,600	Nanofabrication and Performance Evaluation of a New Class of Membrane Filters for Water Purification

PRINCIPAL INVESTIGATOR	AGENCY	TIME PERIOD	AMOUNT AWARDED	RESEARCH TITLE
L.S. Shieh	Dept. of the Army, Army Research Office	2002–2005	\$ 250,000	Evolutionary Computation and Control of Hybrid Uncertain Systems
L.S. Shieh	National Science Foundation	2002–2007	\$ 32,000	Graduate Research Fellowship Program
L.S. Shieh	Texas Prairie View A&M University	2003–2004	\$ 5,000	Brushless DC Motor Direct Drive with DSP
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. Trombetta	UH GEAR Program	Sept. 2003–Aug. 2004	\$ 16,879	Reliability of Alternative Insulators for SiC MIS Electronics
L. Trombetta, R. Wallace (UNT)	Texas Higher Education Coordinating Board	Jan. 2002–Aug. 2004	\$ 228,000	Metal Gate Electrodes for High-K Dielectric Stacks
J.T. Williams	NASA	2001–2004	\$ 222,200	Development of RSW Antennas for the NASA/JSC NSTL
D.R. Wilton, D.R. Jackson	Sandia National Laboratories	2004	\$ 39,928	Studies in Modeling Finite and Infinite Periodic Structures
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, E.J. Charlson	National Security Agency	2000–2004	\$ 712,172	Development of High Voltage, Focused Ion Beam Implantation Technology for MOS-integrated Circuits on Spherical Substrates
J.S. Wolfe, M. Gorman	Texas Higher Education Coordinating Board	2002–2004	\$ 300,000	Surface Wave Plasmas for Next-Generation Integrated Circuit Manufacturing
J. Wosik	NIH	3/15/02–3/31/05	\$ 116,700	MRI of Spine Injury
J. Wosik	TCSAM	9/1/03–8/31/04	\$ 154,096	Superconducting Phased Arrays for MRI Clinical Applications
J. Wosik	TCSAM	9/1/04–8/31/05	\$ 144,400	High Frequency Biosensors; Dielectric Response of Bacterial Spores and Live Cells
J. Wosik, J. Miller	DARPA	11/1/03–10/31/05	\$ 250,000	Dielectric Spectroscopy for the Detection of Biological and Chemical Warfare Agents
J. Wosik, J. Miller	ISSO	5/1/04–8/31/04	\$ 8,250	High Frequency Dielectric and Magnetic Susceptibility Measurements of Martian Soil Simulants
J. Wosik, J. Miller	NASA-ISSO Postdoctoral Aerospace Fellowship Program	9/1/04–8/31/07	\$ 60,000	Martian Soil Biosensors Based on Dielectric Spectroscopy

Le, H. “Harry”, “Configurable Networks”

Advisor: R.J. Barton

The network switch is a key component of a parallel computer system. The performance of the system depends on the performance of the switch under different applications. Configurable networks offer the flexibility of reconfiguring the network to provide the optimal cost required by the application. Configurable networks can out-perform fixed configured networks by doing the configuration either dynamically or statically. We proposed two new approaches in this dissertation. In the first approach, our contribution is that through simulation, we created a reference library of parameter settings that will provide the best results in terms of latency or throughput for each type of traffic load. Given a workload, using this reference table, we can pre-configure a network to obtain a near optimal performance. Another new contribution we will discuss involves using what we call ‘emergent’ reconfigurable behavior circuits that can dynamically shift resources among channels. This same hardware architecture can also be used to implement virtual output queues in a much simpler way than the DAMQ buffer approach [13]. Moreover, it provides more resource sharing than the DAMQ approach. In the DAMQ implementation, buffer space is shared between output queues inside only one input buffer whereas in our approach, the buffer space can be shared among the output queues inside an input buffer as well as with other input buffers.

Peng, Chuan, “Tunable Semiconductor Lasers”

Advisor: H.Q. Le

Mid-infrared semiconductor lasers have important applications in spectroscopy, industrial process control, bio-medical diagnostics, environmental monitoring, remote sensing, and defense. All of these applications demand a compact, reliable, and efficient mid-infrared laser source. The external cavity tunable quantum cascade laser is among the most advanced tunable laser technologies developed recently. However, an impediment to its commercial application is that the existing sources do not meet the requirements due to their narrow tuning range, non-continuous tuning, low temperature operation, limited power, high mechanical complexity, high price, and large size. The objective of this dissertation is to investigate the tuning behavior. The results here suggest a more complex process involving fine phase control combined with coarse grating tuning for spectroscopic applications. Solving these specific problems can lead to high performance tunable mid-IR lasers.

Two factors are identified in this work as limiting the performance of the tunable mid-infrared lasers. These two factors are high intra-cavity residue reflection, which results in Fabry-Perot mode hopping, and the inaccurate grating rotating pivot point selection, which results in longitudinal mode hopping. These problems will contribute to tuning spectra discontinuity.

In this work, the experimental methods used to test the tunable mid-IR lasers are detailed, and the experiments that relate to the determination

of the critical performance-limiting factors are emphasized. In order to improve the operation of these devices, methods including low temperature anti-reflectance coating, thermoelectric stabilized temperature controlled package, as well as the on-chip fine phase control segment are detailed. New tunable lasers incorporating these changes are discussed, and the performance improvement of these devices is demonstrated experimentally.

