



Al Faruque Receives 2015 DAC Best Paper Award

Highlights

- Al Faruque Best Paper Award at DAC and Chancellor's Award
- Dutt Named ACM Fellow
- Heydari Receives Rockwell Grant
- CECS Visitors

CECS member and EECS Professor Mohammad Alfaruque and his student, Korosh Vatanparvar have received the best paper award at the IEEE/ACM 52nd Design Automation Conference, " held in San Francisco on June 7-11, 2015, for their paper titled "Battery lifetime-Aware Automotive Climate Control for Electric Vehicles". The oldest and most prestigious conference in the VLSI/CAD area, DAC receives over 800 submissions of which less than 20% (160) are accepted. Only six papers are nominated for the best paper award.



These papers go through a rigorous selection process involving additional rounds of review, panel discussion, and attendance and evaluation of the

oral presentations at the conference. In the end, only two papers are awarded this prestigious honor. Prof. Al Faruque is the first UCI faculty to receive this award, and one of very few individuals worldwide to have received both DAC and ICCAD (another top CAD conference) best paper awards.



Dutt Named ACM Fellow

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Chancellor's Professor Nikil Dutt was named a 2014 ACM Fellow for his contributions to embedded architecture exploration, and electronic design automation and embedded systems. He was formally inducted at the Annual ACM Awards Banquet held on June 20, 2015 in San Francisco. ACM Fel-

low is ACM's most prestigious member grade and recognizes the top 1% of ACM members for their outstanding accomplishments in computing and information technology and/or outstanding service to ACM and the larger computing community.

CECS Faculty Awards

Heydari Receives Rockwell Collins Grant



Professor Payam Heydari's proposal titled, "Novel Fully Integrated Phased-Array Terahertz Sensors for Se-Through Scanning Applications," has been selected for funding from 40 strong proposals, to the Rockwell Collins Grant Program. Rockwell Collins is a pioneer in the design, production and support of innovative solutions in aerospace and defense. Prof. Heydari is excited to have the opportunity to collaborate with Rockwell Collins and looks forward to the progress and success of this project.



Al Faruque Earns Chancellor's Award for Excellence in Fostering Undergraduate Research



Congratulations to Prof. Mohammad Al Faruque for receiving the 2015 Chancellor's Award for Excellence in Fostering Undergraduate Research.

His student Quan Quoc Minh is the undergraduate student recipient of the Chancellor's Award for Excellence in Undergraduate Research. This award is in recognition of Prof. Al Faruque's outstanding work in mentoring Quan Quoc Minh's engagement in research and creative activity.

Prof. Al Faruque was presented with the award at the 22nd Annual UCI Undergraduate Research Symposium, held on Saturday, May 16, 2015 in the UCI Student Center. The Symposium's theme, "Undergraduate Research: Brilliant Future," celebrated the profound impact that faculty-mentored research and creative experience can have on students' lives and their communities.

For more information about the UCI Undergraduate Research Symposium and the Chancellor's Award, please visit: <http://www.urop.uci.edu/symposium.html>

Graduation Party and CECS Visitors

Dutt and Krichmar Labs Graduation/Farewell Party

Chancellor's Professor Nikil Dutt and Professor Jeffrey Krichmar hosted a graduation/farewell party on Thursday May 21, 2015, at University Hills, to celebrate the graduation of Drs. Abbas Banaiyan-Mofrad, Jun Shin and Ting-Chou Chou and also Dr. Kris Carlson's new position at Sandia National Laboratories in Albuquerque.

Family and friends of the graduates, their fellow graduate students from the Dutt Research Group, the Cognitive Anteatr Robotics Laboratory (CARL), and CECS staff were present to congratulate the new graduates. The four proud graduates popped the cork of a champagne bottle as they celebrated this major milestone and achievement in their life. Prof. Krichmar presented gifts to the new graduate, Dr. Ting-Shuo Chou and the postdoc, Dr. Kris Carlson, as a token of appreciation for their hard work. In addition to the champagne and "Class of 2015" graduation cake, the participants also enjoyed delicious appetizers, Indian food, and drinks.



