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CECS eNEWS

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

Highlights

- **Gajski EDA award 2017**
- **Al Faruque earns Tenure**
- **Awards and Honors**
- **MaxLinear Visit**
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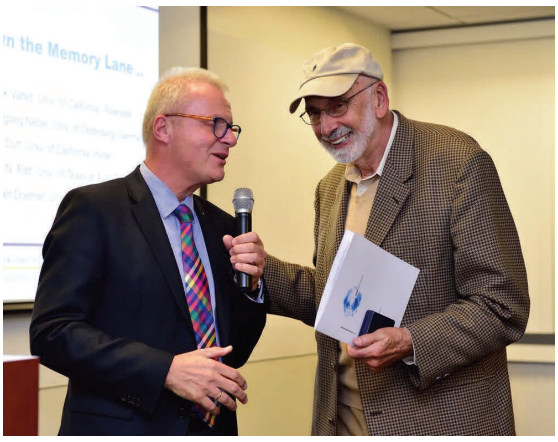
Inside this Issue:

CECS founder Daniel Gajski honored in EDA at CECS-hosted event in conjunction with ICCAD 2017

During a CECS-hosted ICCAD event, CECS founder and former director Daniel Gajski was recognized by eda centrum, an independent institution dedicated to the promotion of research and development in the area of electronic design automation (EDA). He was awarded with the first EDA Contribution Award on November 12th, 2017 for his innumerable contributions and strong support of activities like EDTC, EuroDAC, and DATE.

Prof. Fadi Kurdahi, CECS director and host opened the event, welcomed everyone, and introduced the emcee, Dr. Sanjiv Narayan from Google. Speeches honoring Prof. Gajski were given by Prof. Walfgang Rosenstiel from University of Tubingen, Germany, Prof. Frank Vahid from UCI Riverside, Prof. Yale N. Patt from The University of Texas at Austin and Prof. Rainer Doemer from UCI. Prof. Doemer also presented Prof. Gajski with a family tree of all of his former graduate students and their graduate students.

Daniel D. Gajski is one of the most influential scientists in EDA with more than 40 years of intensive engagement in industry and academia. He developed principles for structured design of electronic systems, implemented these principles by means of languages and tools, and proved their wide industrial applicability. Congratulations!



edacentrum

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Page 1 cont. & Industry Visitor

CECS founder Daniel Gajski honored at CECS-hosted ICCAD 2017 (cont.)

MaxLinear Inc. Visits CECS

MaxLinear's VP, Yves Rasse, visited CECS on October 5th to discuss research collaborations in the SoC (System on a Chip) domain. MaxLinear was founded in 2003. The company's original high performance, radio-frequency receiver products capture and process digital and analog broadband signals for applications including terrestrial, cable and satellite television and DOCSIS broadband. These products include both RF receivers and RF receiver systems-on-chip, or SoCs, which incorporate highly integrated radio system architecture and demodulator technology. The company's products were based on its pioneering low power, low cost CMOS process technology. Currently most of their current academic interactions appears to be with UCSD in the analog/mixed-signal space, but as their designs are getting more complex and involve more digital SoC content, collaboration with UCI is within their scope.

MAXLINEAR

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Awards and Honors

CECS Professor Mohammad Al Faruque Earns Tenure

On July 1st, 2017, assistant professor Al Faruque was promoted to associate professor along with three other UCI engineering professors. In CECS, Professor Al Faruque conducts research on system-level design of embedded systems and cyber-physical systems (CPS) with special interest in CPS design automation and security, model-based design and multi-core systems.

In the past year, he was recognized for his research contribution in the area of embedded systems with the UCI Academic Senate Distinguished Early-Career Faculty Award for Research 2017-18 (see page 3) and also the Henry Samueli School of Engineering Early-Career Faculty Award for Research 2016-17.

Along with his graduate student Korosh Vatanparvar, Al Faruque received the best paper award last year at the IEEE/ ACM Design Automation and Test in Europe (DATE) conference in Dresden, Germany. Additionally, he was the recipient of the Thomas Edison Patent Award 2016 for his patent titled, “Network as automation platform for collaborative E-car charging at the residential premises”. Congratulations!

