


13th Annual Graduate Research and Capstone Design Conference

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UNIVERSITY of HOUSTON
CULLEN COLLEGE of ENGINEERING
Department of Electrical & Computer Engineering

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PROGRAM

April 28, 2017
The Hilton Hotel and Conference Center

8:30 - 8:55 a.m. Registration, Waldorf Astoria Ballroom Lobby

8:55 - 9:00 a.m. GRC - Opening Remarks by Dr. Wanda Wosik, Plaza Room
CDC - Opening Remarks by Dr. Steven Pei, Flamingo Room

9:00 - 10:05 a.m. GRC - Technical Program - Oral Session A, Plaza Room
CDC - Technical Program - Oral Session A, Flamingo Room

10:05 - 10:30 a.m. Welcoming Remarks, Plaza Room
Dr. Hanadi Rifai, Associate Dean, College of Engineering
Dr. Badri Roysam, Chair, Electrical and Computer Engineering

10:30 - 10:45 a.m. Coffee Break, Waldorf Astoria Ballroom Lobby

10:45 - 11:50 a.m. GRC - Technical Program - Oral Session B, Plaza Room
CDC - Technical Program - Oral Session B, Flamingo Room

11:50 - 12:45 p.m. Lunch, Shamrock Ballroom

12:30 - 1:15 p.m. Keynote Presentation: "The Global Impact of Electrical and Computer Engineering in Society", Igor Alvarado, Business Development Manager for Academic Research, National Instruments Corp., Shamrock Ballroom

1:15 - 2:20 p.m. GRC - Technical Program - Oral Session C, Plaza Room
CDC - Technical Program - Oral Session C, Flamingo Room

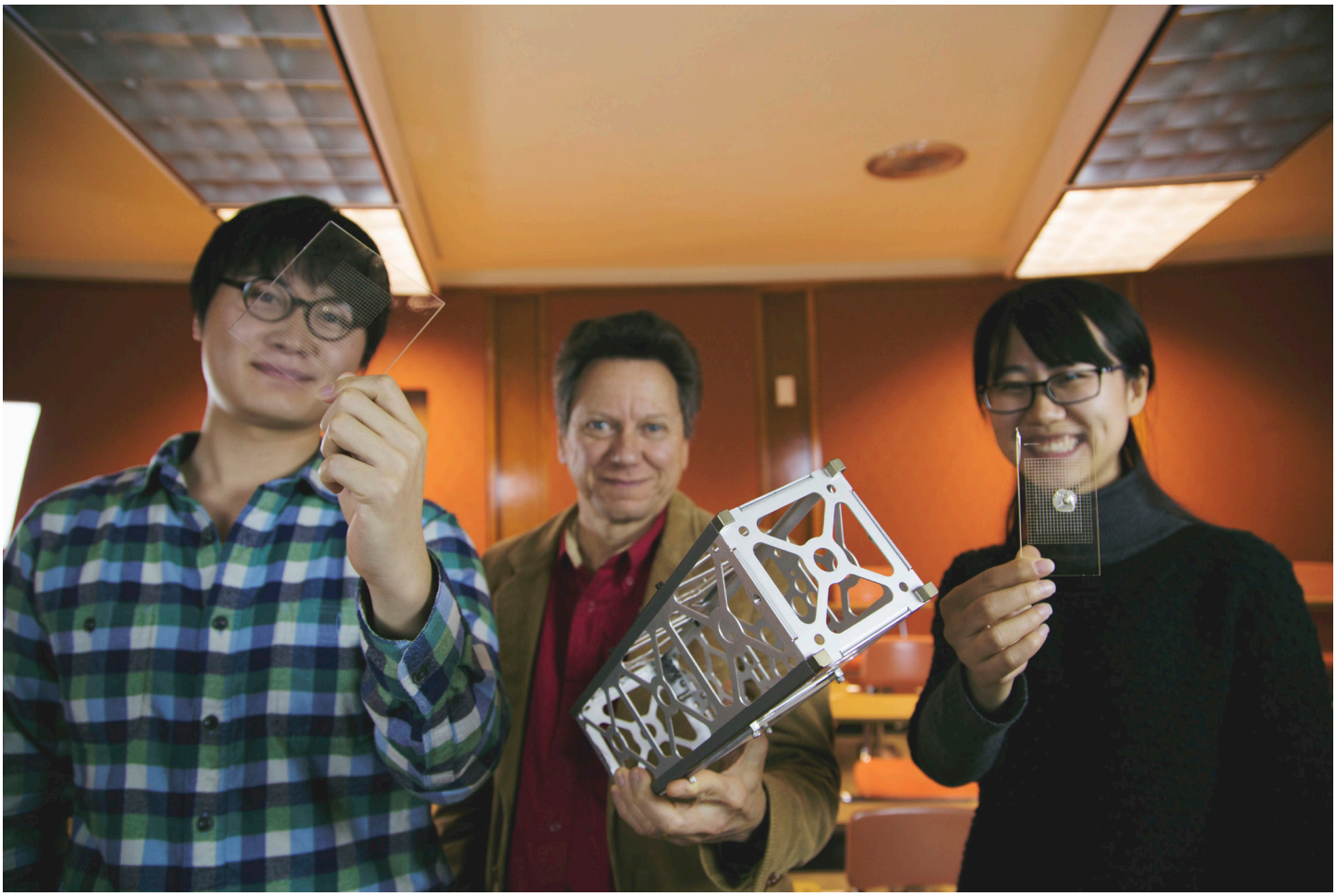
2:20 - 2:30 p.m. Coffee Break, Waldorf Astoria Ballroom Lobby

