



Volume 15 Issue 1
Winter '15

CECS eNEWS



Center for Embedded and Cyber-physical Systems, University of California, Irvine

CECS at ISQED 2015

Highlights

- ISQED 2015
- ASP-DAC 2015
- Invited Lectures
- **Visitor Profile:**
Gil Won Yoon
- **Student Profile:**
Ahmed Ibrahim



3 Papers Presented!

The 16th International Symposium on Quality Electronic Design (ISQED 2015) was held on March 2-4, 2015 at Santa Clara, CA. ISQED, the premier interdisciplinary and multidisciplinary Electronic Design conference - bridges the gap between Electronics/Semiconductor ecosystem members providing electronic design tools, integrated circuit technologies, semiconductor technology, packaging, assembly & testing to achieve design quality. This important three-day event is packed full of tutorials, keynote speeches, panel discussions, and in-depth technical sessions. The following technical papers were presented by CECS faculty researchers and graduate students:

"Cyberphysical-system-on-chip (CPSoC): A Self-aware MPSoC Paradigm with Cross-layer Virtual Sensing and Actuation," by Santanu Sarma, Nikil D. Dutt, Puneet Gupta, Nalini Venkatasubramanian, Alexandru Nicolau.

"Orchestrated Application Quality and Energy Storage Management in Solar-powered Embedded Systems," by Nga Dang, Hossein Tajik Nikil D. Dutt, Nalini Venkatasubramanian, Eli Bozorgzadeh.

"Thermal Sensor Allocation for SoCs based on Temperature Gradients," by Jun Yong Shin, Fadi J. Kurdahi, Nikil D. Dutt.

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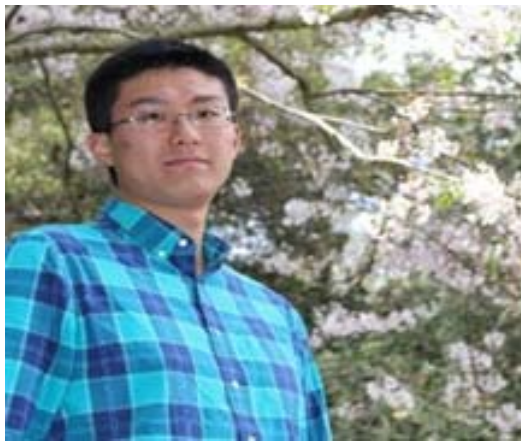


ASP-DAC & CECS Lectures

Guantao Liu & Che-Wei Chang Present at ASP-DAC



ASP-DAC 2015 is the twentieth annual international conference on VLSI design automation in Asia and the South Pacific, one of the most active regions for design and fabrication of silicon chips in the world. This year, the conference was held in Chiba Japan from January 19-22, 2015. The conference aims at providing the Asian and South Pacific CAD/DA and Design community with opportunities to present recent advances, and with forums for future directions in technologies related to Electronic Design Automation (EDA). Below are two papers that were presented by CECS graduate students from Prof. Rainer Doemer's research group.



Guantao Liu co-presented his paper titled "Optimizing Thread-to-Core Mapping on Manycore Platforms with Distributed

Tag Directories" at Technical Session 5A: Optimization and Exploration for Caches, on Wednesday, January 21, 2015. The paper's other authors include Tim Schmidt (UCI), Prof. Rainer Dömer (UCI), Ajit Dingankar (Intel) and Desmond Kirkpatrick (Intel).

Che-Wei Chang co-authored a paper with Prof. Rainer Dömer titled "Communication Protocol Analysis of Transaction-Level Models Using Satisfiability Modulo Theories" and presented it at Technical Session 7A: Ensuring the Correctness of System Integration on Thursday, January 22, 2015.



Che-Wei Chang recently received his Ph.D. and is now working at MathWork in Boston.