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Awards and Honors

Professor Nikil Dutt awarded the CS@ILLINOIS 2017 Distinguished Educator Award

Chancellor's Professor of Computer Science Nikil Dutt was honored with the CS@ILLINOIS 2017 Distinguished Educator Award in an award banquet ceremony held at the University of Illinois at Urbana-Champaign (UIUC) on October 20, 2017. The CS @ ILLINOIS Distinguished Educator Award honors UIUC computer science alumni or faculty members who have made outstanding contributions to computer science education and research, and recognizes those who excel at motivating computer science students. Dutt's award recognizes his contributions to embedded systems and architecture research, his mentoring of many successful PhD advisees, as well as his teaching.

Professor Mohammad Al Faruque recognized by Academic Senate

Professor Mohammad Al Faruque from CECS has been recognized for his exemplar achievements in research by the Academic Senate. He was presented with the Distinguished Assistant Professor Award for Research on November 6, 2017 in the Newkirk Alumni Center. This award is given to those who have achieved excellence through their activities in research, teaching, and service.

His current research is focused on system-level design of embedded systems and Cyber-Physical-Systems (CPS) with special interests on CPS design automation, model-based design, multi-core systems, and CPS security. Just last year, he received the Thomas Alva Edison Patent Award 2016!

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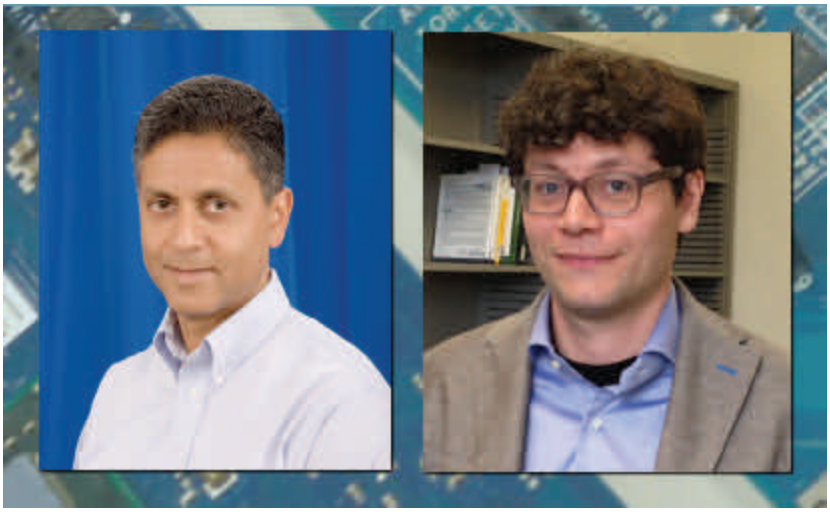
Awards and Honors

Professor Tsudik received 2017 ACM SIGSAC Outstanding Contributions Award

Chancellor's Professor of Computer Science Gene Tsudik was presented with the ACM SIGSAC Outstanding Contributions Award at the ACM Conference on Computer and Communications Security in Dallas on Nov. 1. Tsudik received the award for his leadership in security and privacy research. The Outstanding Contributions Award is given for significant contributions to the field of computer and communication security through fostering research and development activities, educating students and providing professional services such as the running of professional societies and conferences. His research interests include many topics in security, privacy and applied cryptography.

Dutt and Levorato awarded NSF grant for healthcare IoT research



Chancellor's Professor of Computer Science Nikil Dutt and Assistant Professor of Computer Science Marco Levorato have received a $300,000 research grant from the National Science Foundation (NSF) for designing a personalized ubiquitous healthcare framework using the Internet of Things (IoT). Dutt and Levorato lead the research project "IoCT-CARE: Internet of Cognitive Things for Personalized Healthcare" jointly with Finnish partners at the University of Turku, the Turku University Central Hospital, and VTT Finland. The two-year project investigates a self-aware cognitive IoT architecture for ubiquitous health monitoring that can predict early onset of critical health conditions such as heart attacks. The project is funded as part of the NSF WiFiUS program jointly managed by the Academy of Finland and the US National Science Foundation, and aims to expand research collaboration between Finland and the United States in new areas of wireless telecommunications research.