2:30 - 3:35 p.m. GRC - Technical Program - Oral Session D, Plaza Room
CDC - Technical Program - Oral Session D, Flamingo Room

3:35 - 5:30 p.m. Technical Program - Poster Session, Waldorf Astoria Ballroom
*4:55 - 5:30 p.m. CDC Teams Break for Elevator Talk Preparation

5:30 - 6:00 p.m. Elevator Talks by CDC Students, Shamrock Ballroom

6:00 - 6:30 p.m. Awards Ceremony and Reception, Shamrock Ballroom



Graduate Research Presentations

SESSION A: POWER, MANAGEMENT, AND DATA SYSTEMS FOR MICROGRIDS, COMMUNICATION, MOBILE AND BIOMEDICAL IMAGING.
SESSION TYPE: ORAL
TIME: 9:00 - 10:05 A.M.
FACULTY CHAIR: DR. DAVID MAYERICH

POSTER NUMBER

9:00 - 9:05 a.m.	**POWER SHARING AND POWER QUALITY CONTROL USING DG-INTERFACING VOLTAGE SOURCE INVERTER IN MICROGRID** *Qicheng Huang and Kaushik Rajashekara*	A1
9:06 - 9:11 a.m.	**ADVANCED POWER SHARING SCHEME UNDER UNBALANCED AND NONLINEAR LOADS IN ISLANDING MICROGRID** *Mehmet Emin Akdogan and Mehdi Abolhassani*	A2
9:12 - 9:17 a.m.	**IMPLEMENTATION OF ADAPTIVE PROTECTION SCHEME FOR MICROGRID USING IEC 61850 COMMUNICATION PROTOCOL** *Rikesh Shah, Wajiha Shireen, and Pretham Goli*	A3
9:18 - 9:23 a.m.	**REDEFINING QoS AND CUSTOMIZING THE POWER MANAGEMENT POLICY TO SATISFY INDIVIDUAL MOBILE USERS** *Kaige Yan, Xingyao Zhang, Jingweijia Tan, and Xin Fu*	A4
9:24 - 9:29 a.m.	**A HIERARCHIAL GAME FRAMEWORK FOR RESOURCE MANAGEMENT IN FOG COMPUTING** *Huaqing Zhang, Yanru Zhang, Yunan Gu, and Zhu Han*	A5
9:30 - 9:35 a.m.	**FULL DUPLEX IN MASSIVE MIMO SYSTEMS: ANALYSIS AND FEASIBILITY** *Radwa Sultan, Lingyang Song, Karim G. Seddik, and Zhu Han*	A6
9:36 - 9:41 a.m.	**THREE DIMENSIONAL AUTOMATED SEGMENTATION OF NEURAL SOMA IN LARGE KESM IMAGES OF BRAIN TISSUE** *Leila Saadatifard and David Mayerich*	A7