The coupled cavity model was developed for data analysis and laser design. It was based on the S-matrix method. The model can calculate the cavity mode loss envelop, longitudinal modes inside the cavity, and the laser tuning dynamics. The results from the model were compared extensively with experiments and good agreement was obtained. Finally, some ideas for future work including the demonstration of a prototype high power mid-IR tunable laser system are presented.

Zhang, HuanLin, “Mid-Infrared Bragg Grating Photonic Devices: Tunable Lasers and Optical Pre-Amplifiers”

Advisor: H.Q. Le

Mid-infrared (mid-IR) photonics such as lasers, optical amplifiers, and detectors have important applications in spectroscopic sensing, bio-medical diagnostics, environmental monitoring, and defense. Spectroscopic sensing requires lasers with broad wavelength tunability and narrow linewidth. Remote sensing often involves weak signals that can benefit from optical preamplifiers for high-sensitivity receiver. The objective of this dissertation is to develop wavelength-tunable mid-IR lasers and optical pre-amplifiers using Bragg gratings. Bragg grating is a key photonic technology for wavelength control, optical mode coupling, and beam shaping. Specifically in this work, advanced surface-emitting Bragg grating is applied to develop novel mid-IR tunable lasers and optical preamplifiers.

Bragg-grating device development includes design, fabrication, and experimentation. For grating fabrication, a holographic setup using an Ar⁺-laser and based on Lloyds mirror configuration has been built for patterning. Several grating transfer techniques have been investigated.

Two tunable laser approaches have been developed. The first approach employs an external in-band AlGaAs/GaAs Bragg-grating waveguide that is coupled with a quantum cascade laser. This configuration allows wavelength control via the Bragg grating that is separate from the gain segment and impervious to the latter’s wide operation temperature variation. Stable wavelength operation at ~5.13 μm with ~20-nm tuning range was achieved. The second approach uses an integrated off-band surface-emitting Bragg grating, which has negligible reflection inside the cavity and allows free-space coupling to an external mirror to form a linear cavity. Wavelength control was achieved with a combination of coarse and broad wavelength tuning (140 nm) with the external mirror, and continuous, fine wavelength tuning (1.85 nm) via current-induced phase shift in the Bragg grating. An essential and novel feature is the

separate electrical controls of the two segments, which allows wavelength fine-tuning without power variation and vice versa.

The off-band surface-emitting Bragg grating was also used to develop mid-IR optical pre-amplifiers that are capable of integrated ASE-filtering and wavelength-division-multiplexing. A device has been developed on a 4.7- μm quantum cascade laser wafer with a net optical gain of >13 dB, and an ASE-filtered noise-power spectral density of -99 dBm/Hz^{1/2}. In summary, mid-IR photonics based on Bragg gratings are highly promising for many applications.

Han, Keping, “Fabrication of Micro-Filtration Membranes Using Ion Beam Aperture Array Lithography”

Advisor: P. Ruchhoeft

In this dissertation, we studied the fabrication of freestanding micro-filtration membrane filters using ion beam aperture array lithography (AAL). The work involved the development of an in-house stencil mask fabrication process, where both silicon and silicon nitride membranes were explored, the fabrication of free-standing polyimide filtration membranes, the measurement of the statistical pore-size distribution for the manufacturing process, and the experimental measurement of water permeability for membranes with varying pore densities.

In the AAL manufacturing process, a stencil mask, containing a periodic array of circular openings (the aperture array), is irradiated by a broad beam of energetic (~50keV) helium ions. The ions are either stopped in the opaque region of the mask or pass through the openings to expose the resist on a substrate that is placed in close proximity and thus replicate the mask pattern. Each mask opening can be used to “write” an arbitrary pattern in a massively parallel fashion by either inclining the beam relative to the mask or by moving the substrate underneath the mask. By taking advantage of this flexibility, we were able to fabricate filters with 200 and 350nm diameter pores, 0.25cm² area and with a pore density that varied from 2.5x10⁷ to 4x10⁸ pores/cm². The filters had uniform, equally spaced pores without any pore overlap for any given pore size and pore density. The pores size varied less than $\pm 3.5\%$ of the nominal size for over one hundred samples. In addition, the standard deviation of the pore size was less than 7% of the mean for any given pore density. The permeability of clean water through these membranes was measured and was five times larger than the commercial membrane permeability with similar pore size and density.

Lili Zhong, “Simulation of Tri-Axial Induction Tools in Dipping Anisotropic Beds”

Advisors: L. Shen and R. Liu

At the end of the 1950s, the induction logging tool was invented to measure the conductivity of earth formations. Until recently, the basic

theory of induction well logging has not taken into account conductivity anisotropy in the geological formations. Also, the early basic theory of induction logging applies to cases in which the tool orientation and the bedding plane are perpendicular. However, in the oil industry deviated boreholes are widely drilled now, and anisotropy is often found in reservoirs. Therefore the issue of induction logging in deviated wells drilled in anisotropic formations becomes very important.

A set of simulation codes is developed in this dissertation to simulate induction tools in deviated wells drilled in anisotropic formations. The software is complete with user-friendly graphical interface and high-computation speed. The simulation code can be applied to a newly developed class of induction tools with transmitting and receiving coils oriented in three mutually perpendicular directions. The new tool is often referred to as the “tri-axial induction tool.” The axis of the tool may intercept a formation with a constant dip angle, a constant azimuthal angle and a constant orientation angle.