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CECS Student Profile—Sina Faezi

Sina Faezi is a second-year MS/PhD student with a focus on Computer Engineering in the Electrical Engineering and Computer Science (EECS) department at UC Irvine. He received his Bachelor's degree from Sharif University of Technology, Iran, with a Major in Electrical Engineering and a Minor in Computer Engineering in 2015. He ranked 29th among more than 300,000 participants for the Bachelor level university entrance exam in 2010, and he has received the Distinguished Bachelor's Thesis Award for the research he conducted during his undergraduate studies.

The topic of the research project he conducted at his undergraduate institute was "Quality Improvement and Critical Object Detection in Millimeter Wave (mmW) Images." In this project, he improved the quality of mmW images using image processing techniques. Also, he developed a machine learning algorithm capable of detecting dangerous objects such as guns and knives in the poor-quality images captured by the mmW technology.

Currently, he is working under the supervision of Professor Al Faruque in the Advanced Integrated Cyber-Physical Systems (AICPS) laboratory at UCI. His current works in the AICPS lab are on the topic of data-driven modeling of Cyber-Physical Systems (CPS). He creates and uses data-driven models to tackle practical issues like durability, security, and process control. Sina thrived in the collaborative environment of the AICPS lab and accomplished a lot over two years. He has modeled long-term drivers' behavior using neural networks and used the model for improving durability and energy consumption of Electric Vehicles. He has also studied information leakage of 3D-printers from physical side-channels such as thermal, acoustic, magnetics, and in his latest work, he has developed a data-driven approach for securing 3D printers from similar types of confidentiality attacks.

Besides research, he has been a teaching assistant as both an undergraduate and graduate student. When he was an undergraduate student, he had the chance to be a teaching assistant for courses such as computer structure, operating systems, and ASIC and FPGA design. As a graduate student, he was a teaching assistant for several courses including CPS and introduction to programming with Python.

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Publications

Publications

The following papers were published by CECS affiliates from July 2017 through December 2017 (and unreported papers from previous eNews).

Author, Title, Publication Conference Proceedings

Lakshmi Bhamidipati, Bhoopal Gunna, Houman Homayoun, Avesta Sasan, **"A Power Delivery Network and Cell Placement Aware IR-Drop Mitigation Technique: Harvesting Unused Timing Slacks to Schedule Useful Skews,"** ISVLSI 2017: 272-277 July 3-5, 2017

Bruce Berg, Tyler Kaczmarek, Alfred Kobsa, Gene Tsudik, **"Lights, Camera, Action! Exploring Effects of Visual Distractions on Completion of Security Tasks**," ACNS 2017: 124-144 July 10-12, 2017

Giuseppe Ateniese, Michael T. Goodrich, Vassilios Lekakis, Charalampos Papamanthou, Evripidis Paraskevas, Roberto Tamassia, **"Accountable Storage,"** ACNS 2017: 623-644 July 10-12, 2017

Karim Eldefrawy, Norrathep Rattanavipanon, Gene Tsudik, **"HYDRA: Hybrid Design for Remote Attestation (using a Formally Verified Microkernel),"** WISEC 2017: 99-110 July 18-20, 2017

Jeng-Hau Lin, Tianwei Xing, Ritchie Zhao, Zhiru Zhang, Mani B. Srivastava, Zhuowen Tu, Rajesh K. Gupta, **"Binarized Convolutional Neural Networks with Separable Filters for Efficient Hardware Acceleration,"** CVPR Workshops 2017: 344-352J uly 21-26, 2017

David Eppstein, Michael T. Goodrich, **"Brief Announcement: Using Multi-Level Parallelism and 2-3 Cuckoo Filters for Set Intersection Queries and Sparse Boolean Matrix Multiplication,"** SPAA 2017: 137-139 July 24-26, 2017

Amir Mahdi Hosseini Monazzah, Majid Shoushtari, Seyed Ghassem Miremadi, Amir M. Rahmani, Nikil Dutt, **"QuARK: Quality-Configurable Approximate STT-MRAM Cache by Fine-Grained Tuning of Reliability-Energy Knobs,"** ISLPED 2017: 1-6 July 24-26, 2017

Bhoopal Gunna, Lakshmi Bhamidipati, Houman Homayoun, Avesta Sasan, **"Spatial and Temporal Scheduling of Clock Arrival Times for IR Hot-Spot Mitigation, Reformulation of Peak Current Reduction,"** ISLPED 2017: 1-6 July 24-26, 2017