9:42 - 9:47 a.m. **GPU BASED FEATURE SELECTION USING MULTIDIMENSIONAL BIOMEDICAL IMAGES TO ENABLE FAST INFRARED IMAGING USING DFIR** A8
Rupali Mankar, Saurabh Prasad, Michael Walsh, and David Mayerich

9:48 - 9:53 a.m. **FAST GPU-BASED SEGMENTATION FOR HIGH-THROUGHPUT TIME LAPSE IMAGING MICROSCOPY IN NANOWELL GRIDS (TIMING)** A9
Jiabing Li, Leila Saadatifard, Navin Varadarajan, Badri Roysam, and David Mayerich

9:54 - 9:59 a.m. **VISUALIZATION AND VALIDATION SYSTEM FOR HIGH-THROUGHPUT QUANTITATIVE CHARACTERIZATION OF TIME-LAPSE IMAGING MICROSCOPY IN NANOWELL GRIDS (TIMING)** A10
Hengyang Lu, Melisa A. M. Paniangua, Navin Varadarajan, and Badri Roysam

10:00 - 10:05 a.m. **STRUCTURE TENSOR TRACTOGRAPHY FOR VISUALIZING LARGE-SCALE MICROSCOPY DATA SETS** A11
Srijani Mukherjee and David Mayerich

10:05 - 10:30 a.m. **WELCOMING REMARKS AND ADDRESSES IN PLAZA ROOM**
Dr. Hanadi Rifai, Associate Dean, College of Engineering
Dr. Badri Roysam, Chair, Electrical and Computer Engineering

10:30 - 10:45 a.m. **COFFEE BREAK**

SESSION B: BROAD APPLICATIONS OF ELECTROMAGNETICS: BIOMEDICAL TREATMENT AND DIAGNOSTICS, VLSI CIRCUITS, AND CONTROL.
SESSION TYPE: ORAL
TIME: 10:45 - 11:50 A.M.
FACULTY CHAIR: DR. JOE CHARLSON

10:45 - 10:50 a.m. **GENDER DIFFERENCES IN NEURAL ACTIVITY WHILE EXPERIENCING ART IN A MUSEUM SETTING** B1
Akshay Sujatha Ravindran and Jose L. Contreras-Vidal

10:51 - 10:56 a.m. **ADVANCED RECOGNITION OF TERRAIN TRANSITIONS DURING LOCOMOTION VIA NON-INVASIVE EEG** B2
Justin A. Brantley, Trieu Phat Luu, and Jose L. Contreras-Vidal

10:57 - 11:02 a.m. **THE LONG EFFECTS OF MILD TRAUMATIC BRAIN INJURY ON BRAIN ACTIVITY BASED ON THE STROOP PARADIGM** B3
Lianyang Li and George Zouridakis

11:03 - 11:08 a.m. **REDUCTION OF RADAR CROSS SECTION USING ACTIVE ANTENNA ELEMENTS** B4
O. H. Council, Sohini Sengupta, D. R. Jackson, and S. A. Long

11:09 – 11:14 a.m. **ASSESSMENT OF TIME REVERSAL METHODS USED FOR OPTIMIZED HYPERTHERMIA IN CANCER TREATMENT** B5
Kuang Qin and Jarek Wosik

11:15 – 11:20 a.m. **WIDEBAND LNA WITH 1.9 DB NOISE FIGURE IN 0.18 µM CMOS FOR HIGH FREQUENCY ULTRASOUND IMAGING APPLICATIONS** B6
Yuxuan Tang, Yulang Feng, Zhiheng Zuo, Qingjun Fan, and Jinghong Chen

11:21 – 11:26 a.m. **BIO-IMPEDANCE SPECTROSCOPY FOR MITOCHONDRIAL ANALYSIS** B7
Uday Kiran Karlapudi, Joe Charlson, Jarek Wosik, Jinghong Chen, and Wanda Zagozdzon-Wosik

11:27 - 11:32 a.m. **EARLY STUDIES OF A NEW TRANSMISSION MECHANISM FOR MANIPULATOR ACTUATION DESIGNED FOR MR-GUIDED INTERVENTIONS** B8
Haoran Zhao, Xin Liu, Habib M. Zaid, Dipan J. Shah, Michael Heffernan, Aaron T. Becker, and Nikolaos V. Tsekos