The theory of this new tri-axial induction tool is briefly discussed and summarized. Formulas for the electromagnetic fields generated by these three transmitting coils have been derived. The derivation uses the coefficient propagator method to facilitate computer coding under the assumption of a negligible borehole effect and no invasion. The structures of the new simulation code are designed elaborately to improve the efficiency of the simulation. The FORTRAN code has been integrated into the existing Wellog Simulator. Because the new induction tool has three transmitting and three receiving coils, a total of nine logs are to be obtained at each logging depth. Therefore, the software will compute nine distinctive logs at each logging depth and display the results on the computer screen and record them in an ASCII file. To improve the usefulness of this code, we developed an inversion scheme based on the Jacobian matrix method to obtain the apparent horizontal and vertical conductivities and the apparent dip angle at each logging depth.

Weishan Han, “3D Finite Element Simulation Method of Induction and MWD Tools”

Advisors: L. Shen and R. Liu

This dissertation focuses on the numerical simulation of induction and MWD logging tool responses in a complicated three-dimensional (3-D) environment. The work presented in this dissertation can be divided into three major parts:

1. As an endeavor to increase the calculating speed, an existing 3-D finite element code “Dracula” is parallelized using both MPI and OpenMP. Nine processors were used to conduct the calculation, which reduce the computing time for one logging point from about three hundred seconds to around one hundred seconds.
2. A new finite element method was developed to simulate the response of induction tools in 3-D formations. Magnetic potential fields are selected

instead of E fields to obtain more stable solutions. Meanwhile, the Coulomb gauge condition is used to eliminate the spurious solution. In practice, the nodal base is chosen, and the sparse linear system is solved by quasi-minimum residue (QMR) solver with simple Jacobian preconditioning. 1-D and 2-D cases are calculated and compared with existing software packages. Several 3-D cases are also studied using the new algorithm.

3. The new 3-D finite-element method is used to solve controlled-source electromagnetic (EM) measurement-while-drilling (MWD) problems in anisotropic electrically conducting media with multi-layers and invasion zones. The solution is based on a weak formulation of the governing Maxwell’s equations. The resulting sparse linear system is solved efficiently using a quasi-minimal residual method with simple Jacobian scaling as a preconditioner. The main aspect of this work includes derivation of the governing functions using edge-based bases and the implementation of a 3-D cylindrical mesh generator, which can separate the different layers and invasion zones into different tetrahedra. These new features made it possible to quantitatively interpret MWD-logs in complicated 3-D logging environments. Examples are given for 1-D, 2-D and 3-D problems in both isotropic and anisotropic formations, and comparisons of the results are made to validate the algorithm using existing software packages developed by the Well Logging Lab at the University of Houston in 1-D and 2-D cases.

The developed methods are general and can also be adapted for controlled-source EM modeling in mining, groundwater and other applications.

Shanjun Li, “Analysis of Complex Formation Using Computer Techniques”

Advisors: L. Shen and R. Liu

Three fracture models, the plane-fracture model, the matchstick-fracture model and the cubic-fracture model, have been studied. Formulas of equivalent conductivity tensors of these fracture models are presented. Using these equivalency principles and by means of 3-D finite element method (FEM), dual laterolog responses in various fracture models have been computed and studied. A new conceptual 3-D electrode-type logging tool is presented. The tool can present six investigation depths while detecting 12 azimuthal resistivities. So the tool can show, at each logging point, the formation resistivity for different radial depths at various azimuthal angles around the borehole. The simulated results show that the tool can be used to more reliably determine the 3-D formation resistivity distribution in deviated and horizontal wells than most well logging tools widely used around the world.

By solving the two-phase fluid flow equations and the convective-diffusive equation using the finite difference method (FDM) and by means of the Archie’s equation, the time-varying invasion profiles of formation water saturation, profiles of salinity distributions and profiles of formation resistivity are obtained. Using accurate computer codes for simulation of

induction and laterolog tools in two-dimensional formation, a series of time-lapse dual laterolog and dual induction logs are obtained.

Based on a successive forward modeling algorithm, a 2-D inversion method and a 3-D inversion method using induction logs are presented. Because the Jacobian matrix only needs to be computed once in the algorithm, the new inversion method is computationally more efficient than least square methods, such as the Marquardt-Levenberg method.

Based on the Marquardt method and the 2-D inversion algorithm mentioned above, a 2-D inversion software of array induction logs is developed. Meanwhile, a few efficiency enhancements to improve the calculation speed and to stabilize the solution are introduced.

Based on the Marquardt method, another 2-D inversion software of MWD data is developed. Based on the investigation characteristics in the radial direction and vertical direction of MWD tools, a few efficiency enhancements to improve the calculation speed and to stabilize the solution are introduced also.

Lu, Zhao, “Robust and Adaptive Control of Chaotic Systems via Computational Intelligence”

Advisor: L.S. Shieh

Chaos is a special feature of complex parametric nonlinear dynamical systems. It has the random-like behavior usually seen in stochastic systems although it is associated with deterministic dynamics. Chaos is at the edge of stability and therefore could easily lead systems to an unstable, performance-degraded, or even catastrophic situation. In such cases, chaos is considered as undesired and should be totally avoided or completely eliminated.

Given that most physical chaotic systems inherently contain unknown nonlinearities or uncertain parameters, this dissertation is concerned with the robust and adaptive control for uncertain and unknown chaotic systems. The methodology of computational intelligence is adopted to develop effective nonlinear control approaches for chaos control.

Sliding mode control is exploited for controlling chaotic systems with multi-input in presence of parametric uncertainties. The issues of synthesizing sliding manifolds and designing simplex control vectors are first formulated as global optimization problems, and then the chaos optimization is successfully applied in solving the optimization problems encountered.

