



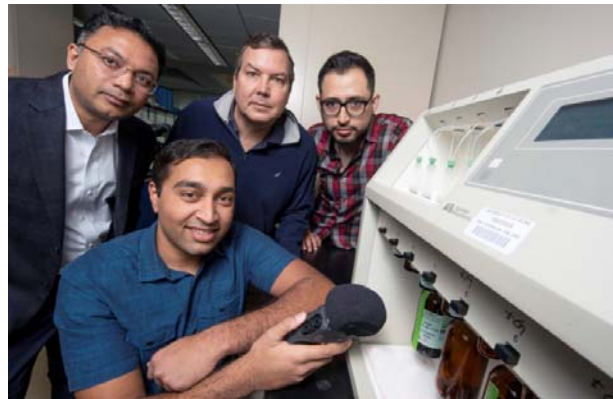
UCI and UCR Scientists Discover DNA Synthesizer to Steal Genetic Blueprint

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UCI and UCR researchers consisting of Professors Mohammad al Faruque and John Chaput and graduate students Arnav Malawade and Sina Faezi have helped discover that hackers can

steal genetic blueprints by interpreting sounds emitted by a DNA synthesizer.

DNA synthesizers are complex machines with pipes, fluid reservoirs, solenoid valves, and electrical circuitry. All of these components have their own voices, which can be used for DNA synthesis.

Professor Al Faruque believes that this discovery can be used for a good cause such as a monitoring tool to nullify the possibility of individuals stealing genetic blueprints. A side-channel attack methodology will be able to predict each base in a DNA sequence with about 88 percent accuracy. This amount of accuracy can lead to the reconstruction of short sequences with complete reliability. Thus, this can lead to the reconstruction of an entire DNA sequence. The cost of this methodology is often a top priority in designing labs and products. However, this kind of research forces designers and engineers to pay attention to security and privacy as well.

This great discovery was featured in The New York Times as well as Wired. Congratulations, UCI and UCR Professors and graduate students!



Awards and Honors

CECS Professor Gene Tsudik Featured on CALmatters



Chancellor's Professor of Computer Science Gene Tsudik has been featured on CALmatters for his discovery involving simple devices that can transmit wirelessly can triangulate the movement of people in a home. His experiment involving smart devices all over the home hoped to discourage electrical use throughout the home. Although this was not shown through his experiment, Tsudik has laid the groundwork to modernize the electricity network through the state.

Gene Tsudik received his Ph.D. in Computer Science from USC in 1991. His research interests lie in security, privacy, and applied cryptography. He is a Fulbright Scholar, Fulbright Specialist, an ACM Fellow, an IEEE Fellow, and an AAAS Fellow. He has achieved

remarkable awards during his time at UCI. Congratulations, Professor Gene Tsudik!

UCI CECS Welcomes Professor Sang-Woo Jun to Collaborate with UCI Students



The CECS Department at UCI has welcomed a new Professor into their department, Professor Sang-Woo Jun. Sang-Woo Jun completed his undergraduate studies at the Seoul National University in Korea. He worked with Professor Arvind's group at MIT in 2011 and eventually created a physical system that was doing what his proposal said it would.

Sang-Woo Jun earned his Ph.D. in Electrical Engineering and Computer Science at MIT in 2018. He received his Bachelor's Degree in Electrical and Computer Engineering at Seoul National University in 2010. Sang-Woo Jun's research involves exploring systems that are high performance or high efficiency. He uses NAND flash storage and reconfigurable hardware acceleration using FPGAs. Innovative system architectures for low-cost high-performance computing is what he spends most

of his time researching.

Welcome to CECS, Professor Sang-Woo Jun!

Awards and Honors

Professor Rainer Doemer Selected as Deans' Honoree



This year, CECS Professor Rainer Doemer has been selected as Deans' Honoree for Excellence in Undergraduate Teaching. This award is given to those who are nominated by campus-wide individuals such as peers, colleagues, and students. It is a prestigious award that portrays the likability of a Professor to those around them.

Professor Rainer Doemer is loved by both students and faculty alike, and this award shows that to this award's nominees. Rainer Doemer is the only professor from the Henry Samueli School of Engineering that was recognized as a Deans' Honoree for this academic year. In total, around 300 professors, lecturers, and TAs have been recognized by their colleagues and students for exemplary teaching, Congratulations, Professor Rainer Doemer!