CECS Visitors

Professor Rainer Leupers from RWTH Aachen University in Germany, visited CECS on Thursday, April 9, 2015. He also gave a talk titled "Design Technologies for Embedded Multiprocessor Systems-on-Chip". His research and teaching activities comprise software development tools, processor architectures, and system-level electronic design automation, with focus on application-specific multicore systems. The photo on the next page was taken with CECS Director Fadi Kurdahi, Profs. Mohammad Al Faruque, Rainer Domer and Daniel Gajski.

Visitors & Quarterly Meeting

CECS Visitors (cont. from pg. 3)...



Professor Muhammad Mustafa Hussain from the King Abdullah University of Science and Technology (KSUST) was the guest speaker for the talk on Tuesday, April 21, 2015. The title of his talk was "Flexible-Stretchable-Reconfigurable CMOS

Electronics Through Hybrid Integration of Heterogeneous Materials for Wearable Interactive Electronic Systems". During his visit, he also had a chance to meet with faculty from BME, EECS and Beckman Laser Institute to explore future collaboration with them.

CECS Spring Quarter Meeting

CECS hosted a Spring Quarter meeting on April 29, 2015 at the Harut Barsamian Colliquia Room. Prof. Rainer Dömer presented his research titled, "Out-of-Order Parallel Simulation of SystemC Virtual Platforms on Many-Core Architectures." In this presentation, Prof. Dömer provided an overview of his project on advanced parallel simulation, supported by Intel® Corporation. This research project applies Out-of-Order Parallel Discrete Event Simulation (OoO PDES), developed at CECS to embedded design models written in SystemC. This project aims at maximum simulation speed due to parallel execution on many-core host platforms and, at the same time, maximum compliance with standard SystemC semantics. To achieve these ambitious goals, they introduce a dedicated SystemC compiler with advanced static analysis for dependency conflicts, model instrumentation and parallel code generation. A new parallel SystemC library provides multi-threading safe primitives and an out-of-order parallel scheduler for many-core target platforms, such as the Intel® Xeon Phi™ coprocessor. In the end, we plan to release the parallel SystemC environment as Open Source for potential standardization by the Accellera SystemC community.



Publications

Publications

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

Author, Title, Publication

Conference Proceedings

Blerim Cici, Minas Gjoka, Athina Markopoulou, Carter T. Butts, **"On the Decomposition of Cell Phone Activity Patterns and their Connection with Urban Ecology,"** the 16th ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc 2015): 317-326, Hangzhou, China, June 22-25, 2015

Codrut Stancu, Christian Wimmer, Stefan Brunthaler, Per Larsen, Michael Franz, **"Safe and Efficient Hybrid Memory Management for Java,"** the 25th ACM ISGPLAN International Symposium on Memory Management (ISMM 2015):81-92, Portland, OR, USA, June 13-14, 2015

Hamid Mirzaei Buini, Steffen Peter, Tony Givargis, **"Including variability of Physical Models into the Design Automation of Cyber-Physical Systems,"** the 52nd Annual Design Automation Conference (DAC 2015):153:1-153:6, San Francisco, CA, USA, June 7-11, 2015

Abbas Rahimi Daniele Cesarini, Andrea Marongiu, Rajesh K. Gupta, Luca Benini, **"Task Scheduling Strategies to Mitigate Hardware Variability in Embedded Shared Memory Clusters,"** the 52nd Annual Design Automation Conference (DAC 2015):152:1-152:6, San Francisco, CA, USA, June 7-11, 2015

Mohammad Khavari Tavana, Mohammad Hossein Hajkazemi, Divya Pathak, Ioannis Savidis, Houman Homayoun, **"ElasticCore: Enabling Dynamic Heterogeneity with Joint Core and Voltage/Frequency Scaling,"** the 52nd Annual Design Automation Conference (DAC 2015):151:1-151:6, San Francisco, CA, USA, June 7-11, 2015

