10th Annual Graduate Research Conference

April 25, 2014
The Hilton UH Hotel & Conference Center
Houston, Texas

Program

8:30 - 8:55 am  Registration, Waldorf Astoria Room 210, Lobby
8:55 - 9:00 am  Opening Ceremonies, Plaza Room 247
   • 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  Remarks
   • Dr. Dmitri Litvinov, Vice Provost, Dean of Graduate School
   • Dr. Joe Tedesco, Dean, College of Engineering
   • Dr. Badri Roysam, Chairman, ECE Department
10:30 - 10:45 am  Coffee Break, Waldorf Astoria Room 210, Lobby
10:45- 11:30 am  Technical Program - Oral Session B, Plaza Room 247
11:30- 12:30 pm  Lunch, Waldorf Astoria Room 210
12:30 - 1:00 pm  Plenary Presentation “EUCLID, BIGGERS, AND SCHLUMBERGER” by
   Steven Gomez, Mechanical Metier Manager Schlumberger, Waldorf
   Astoria Room 210
1:00 - 3:00 pm  Technical Program - Poster Session C, Conrad Ballroom
3:00 – 4:00 pm  Technical Program - Oral Session D, Plaza Room 247
4:00 - 4:15 pm  Coffee Break, Waldorf Astoria Room 210, Lobby
4:15 - 5:15 pm  Technical Program - Oral Session E, Plaza Room 247
5:15 - 5:45 pm  Elevator Talks by CDC students, Waldorf Astoria Room 210
5:45 - 7:00 pm  Awards Ceremony and Alumni Mixer Reception, Waldorf Astoria
   Room 210
GRC 2014 TECHNICAL PROGRAM

The Hilton UH Hotel & Conference Center

April 25, 2014

8:30 – 8:55 am  Registration, Waldorf Astoria Room 210, Lobby

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

Session A: Neural Sensing and Brain Control at Macro- to Nano-Scale
Session Type: Oral
Time: 9:00 – 10:00 am
Faculty Chair: Dr. Haluk Ogmen

9:00 – 9:15 am  BRAIN MACHINE INTERFACE CONTROL OF A THERAPEUTIC EXOSKELETON
Nikunj A. Bhagat*, James French, Anusha Venkatakrishnan, Nuray Yozbatiran, Gerard E. Francisco, Marcia K. O'Malley, and Jose L. Contreras-Vidal

9:15 – 9:30 am  CONTRIBUTIONS OF ENDOGENOUS AND EXOGENOUS REFERENCE FRAMES TO PERCEPTION OF MOTION DIRECTION
Mehmet N. Agaoglu*, Michael Herzog, and Haluk Ogmen

9:30 – 9:45 am  A RELIABLE, HIGH THROUGHPUT APPROACH FOR FABRICATION OF OPTRODES FOR OPTOGENETIC STUDIES IN PRIMATES
Apeksha Awale*, Mufadal Gheewala, Pratik Motwani, Wei-Chuan Shih, G. Purushothaman, and John C. Wolfe

9:45 – 10:00 am  COMPREHENSIVE COMPUTATIONAL ANALYSIS OF TISSUE REMODELING IN THE RAT BRAIN AFTER TRAUMATIC INJURY
Kedar Grama*, Yanbin Lu, Murad Megjhani, and Badri Roysam

10:00 – 10:30 am  Welcoming Remarks and Addresses in Plaza
• Dr. Dmitri Litvinov, Vice Provost, Dean of Graduate School
• Dr. Joe Tedesco, Dean, College of Engineering
• Dr. Badri Roysam, Chairman, ECE Department

10:30 – 10:45 am  Coffee Break
Session B: Optical and Magnetic Effects Enhanced by Nanoparticles in Medical Diagnostics and Intervention
Session Type: Oral
Time: 10:45 – 11:30 am
Faculty Chair: Dr. Joe Charlson

10:45 – 11:00 am
IMPROVEMENT OF TISSUE ANALYSIS AND CLASSIFICATION USING OPTICAL COHERENCE TOMOGRAPHY COMBINED WITH RAMAN SPECTROSCOPY
Chih-Hao Liu*, Ji Qi, Shang Wang, Chen Wu, Wei-Chuan Shih, and Kirill V. Larin