Google Awards Research Funding to Professor Brian Demsky



Google has named two faculty members from the UCI Samueli School's Department of Electrical Engineering and Computer Science as winners of its Google Faculty Research Awards. CECS Professor Brian Demsky and Assistant Professor Aparna Chandramowlishwaran have been selected for this award.

Only 15% of applicants are funded for this highly competitive award. It promises academic research projects in computer science, engineering, and related fields. Demsky intends to use this award to further his research into software reliability and complication.

The Google Faculty Research Awards Program seeks to support world-class faculty pursuing cutting-edge research with a goal of identifying and strengthening long-term collaborative relationships with faculty working on problems that will impact how future generations use technology.

Visitor and Student Profile

Visitor Profile: Dr. Ruiyun Yu



Professor and Vice Dean of the Software College in Northeastern University at Shenyang, P. R China, Dr. Ruiyun Yu has visited UCI for research collaborations. He received his Ph.D. and M.S. degrees in Computer Science in 2009 and 2004 and his B.S. in Mechanical Engineering from Northeastern University in 1997.

His research interests include urban sensing and computing, data intelligence, and mixed reality. He has been leading 11 projects funded by the National Natural Science Foundation Committee of China, the Ministry of Education of China, Science and Technology, and Agency of Liaoning Province. He has been serving as the TPC chair of MSN 2018, publicity co-chair of WoWMoM 2019, and TPC members of a number of international conferences.

He has also won a series of teaching awards such as the National Teaching Achievement Award of China and the Teaching Achievement Award of Liaoning Province in 2013 and 2018.

German Researchers from BHTC and Carl von Ossietzky University visit UCI



On Tuesday, January 15, 2019, CVOU and BHTC visitors came to UCI in order to collaborate with Professor Doemer for Embedded Systems Research. Professor Achim Rettburg was also a part of this collaboration.

BHTC covered a presentation of Behr-Hella-Thermo-Control, products, and future product ideas. Professor Achim Rettburg covered a talk covering the topic of future challenges in the automotive industry such as the number of ECU within the E/E– architecture, and the design of HMI interface for autonomous driving cars. Rettburg

presented three different proposals to combat these challenges in the future with the help of the University of Applied Science Hamm-Lippstadt.

CECS Lectures and Seminars

CECS Seminar—Prof. Masahiro Fujita



On Thursday, January 14, 2019, Masahiro Fujita, Professor in the Department of Electrical Engineering at the University of Tokyo, Japan, held a seminar titled “Partial Logic Synthesis and its Application to Automatic Generation of Parallel/Distributed Algorithms.” This talk is centered around the partial logic synthesis problem and how to use matrix-vector product computation to show how theoretical optimum distributed/parallel computation can be automatically generated targeting many cores and chips which are connected through a ring connection.

Masahiro Fujita received his Ph.D. in Information Engineering from the University of Tokyo in 1985 on his work on model checking of hardware designs by using logic programming languages. Since March 2000, Fujita has been a professor at the VLSI Design and Education Center at the University of Tokyo. He has been involved in Japanese governmental research for dependable system designs and has developed a formal verifier for C programs that could be used for both hardware and embedded software designs.

CECS Seminar—Ph.D. Candidate Liron David



On Tuesday, March 12, 2019, Liron David, Ph.D. Candidate in Electrical Engineering at Tel-Aviv University, held a seminar titled “Poly-Logarithmic Side Channel Rank Estimation via Exponential Sampling”. This talk is centered around the proposition of ESrank, the first rank estimation algorithm that enjoys provable poly-logarithmic time and space-complexity, which also achieves excellent practical performance. Since rank estimation is an important tool for side-channel evaluations laboratories, the ESrank can help mitigate any problems along the way.

Liron David is a Ph.D. candidate in Electrical Engineering at Tel-Aviv University under the supervision of Prof. Avishai Wool. She received her B.Sc. Degree in Computer Science and Electrical Engineering as well as her M.Sc. Degree in Electrical Engineering from Tel-Aviv University. She has won the Weinstein best paper prize in 2018 and the Tel-Aviv University excellence in teaching in 2018.