CECS Invited Lectures

During Winter'15, CECS hosted the following 5 invited talks from academia and industry. Photos are shown below. More information about CECS seminars is available on the CECS web site: www.cecs.uci.edu

CECS Invited Lectures (cont. from pg. 2)...

"Architectural Support for Security in Emerging Platforms"

by Prof. Nael Abu-Ghazaleh, CSE and ECE Departments,
UC Riverside

Wednesday, March 4, 2015

Host: Fadi Kurdahi

**"Towards the Automatic Application and Verification of Countermeasures Against Physical Attacks"**

by Dr. Francesco Regazzoni, Advanced Learning and Research Institute (ALaRI), University of Lugano, Switzerland
Tuesday, March 3, 2015

Host: Prof. Nikil Dutt and Dr. Rosario Cammarota

**"Inertial and Bio-potential-based Wearable Computers: Algorithms and Applications"**

by Prof. Roozbeh Jafari, Electrical Engineering Department,
University of Texas at Dalls

Thursday, February 12, 2015

Host: Eli Bozorgzadeh

**"Connected Context Computing for Smart IoT"**

by Prof. Jane Yung-jen Hsu, Director, Intel-NTU Connected
Context Computing Center, National Taiwan University

Tuesday, February 10, 2015

Host: Prof. Kwei-Jay Lin

**"Design Automation of Things: Power Consumption Characterization, Modeling and Estimation of Electric Vehicles"**

by Prof. Naehyuck Chang

Tuesday, February 10, 2015

Host: Nikil Dutt



Visitor & Student Profiles

Visitor Profile: Prof. Gil Won Yoon



Professor Gil Won Yoon from Department of Electronics & Information Technology, Seoul National University of Science and Technology, Korea, recently joined CECS as a visiting researcher from February 2015 - January 2016.

Prof. Gil Won Yoon received his BS degree from Seoul National University, Seoul, Korea in 1977,

MS and Ph.D degrees from the University of Texas at Austin, in 1984 and 1988 respectively.

His previous work experience includes the development of medical devices at Samsung electronics, Korea. He also worked at the National Institute for Health and Medical Research (INSERM) in France, and at Utah Laser Institute, Salt Lake City, Utah.

His research interests include biosignal sensing and processing, ubiquitous personal health monitoring and biomedical spectroscopy.

Prof. Pai Chou is hostint his visit to CECS and UCI.



New Student Profile: Ahmed Mokhtar Nagy Ibrahim

I am Ahmed Ibrahim. I recieved my B.Sc. in electronics and communications from Ain shams University, Cairo, Egypt in 2008, then pursued my masters degree at Nile University in Cairo in 2014.

My research was in the computer aided design and design automation field. At the same time I was working in the integrated circuits industry as a digital hardware designer. I have participated in the production of many integrated circuits chips in the inertial sensors field.

This year I joined the Wireless Systems and Circuits Laboratory in UCI as a PhD student. I am currently working with Professor Ahmed Eltawil as a CECS graduate student researcher on a research project which targets developing a system



that uses smartphones to detect earthquakes and to assess the state of buildings after these disasters.

CECS Winter Mtg. & Publications

CECS Winter '15 Quarterly Meeting

Over 70 graduate students, faculty and staff attended CECS's Winter Quarterly meeting held on January 29, 2015 at the Harut Barsamian Colloquia Room. CECS Director Fadi Kurdahi welcomed everyone and Prof. Pai Chou presented an overview of his current research on embedded systems. The first half of the talk was on low-power miniature wireless embedded platforms and energy harvesting systems. The second half was on software support for embedded systems, including indoor localization, interactive programming, and middleware for the Internet of Things (IoT) cloud.



Publications

The following papers were published by CECS affiliates between January 2015 through March 2015 (and unreported papers from previous eNews).