Santanu Sarma, T. Muck, Luis Angel D. Bathen, Nikil D. Dutt, Alexandru Nicolau, **"SmartBalance: A Sensing-driven Linux Load Balancer for Energy Efficiency of Heterogeneous MPSoCs,"** the 52nd Annual Design Automation Conference (DAC 2015):109:1-109:6, San Francisco, CA, USA, June 7-11, 2015

Bharathan Balaji, Mohammad Abdullah Al Faruque, Nikil D. Dutt, Rajesh K. Gupta, Yuvraj Agarwal, **"Models, Abstractions, and Architectures: the Missing Links in Cyber-Physical Systems,"** the 52nd Annual Design Automation Conference (DAC 2015):82:1-82:6, San Francisco, CA, USA, June 7-11, 2015

Korosh Vatanparvar, Mohammad Adbullah Al Faruque, **"Battery Lifetime-aware Automotive Climate Control for Electric Vehicles,"** the 52nd Annual Design Automation Conference (DAC 2015):37:1-37:6, San Francisco, CA, USA, June 7-11, 2015

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Publications

Publications

- | Author, Title, Publication | Conference Proceedings |
|--|------------------------|
| Abbas BanaiyanMofrad, Mojtaba Ebrahimi, Fabian Oboril, Mehdi Baradaran Tahoori, Nikil D. Dutt, "Protecting Caches Against Multi-bit Errors Using Embedded Erasure Coding," the 20th IEEE European Test Symposium (ETS 2015):1-6, Cluj-Napoca, Romania, May 25-29, 2015 | |
| Mohammad Hossein Hajkazemi, Michael Chorney, Reyhaneh Jabbarvand Behrouz, Mohammad Khavari Tavana, Houman Homayoun, "Adaptive Bandwidth Mangement for Performance-Temperature Trade-offs in Heterogeneous HMC+DDR_x Memory," ACM Great Lakes Symposium on VLSI (GLVLSI 2015): 391-396, Pittsburgh, PA, USA, May 20-22, 2015 | |
| Sai Vineel Reddy Chittamuru, Srinivas Desai, Sudeep Pasricha, "Reconfigurable Silicon-Photonic Network with Improved Channel Sharing for Multicore Architectures," ACM Great Lakes Symposium on VLSI (GLVLSI 2015):63-68, Pittsburgh, PA, USA, May 20-22, 2015 | |
| Katayoun Neshatpour, Houman Homayoun, Amin Khajeh, Wayne Burleson, "Revisiting Dynamic Thermal Management Exploiting Inverse Thermal Dependence," ACM Great Lakes Symposium on VLSI (GLVLSI 2015): 385-390, Pittsburgh, PA, USA, May 20-22, 2015 | |
| Katayoun Neshatpour, Maria Malik, Houman Homayoun, "Accelerating Machine Learning Kernel in Hadoop Using FPGAs," the 15th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGRID 2015): Shenzhen, China, May 4-7, 2015 | |
| Philipp A. Hartmann, Kim Grüttner, Wolfgang Nebel, "Advanced SystemC Tracing and Analysis Framework for Extra-Functional Properties," the 11th International Symposium (ARC 2015):141-152, Bochum, Germany, April 13-17, 2015 | |
| Jiang Wan, Arquimedes Canedo, Mohammad Abdullah Al Faruque, "Model-based Design of Time-triggered Real-time Embedded Systems for Digital Manufacturing," the 18th International Conference on Hybrid Systems: Computation and Control (HSCC 2015):295-296, Seattle, WA, USA, April 14-16 | |
| Korosh Vatanparvar, Mohammad Abdullah Al Faruque, "Energy Management as a Service over Fog Computing Platform," the ACM/IEEE 6th International Conference on Cyber-Physical Systems (ICCPS 2015):248-249 Seattle, WA, USA, April 14-16, 2015 | |
| Per Larsen, Stefan Brunthaler, Michael Franz, "Automatic Software Diversity," IEEE Security & Privacy 13(2):30-37, March-April, 2015 | |

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Publications

Author, Title, Publication

Journal Papers

Sai Vineel Reddy Chittamuru, Sudeep Pasricha, **"Crosstalk Mitigation for High-Radix and Low-Diameter Photonic NoC Architectures,"** IEEE Design & Test 21(3):29-39, March, 2015