Publications

Publications

The following papers were published by CECS affiliates from Jan 2019 through Mar 2019 (and unreported papers from previous eNews).

Author, Title, Publication

Conference Proceedings

Mahdi Torabzadehkashi, Siavash Rezaei, Ali Heydarigorji, Hossein Bobarshad, Vladimir Castro Alves, Nader Bagherzadeh: **Catalina: In-Storage Processing Acceleration for Scalable Big Data Analytics**. PDP 2019: 430-437, February 13-15, 2019

Sajjad Taheri, Payman Behnam, Eli Bozorgzadeh, Alexander V. Veidenbaum, Alexandru Nicolau: **AFFIX: Automatic Acceleration Framework for FPGA Implementation of OpenVX Vision Algorithms**. FPGA 2019: 252-261, February 24-26, 2019

Zhou Fang, Jeng-Hau Lin, Mani B. Srivastava, Rajesh K. Gupta: **Multi-tenant mobile offloading systems for real-time computer vision applications**. ICDCN2019: 21-30, January 4-7, 2019

Huan Wang, Zisong Wang, Payam Heydari: **A Wideband Blocker-Tolerant Receiver with High-Q RF-Input Selectivity and <-80dBm LO Leakage**. ISSCC 2019: 450-452, February 17-21, 2019

Ashkan Vakil, Houman Homayoun, Avesta Sasan: **IR-ATA: IR annotated timing analysis, a flow for closing the loop between PDN design, IR analysis & timing closure**. ASP-DAC 2019: 152-159, January 21-24, 2019

Hosein Mohammadi Makrani, Hossein Sayadi, Tinoosh Mohsenin, Setareh Rafatirad, Avesta Sasan, Houman Homayoun: **XPPE: cross-platform performance estimation of hardware accelerators using machine learning**. ASP-DAC 2019: 727-732, January 21-24, 2019

Jeffrey L. Krichmar: **A Neurobiologically Inspired Plan Towards Cognitive Machines**. AAAI Spring Symposium: Towards Conscious AI Systems 2019, March 25-27, 2019

Mohsen Imani, Sahand Salamat, Saransh Gupta, Jiani Huang, Tajana Rosing: **FACH: FPGA-based acceleration of hyperdimensional computing by reducing computational complexity**. ASP-DAC 2019: 493-498, January 21-24, 2019

Minxuan Zhou, Mohsen Imani, Saransh Gupta, Yeseong Kim, Tajana Rosing: **GRAM: graph processing in a ReRAM-based computational memory**. ASP-DAC 2019: 591-596, January 21-24, 2019

Daniel Peroni, Mohsen Imani, Tajana Rosing: **ALook: adaptive lookup for GPGPU acceleration**. ASP-DAC 2019: 739-746, January 21-24, 2019

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Joe Michael Allen, Frank Vahid, Alex D. Edgcomb, Kelly Downey, Kris Miller: **An Analysis of Using Many Small Programs in CS1**. SIGCSE 2019: 585-591, February 27 – March 2

Frank Vahid, Roman Lysecky: **Auto-Graded Programming Labs: Dos and Don'ts for Less-Stressed Higher-Performing Students, Reduced Grading Time, and Happier Teachers**. SIGCSE 2019: 1250, February 27 – March 2

Nisha Panwar, Shantanu Sharma, Guoxi Wang, Sharad Mehrotra, Nalini Venkatasubramanian: **Verifiable Round-Robin Scheme for Smart Homes**. CODASPY 2019: 49-60, March 25-27, 2019

Zhiqiang Zuo, John Thorpe, Yifei Wang, Qihong Pan, Shenming Lu, Kai Wang, Guoqing Harry Xu, Linzhang Wang, Xuandong Li: **Grapple: A Graph System for Static Finite-State Property Checking of Large-Scale Systems Code**. EuroSys 2019: 38:1-38:17, March 25-28, 2019

Oliver De Candido, Hela Jedda, Amine Mezghani, A. Lee Swindlehurst, Josef A. Nossek: **Reconsidering Linear Transmit Signal Processing in 1-Bit Quantized Multi-User MISO Systems**. IEEE Trans. Wireless Communications 18(1): 254-267, January 2019