Author, Title, Publication	Conference Proceedings
Shah Mohammad Faizur Rahman, Qing Yi, Houman Homayoun, " Just-in-time Component-wise Power and Thermal Modeling ,"	12th ACM International Conference on Computing Frontiers (CF'15): 2:1-2:8, Conference on Computing Frontiers 2015: Ischia, Italy, March 18-21, 2015
Roberto Valentini, Marco Levorato, Carlo Fischione, " Performance Analysis of IEEE 802.15.3c-Based mmW Wireless Networks ,"	the 49th Annual Conference on Information Sciences and Systems (CISS 2015):1-6, Baltimore, MD, USA, March 18-20, 2015
Che-Wei Chang, Rainer Dömer, " May-happen-in-parallel Analysis of ESL Models Using UP-PAAL Model Checking ,"	the 2015 Design, Automation & Test in Europe Conference & Exhibition (DATE 2015):1567-1570, Grenoble, France, March 9-13, 2015
Abbas Rahimi, Amirali Ghofrani, Kwang-Ting Cheng, Luca Benini, Rajesh K. Gupta, " Approximate Associative Memristive Memory for Energy-Efficient GPUs ,"	the 2015 Design, Automation & Test in Europe Conference & Exhibition (DATE 2015):1497-1502, Grenoble, France, March 9-13, 2015

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Publications

Publications

Author, Title, Publication

Conference Proceedings

Nishit Ashok Kapadia, Sudep Pasricha, **"VARSHA: Variation and Reliability-aware Application Scheduling with Adaptive Parallelism in the Dark-silicon Era,"** the 2015 Design, Automation & Test in Europe Conference & Exhibition (DATE 2015):1060-1065, Grenoble, France, March 9-13, 2015

Zonglin Guo, Ian G. Harris, Lih-feng Tsaur, Xianbo Chen, **"An On-Demand Scatternet Formation and Multi-Hop Routing Protocol for BLE-based Wireless Sensor Networks,"** IEEE Wireless Communications and Networking Conference (WCNC 2015): New Orleans, LA, USA, March 9-12, 2015

Anna Korotaeva, Wolfgang Nebel, **"Impact of Data Sharing on Co-Running Embedded Applications in Multi-core System,"** the 23rd Euromicro International Conference on Parallel, Distributed, and Network-based Processing (PDP 2015):716-720, Turku, Finland, March 4-6, 2015

Santanu Sarma, Nikil D. Dutt, Puneet Gupta, Nalini Venkatasubramanian, Alexandru Nicolau, **"Cyberphysical-system-on-chip (CPSoC): A Self-aware MPSoC Paradigm with Cross-layer Virtual Sensing and Actuation,"** the 16th International Symposium on Quality Electronic Design (ISQED 2015):625-628, Santa Clara, CA, USA, March 2-4, 2015

Nga Dang, Hossein Tajik Nikil D. Dutt, Nalini Venkatasubramanian, Eli Bozorgzadeh, **"Orchestrated Application Quality and Energy Storage Management in Solar-powered Embedded Systems,"** the 16th International Symposium on Quality Electronic Design (ISQED 2015):227-233, Santa Clara, CA, USA, March 2-4, 2015

Jun Yong Shin, Fadi J. Kurdahi, Nikil D. Dutt, **"Thermal Sensor Allocation for SoCs based on Temperature Gradients,"** the 16th International Symposium on Quality Electronic Design (ISQED 2015):29-34, Santa Clara, CA, USA, March 2-4, 2015

Payam Heydari, Taizo Yamawaki, **"Session 25 Overview: RF Frequency Generation from GHz to THz: RF Subcommittee,"** IEEE International Solid-State Circuits Conference (ISSCC 2015): San Francisco, CA, USA, February 22-26, 2015

Korosh Vatanparvar, Quan Chau, Mohammad Abdullah Al Faruque, **"Home Energy Management as a Service over Networking Platforms,"** IEEE Power & Energy Society Innovative Smart Grid Technologies Conference (ISGT 2015):1-5, Washington, DC, USA, February 18-20, 2015