11:33 - 11:38 a.m. **STIMULATED RAMAN HYPERSPECTRAL IMAGING BASED ON SPECTRAL SELECTION OF BROADBAND LASER PULSES** B9
Jingting Li and Wei-Chuan Shih

11:39 - 11:44 a.m. **EXOSOME DETECTION WITH NANOPOROUS GOLD DISK VIA LOCALIZED SURFACE PLASMON RESONANCE SHIFT** B10
N. Ngo, O. Zenasni and W. Shih

11:45 - 11:50 a.m. **PHYSICAL EXPERIMENTS FOR TURN COST OF MULTICOPTER** B11
An Nguyen, Dominik Krupke, Sándor Fekete, and Aaron T. Becker

11:50 - 12:45 p.m. **LUNCH, SHAMROCK BALLROOM**

12:30 - 1:15 p.m. **KEYNOTE PRESENTATION, SHAMROCK BALLROOM**
"THE GLOBAL IMPACT OF ELECTRICAL & COMPUTER ENGINEERING IN SOCIETY"
Igor Alvarado, Business Development Manager for Academic Research National Instruments Corp.

SESSION C: FABRICATION AND CONTROL OF MICRO- AND NANO PROBES, STRUCTURES, AND MICROROBOTS.
SESSION TYPE: ORAL
TIME: 1:15 - 2:15 P.M.
FACULTY CHAIR: DR. AARON BECKER

1:15 – 1:20 p.m. **DEVELOPMENT OF MULTI-CONTACT PROBES WITH THIN FILM CONDUCTOR WIRING ON OPTICAL FIBER SUBSTRATES** C1
Tamanna Afrin Tisa, Apeksha Awale, Mufaddal Gheewala, Pratik Motwani, Rebecca Kusko, Madhuri Manjunath, Venu Jonnalagadda, Navjot Randhawa, Gopathy Purushothaman, John Dani, Wei-Chuan Shih, and John Wolfe

1:21 - 1:26 p.m. **DEVELOPMENT OF REUSABLE, FLEXIBLE ELECTROSTATIC LENSES FOR NANOPANTOGRAPHY** C2
Prithvi Basu, Ryan Sawadichai, Ya Ming, Vincent M. Donnelly, Demetre J. Economou and Paul Ruchhoeft

1:27 – 1:32 p.m. **GENERATING SYNTHETIC MICROVASCULAR MODEL FOR MICROFLUIDICS** C3
Jiaming Guo, Paul Ruchhoeft, and David Mayerich

1:33 - 1:38 p.m. **PATH PLANNING AND AGGREGATION FOR A MICROROBOT SWARM IN VASCULAR NETWORKS USING A GLOBAL INPUT** C4
Li Huang, Louis Rogowski, Min Jun Kim, and Aaron T. Becker

1:39 - 1:44 p.m. **PARALLEL SELF-ASSEMBLY UNDER UNIFORM CONTROL INPUTS** C5
Sheryl Manzoor, Samuel Sheckman, Jarrett Lonsford, Hoyeon Kim, Minjun Kim, and Aaron T. Becker

1:45 - 1:50 p.m. **ALGORITHMS FOR SHAPING A PARTICLE SWARM WITH A SHARED CONTROL INPUT USING BOUNDARY INTERACTION** C6
Shiva Shahrokhi, Arun Mahadev, and Aaron T. Becker

1:51 – 1:56 p.m. **MAXIMIZING SWARM COVERAGE:HUNTING FOR MEMBERS OF A MOVING POPULATION** C7
Mary C. Burbage and Aaron T. Becker

1:57 - 2:02 p.m. **GLOBALLY CONTROLLED SWARM FOR MULT-ROBOT COVERAGE** C8
Arun V. Mahadev, Dominik Krupke , S´andor P. Fekete, and Aaron T. Becker

2:03 – 2:08 p.m. **FLUORESCENCE IMAGING WITH DOTLENS ON A SMARTPHONE** C9
Yulung Sung and Wei-Chuan Shih