In the face of unknown chaotic systems, neural networks are incorporated into the methodologies of Lyapunov control and feedback linearization in an adaptive way. Recurrent high-order neural network (RHONN) is used in modeling the unknown chaotic systems, and the proof for closed-loop stability of control systems is also presented.

Illustrative simulations with uncertain/unknown chaotic systems are also given to demonstrate the effectiveness of the proposed control methods.

Ph.D. Student Roster

Mohammad K. Ababneh, “Digital Redesign of Uncertain Nonlinear Control Systems”

Advisors: G.R. Chen and L.S. Shieh

Designing robust controllers for uncertain systems has been an active research topic in recent years. However, most of the research efforts have been concentrated on the design of continuous-time controllers for continuous-time systems or discrete-time controllers for discrete-time systems. In this thesis, the hybrid continuous-discrete case is considered, where a new and systematic method for designing discrete-time robust controllers for continuous-time uncertain nonlinear systems with structured uncertainties is presented. In the proposed methodology, the robust controller is designed in terms of the optimal linear model representation of the nominal system around each operating point of the system trajectory, while the uncertainties are decomposed such that the uncertain nonlinear system can be rewritten as a set of local linear models with disturbing inputs. Applying conventional robust control techniques, a continuous-time robust controller is first designed to eliminate the effects of the uncertainties in the underlying system. A robust H_∞ digital controller is then obtained as the result of a digital redesign of the pre-designed continuous-time robust controller using the state-matching technique. The proposed methodology is successfully applied to the case of hybrid observer-based controllers and the case of hybrid synchronization problems. An important aspect of this methodology is its robustness to fix uncertainties in the system such as the structured uncertainty. The performance and the effectiveness of the developed methodology is simulated and illustrated through numerous numerical examples of digital control of complex chaotic systems.

Canelon, Jose I., “A New Approach for Neural Control of Dynamic Systems”

Advisors: L.S. Shieh and N.B. Karayiannis

This dissertation focuses on the development of a new approach for the neural network-based control of both discrete-time and continuous-time nonlinear dynamic systems. This approach includes the identification of a neural network discrete-time model of the system, using discrete input-output data obtained at a fast sampling rate. Then, at every operating point of the system, an optimal local linear model is obtained from the neural network model. A local fast-rate linear digital controller is designed based on this optimal local linear model, by means of linear control design techniques. Therefore, the proposed approach does not rely on a physical principle model of the dynamic system, since the design of the controller is based on the neural network model identified from data. In addition, regardless of the nature of the nonlinear system to be controlled, a neural network model will always have the same structure. Hence, the optimal linear model is calculated with very small computational effort.

For discrete-time systems, the fast-rate controller is directly applied to the system at that particular operating point. For continuous-time systems, the design procedure includes two additional stages. First, the parameters of a linear continuous-time controller are determined from the fast-rate digital controller, by means of the newly proposed reverse-digital redesign method, which indirectly estimates an analog control law from a fast-rate digital control law without directly utilizing the analog models. Then, the analog controller is digitally implemented by means of a slow-rate digital controller, calculated based on digital redesign techniques. As a result, this digital implementation yields lower controller gains and allows more computation time to complete the whole design process.

The proposed approach showed good performance in the control of linear and nonlinear discrete-time systems and continuous-time chaotic systems. Additionally, a state-space digital PID design approach was successfully proposed for the control of nonlinear continuous-time multivariable systems. The proposed control approach was also successfully tested in the control of helicopter vibration, using a Black Hawk helicopter model identified from the data obtained in a wind tunnel test. In all the examples, the systems to be controlled were assumed unknown.

Ali, Warsame H., “Design and Digital Implementation of Proportional-Integral-Derivative Controller for Nonlinear Motors”

Advisor: L.S. Shieh

This dissertation presents the design and implementation of digital Proportional-Integral-Derivative (PID) controller for nonlinear motors. A new methodology is presented for the PID controller parameters to be systematically developed through system state-feedback and controller state-forward Linear Quadratic Regulator (LQR) approach, such that satisfactory performance with guaranteed closed-loop stability is achieved.

To deal with modeling error and input saturation in the developed approach, an Internal Modeling Controller (IMC) structure is utilized, such that robustness is improved. The disturbance rejection is achieved based on a multi-objective observer, in which observation error is purposely retained and utilized in load disturbance compensation. This makes disturbance rejection tuning independent of the adjustment for speed command tracking, and the disturbance compensation is an integrated part of the controller output, such that reducing the chance of input or state saturation. The digital implementation is obtained based on the above-developed controller, such that the resulting mixed-signal system performance will closely match that of the motor simulations.

The developed method is implemented using dSPACE DSP system interfaced with linear and nonlinear motors driven by switching power converter. The experimental result confirms its effectiveness.

