

11TH Annual Graduate Research Conference

May 1, 2015
The Hilton UH Hotel & Conference Center
Houston, Texas

Program

8:30 - 8:55 am	Registration, Conrad Ballroom, Room S202, Lobby
8:55 - 9:00 am	Opening Ceremonies, Plaza Room 247 <ul style="list-style-type: none">• Opening Remarks by Dr. Pauline Markenscoff, Conference Chair• Welcome to Technical Sessions by Dr. Wanda Wosik
9:00 - 10:00 am	Technical Program - Oral Session A, Plaza Room 247
10:00 -10:30 am	Welcoming Remarks <ul style="list-style-type: none">• Dr. Joe Tedesco, Dean, College of Engineering• Dr. Suresh Khator, Associate Dean, College of Engineering• Dr. Badri Roysam, Chairman, ECE Department
10:30 - 10:45 am	Coffee Break, Conrad Ballroom, Room S202, Lobby
10:45- 11:30 am	Technical Program - Oral Session B, Plaza Room 247
11:30- 12:30 pm	Lunch, Conrad Ballroom, S202
12:30 - 1:00 pm	Plenary Presentation by Kenny Mercado, Sr. Vice President of Electric Operations Center Point Energy “ <i>Find your zest: making “room” for career, family, community and self</i> ”, Conrad Ballroom, S202.
1:00 - 3:00 pm	Technical Program - Poster Session C, Shamrock Ballroom, Room 261
2:30 – 3:00 pm	NI Presentation, Igor Alvarado, Flamingo, Room 275
3:00 – 4:00 pm	Technical Program - Oral Session D, Plaza Room 247
4:00 - 4:15 pm	Coffee Break, Conrad Ballroom, Room S202, Lobby
4:15 - 5:30 pm	Technical Program - Oral Session E, Plaza Room 247
5:30 – 6:00 pm	Elevator Talks by CDC students, Conrad Ballroom, Room S202
6:00 - 6:30 pm	Awards Ceremony Conrad Ballroom, Room S202

GRC 2015 TECHNICAL PROGRAM

The Hilton UH Hotel & Conference Center

May 1, 2015

8:30 – 8:55 am Registration, Conrad Ballroom, Room S202, Lobby

8:55 – 9:00 am Opening Remarks in Plaza Room 247

Session A: Nanomaterials: Their Properties, Processes, and Applications

Session Type: Oral

Time: 9:00 – 10:00 am

Faculty Chair: Dr. Jack Wolfe

9:00 – 9:15 am **GRAPHENE OXIDE LIQUID CRYSTALS FOR REFLECTIVE DISPLAY WITHOUT POLARIZING OPTICS**

Zhuan Zhu¹, Yanan Wang, Yang Li, and Jiming Bao

9:15 – 9:30 am **PROCESS DEVELOPMENT OF SHAPE ENGINEERED NANOPARTICLES FOR ENHANCED IMAGING AND DRUG DELIVERY**

David Shakarizaz, Paul Ruchhoeft, Aaron Becker, Wei-Chuan Shih, Masud Arnob, Randy Lee, Chulsoon Park, Jacinta Conrad

9:30 – 9:45 am **CALCULATED OPTICAL PROPERTIES OF NANOPOROUS GOLD PLASMONIC NANOPARTICLES: EFFECTIVE MEDIUM APPROXIMATION**

Md Masud Parvez Arnob, Jeanbo Zeng, and Wei-Chuan Shih

9:45 – 10:00 am **A RELIABLE, HIGH THROUGHPUT APPROACH FOR FABRICATION OF OPTRODES FOR OPTOGENETIC STUDIES IN PRIMATES**

A. Awale, M. Gheewala, P. Motwani, W. -C. Shih, G. Purushothaman, and J. C. Wolfe

10:00 – 10:30 am **Welcoming Remarks and Addresses in Plaza**

- Dr. Joe Tedesco, Dean, College of Engineering
- Dr. Suresh Khator, Associate Dean, College of Engineering
- Dr. Badri Roysam, Chairman, ECE Department

10:30 – 10:45 am **Coffee Break**

Session B: Electromagnetic Effects in Medicine: Testing, Diagnostics, and Treatment