2:09 - 2:14 p.m. **HIGH-THROUGHPUT AND HIGH QUALITY MID-INFRARED SPECTRO-SCOPIC IMAGING USING DISCRETE FREQUENCY LASER SCANNING AND TIME-DELAYED INTEGRATION** C10
Shihao Ran and David Mayerich

2:15 - 2:20 p.m. **MOVING MILLIROBOTS THROUGH TISSUE USING MAGNETIC HAMMER ACTUATION** C11
Ashwin Ramakrishnan, Julien Leclerc, and Aaron T. Becker

2:20 - 2:30 p.m. **COFFEE BREAK**

SESSION D: PHYSICS, TECHNOLOGY, AND CHARACTERIZATION OF NEW MATERIALS FOR ELECTRON DEVICES AND CIRCUITS, MEMS, AND ENERGY SOURCES.
SESSION TYPE: ORAL
TIME: 2:30 - 3:35 P.M.
FACULTY CHAIR: DR. JACK WOLFE

2:30 - 2:35 p.m. **ELECTROLESS ATOMIC LAYER DEPOSITION OF PT2+ ON CU NANOWIRES** D1
Dhaivat J. Solanki and Stanko R. Brankovic

2:36 - 2:41 p.m. **FABRICATION OF MULTI-POINT SIDE-FIRING OPTICAL FIBER BY LASER MICRO-ABLATION** D2
Hoang Nguyen, Arnob M Parvez, Aaron T Becker, John C Wolfe, Matthew K Hogan, Philip J Horner, and Wei-Chuan Shih

2:42 - 2:47 p.m. **MECHANICAL MILLING INDUCED BAND GAP CHANGE IN PSEUDOBOEHMITE AND PSEUDOBOEHMITE DOPED WITH CR^{3+}** D3
W. Yang, S. Brankovic, and F. C. Robles Hernández

2:48 - 2:53 p.m. **ENHANCING INTERFACIAL STABILITY OF SODIUM METAL ANODE WITH SOLID POLYMER-SULFIDE COMPOSITE ELECTROLYTE** D4
Ye Zhang and Yan Yao

2:54 – 2:59 p.m. **(110) CUBIC AND (100) RHOMBOHEDRAL GE CRYSTAL FORMATION ON GLASS USING AL-INDUCED CRYSTALLIZATION** D5
Kaveh Shervin, Khim Kharel, and Alexandre Freundlich

3:00 – 3:05 p.m. **CHICKEN EGG SHELLS AS ROBUST, REPRODUCIBLE, AND LOW-COST SERS SUBSTRATES** D6
Md Masud Parvez Arnob and Wei-Chuan Shih

3:06 – 3:11 p.m. **INTERACTION OF ORGANIC CATION WITH WATER MOLECULE IN PEROVSKITE CH3NH3PBI3: FROM DYNAMIC ORIENTATIONAL DISORDER TO HYDROGEN BONDING** D7
Zhuan Zhu, Viktor G. Hadjiev, Yaoguang Rong, Rui Guo, Bo Cao, Zhongjia Tang, Fan Qin, Yang Li, Yanan Wang, Fang Hao, Swaminathan Venkatesan, Wenzhi Li, Steven Baldelli, Arnold M. Guloy, Hui Fang, Yandi Hu, Yan Yao, Zhiming Wang, and Jiming Bao

3:12 – 3:17 p.m. **DIRECT FABRICATION OF NANO-POROUS GOLD DISKS ON POLYDIMETHYLSILOXANE** D8
Ibrahim Misbah and Wei-Chuan Shih