STUDENT	FIELD	TENTATIVE TITLE	ADVISOR	EXP. COMP.
Huang, H. “Kyle”		“Time-Reversal Communication in Sensor Networks”	R.J. Barton	Aug. 2009
Joseph, Clement	Solid State		E.J. Charlson	2006
Kavian, Nasrollah	Solid State		E.J. Charlson	2006
Pillai, Rajeev	Solid State		E.J. Charlson	2007
Radhakrishnan, Gokul	Solid State		E.J. Charlson	2007
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
Hames, Kevin	Computer Engineering	“Fault Tolerant Circuit Designs for Radiation Hardened Circuits”	J. Chen	2007
Qiang, Rui	Computer Engineering	“Modeling of Nano-Meter FSS Structures”	J. Chen	2007
Zhou, Wei	Biomedical Signal Processing	“The Supervised Matching Pursuit Method (SMP) and Its Application in the Analysis of the Electroretinogram (ERG)”	J. Glover	Dec. 2005
Mitra, Joyeeta	Intelligent Systems	“A Multi-Stage Rule-Based System for the Detection of Epileptic Seizures in the Neonatal EEG”	J. Glover	May 2006
Chakravarthy, Ramya			J. Glover	
Gallardo, Victor	Video Processing	“Real-Time Processing of Video Data from an Adaptive Optics Retinal Imaging System”	T.J. Hebert	Aug. 2007
Nian, Yibo	Microelectronics	“Resistive Random Access Memory Development Using Perovskite Oxide Searchable Films”	A. Ignatiev	2006
Song, Yang	Microelectronics	“Ferroelectric Thin Film-Based Optical Microdetectors for the Restoration of Sight in Humans”	A. Ignatiev	2006
Dang, Lien			D.R. Jackson	
Langston, William	Applied Electromagnetics	“High-Frequency Fields Radiated by Pulses on Printed Circuit Transmission Lines”	D.R. Jackson and J.T. Williams	Dec. 2005
Weixin, Dong	Applied Electromagnetics	“The Effective Point of Radiation from Microstrip Antennas”	D.R. Jackson and J.T. Williams	Dec. 2007
Xu, Hao	Applied Electromagnetics	“Investigation of Compact Reduced Surface Wave Antennas”	D.R. Jackson, S.A. Long and J.T. Williams	Dec. 2005
Kanlioglu, Osman	Applied Electromagnetics	“Analysis and Design of Reduced Surface Wave Antennas”	D.R. Jackson, S.A. Long and J.T. Williams	Aug. 2006
Lertsirimit, Chatrpol	Applied Electromagnetics	“Electromagnetic Coupling to Printed Circuit Boards from Exterior Fields”	D.R. Jackson and D.R. Wilton	Aug. 2005
Miller, Vonda	Intelligent Systems	“Invariance in Spatio-Temporal Patterns”	B.H. Jansen	May 2004
Hu, L.	Neuro-Engineering	“Gating in Normal and Schizophrenia Populations”	B.H. Jansen	Dec. 2006
Kumar, Arun	Signal Processing	“Echography”	B.H. Jansen	May 2007
Hu, Bian	Neuro-Engineering		V.A. Kalatsky	2008
Righetti, Raffaella	Biomedical Imaging	“Poroelastography: Ultrasonic Estimation and Imaging of the Local Time-dependent Distribution of the Elastic and Permeability Properties of Poroelastic Media”	Co-advisors: B.H. Jansen and J. Ophir	May 2005
Tao, Guozhi	Medical Imaging	“Extraction of Temporal Motion Strength Signals from Video Recordings of Neonatal Seizures”	N.B. Karayiannis	Dec. 2005

STUDENT	FIELD	TENTATIVE TITLE	ADVISOR	EXP. COMP.
Xiong, Yaohua	Medical Imaging	"Extraction of Temporal Motor Activity Signals from Video Recordings of Neonatal Seizures"	N.B. Karayiannis	Dec. 2005
Jung, Il-Mo	Telecommunications	"Improving Video Streaming for Law Enforcement Applications"	N.B. Karayiannis	May 2008
Rui, Liu	Intelligent Systems	"Improving Video Acquisition for Law Enforcement Applications"	N.B. Karayiannis	May 2008
Mengoulis, Antonios	Biomedical Engineering	"Prediction of Epileptic Seizures Using Quantum Neural Networks"	N.B. Karayiannis	Dec. 2009
Wang, Yi	Optical Sensing	"Multi-Spectral Laser-Based Optical Sensing"	H. Le	May 2004
Wang, Yang	Optical Sensing and Lidars	"Optical Stand-Off Networked Sensor for 3-D Target Surveillance and Identification"	H. Le	May 2007
Chunsheng, E.	Nanomagnetics	"System Design for Patterned Magnetic Recording Medium"	D. Litvinov	2008
Parekh, Vishal	Nanomagnetics	"Process Development for Patterned Medium Fabrication,"	D. Litvinov	2008
Chen, Yuanhang	Subsurface Sensing	"High Speed Laser Profiler System"	R. Liu	Fall 2005
Sun, Wei	Subsurface Sensing	"Development of a Scanning Laser Surface Imaging Device"	R. Liu	Fall 2005
Sun, Yijie	Subsurface Sensing	"Advanced Ground Penetrating Radar and Signal Processing Methods"	R. Liu	Fall 2005
Guo, Lianhe	Subsurface Sensing	"Piezo and Microwave WIM Sensors"	R. Liu	Spring 2006
Xing, Huichun	Subsurface Sensing	"Imaging Subsurface Using GPR Data"	R. Liu	Fall 2006
Wu, Min	Subsurface Sensing	"Fast Image Processing Algorithms for CCD Image Processing"	R. Liu	Spring 2007
Wang, Ying	Subsurface Sensing	"High Speed, Real-Time and Sequential Sampling Methods Applied to GPR Systems"	R. Liu	Fall 2007
Zhang, Zhibing	Subsurface Sensing	"Non-Contact Distance Measurement Instruments"	R. Liu	Spring 2008
Tang, Yumei	Well Logging	"Parallel Computing of Well Logging Problems"	R. Liu	Fall 2007
Nasari, Hamid	Well Logging	"Relay Based Wireless Telemetry System for LWD Systems"	R. Liu	Fall 2008
Kao, Chien-Ping			R. Liu	
Xie, Jiabin			R. Liu	
Kennedy, Timothy	Applied Electromagnetics	"Modification of Current Distributions on Existing Conducting Structures"	S.A. Long and J.T. Williams	May 2006
Jian, Feng	Computational Bioengineering	"3-D Cellular Automata Models for Tissue Engineering and their 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	2005
Koc, Alpay	Neuro-Engineering	"Dynamics of Conscious and Unconscious Processing in Human Vision"	H. Ogmen	Aug. 2006
Aydin, Murat	Neuro-Engineering	"Grouping-Based Real-Time Feature Attribution in Human Vision"	H. Ogmen	Aug. 2007
Alissa, Yazan	Neuro-Engineering	"Task-Dependent Organization of Neural Assemblies"	H. Ogmen	Dec. 2007
Kafaligonul, Hulusi	Neuro-Engineering	"Real-Time Dynamics of Surface and Boundary Processes for Moving Objects in Human Vision"	H. Ogmen	May 2008