Session Type: Oral

Time: 10:45 – 11:30 am

Faculty Chair: Dr. Joe Charlson

- 10:45 – 11:00 am** **NUMERICAL STUDY ON MRI RF HEATING REDUCTION FOR EXTERNAL FIXATION DEVICES USING ABSORPTION MATERIAL**
Xin Huang, Jianfeng Zheng, and Ji Chen
- 11:00 – 11:15 am** **TIME REVERSAL CONCEPT IN FOCUSED RF HYPERTHERMIA**
Kuang Qin and Jarek Wosik
- 11:15 – 11:30 am** **MANIPULATING CELLS WITH A DYNAMICALLY-RECONFIGURABLE ELECTRO-MAGNETIC COIL**
Ruoli Jiang*, Ji Chen, Ben H. Jansen
- 11:30 – 12:30 pm** **Lunch**, Conrad Ballroom, Room S202
- 12:30 – 1:00 pm** Plenary Presentation **FIND YOUR ZEST: MAKING “ROOM” FOR CAREER, FAMILY, COMMUNITY AND SELF**, by Kenny Mercado, Sr. Vice President of Electric Operations Center Point Energy, Conrad Ballroom, S202

Session C: POSTER PRESENTATIONS

Time: 1:00 – 3:00 pm

Faculty Chair: Dr. Haluk Ogmen

Session P1: Optical and Electrical Imaging for Biomedical Applications

SPATIAL MAPPING OF THE BIOMECHANICAL PROPERTIES OF RABBIT CORNEA AFTER CROSS-LINKING USING OPTICAL COHERENCE ELASTOGRAPHY

Jiasong Li, Manmohan Singh, Srilatha Vantipalli, Zhaolong Han, Michael D. Twa, and Kirill V. Larin

**CO-FOCUSED ULTRASOUND AND OPTICAL
COHERENCE ELASTOGRAPHY SYSTEM FOR THE STUDY
OF AGE-RELATED CHANGES OF BIOMECHANICAL
PROPERTIES OF CRYSTALLINE LENS
IN RABBIT EYES**

Chen Wu, Zhaolong Han, Shang Wang, Jiasong Li, Manmohan Singh,
Chih-hao Liu, Salavat Aglyamov, Stanislav Emelianov, Fabrice Manns,
and Kirill V. Larin

**MURINE EMBRYONIC IMAGING BY OPTICAL COHERENCE
TOMOGRAPHY AND OPTICAL PROJECTION
TOMOGRAPHY**

Manmohan Singh, Victor Piazza, Anjul Davis, Alex Cable, Tegya
Vedakkan, Trevor Janecek, Michael V Frazier, Raksha Raghunathan¹,
Achuth Nair, Irina Larina, Mary E. Dickinson, and Kirill V. Larin

**TISSUE CLASSIFICATION OF NEPHRITIC KIDNEY USING
OPTICAL COHERENCE ELASTOGRAPHY**

Chih-Hao Liu, Manmohan Singh, Jiasong Li, Chen Wu, Rita Idugboe,
Yong Du, Chandra Mohan, Michael Twa, and Kirill V. Larin

BRAIN MAPPING IN TRAUMATIC BRAIN INJURY

Lianyang Li and George Zouridakis

**AUTOMATED GPU-ACCELERATED SEGMENTATION OF
VOLUMETRIC FIBER NETWORKS**

Pavel Govyadinov and David Mayerich

**3D QUANTITATIVE ANALYSIS OF THE FEMALE TORSO
DURING BREAST RECONSTRUCTION**

Audrey Cheong and Fatima Merchant

**IMAGING AND CLASSIFICATION OF FTIR SPECTROSCOPIC
DATA FOR CANCER DIAGNOSIS**

Rupali Mankar, Michael Walsh, Rohit Bhargava, and David Mayerich

**POPULATION-SCALE THREE-DIMENSIONAL
RECONSTRUCTION AND QUANTITATIVE PROFILING OF
MICROGLIA ARBORS**

M. Megjhani, Y. Lu, and B. Roysam

**RAMAN SPECTROSCOPY AS A DIAGNOSTIC TOOL FOR
MONITORING ACUTE NEPHRITIS**

Jingting Li, Yong Du, Ji Qi, Ravikumar Sneha, Anthony Chang,
Chandra Mohan, and Wei-Chuan Shih

