CECS eNEWS

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- **ESWEEK 2011**

CECS HOSTS SOCA/KSEM/SOSE/RTSOAA

- Staff

The 2011 IEEE International Conference on Service-Oriented Computing and Applications (SOCA) was held at University of California, Irvine on December 12-14, 2011. CECS faculty Prof. K-J Lin was the General Chair of the conference, and CECS administration staff Grace Wu served as the Local Organizing Chair. This conference was part of the following co-located conferences and workshops: Knowledge Science, Engineering Management (KSEM), Service-Oriented System Engineering (SOSE), Real-time Service-oriented Architectures and Applications (RTSOAA), Knowledge and Service Technology for Life, Environment, and Sustainability (KASTLES), and the 1st International Workshop on Large-Scale Cyber-Physical Systems (LCPS).

The Best Paper Award was given to Joshua Church and Amihai Motro from George Mason University, Faifax, VA, for the paper titled "Learning Service Behavior with Progressive Testing". Over 180 participants from 13 different countries, from both industry and academia attended. As a co-host, CECS Director, Prof. Gajski gave the welcome address and praised the success of the conference. 3 Keynote speeches and 21 sessions and joint panels were presented throughout this three-day event.

STUDENT PROFILE & INTERNSHIP

Visitor Profile: Jae-Hyun Park

- Staff

Dr. Jae-Hyun Park is a visiting scholar at UC Irvine, hosted by Professor Pai H. Chou from February 2011 to January 2012.

He received the B.S. degree in Computer Science from Chung-Ang University, Korea, in 1988, and the M.S. and Ph.D. degrees in Computer Science from the KAIST, Taejon, in 1991 and 1995, respectively. From 1991 to 1994, as a research staff of the Satellite Research Center in KAIST, He had developed the embedded operating system for the onboard computer of KITSAT (the first Korean satellite). Especially, he had modified the Nucleus RTX Kernel (real-time operating system kernel) for dynamic process creation in a mission control on-board computer system. It enables to create process which is uploaded from the ground station. This works was published in the Proc. of AIAA/IEEE Digital Avionics Systems Conference. As his Ph.D. research, he did work on the fault-tolerant high-performance multistage interconnection networks for ATM switching and multiprocessing, which was published in IEEE/ACM Trans. on Networking. From 1995 to 2000, he was with the Samsung Electronics Co., Korea, where he had developed the multiprotocol label switching system over the Asynchronous Transfer Mode Switching System, including the development of the label distribution protocol, which was published in IEICE Trans. on Comm. He received the 1996 Best Research Paper Award-Golden Prize in 1997 and the 1997 Award of Excellence in Research and Development-Silver Prize in 1998, all from Samsung Electronics Co. From 2000 to 2002, he was with the School of EECS, Yeungnam University, Korea. Since 2002, he has been a professor of the School of Computer Science and Engineering, Chung-Ang University, Korea.

His current research interests include switching architectures, ad hoc networks, and scale-free networks.

Graduate Student Internship: Abhinav Parvathareddy
Qlogic Corporation

This summer I interned at Qlogic Corporation. The duration of the internship was for 12 weeks and it was from june 19th through September 9th. It was a full time summer position in which, I had a chance to work with some really brilliant people and had a very exciting learning experience.

Qlogic Corporation began as an offshoot of Emulex corporation and its major market is the Host Bus Adapters. Its headquarters is situated in Aliso Viejo, California. Although HBAs is the bread and butter product of QLogic, it has many other business interests like switches and routers.

My position was in a relatively new group called the storage solution group or SSG for short. It dealt with remote storage solutions and had prestigious clients like Boeing and Apple.

QLOGIC®

INTERNSHIP cont. & AWARDS

Graduate Student Internship: Abhinav Parvathareddy
Qlogic Corporation (continued from page 2)...

I started off with their latest remote storage router and got to play around a little with its driver. I had a chance to implement a few tweaks in the code in response to some customer issues. Later I moved on to testing of their new 10GB FC port on the router with measurements targeted towards various storage devices which include RamSan and 3par.

On the whole, it was an extremely gratifying experience to work in an industry setting and get to know a few people in the industry. I was extensively supported by my group members and they were very friendly. The company offered me a full time position as well but since I started my PhD in the subsequent quarter, I couldn't take it. But I look forward to join them again the upcoming summer for another internship.