STUDENT	FIELD	TENTATIVE TITLE	ADVISOR	EXP. COMP.
Yilmaz, Ozgur	Neuro-Engineering	"The Role of Focal Attention in Dynamic Vision"	H. Ogmen	May 2008
Peng, Peng	Microelectronics	"Carrier Transport in Mid-infrared Type-II Quantum Cascade Lasers"	S.S. Pei	2005
Singh, Cynthia	Microelectronics	"Planar Long Wavelength Infrared Photodetector Based on Type-II Superlattices"	S.S. Pei	2005
Wang, Xue	Microelectronics	"Antimonide-Based Quantum Dots"	S.S. Pei	2005
Yu, Qingkai	Microelectronics	"Selective and Directional Growth of Single Wall Carbon Nanotubes"	S.S. Pei	2006
Ruiz, Ariel	Microelectronics	"Fabrication and Performance Evaluation of Lithographically-defined Ultrafiltration Membranes"	P. Ruchhoeft	2008
Madsen, J.M.	Control Systems	"Digital PID Control of Hybrid Multivariable Systems with Multiple Time Delays"	L.S. Shieh	2005
Provence, R.S.	Control Systems	"State-Space Self-Tuning Control of Nonlinear GPS"	L.S. Shieh	2005
Zhang, H.	Control Systems	"Anti Chaotic Systems"	Co-Advisor: L.S. Shieh (Advisor: G. Chen)	2005
Zhou, H.	Control Systems	"Digital PID Control of Nonlinear Uncertain Systems"	L.S. Shieh	2005
Moussighi, M.	Control Systems	"Digital Control of Hybrid Systems"	L.S. Shieh	2006
Cofie, P.	Control Systems	"Anti-Wind-Up Controller Design"	L.S. Shieh	2007
Gu, X.	Control Systems	"Nonlinear Filtering for GPS"	L.S. Shieh	2007
Sun, M.	Control Systems	"Nonlinear Controller Design"	L.S. Shieh	2007
Leigh, Kevin	Computer Engineering	"Microarchitecture Based Computer System Design"	J. Subhlok	Fall 2006
Xu, Qiang	Computer Engineering	"Characterizing and Predicting Program Behavior with Performance Skeletons"	J. Subhlok	Fall 2006
Lee, Iljeong	Microelectronics	"Full Band 1D Quantum Transport Modeling Using a Green's Function Method"	L. Trombetta	Sept. 2004
Rong, Qingyi		"Integral Equation Approach to Modeling Well Logging Tools in Slanted Boreholes"	D.R. Wilton	May 2005
Nounu, Hatem	Microelectronics	"Vitreous Carbon Coatings for Atom Beam Lithography Masks"	J.C. Wolfe	2005
Yao, Manwen	Microelectronics	"Fluorescence Based Biosensor"	J.C. Wolfe	2005
Barghava, Mansi	Microelectronics	"Surface Wave Plasma Etching"	J.C. Wolfe	2008
Craver, Barry	Microelectronics	"Atom Beam Lithography"	J.C. Wolfe	2008
Xue, Lian	Bio-Engineering	"High SNR MRI of Spine Injury"	J. Wosik and H. Ogmen	2006
Kamel, Maged	Microwave Engineering	"RF Arrays for Partial Parallel Magnetic Resonance Imaging"	J. Wosik and S. Long	2006
Darne, Chinmay	MEMS/Microelectronics	"Design and Fabrication of Si and GaN Based MEMS"	W. Zagodzdon-Wosik	2007
I-Chih, Tan	Biomedical Engineering	"Magnetic Nanoparticles in Medical Diagnostics"	W. Zagodzdon-Wosik and A. Brezdeikis	2007
Iyer, Darshan	Biomedical Signal Processing	"Improve Evoke Potential Estimation Using an Iterative Independent Component Analysis Approach"	G. Zouridakis	Spring 2005