Publications

- | Author, Title, Publication | Conference Proceedings |
|---|------------------------|
| Rana A. Abdelaal, Alireza Shahan Behbahani, Ahmed M. Eltawil, "Advanced Base Station Pre-coding and User Receiver Designs for LTE-Advanced Networks," International Conference on Computing, Networking and Communications (ICNC 2015): 1024-1028, Garden Grove, CA, USA, February 16-19, 2015 | |
| Stephen Crane, Andrei Homescu, Stefan Brunthaler, Per Larsen, Michael Franz, "Thwarting Cache Side-Channel Attacks Through Dynamic Software Diversity," the 22nd Annual Network and Distributed System Security Symposium (NDSS 2015), San Diego, CA, USA, February 8-11, 2015 | |
| Vishwath Mohan, Per Larsen, Stefan Brunthaler, Kevin W. Hamlen, Michael Franz, "Opaque Control-Flow Integrity," the 22nd Annual Network and Distributed System Security Symposium (NDSS 2015), San Diego, CA, USA, February 8-11, 2015 | |
| Byron Hawkins, Brian Demsky, Derek Bruening, Qin Zhao, "Optimizing Binary Translation of Dynamically Generated Code," the 13th Annual IEEE/ACM International Symposium on Code Generation and Optimization (CGO 2015):68-78, San Francisco, CA, USA, February 7-11, 2015 | |
| Meltem Ozsoy, Caleb Donovan, Lakov Gorelik, Nael B. Abu-Ghazaleh, Dmitry V. Ponomarev, "Malware-aware Processors: A Framework for Efficient Online Malware Detection," the 21st IEEE International Symposium on High Performance Computer Architecture (HPCA 2015):651-661, Burlingame, CA, USA, February 7-11, 2015 | |
| Che-Wei Chang, Rainer Dömer, "Communication Protocol Analysis of Transaction-level Models Using Satisfiability Modulo Theories," the 20th Asia and South Pacific Design Automation Conference (ASP-DAC 2015):606-611, Chiba, Japan, January 19-22, 2015 | |
| Guantao Liu, Tim Schmidt, Rainer Dömer, Ajit Dingankar, Desmond Kirkpatrick "Optimizing Thread-to-core Mapping on Manycore Platforms with Distributed Tag Directories," the 20th Asia and South Pacific Design Automation Conference (ASP-DAC 2015):429-434, Chiba, Japan, January 19-22, 2015 | |
| Philipp Ittershagen, Philipp A. Hartmann, Kim Grüttner, Wolfgang Nebel, "A Workload Extraction Framework for Software Performance Model Generation," the 2015 Workshop on Rapid Simulation and Performance Evaluation: Methods and Tools (RAPIDO@HiPEAC 2015): 3:1-3:6, Amsterdam, The Netherlands, January 21, 2015 | |
| Santanu Sarma, Nikil Dutt, "Cross-Layer Exploration of Heterogeneous Multicore Processor Configuration," the 28th International Conference on VLSI Design (VLSID 2015):147-152, Bangalore, India, January 3-7, 2015, | |

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PUBLICATIONS

Author, Title, Publication

Journal Papers

Aberto Compagno, Mauro Conti, Cesar Ghali, Gene Tsudik, **"To NACK or not to NACK? Negative Acknowledgements in Information -Centric Networking,"** The Computing Research Repository (CoRR), CoRR abs/1503.02123, March, 2015

Michael C. Avery, Jeffrey L. Krichmar, **"Improper Activation of D1 and D2 Receptors Leads to Excess Noise in Prefrontal Cortex,"** Frontier in Computational Neuroscience, March, 2015

Elsayed Ahmed, Ahmed M. Eltawil, **"On Phase Noise Suppression in Full-Duplex Systems,"** IEEE Transactions on Wireless Communications (TWC)14(3):1237-1251, March, 2015