**SPARSE REPRESENTATION-BASED
DISCRETE DECODING OF EEG SIGNALS FOR BRAIN-
MACHINE INTERFACES (BMI)**

Yuhang Zhang, Atilla Kilicarslan, Saurabh Prasad, and Jose L. Contreras-Vidal

Session P2: Materials, Devices, and Technology at Micro- and Nanoscale

**STABLE AND HIGHLY REVERSIBLE CATHODE IN
AQUEOUS LI-ION BATTERIES ENABLED BY LIGHT-
WEIGHT AND CORROSION-RESISTANT CURRENT
COLLECTOR**

Saman Gheytni and Yan Yao

**IN SITU PATTERNING OF HIERARCHICAL NANOPOROUS
GOLD STRUCTURES BY IN-PLANE DEALLOYING**

Fusheng Zhao, Jianbo Zeng, Gregg M. Santos, and Wei-Chuan Shih

**MODIFICATION OF AU NUCLEATION ON RU(0001)
DURING SLRR OF PB AND CU UPD ML**

Dongjun Wu and Stanko R. Brankovic

**PROBING THE DOPING LEVEL IN GRAPHENE USING
SURFACE PLASMON RESONANCE**

Kamrul Alam, Yang Li, and Jiming Bao

Session P3: Nanoworld of Sensors, Dignostics, and Microscopy

**EVALUATION OF CONNECTED MICRORESONATORS
FOR USE AS SENSORS**

Stewart Nash and Thomas Hebert

**A DISK-BASED, CENTRIFUGALLY-DRIVEN
IMMUNOASSAY PLATFORM FOR RAPID PATHOGEN
DETECTION USING COMMERCIAL AND
MICROFABRICATED LABELS**

C. Pascente, G. Garvey, B. Raja, K. Kourentzi, R. Willson, and P. Ruchhoeft

**INKJET PRINTED LENS SYSTEMS FOR SMARTPHONE
MICROSCOPY**

Yu-Lung Sung, Jenn Jeang, Chia-Hsiung Lee, and Wei-Chuan Shi

Session P4: Wireless Sensors in Control Systems for Communication, Robotics, and Power Transfer

STOCHASTIC SWARM CONTROL WITH GLOBAL INPUTS

S. Shahrokhi and A. Becker

**USING GRADIENT DESCENT TO OPTIMIZE PATHS FOR
SUSTAINING WIRELESS SENSOR NETWORKS**

Srikanth K. V. Sudarshan and Aaron T. Becker

**LONG DISTANCE WIRELESS POWER TRANSFER ALONG
OIL PIPE USING FERRITE MATERIALS**

Xiyao Xin, David R. Jackson, and Ji Chen

Session P5: Energy Efficient Processors

**ENERGY-EFFICIENT CACHE DESIGN IN EMERGING
MOBILE PLATFORMS: THE IMPLICATIONS AND
OPTIMIZATIONS**

Kaige Yan and Xin Fu

**EXPLORING SOFT-ERROR ROBUST AND ENERGY-
EFFICIENT REGISTER FILE IN GPGPUS USING STT-RAM**

Jingweijia Tan and Xin Fu

National Instruments Presentation

Time: 2:30 – 3:00 pm

Place: Flamingo, Room 275

“A Platform-based Measurement & Control Systems Design Guide for Electrical & Computer Engineers” by Igor Alvarado, Academic Business Development Manager & Field Engineer, National Instruments Corp

Session D: Recent Advances in Antennas, Information Security, and Power Systems

Session Type: Oral

Time: 3:00 – 4:00 pm

Faculty Chair: Dr. Yuhua Chen

**3:00 – 3:15 pm DUAL-BAND AND TRI-BAND FABRYPÉROT RESONANT
CAVITY ANTENNAS USING MULTIPLE FSS LAYERS**

Krishna Kota, David R. Jackson, and Stuart A. Long

**3:15 – 3:30 pm PROPERTIES OF 2D PERIODIC LEAKY WAVE ANTENNAS
AT MICROWAVE AND OPTICAL FREQUENCIES**

Sohini Sengupta, David R. Jackson, and Stuart A. Long

**3:30 – 3:45 pm MULTI-PHOTON QUANTUM CRYPTOGRAPHY PROTOCOL
UNDER COLLECTIVE NOISE**

Linsen Wu and Yuhua Chen

3:45 – 4:00 pm **REACTIVE POWER COMPENSATION USING NASH BARGAINING THEORY**
Hung Khanh Nguyen, Hamed Mohsenian-Rad, Amin Khodaei, and Zhu Han