Master Theses Completed

STUDENT	TITLE	ADVISOR
Kulkarni, Rahul	"DSP-Based Control to Reduce Input Ripple Current in PWM Inverters Supplying Unbalanced Loads"	W.L. Anderson
Sushma, Fnu	"Routing Protocols for Mobile Ad Hoc Networks"	W.L. Anderson
Vanapalli, Venkata	"A DSP-Based Control Algorithm for Inverters Use in Alternate Energy Systems"	W.L. Anderson
Egabarum, Sara	"Windows Based Graphics Interface for High Resolution Photolithography"	E.J. Charlson
Motamarri, S.	"Exercise Machine Controller Design"	E.J. Charlson
Radhakrishnan, Gokul	"Capacitance Voltage Measurements on Silicon Spherical Substrates"	E.J. Charlson
Rodriquez, Robert	"Alignment and Metalization on Curved Substrates"	E.J. Charlson
Muktevi, Venu	"Automated Detection of Rhythmic Segments of Repetitive Spike-Like Waves in Neonatal Epileptic Seizures"	J. Glover
Sachanandani, Haresh	"Artifact Removal in Neonatal Seizure EEG Data Using Adaptive Noise Canceling and Independent Component Analysis"	J. Glover
Chen, Wei-Chi	"Optimal Estimation of the Shift-Variant Point Spread Function of a Laser 3-D Imaging System"	T.J. Hebert
Petermann, Walter	"A Method for Sensor Failure Recovery Using Analytical Redundancy"	T.J. Hebert
Varghese, Paul	"Performance Analysis of Shack-Hartmann Wavefront Sensor"	T.J. Hebert
Fasenfes, Benjamin J.	"FAST Computation For Large Arrays"	D.R. Jackson and D.R. Wilton
Doshi, Hitesh B.	"Relationship between Pre-Stimulus EEG and Evoked Potential Morphology"	B.H. Jansen
Grandhi, Vijaykishore	"Analysis of Auditory Evoked Potentials Elicited by Repetitive Stimuli"	B.H. Jansen
Kota, Prashant	"Methods to Improve the Throughput of a P300-Based Brain Machine Interface"	B.H. Jansen
Sundaresan, Karthik	"An Exploratory Study into the Factors Affecting P300"	B.H. Jansen
Bhogu, Ravi	"Encoding Mechanism in a Video Compression System Based on Wavelets and Vector Quantization"	N.B. Karayiannis
Deolalikar, Mandar	"An Image Coding Methodology for Efficient Embedded Bitstream Transmission with Low Decoder Complexity"	N.B. Karayiannis
Kaliyur S.M., Nagabhushan	"An Entropy-Constrained Algorithm for Routing in Communication Networks"	N.B. Karayiannis
Sami, Abdul	"Extraction of Temporal Motor Activity Signals from Video Recordings of Neonatal Seizures"	N.B. Karayiannis

STUDENT	TITLE	ADVISOR
Varughese, Bindu	"Quantifying Video Recordings of Neonatal Seizures by Regularized Optical Flow Computation Methods"	N.B. Karayiannis
Mukherjee, Amit	"Application of Neural Networks in the Analysis of Neonatal EEG"	N.B. Karayiannis and J.R. Glover
Liu, Jingyu	"Measurement of Retro-Reflectivity of Highway Markings"	R. Liu
Yu, Jingyan	"An Application of Fiber Optic Sensor in Weigh-In-Motion Systems"	R. Liu
Walsh, Andrew	"An Investigation of Stacked and Embedded Dielectric Resonator Antennas"	S.A. Long
Zhu, Zeqin	"Two Dimension Fast Fourier Transform Algorithm for EM Field Pattern in Two Dimensional Photonic Crystals"	S.S. Pei
Ruiz, Ariel	"Construction and Characterization of a Metrology Tool for Manufacturing Spherical Focal Surface Arrays"	P. Ruchhoeft
Chennamaneni, P.R.	"LQR Based Digital PID Controller for Multivariable Analog Systems with Long Input Delay"	L.S. Shieh
Ammu, Santosha Lakshmi	"Xray Analysis of Self-Assembled InAs Nanowire Arrays in InAs/GaSb Superlattices"	L. Trombetta
Dharmaiahgari, Bhanu	"Fabrication of HfO ₂ Using Pulsed Laser Deposition for Advanced CMOS Applications"	L. Trombetta
Parekh, Vishal	"Reliability of Thermally Grown SiO ₂ on SiC"	L. Trombetta
Fasenfes, Benjamin	"FAST Computation for Large Arrays"	D.R. Wilton
Barghava, Mansi	"Surface Wave Plasma Etching System"	J.C. Wolfe
Craver, Barry	"A Spatially-Modulated, High Voltage Focused Ion Beam Implantation System"	J.C. Wolfe
Zomorrodian, Valiallah	"Threshold Adjust Implantation for Fabricating MOSFET Circuits on Spherical Substrates"	J.C. Wolfe
Darne, Chinmay	"Use of Zirconium Diboride as a Prospective Candidate for Metal Gates in CMOS Applications"	W. Zagodzdzon-Wosik
Nair, Akhil	"Field Emission Based Pressure Sensors Using Nitride Materials"	W. Zagodzdzon-Wosik
Radhakrishnan, Deepa	"Metallic Gates Used in CMOS Technology"	W. Zagodzdzon-Wosik
Rangijt, Ragesh	"Formation of a Stable Metallic Contact and Junction in Metal-Semiconductors Using TiB ₂ "	W. Zagodzdzon-Wosik
I-Chih, Tan	"Detection of Magnetic Biomedical Markers in Various Matrices"	W. Zagodzdzon-Wosik and A. Brezdeikis

(Students requesting privacy under the Family Education Rights and Privacy Act governing the release of educational records are not included in the listing.)