Majid Shoushtari, Abbas BanaiyanMofrad, Nikil D. Dutt, **"Exploiting Partially-forgetful Memories for Approximate Computing,"** IEEE Embedded Systems Letters 7(1):19-22, March, 2015

Abbas BanaiyanMofrad, Houman Homayoun, Nikil D. Dutt, **"Using a Flexible Fault-Tolerant Cache to Improve Reliability for Ultra Low Voltage Operation,"** ACM Transactions on Embedded Computing Systems (TECS) 14(2):32:1-32:24. March, 2015

Erman Ayday, Emiliano De Cristofaro, Jean-Pierre Hubaux, Gene Tsudik, **"Whole Genome Sequencing: Revolutionary Medicine or Privacy Nightmare?"** IEEE Computer 48(2):58-66, March, 2015

Abdulla Al-Qawasmeh, Sudeep Pasricha, Anthony A. Maciejewski, Howard Jay Siegel, **"Power and Thermal-Aware Workload Allocation in Heterogeneous Data Centers,"** IEEE Transactions on Computer 64(2):477-491, February, 2015

Wenliang He, Daniel Gajski, George Farkas, Mark Warschauer, **"Implementing Flexible Hybrid Instruction in an Electrical Engineering Course: The Best of Three Worlds?"** Computers & Education 81:59-68, February, 2015

Amr M. A. Hussien, Rahul Amin, Ahmed M. Eltawil, Jim Martin, **"Energy Aware Mapping for Reconfigurable Wireless MPSoCs,"** IEEE Transactions on Very Large Scale Integration (VLSI) Systems (TVLSI) 23(2):392-396, February, 2015

Vahid Salmani, Pai H. Chou, **"Resilient Round Robin: A Lightweight Deterministic MAC Primitive,"** TOSN 11(2):31:1-31:38, February, 2015

Mehmet Kayaalp, Timothy Schmitt, Junaid Nomani, Dmitry V. Ponomarev, Nael B. Abu-Ghazaleh, **"Signature-based Protection from Code Reuse Attacks,"** IEEE Transactions on Computers (TC) 64(2):533-546, February, 2015

Jing Huang, A. Lee Swindlehurst, **"Buffer-Aided Relaying for Two-Hop Secure Communication,"** IEEE Transactions on Wireless Communications 14(1):152-164, January, 2015

Bailey Miller, Frank Vahid, Tony Givargis, Philip Brisk, **"Graph-Based Approaches to Placement of Processing Element Networks on FPGAs for Physical Model Simulation,"** ACM Transactions on Reconfigurable Technology and Systems (TRETs) 7(4):37:1-37:22, January, 2015

PUBLICATIONS

Author, Title, Publication

Journal Papers

Chun Meng, Abhik Kumar Das, Abinеш Ramakrishnan, Syed Ali Jafar, Athina Markopoulou, Sriram Vishwanath, "**Precoding-based Network Alignment for Three Unicast Sessions**," IEEE Transactions on Information Theory 61(1):426-451, January, 2015

Iméne Mhadhbi, Nabil Litayem, Slim Ben Othman, Slim Ben Saoud, "**Impact of Hardware/Software Partitioning and MicroBlaze FPGA Configurations on the Embedded Systems Performances**," Complex System Modeling and Control Through Intelligent Soft Computations 2015:711-744

Esha Ghosh, Michael T. Goodrich, Olga Ohrimenko, Roberto Tamassia, "**Fully-Dynamic Verifiable Zero-Knowledge Order Queries for Network Data**," IACR Cryptology ePrint Archive 2015:283, 2015

CECS—promoting creativity and pursuing discovery!

Center for Embedded and Cyber-Physical Systems, University of California, Irvine



CECS Mission Statement:

To conduct leading-edge interdisciplinary research in embedded systems emphasizing automotive, communications, and medical applications, and to promote technology and knowledge transfer for the benefit of the individual and society.



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