Hailun Tan, Gene Tsudik, Sanjay K. Jha: **MTRA: Multi-Tier randomized remote attestation in IoT networks**. Computers & Security 81: 78-93, March 2019

Gergely Ács, Mauro Conti, Paolo Gasti, Cesar Ghali, Gene Tsudik, Christopher A. Wood: **Privacy-Aware Caching in Information-Centric Networking**. IEEE Trans. Dependable Sec. Comput. 16(2): 313-328, January-February 2019

Xavier Carpent, Norrathep Rattanavipanon, Gene Tsudik: **Remote Attestation via Self-Measurement**. ACM Trans. Design Autom. Electr. Syst. 24(1): 11:1-11:15, January 2019

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Jiang Wan, Anthony Bahadir Lopez, Mohammad Abdullah Al Faruque: **Physical Layer Key Generation: Securing Wireless Communication in Automotive Cyber-Physical Systems**. TCPS 3 (2): 13:1-13:26 (2019), January 2019

Sepehr Tabrizchi, Mohammad Reza Taheri, Keivan Navi, Nader Bagherzadeh: **Novel CNFET ternary circuit techniques for high-performance and energy-efficient design**. IET Circuits, Devices & Systems 13(2): 193-202 (2019), January 2019

Rana A. Abdelaal, Hasan Erdem Yantir, Ahmed M. Eltawil, Fadi J. Kurdahi: **Power Performance Tradeoffs Using Adaptive Bit Width Adjustments on Resistive Associative Processors**. IEEE Trans. on Circuits and Systems 66-I(1): 302-312 (2019), January 2019

Maral Amir, Frank Vahid, Tony Givargis: **Switching Predictive Control Using Reconfigurable State-Based Model**. ACM Trans. Design Autom. Electr. Syst. 24(1): 2:1-2:21 (2019), January 2019
Rajesh K. Gupta, Subhasish Mitra, Puneet Gupta: **Variability Expeditions: A Retrospective**. IEEE Design & Test 36(1): 65-67 (2019), February 2019

Farzad Etemadi, Payam Heydari, Hamid Jafarkhani: **On Analog QAM Demodulation for Millimeter-Wave Communications**. IEEE Trans. on Circuits and Systems 66-II(2): 402-406 (2019), January 2019

Kimia Zamiri Azar, Hadi Mardani Kamali, Houman Homayoun, Avesta Sasan: **SMT Attack: Next Generation Attack on Obfuscated Circuits with Capabilities and Performance Beyond the SAT Attacks**. IACR Trans. Cryptogr. Hardw. Embed. Syst. 2019(1): 97-122, January 2019

Zhou Li, Yazhou Li, Ruopei Zhan, Yan He, Xiao-Ping Zhang: **AC Grids Characteristics Oriented Multi-Point Voltage Coordinated Control Strategy for VSC-MTDC**. IEEE Access 7: 7728-7736, January 2019

Lei Tao, Xue Jiang, Zhou Li, Xingzhao Liu, Zhixin Zhou: **Multiscale Incremental Dictionary Learning With Label Constraint for SAR Object Recognition**. IEEE Geosci. Remote Sensing Lett. 16 (1): 80-84, January 2019

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Aditya Khune, Sudeep Pasricha: **Mobile Network-Aware Middleware Framework for Cloud Off-loading: Using Reinforcement Learning to Make Reward-Based Decisions in Smartphone Applications**. IEEE Consumer Electronics Magazine 8(1): 42-48, January 2019

Edoardo Fusella, Mahdi Nikdast, Ian O'Connor, José Flich, Sudeep Pasricha: **Guest Editors' Introduction: Emerging Networks-on-Chip Designs, Technologies, and Applications**. JETC 15 (1): 1:1-1:2, February 2019

Yeseong Kim, Mohsen Imani, Tajana Simunic Rosing: **Image Recognition Accelerator Design Using In-Memory Processing**. IEEE Micro 39(1): 17-23, January-February 2019

M. Mohamed Asan Basiri, Sandeep K. Shukla: **Asynchronous hardware implementations for crypto primitives**. Microprocessors and Microsystems - Embedded Hardware Design 64: 221-236, February 2019