Mohsen Imani, Saransh Gupta, Atl Arredondo, Tajana Rosing, **"Efficient Query Processing in Crossbar Memory,"** ISLPED 2017: 1-6 July 24-26, 2017

Susana Sousa, Alexandre Santos, António Costa, Bruno Dias, Bruno Ribeiro, Fábio Gonçalves, Joaquim Macedo, Maria João Nicolau, Óscar Gama, **"A New Approach on Communications Architectures for Intelligent Transportation Systems,"** MobiSPC 2017: 320-327 July 24-26, 2017

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Publications

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Author, Title, Publication **Conference Proceedings**

Kwei-Jay Lin, Sen Zhou, Surong Yan, Takayuki Ito, **"Service-Oriented Things: Delivering Smart Services Using Internet of Things,"** CBI (1) 2017: 217-226 July 24-27, 2017

Cesar Ghali, Gene Tsudik, Ersin Uzun, Christopher A. Wood, **"Closing the Floodgate with Stateless Content-Centric Networking,"** ICCCN 2017: 1-10 July 31 - August 3, 2017

Sören Schreiner, Maher Fakih, Kim Grüttner, Duncan Graham, Wolfgang Nebel, Salvador Peiro Frasquet, **"A Functional Test Framework to Observe MPSoC Power Management Techniques in Virtual Platforms,"** DSD 2017: 315-322 August 30 -September 1, 2017

William E. Devanny, Jeremy T. Fineman, Michael T. Goodrich, Tsvi Kopelowitz, **"The Online House Numbering Problem: Min-Max Online List Labeling,"** ESA 2017: 33:1-33:15 September 4-6, 2017

Zhou Fang, Mulong Luo, Tong Yu, Ole J. Mengshoel, Mani B. Srivastava, Rajesh K. Gupta, **"Mitigating Multi-Tenant Interference on Mobile Offloading Servers: Poster Abstract,"** SoCC 2017: 644 September 24-27, 2017

Cin-Han Yang, Tun-Wen Pai, Ron-Shan Chen, Hsin-Yiu Chou, **"Data Based Feature Identification of Polymorphic Functional Marker from Transcriptome Comparison,"** SoMeT 2017: 233-241 September 26-28, 2017

Peyman Nazari, Zheng Wang, Payam Heydari, **"A High-Power Multi-Port 0.46THz Radiation Source in Nano-Scale Silicon Technology using Fundamental-Frequency Oscillation beyond f_{MAX} of Transistors, "** NANOCOM 2017: 26:1-26:6 September 27-29, 2017

Cesar Ghali, Gene Tsudik, Christopher A. Wood, **"When Encryption is not Enough: Privacy Attacks in Content-Centric Networking,"** ICN 2017: 1-10 September 26-28, 2017

Vipin Kumar Kukkala, Sudeep Pasricha, Thomas Bradley, **"JAMS: Jitter-Aware Message Scheduling for FlexRay Automotive Networks,"** NOCS 2017: 11:1-11:7 October 19-20, 2017

Ishan G. Thakkar, Sai Vineel Reddy Chittamuru, Sudeep Pasricha, **"Improving the Reliability and Energy-Efficiency of High-Bandwidth Photonic NoC Architectures with Multilevel Signaling"** NOCS 2017: 4:1-4:8 October 19-20, 2017

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Author, Title, Publication **Journals**

Sandeep K. Shukla, **"Editorial: Cyber Security, IoT, Block Chains - Risks and Opportunities,"** TECS 16(3): 62:1-62:2, July 2017

Yongzhi Li, Cheng Tao, A. Lee Swindlehurst, Amine Mezghani, Liu Liu, **"Downlink Achievable Rate Analysis in Massive MIMO Systems with One-Bit DACs,"** IEEE Communications Letters 21 (7): 1669-1672, July 2017

Wael M. Elsharkasy, Amin Khajeh, Ahmed M. Eltawil, Fadi J. Kurdahi, **"Reliability Enhancement of Low-Power Sequential Circuits Using Reconfigurable Pulsed Latches,"** TCAS 64(7): 1803-1814, July 2017

Hongzhi Zhao, Nader Bagherzadeh, Jie Wu, **"A General Fault-Tolerant Minimal Routing for Mesh Architectures,"** TC 66(7): 1240-1246, July 2017