11:00 – 11:15 am
MONOLITHIC NANOPOROUS GOLD NANOPARTICLES
Fusheng Zhao*, Jianbo Zeng, and Wei-Chuan Shih

11:15 – 11:30 am
MANIPULATION OF NANOPARTICLES USING AC MAGNETIC FIELDS TO TRIGGER TUMOR CELL APOPTOSIS
Dhivya Ketharnath* Leiming Xie, Biana Godin, and Jarek Wosik

11:30 – 12:30 pm
Lunch, Waldorf Astoria Room 210

12:30 – 1:00 pm
Plenary Presentation “EUCLID, BIGGERS, AND SCHLUMBERGER” by Steven Gomez, Mechanical Metier Manager Schlumberger, Waldorf Astoria Room 210

Session C: POSTER PRESENTATIONS
Time: 1:00 – 3:00 pm
Faculty Chairs: Dr. Jack Wolfe and Dr. Zhu Han

Session P1: Imaging for Biomedical Applications

UNSUPERVISED DISCOVERY OF SUBSPACE TRENDS IN HIGH DIMENSIONAL DATA
Yan Xu*, Peng Qiu, and Badri Roysam
COMPREHENSIVE QUANTITATIVE PROFILING OF BRAIN CYTOARCHITECTURAL ALTERATIONS CAUSED BY BINGE ALCOHOL
Prathamesh Kulkarni*, Leigh Leasure, Emily Barton, William Shain, Yanbin Lu, Yan Xu, Murad Megjhani, and Badrinath Roysam

PREDICTIVE MODELING OF THE FEMALE TORSO DURING BREAST RECONSTRUCTION
Audrey Cheong* and Fatima Merchant

DEEP IMAGING OF MOUSE EMBRYOS BY ROTATIONAL OCT
Narendran Sudheendran, Chen Wu*, Irina V. Larina, Mary E. Dickinson, and Kirill V. Larin

SHEAR WAVE IMAGING OPTICAL COHERENCE TOMOGRAPHY (SWI-OCT)
Shang Wang* and Kirill V. Larin


AN INVESTIGATION OF MULTIBAND FABRY-PÉROT RESONANT CAVITY ANTENNAS
Krishna Kota*, David R. Jackson, and Stuart A. Long

EXAMINATION OF RADIATION FROM 2D PERIODIC LEAKY-WAVE ANTENNAS
Sohini Sengupta*, David R. Jackson, and Stuart A. Long

MICROWAVE CHARACTERIZATION OF YBCO FILMS ON RIGID AND FLEXIBLE SUBSTRATES
Kuang Qin*, Dhivya Ketharnath, Eduard Galstyan, Venkat Selvamanicka, and Jarek Wosik

Session P3: Cognitive and Noninvasive Biosensing Including BioMEMS and Materials

PROCESSING MOTION INFORMATION VIA THE NON-FIXATING EYE IN MONKEYS WITH STRABISMUS
Sevda Agaoglu*, Mehmet Agaoglu, V. E. Das, and Haluk Ogmen

AIR-PUFF OCE FOR ASSESSMENT OF MOUSE CORNEA IN VIVO
Jiasong Li*, Shang Wang, Manmohan Singh, Salavat Aglyamov, Stanislav Emelianov, Michael Twa, and Kirill V. Larin
MICROFLUIDIC LABEL-FREE MONITORING OF DNA HYBRIDIZATION
Ji Qi*, Jianbo Zeng, Fusheng Zhao, Steven Hsesheng Lin, Uli Strych, Richard C. Willson, and Wei-Chuan Shih

MULTI-FUNCTIONAL NANOPOROUS FILTER FOR TYLENOL AND UREA SENSING IN URINE
Yu-Lung Sung*, Fu-Sheng Zhao, and Wei-Chuan Shih

Session P4: Wireless Energy Transmission, Communication, and Power Solutions

AN ADAPTIVE MAXIMUM POWER POINT TRACKING ALGORITHM FOR WIND ENERGY CONVERSION SYSTEMS
Shyam Jakiraman*, Radhakrishna Kotti, and Wajiha Shireen

WIRELESS ENERGY TRANSMISSION FOR GEOPHYSICAL APPLICATIONS
Xiyao Xin*, David Jackson, Ji Chen, and Paul Tubel