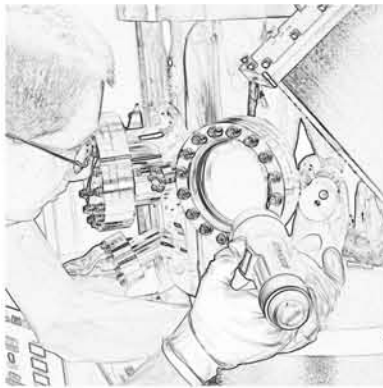
M.S. Student Roster

M.E.E. Telecommunications Internships Completed (2004)

STUDENT	TITLE	ADVISOR
Hassan, Safinaaz	"A Graphical User Interface for Analyzing the Histograms of PET images"	W.L. Anderson

STUDENT	FIELD	TENTATIVE TITLE	ADVISOR	EXP. COMP.
Vyas, Purva	Telecommunications	"Networks"	W.L. Anderson	May 2005
Nene, Hrishekesh	Telecommunications		W.L. Anderson	Aug. 2005
Sen, Sudipta	Computer Systems Engineering	"Computer Systems"	W.L. Anderson	Aug. 2005
Rao, D.		"Evaluation of Position Estimation Techniques for UWB Communication Systems"	R.J. Barton	Aug. 2006
Ganji, Tulsi	Solid State		E.J. Charlson	2005
Jayavaman, Swaminathan	Solid State		E.J. Charlson	2005
Ravichandran, B	Solid State		E.J. Charlson	2005
Sathymoorthy, Srivatsan	Solid State		E.J. Charlson	2005
Suriyanarayanan, Arvind	Solid State		E.J. Charlson	2005
Adluri, Kiran	Solid State		E.J. Charlson	2006
Arigai, Niranjan	Solid State		E.J. Charlson	2006
Liu, Xin	Solid State		E.J. Charlson	2006
Guo, Hongji	Solid State		E.J. Charlson	2007
Rusu, Vlad C.		"Available Transfer Capability Defined for Large Power Pools"	O. Crisan	May 2005
Chakravarthy, Ramya	Biomedical Signal Analysis	"Analysis of Epileptic Seizures in the Neonatal EEG"	J. Glover	Aug. 2005
Martinez, Rebecca	Image Processing	"A Method for Sensor Failure Recovery Using Analytical Redundancy"	T.J. Hebert	May 2006
Oroscar, Siddharth	Applied Electromagnetics	"Investigation and Optimization of the Ewald Method for Calculating the Periodic Free-Space Green's Function"	D.R. Jackson and D.R. Wilton	May 2005
Ng, Akbar	Applied Electromagnetics	"Design of Conformal Antennas for Next-Generation Integrated Mobile Communication Systems"	D.R. Jackson and J.T. Williams	May 2005
Chandrasekhar, Rajah M.	Signal Analysis/Biomedical	"Elastography"	B.H. Jansen (with Dr. J. Ophir, UT-Medical School, Houston)	May 2005

STUDENT	FIELD	TENTATIVE TITLE	ADVISOR	EXP. COMP.
Bonala, Bharat	Neuro-Engineering	"Single Trial P300 Analysis"	B.H. Jansen	May 2006
Osho, Kunle	Neuro-Engineering	"Brain Machine Interface"	B.H. Jansen	Aug. 2006
Seetharaman, Anush	Semiconductor Photonics		H.Q. Le	May 2004
Manapuram, Ravikiran	Microscopic Spectroscopic Imaging		H.Q. Le	Dec. 2006
Chen, Jingheng	Subsurface Sensing	"Soil Moisture Measurement Using Ring Resonators"	R. Liu	Fall 2005
Ekbote, Aditya	Subsurface Sensing	"FCC Compliant FMCW GPR System,"	R. Liu	Fall 2005
Li, Jing	Well Logging	"Measurement of Rock Properties in Wide Frequency Band"	R. Liu	Fall 2005
Xiao, Yi		"Development of Portable Pulsed Ground Penetrating Radar Transceivers"	R. Liu	Fall 2006
DeYoung, Christopher	Applied Electromagnetics	"Dielectric Resonator Antennas"	S.A. Long	May 2005
Akkerman, Kathleen	Applied Electromagnetics	"Modification of Currents on Existing Structures"	S.A. Long and J.T. Williams	May 2005
Cilingiroglu, Emre	Neuro-Engineering	"Design of a Custom Stimulus Generator and Its Application to the Studies of Perceptual Dynamics"	H. Ogmen	Aug. 2005
Fong, Michael	Neuro-Engineering	"Effect of Attention on Visual Masking"	H. Ogmen	Aug. 2005
Charan, Vemula Sri	Microelectronics	"Fabrication of Nano-Scale Electrostatic Immersion Lenses for a Nanopantography System"	P. Ruchhoeft	May 2006
Mehta, N.M.		"Adaptive Filter for GPS"	L.S. Shieh	2005
Spradlin, G.T.		"Digital Control Systems"	L.S. Shieh	2005
Patil, A.V.		"Multi-Dimensional Signal Processing"	Co-Advisor: L.S. Shieh	2005
Raghunathan, Abhijit		"Schrödinger Wave Equation Solution for Gate Oxide Tunneling in MOS Devices"	L. Trombetta	Sept. 2006
Zhu, Zeqin	Microelectronics	"Two Dimension Fast Fourier Transform Algorithm for EM Field Pattern in Two Dimensional Photonic Crystals"	S.S. Pei	2004



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