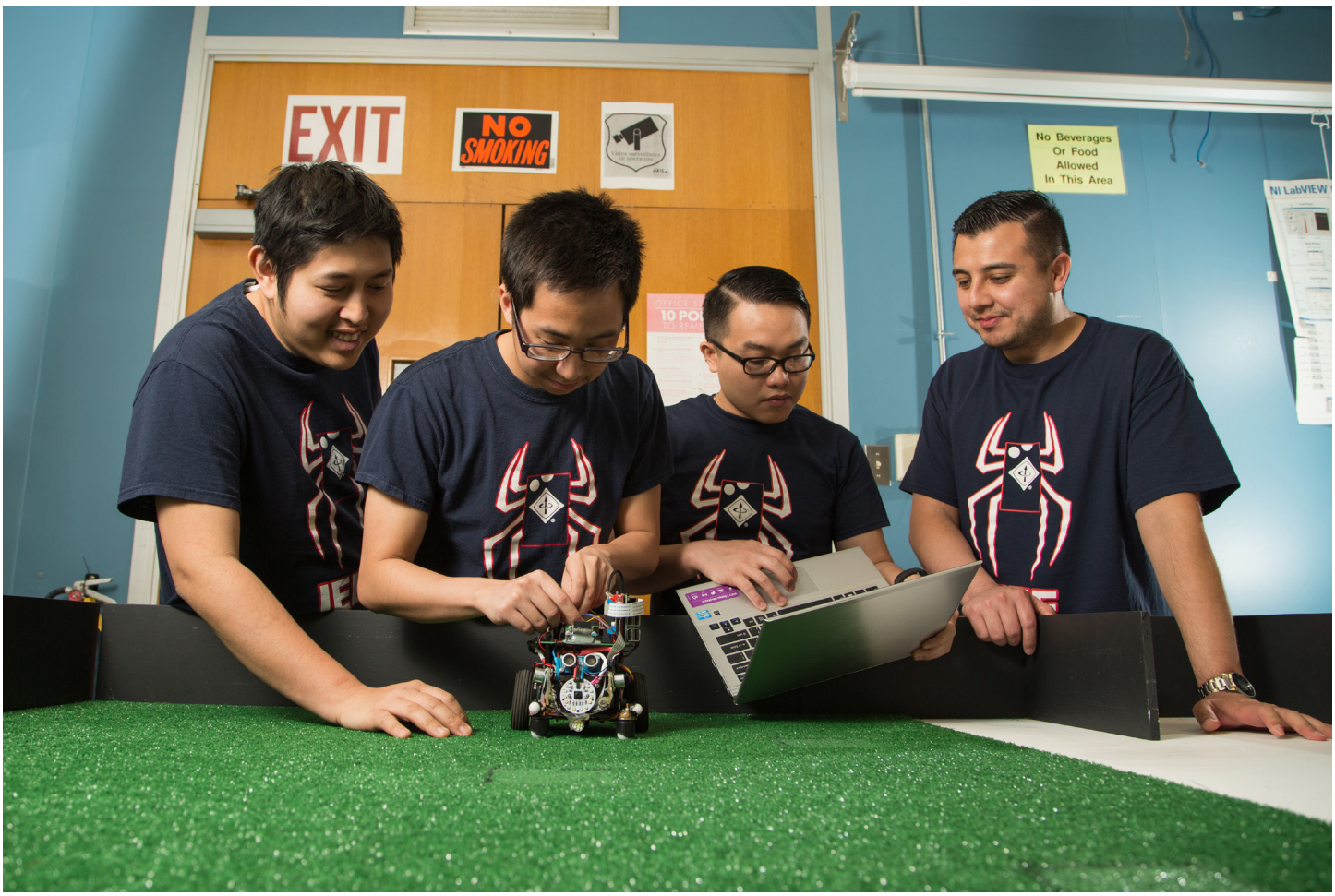
3:18 – 3:23p.m. **ULTRA-FAST ENERGY STORAGE PROPERTIES OF CONJUGATED REDOX POLYMER: A MECHANISM STUDY** D9
Fang Hao and Yan Yao

3:24 – 3:29 p.m. **TOWARDS A FULL AQUEOUS CALCIUM-ION BATTERY FOR GRID ENERGY STORAGE** D10
Saman Gheytani and Yan Yao

3:30 – 3:35 p.m. **FAST GPU-BASED SNAKES FOR MASSIVE 2D/3D IMAGES** A12
M. Lotfollahi and D. Mayerich

SESSION E: POSTER PRESENTATIONS
TIME: 3:35 – 5:30 PM, WALDORF ASTORIA, BALLROOM
ALL POSTERS WILL MATCH TALKS PRESENTED BY THE GRADUATE STUDENTS IN ORAL SESSIONS.