ENSEMBLE MULTIPLE KERNEL ACTIVE LEARNING FOR CLASSIFICATION OF MULTI-SOURCE REMOTE SENSING DATA
Yuhang Zhang* and Saurabh Prasad

TIME-REVERSAL PPM FOR STRESS WAVE COMMUNICATIONS IN SOLID STRUCTURES
Qing Ji*, Rong Zheng, Zhi Ding, and Gangbing Song

Session P5: Networking; Theoretical and Practical Solutions

SOCIAL NETWORK AWARE DEVICE-TO-DEVICE COMMUNICATION IN WIRELESS NETWORKS
Yanru Zhang*, Erte Pan, and Zhu Han

NON-PARAMETRIC BAYESIAN LEARNING FOR INFERRING HIDDEN CAUSES WITH POTENTIALLY INFINITE LAYERS
Erte Pan* and Zhu Han

A DISTRIBUTED PARALLEL APPROACH FOR BIG DATA SCALE OPTIMAL POWER FLOW WITH SECURITY CONSTRAINTS
Lanchao Liu* and Zhu Han
DYNAMIC ASYMMETRIC SCHEDULING FOR EDGE ROUTERS IN RECONFIGURABLE ASYMMETRIC OPTICAL BURST SWITCHING NETWORKS
Linsen Wu*, Chenxing Ma*, and Yuhua Chen

Session P6: Materials, Devices, and Technology at Micro- and Nanoscale

REACTION KINETICS OF SURFACE LIMITED REDOX REPLACEMENT OF LEAD UPD STUDIED BY SURFACE REFLECTIVITY AND CONVENTIONAL ELECTROCHEMICAL METHODS
Ela Bulut* and Stanko R. Brankovic

THE SIMULATION OF ESAKI TUNNELING DIODE I-V CHARACTERISTICS AND STUDY OF PARAMETERS IMPROVING THE DEVICE ELECTRICAL BEHAVIOR
Kaveh Shervin* and Alex Freundlich

LASER-ASSISTED DEALLOYING LITHOGRAPHY
Jingting Li* and Wei-Chuan Shih

NON-INVASIVE RAPID THERMAL ANNEALING OF NANOPOROUS GOLD DISKS (NPGDs)
Md Masud Parvez Arnob* and Wei-Chuan Shih

ENHANCEMENT OF EPIR SWITCHING CHARACTERISTICS OF PCMO RERAM USING OXYGEN DEFICIENT $\text{Al}_2\text{O}_x$ DIFFUSION BARRIER
R. Mithun Kumar*, Rabi Ebrahim, and Alex Ignatiev

Session D: Antenna, Networks, and Power Systems
Session Type: Oral
Time: 3:00 – 4:00 pm
Faculty Chair: Dr. Ji Chen

3:00 – 3:15 pm  A CYLINDRICAL DIELECTRIC SURFACE-WAVE ANTENNA
Nicholas A. Boggs*, Stuart A. Long, and David R. Jackson

3:15 – 3:30 pm  SMART CHARGING FACILITIES FOR PLUG IN HYBRID ELECTRIC VEHICLES IN A DC MICROGRID
Preetham Goli* and Wajiha Shireen

3:30 – 3:45 pm  POWER SYSTEM ASSET MANAGEMENT FOR
HURRICANE-PRONE INFRASTRUCTURE DAMAGES
Ali Arab*, Amin Khodaei, Suresh K. Khator, and Zhu Han

3:45 – 4:00 pm SUB-MILLISECOND DYNAMIC OPTICAL PATH SETUP IN DWDM MULTI-MODE SWITCHING NETWORKS
Wen Hao Chen*, Lei Wang, Dmitriy Chenchykov, Linsen Wu*, and Yuhua Chen

4:00 – 4:15 pm Coffee Break

Session E: Basic and Material Science for New Devices and Technology Development
Session Type: Oral
Time: 4:15 – 5:15 pm
Faculty Chair: Dr. Stanko Brankovic

4:15 – 4:30 pm MODELING AND FABRICATION OF GaAs SOLAR CELLS WITH HIGH DISLOCATION TOLERANCE
Akhil Mehrotra*, W. Wang, and Alex Freundlich