Sandeep K. Shukla: **Editorial: Embedded Security Challenge: Cyber Security Contests in the Embedded Computing Domain**. ACM Trans. Embedded Comput. Syst. 17(6): 91:1-91:2, January 2019

Misagh Khayambashi, Arnold Lee Swindlehurst: **Estimation of Sparse Directional Connectivity With Expectation Maximization**. IEEE Trans. Signal Processing 67(4): 854-869, January 2019

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Sina Shahhosseini, Ahmad Albaqsami, Masoomeh Jasemi, Shaahin Hessabi, Nader Bagherzadeh: **Partition Pruning: Parallelization-Aware Pruning for Deep Neural Networks**. CoRRabs/1901.11391, January 2019

Mohammed E. Fouda, Ahmed M. Eltawil, Fadi J. Kurdahi: **On Resistive Memories: One Step Row Readout Technique and Sensing Circuitry**. CoRRabs/1903.01512, March 2019

Murad Murad, Ahmed M. Eltawil: **Performance Analysis and Enhancements for In-Band Full-Duplex Wireless Local Area Networks**. CoRR abs/1903.11720, March 2019

Alexios Voulimeneas, Dokyung Song, Fabian Parzefall, Yeoul Na, Per Larsen, Michael Franz, Stijn Volckaert: **DMON: A Distributed Heterogeneous N-Variant System**. CoRR abs/1903.03643, March 2019

Alon Efrat, David Eppstein, Daniel Frishberg, Michael T. Goodrich, Stephen G. Kobourov, Nil Mamano, Pedro Matias, Valentin Polishchuk: **Euclidean TSP, Motorcycle Graphs, and Other New Applications of Nearest-Neighbor Chains**. CoRR abs/1902.06875, February 2019

Zhiqian Chen, Gaurav Kolhe, Setareh Rafatirad, Sai Manoj P. D., Houman Homayoun, Liang Zhao, Chang-Tien Lu: **Estimating the Circuit Deobfuscating Runtime based on Graph Deep Learning**. CoRRabs/1902.05357, February 2019

Xinyun Zou, Soheil Kolouri, Praveen K. Pilly, Jeffrey L. Krichmar: **Neuromodulated Goal-Driven Perception in Uncertain Domains**. CoRR abs/1903.00068, March 2019

Hirak J. Kashyap, Charless Fowlkes, Jeffrey L. Krichmar: **Sparse Representations for Object and Ego-motion Estimation in Dynamic Scenes**. CoRRabs/1903.03731, March 2019

Soheil Kolouri, Nicholas Ketz, Xinyun Zou, Jeffrey L. Krichmar, Praveen K. Pilly: **Attention-Based Structural-Plasticity**. CoRR abs/1903.06070, March 2019

Jude Tchaye-Kondi, Yanlong Zhai, Kwei-Jay Lin, Wenjun Tao, Kai Yang: **Hadoop Perfect File: A fast access container for small files with direct in disc metadata access**. CoRR abs/1903.05838, March 2019

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Aniket Shivam, Neftali Watkinson, Alexandru Nicolau, David A. Padua, Alexander V. Veidenbaum: **Towards an Achievable Performance for the Loop Nests**. CoRR abs/1902.00603, February 2019

Yunhui Guo, Yandong Li, Rogério Schmidt Feris, Liqiang Wang, Tajana Rosing: **Depthwise Convolution is All You Need for Learning Multiple Visual Domains**. CoRRabs/1902.00927, February 2019

Shubham S. Srivastava, Medha Atre, Shubham Sharma, Rahul Gupta, Sandeep K. Shukla: **Verity: Blockchains to Detect Insider Attacks in DBMS**. CoRR abs/1901.00228, January 2019

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Mingjie Shao, Wing-Kin Ma, Qiang Li, A. Lee Swindlehurst: **One-Bit Sigma-Delta MIMO Precoding**. CoRR abs/1903.03319, March 2019

Nisha Panwar, Shantanu Sharma, Guoxi Wang, Sharad Mehrotra, Nalini Venkatasubramanian: **Verifiable Round-Robin Scheme for Smart Homes**. CoRR abs/1901.08618, January 2019

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