5:30– 6:00 p.m.	**ELEVATOR TALKS BY CDC STUDENTS HOSTED BY DR. LEN TROMBETTA SHAMROCK, BALLROOM**
6:00 – 6.30 p.m.	**AWARDS CEREMONY AND RECEPTION, SHAMROCK, BALLROOM**



Capstone Design Presentations

SESSION A: ORAL PRESENTATIONS
TIME: 9:00 - 10:00 AM, FLAMINGO ROOM
FACULTY CHAIR: DR. STEVEN PEI

9:00 - 9:15 a.m.	**GROUND SG100 POWER SUPPLY (GSPS)** *Kaisong Fan, Elliot Pucek, Deedhiti Sharanya, and Matthew Yepes*	A1
9:15 – 9:30 AM	**ARDUINO BASED HOME AUTOMATION** *Osama Eter, Michael Ngo, Jonathan Soileau, and Marvine Adrian Penson*	A2
9:30 – 9:45 AM	**SOLAR OUTLET** *Eliud Serna, Jiwantha Mannapperuma, David Oshkoohi, and Jose Tenorio*	A3
9:45 – 10:00 AM	**PRODUCTION AUTOMATION PROJECT, COVESTRO** *Jasmin Hemdani, Keon McEwen, Ikemefule Onyearugha, and Nathan Prows*	A4
10:05 – 10:30 AM	**WELCOMING REMARKS AND ADDRESSES IN PLAZA ROOM** *Dr. Hanadi Rifai, Associate Dean, College of Engineering* *Dr. Badri Roysam, Chair, Electrical and Computer Engineering*	
10:30 – 10:45 AM	**COFFEE BREAK**	

SESSION B: ORAL PRESENTATIONS
TIME: 10:45 - 11:45 AM, FLAMINGO ROOM
FACULTY CHAIR: DR. STEVEN PEI

10:45 – 11:00 a.m. **DYNAMIC BRAILLE DISPLAY** B1
Daniel Lopez, Katherine Perez, Sergio Silva, and David Garcia-Castellano

11:00 – 11:15 a.m. **CNC LASER ENGRAVER** B2
Michael Pincus, Theodore Rodriguez, Nayam Perez, and Logan Golden

11:15 – 11:30 a.m. **FSAE DIAGNOSTIC SYSTEM** B3
Isaias Amaya, Otoniel Canuz, and Osvaldo Rodriguez-Martinez

11:30 - 11:45 a.m. **IEEE ROBOTICS** B4
Cuong Ha, Kasan Momin, Idam Obiahu, and Tevin Richards

11:50 - 12:45 p.m. **LUNCH, SHAMROCK, BALLROOM**

12:30 - 1:15 p.m. **KEYNOTE PRESENTATION, SHAMROCK BALLROOM**
"THE GLOBAL IMPACT OF ELECTRICAL & COMPUTER ENGINEERING IN SOCIETY"
Igor Alvarado, Business Development Manager for Academic Research National

SESSION C: ORAL PRESENTATIONS
TIME: 1:15 - 2:15 PM, FLAMINGO ROOM
FACULTY CHAIR: DR. LEN TROMBETTA

1:15 - 1:30 p.m. **SWARM DEMOSNTRATION HARDWARE SYSTEM: APPLIED TO MAINTAINING A WIRELESS SENSOR NETWORK** C1
Christiana Chamon, Rachel Dunn, Maria Ciara Lalata, and Mable Wan

1:30 – 1:45 p.m. **APAT CONTROLLER** C2
Efrain Guajardo, Mohammad Nazarifar, and Abdulrahmar Kamal

1:45 – 2:00 p.m. **CNC LASER ENGRAVER** C3
Christopher Gay, Arian Pourmotamed, Justin Crabb, and King Fung

2:00 – 2:15 p.m. **PROJECT: INDEPENDENCE** C4
Moriah Hargrove-Anders, Nancy Ibarra, and Clayton Manchaca

2:15 – 2:30 p.m. **COFFEE BREAK**

SESSION D: ORAL PRESENTATIONS
TIME: 2:30 - 3:00 PM, FLAMINGO ROOM
FACULTY CHAIR: DR. LEN TROMBETTA

2:30 – 2:45 p.m. **AUTOMATIC SMOKER** D1
Jonathan DeLeon, Benito Martinez Jr., and Phuong Ngo

2:45 – 3:00 p.m. **RESISTOR BOT** D2
Michael Brannon, Sarah Thomas, Julio Moreno, and Hazuki Chino

SESSION E: POSTER PRESENTATIONS
TIME: 3:35 – 5:30 PM, WALDORF ASTORIA, BALLROOM
ALL POSTERS WILL MATCH TALKS PRESENTED BY THE STUDENTS IN ORAL SESSIONS.