Duy-Quoc Lai, Behzad Sajadi, Shan Jiang, Meenakshisundaram Gopi, Aditi Majumder, **"A Distributed Memory Hierarchy and Data Management for Interactive Scene Navigation and Modification on Tiled Display Walls,"** IEEE Transactions on Visualization and Computer Graphics (TVCG): 21(6):714-729, June, 2015

Jun Yong Shin, Fadi J. Kurdahi, Nikil Dutt, **"Cooperative On-chip Temperature Estimation Using Multiple Virtual Sensors,"** IEEE Embedded Systems Letters 7(2):37-40, June, 2015

Lucas Francisco Wanner, Liangzhen Lai, Abbas Rahimi, Mark Gottscho, Pietro Mercati, Chu-Hsiang Huang, Frederic Sala, Yuvraj Agarwal, Lara Dolecek, Nikil D. Dutt, Puneet Gupta, Rajesh K. Gupta, Ranjit Jhala, Rakesh Kumar, Sorin Lerner, Subhasish Mitra, Alexandru Nicolau, Tajana Simunic Rosing, Mani B. Srivastava, Steven Swanson, Dennis Sylvester, Yuanyuan Zhou, **"NSF Expedition on Variability-aware Software: Recent Results and Contributions,"** - Information Technology 57 (3):181-198, June, 2015

Pooria M. Yaghini, Ashkan Eghbal, Nader Bagherzadeh, **"On the Design of Hybrid Routing Mechanism for Mesh-based Network-on-chip,"** Integration 50:183-192, June, 2015

Masound Daneshtalab, Nader Bagherzadeh, Hamid Sarbazi-Azad, **"On-chip Parallel and Network-based Systems,"** Integration 50:137-138, June, 2015

Ayhan Demiriz, Nader Bagherzadeh, Abdulaziz Alhusein, **"Using Constraint Programming for the Design of Network-on-chip Architectures,"** Computing 97(6):579-592, June, 2015

Masound Daneshtalab, Nader Bagherzadeh, Hamid Sarbazi-Azad, **"Special Issue on On-chip Parallel and Network-based Systems,"** Computing 97(6):539-541, June, 2015

Cesar Ghali, Marc A. Scholsberg, Gene Tsudik, Christopher A. Wood, **"Interest-based Access Control for Content Centric Networks (extended version),"** The Computing Research Repository (CoRR) CoRR abs/1505.06258, May 2015

Korosh Vatanparvar, Mohammad Abdullah Al Faruque, **"Design Space Exploration for the Profitability of a Rule-Based Aggregator Business Model Within a Residential Microgrid,"** IEEE Transactions on Smart Grid 6(3): 1167-1175, May, 2015

Mark Gottscho, Luis Angel D. Bathen, Nikil Dutt, Alex Nicolau, Puneet Gupta, **"VIPZoneEE: Hardware Power Variability-Aware Virtual Memory Mangement for Energy Savings,"** IEEE Transactions on Computers 64(5):1483-1496, May, 2015

PUBLICATIONS

Author, Title, Publication

Journal Papers

Jingjing Wang, Nael B. Abu-Ghazaleh, Dmitry V. Ponomarev, "**AIR: Application-level Interference Resilience for PDES on Multicore Systems,**" ACM Transactions on Modeling and Computer Simulation (TOMACS)25(3):19, April, 2015

Misagh Khayambashi, ooria M. Yaghini, Ashkan Eghbal, Nader Bagherzadeh, "**Analytical Reliability Analysis of 3D NoC under TSV Failure,**" ACM Journal on Emerging Technologies in Computing Systems (JETC) 11(4):43, April, 2015

Jeffrey L. Krichmar, Philippe Coussy, Nikil Dutt, "**Large-Scale Spiking Neural Networks Using Neuromorphic Hardware Compatible Models,**" ACM Journal on Emerging Technologies in Computing Systems (JETC)11(4):36, April, 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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