4:00 – 4:15 pm **Coffee Break**

Session E: Processing and Characterization of New Materials for Electron Devices and Energy Sources

Session Type: Oral

Time: 4:15 – 5:30 pm

Faculty Chair: Dr. Stanko R. Brankovic

4:15 – 4:30 pm **GRAPHENE COATING AS A PROTECTIVE LAYER ON COPPER ALLOY SURFACE**
Sirui Xing, Xin Wu, and Shin-Shem Pei

4:30 – 4:45 pm **REACTION KINETICS OF AU DEPOSITION BY SLRR OF LEAD UPD STUDIED BY SURFACE REFLECTIVITY**
Ela Bulut and Stanko R. Brankovic

4:45 – 5:00 pm **CRYSTALLINE GE ON GLASS USING AL INDUCED CRYSTALLIZATION: FOR THIN FILM III-V PHOTOVOLTAICS**
K. Shervin, K Kharel, and A. Freundlich

5:00 – 5:15 pm **MULTI-SPECTRAL LASER SCANNING CONFOCAL MICROSCOPY WITH STRUCTURED ILLUMINATION**
Tuo Shi, S. Abhilash, and Han Q. Le

5:15 – 5:30 pm **HEAVILY N-DOPABLE π -CONJUGATED REDOX POLYMERS WITH ULTRA-FAST ENERGY STORAGE CAPABILITY**
Yan Jing, Yanliang Liang, and Yan Yao

5:30– 6:00 pm **Elevator Talks by CDC Students**, Hosted by Dr. Len Trombetta, Conrad Ballroom, Room S202

6:00 – 6.30 pm **Awards Ceremony and Reception**, Conrad Ballroom, Room S202

Plenary Presentation by
Kenny Mercado
Sr. Vice President of Electric Operations
CenterPoint Energy

Find your zest: making “room” for career, family, community and self

We each have our own reason for becoming an engineer*:

- “I was enamored with the solar collectors my dad built in our front yard in the 1980s to help heat our house.” -- Heidi
- “Engineering to me is problem solving and teamwork.” -- Sara
- “To be a good engineer is to know how to do things -- Simon
- “I was determined to show that women can be great engineers.” -- Iris

We can fulfill ourselves and meet society’s needs as engineers, but there is more to life than work. My minister used to say, “What words do you want on your tombstone or your obituary?”

If you put everything into your work, then your résumé will be your tombstone.

So what I’ve tried to do is put as much of my *zest*— that which measures one’s whole substance of life —into my family, to my work, and to my community, while still making room for myself.

What is your passion? Find and follow your zest. Work hard, but balance your life. Do well and do good. Do good for your family. Do good for your company. Do good for your profession. Do good for the community. Do good for society. Make room for yourself, but remember you are part of something larger. Your life is yours to build, so create rooms to be a home for your zest.

*Leidos Engineering’s “Engineering Week” profiles

Kenny Mercado



I am a fourth-generation Houstonian. My mother - a loan officer - and my father, who worked for the railroad, built our house. By the time I was in high school, I knew I wanted to be an engineer.

I got both a Bachelor of Science degree in electrical engineering and a Master of Science degree in industrial engineering (at night while working for Houston Lighting & Power) from the University of Houston. I also received an Executive MBA degree from Mays Business School at Texas A&M University.

Starting at HL&P – the predecessor to CenterPoint Energy’s Houston Electric utility – in 1985, I’ve been blessed with many opportunities in my career in engineering and electric operations management. I was responsible for CenterPoint Energy’s electric distribution, substation and transmission operations when Hurricane Ike hit in 2008. It was my privilege to lead a team, which has brought our electric grid into the digital age through a multiyear deployment of a smart grid system, including the installation of smart meters and intelligent grid technology. I am now senior vice president of CenterPoint Energy’s electric utility business, with financial and operational responsibility for delivering power to more than 2.2 million homes and businesses in the 5,000 square-mile Houston metropolitan area.

I am a licensed professional engineer registered in the state of Texas and serve on the boards of the March of Dimes in Houston, the University of Houston Honors College and Engineering Leadership Program, Southeastern Electric Exchange and the Texas Center for Commercialization of Electric Technologies.

My wife Jill and I are proud and busy coaches of three great kids.