Jie Chen, Feng Jiang, A. Lee Swindlehurst, **"The Gaussian CEO Problem for Scalar Sources With Arbitrary Memory,"** TIT 63(7): 4286-4297, July 2017

Sai Vineel Reddy Chittamuru, Srinivas Desai, Sudeep Pasricha, **"SWIFTNoC: A Reconfigurable Silicon-Photonic Network with Multicast-Enabled Channel Sharing for Multicore Architectures,"** JETC 13(4): 58:1-58:27, August 2017

Sandeep K. Shukla, **"Editorial: Security of Mobile Devices,"** TECS16 (4): 91:1-91:2, September 2017

Mohammad Hashem Haghbayan, Antonio Miele, Amir M. Rahmani, Pasi Liljeberg, Hannu Tenhunen, **"Performance/Reliability-Aware Resource Management for Many-Cores in Dark Silicon Era."** TC 66(9): 1599-1612, September 2017

Amodh Kant Saxena, Inbar Fijalkow, A. Lee Swindlehurst, **"Analysis of One-Bit Quantized Precoding for the Multiuser Massive MIMO Downlink,"** TSP 65(17): 4624-4634, September 2017

Divya Pathak, Houman Homayoun, Ioannis Savidis, **"Smart Grid on Chip: Work Load-Balanced On-Chip Power Delivery,"** TVLSI 25(9): 2538-2551, September 2017

Mahya Sam Daliri, Reza Faghih Mirzaee, Keivan Navi, Nader Bagherzadeh, **"High-Performance Ternary Operators for Scrambling,"** Integration 59: 1-9, September 2017

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Publications

Author, Title, Publication **Journals**

M. Mohamed Asan Basiri, Sandeep K. Shukla, **"Flexible VLSI Architectures for Galois Field Multipliers,"** Integration 59: 109-124, September 2017

Sepehr Tabrizchi, Atiyeh Panahi, Fazel Sharifi, Keivan Navi, Nader Bagherzadeh, **"Method for Designing Ternary Adder Cells Based on CNFETs,"** IET Circuits, Devices & Systems 11(5): 465-470, September 2017

Jie Tang, Dawei Sun, Shaoshan Liu, Jean-Luc Gaudiot, **"Enabling Deep Learning on IoT Devices,"** IEEE Computer 50(10): 92-96, October 2017

Christopher Langlois, Saideep Tiku, Sudeep Pasricha, **"Indoor Localization with Smartphones: Harnessing the Sensor Suite in Your Pocket,"** IEEE Consumer Electronics Magazine 6(4): 70-80, October 2017

Alireza Karimi-Bidhendi, Omid Malekzadeh-Arasteh, Mao-Cheng Lee, Colin M. McCrimmon, Po T. Wang, Akshay Mahajan, Charles Y. Liu, Zoran Nenadic, An H. Do, Payam Heydari, **"CMOS Ultralow Power Brain Signal Acquisition Front-Ends: Design and Human Testing,"** TBCAS 11 (5): 1111-1122, October 2017

Colin M. McCrimmon, Jonathan Lee Fu, Ming Wang, Lucas Silva Lopes, Po T. Wang, Alireza Karimi -Bidhendi, Charles Y. Liu, Payam Heydari, Zoran Nenadic, An H. Do, **"Performance Assessment of a Custom, Portable, and Low-Cost Brain-Computer Interface Platform,"** TBME 64(10): 2313 -2320, October 2017

Surong Yan, Kwei-Jay Lin, Xiaolin Zheng, Wenyu Zhang, Xiaoqing Feng, **"An Approach for Building Efficient and Accurate Social Recommender Systems Using Individual Relationship Networks,"** TKDE. 29(10): 2086-2099, October 2017

Anil Kanduri, Mohammad Hashem Haghbayan, Amir M. Rahmani, Pasi Liljeberg, Axel Jantsch, Hannu Tenhunen, Nikil Dutt:, **"Accuracy-Aware Power Management for Many-Core Systems Running Error-Resilient Applications,"** TVLSI_25(10): 2749-2762, October 2017

Haneet Singh Mahajan, Thomas Bradley, Sudeep Pasricha, **"Application of Systems Theoretic Process Analysis to a Lane Keeping Assist System,"** Reliability Engineering & System Safety 167: 177-183, November 2017

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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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