5:30– 6:00 p.m. **ELEVATOR TALKS BY CDC STUDENTS HOSTED BY DR. LEN TROMBETTA**
SHAMROCK, BALLROOM

6:00 – 6.30 p.m. **AWARDS CEREMONY AND RECEPTION, SHAMROCK, BALLROOM**

KEYNOTE PRESENTATION

"THE GLOBAL IMPACT OF ELECTRICAL & COMPUTER ENGINEERING IN SOCIETY"

IGOR ALVARADO
Business Development Manager for Academic Research
National Instruments Corp.

As a professional career, Electrical and Computer Engineering (ECE) is rapidly evolving as new technologies and applications demand an engineer capable of designing, building, maintaining and operating complex systems that are tightly coupled with mechanical engineering, software engineering, biomedical engineering and other disciplines. But not everything is about technology; the social component in the ECE student's education and professional career is also key; as part of the non-technical student outcomes, the Accreditation Board for Engineering and Technology (ABET) indicates that students should have the "ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability". Nowadays, ECE must be part of a "transdisciplinary integration of life sciences, physical sciences, engineering, and beyond through convergence, to form a comprehensive synthetic framework for tackling scientific and societal challenges that exist at the interfaces of multiple fields". Many of these complex systems can be considered "systems of systems" in which different distributed "agents" that conduct specialized tasks are simultaneously collaborating through wired/wireless communication channels to achieve a global objective. Examples of these systems include a whole new generation of Cyber Physical Systems (CPS) that intrinsically involve controls, communications and computing, together with sensing and actuation, cybersecurity, deep learning and data analytics; at this level, large, highly distributed but tightly integrated systems have made possible such concepts as Smart Cities in which technology can have a direct impact on our lives and on society in general. In this talk, we will take a journey across multiple scenarios in which the ECE professional could (and should) play a key role by designing, developing and deploying new technologies and complex bio-mechatronic systems that leverage emerging technologies such as neuromorphic and quantum computing, spintronics, 5G and mmWave wireless communications, metamaterials, human/brain-machine interfaces and many others.

ABOUT THE SPEAKER

Mr. Alvarado is a Mechanical Engineer (Kansas State University, 1984) and currently works with National Instruments (NI) as the Business Development Manager for Academic Research. He has been with NI since 1999, and has more than 30 years practical experience in the design, development and deployment of real-time, measurement and control systems that involve high-performance numerical methods in C, C++, FORTRAN and NI LabVIEW using PC-based and embedded technologies for a wide spectrum of academic research projects and industries including system-level solutions for the energy sector. Mr. Alvarado led the development and implementation of some of the first power sub-station monitoring and control systems using LabVIEW and NI data acquisition hardware on industrial computers in Latin America. He has also been involved in several research centers at leading universities in Texas and Oklahoma. On the STEM teaching/education side, Mr. Alvarado has been involved in the design and implementation of novel approaches for teaching/learning and scientific research in science/engineering with a special emphasis on hands-on learning and undergraduate research projects. He is an active member of several professional societies, including the Institute of Electrical and Electronics Engineers (IEEE), the Society of Industrial and Applied Mathematics (SIAM), the International Society of Automation (ISA), the American Physical Society (APS) and the Ibero-American Science and Technology Education Consortium (ISTEC). Mr. Alvarado has published papers in technical publications and has taught courses to engineers and scientists involved in instrumentation, control and automation applications in industry and academia. He has also been an invited speaker at numerous leading universities in the U.S. and Latin America, as well as national/international meetings. Over the past 28 years, he has served as a consultant or advisory board member for several institutes, colleges, universities, corporations and research laboratories and currently advises two international innovation institutes, and several colleges and universities in the U.S.

THANK YOU FOR JOINING US AT THE 2017 GRADUATE REASEARCH AND CAPSTONE DESIGN CONFERENCE!

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Department of Electrical & Computer Engineering