4:30 – 4:45 pm RAMAN AND PHOTOLUMINESCENCE SPECTROSCOPY OF CVD SYNTHESIZED SINGLE CRYSTAL WS2
Su-Chi Chang*, Yanan Wang, R Mithun Kumar, Rabi Ebrahim, Viktor Hadjiev, Alex Ignatiev, Jiming Bao, and Shin-Shem Pei

4:45 – 5:00 pm THE UNDER POTENTIAL DEPOSITION of Pb on Ru(0001)
Dongjun Wu*, Qiuyi Yuan, and Stanko R. Brankovic

5:00 – 5:15 pm SODIUM ION INTERCALATION FOR 2-D MATERIALS AS ADVANCED BATTERIES
Yifei Li*, Yanliang Liang, Hyundeog Yoo, and Yan Yao

5:15 – 5:45 pm Elevator Talks by CDC Students, Waldorf Astoria Room 210

5:45 – 7.00 pm Awards Ceremony and Alumni Mixer Reception, Waldorf Astoria Room 210
Euclid, Biggers, and Schlumberger

Through my eighteen year career with Schlumberger, I have been able to blend my passion for engineering and volunteering. I will share my story hoping it will inspire you to help shape the company and community you join after graduation.

An excerpt from a colleague’s book *The CSTEM Challenge* best captures the spirit of my story:

“Schlumberger recognizes the importance of developing individuals that will one day join the workforce in STEM fields. This is one of many reasons that you will see Steve Gomez at every CSTEM event. With his backpack and baseball cap, he might pass as a student, but do not be fooled. Gomez has degrees from MIT and Stanford and currently serves as a robotics expert at Schlumberger, the leading Oilfield Services provider.

When the staff at CSTEM starts talking about him, it is best to grab a seat because they have lots to say. While volunteering in Fort Bend Independent School District, The CSTEM staff met Steve Gomez and they hit it off immediately, brainstorming how best to get disadvantaged students interested in STEM subjects, and dreaming of ways to use all resources available to them to make an impact.

Eventually, they concluded that they should join forces and do something truly noteworthy. As Gomez said, “Alone we were doing great things, together we would reach new heights.”

So in 2007, they launched the CSTEM Challenge.

Gomez is the leading inspiration behind the creative concept. His commitment to the environment combined with his passion for John Bigger’s artwork, led him to suggest an expansive competition that would draw out students’ diverse talents.

Gomez, an engineer, teacher, and veteran robot builder, envisioned a competition that would be about more than just constructing faster, more efficient robots. He wanted a competition that would require students to think about thinking itself; that would encourage mechanical students to bond with artistic students; that would tie together theoretical concepts and real-life applications; that would connect younger students to older students and link all students to the larger community and world.

The first CSTEM Challenge accomplished all these objectives- and more. It told a story.

The annual theme *Everyone is an Artist and an Engineer* is an open invitation to all involved to integrate both STEM and art into the fabric of life.”

Since 2007 the story continues, the CSTEM Challenge has grown to International status and was honored by the White House in March 2014.
Steve Gomez

Growing up in a small, South Texas town, I played third base for my high school baseball team and helped them to back-to-back AAA state championships. I learned to hit a 90 mph fastball, but never really could hit the curve ball, so following high school I ventured off to Massachusetts Institute of Technology. After one college game in the snow, I retired from baseball and began to pursue my interests in robotics and education. Formally, I studied Mechanical Engineering, but grew more interested in technology and learning. Through M.I.T., I volunteered at the first Computer Clubhouse, of which there are now 90 around the world. Upon graduation, I decided to try a warmer climate and attended Stanford University for my master’s degree with a focus on Robotics and Control. There, I attempted to launch one of the early LEGO RCX bricks into space, but unfortunately, my payload did not make the final cut.

With my formal education complete, I decided to return home and began working for Schlumberger. As an engineer, I helped design an innovative directional drilling tool. I then became a product development manager. My love for learning and sharing continues and I have volunteered with numerous organizations in Houston and abroad including, Hightower High School, YES College Prep, Carnegie Vanguard High School, Project Row Houses, Marshall High School, and Schlumberger Seed in Mexico and Egypt. I am currently a member of Houston’s HISD 21st Century Advisory Committee which will shape education for area K-12 students for the next 100 years!

My wife and I are raising two great kids and we enjoy, tennis, our Jack Russell Terriers, collecting art, and solving the Rubik’s cube.