Tony Givargis receives ASEE ECE Division Hewlett-Packard
Frederick Emmons Terman Award

Staff

The Frederick Emmons Terman Award is presented annually to an outstanding young electrical engineering educator by the Electrical and Computer Engineering Division of the American Society for Engineering Education. The Terman Award, established in 1969 by the Hewlett-Packard Company, consists of $5,000, an engraved gold-plated medal, a bronze replica of the medal mounted on a walnut plaque, and a parchment certificate. This year's award was presented at the ASEE/IEEE Frontiers in Education Conference in Rapid City, South Dakota. The recipient must be an electrical engineering educator who is less than 45 years old on June 1 of the year in which the award is presented and must be the principal author of an electrical engineering textbook published before June 1 of the year of his/her 40th birthday. The book must have been judged by his/her peers to be an outstanding original contribution to the field of electrical engineering. The recipient must also have displayed outstanding achievements in teaching, research, guidance of students, and other related activities.

Tony Givargis received his Computer Science MS and PhD degrees from University of California, Riverside in 1997 and 2001 respectively. He is currently a Professor in the Department of Computer Science and faculty in the Center for Embedded Computer Systems, at the University of California, Irvine. His research interests include all aspects of embedded system design, in particular, embedded software and multi-core systems-on-a-chip architectures. He has published over 70 peer-reviewed conference and journal papers, over 10 issued patents, and a number of best paper awards. He is the co-author of two popular textbooks on embedded system design and has received numerous teaching, service and research awards.

ESWEEK 2011

CECS At ESWEEK

Staff
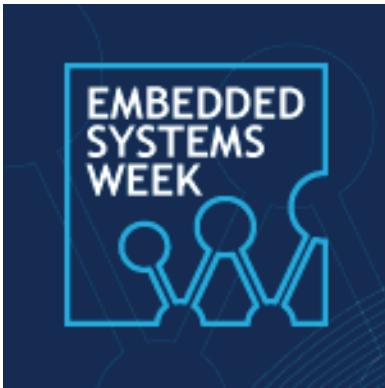
Embedded Systems Week is an exciting event which brings together conferences, tutorials, and workshops centered on various aspects of embedded systems research and development. Leading conferences in the area take place at the same time and location, allowing attendees to benefit from a wide range of topics covered by these conferences and their associated tutorials and workshops.

The 2011 ESWEEK, held on October 9-14, in Taipei, Taiwan, included the CASES, CODES+ISSS, and EMSOFT conferences. Workshops and Symposia included ESTIMedia, CASA (co-organized by CECS alum, Aviral Shrivistava), WESS, WSS, WESE, TiMoBD, MeAOW (co-organized by CECS faculty, Nikil Dutt), and MBDEFP.

CECS faculty and alumni played a major role in the success of this seminal event. The CODES+ISSS technical program committee consisted of Pai Chou, Fadi Kurdahi, Aviral Shrivastave, Prabhat Mishra, Rainer Doemer, Sudeep Pasricha, Tony Givargis and Daniel Gajski. Aviral Shrivastava was also an ESWEEK organizational chair . Rajesh Gupta was the program chair for the CASES conference and Tony Givargis, Andreas Gerstlauer and Aviral Shrivistava served on the technical committee.

Four papers were accepted at the conference, one of which was nominated for the Best Paper award:

CODES+ISSS: L. BAthen, D. Shin, S-S. Lim, N. Dutt, **"SPMVisor: Dynamic ScratchPad Memory Virtualization for Secure, Low Power and High Performance, Distributed On-Chip Memories"** (*Best Paper Candidate*)

CASES: A. BanaiyanMofrad, H. Homayoun, and N. Dutt, **"FFT-Cache: A Flexible Fault-Tolerant Cache Architecture for Ultra Low Power Voltage Operation"**

WESS: D. Hong, L. Bathen, S-S. Lim, N. Dutt, **"DynaPoMP: Dynamic Policy-driven Memory Protection for Embedded Systems"**

S. Golshan, A. Khajeh, H. Homayoun, E. Bozorgzadeh, A. Eltawil and F. Kurdahi, **"Reliability-Aware Placemnent in SRAM-Based FPGA for Voltage Scaling Realization in the Presence of Process Variations"**

CECS members also presented two invited talks:

MeAOW: **Virtualizing on-chip distributed memories for low power, error-resilient, secure Systems-on-Chip**, Luis Bathen and Nikil Dutt

WESS: **Memory Virtualization and Security for Embedded Systems**, Luis Bathen and Nikil Dutt

PUBLICATIONS

The following papers were published by CECS affiliates between
August 2011 to December 2011 (and unreported papers from previous eNews).

Focus	Title, Author, Publication
Adaptive Test Framework	Baris Arslan, Alex Orailoglu: Adaptive Test Framework for Achieving Target Test Quality at Minimal Cost. Asian Test Symposium, New Delhi, India, November 20-23, 2011: 323-328
Cryptology and Network Security	Dongdai Lin, Gene Tsudik, Xiaoyun Wang: Cryptology and Network Security - 10th International Conference, CANS 2011, Sanya, China, December 10-12, 2011. Proceedings Springer 2011
Testing-Human Genomes	Pierre Baldi, Roberta Baronio, Emiliano De Cristofaro, Paolo Gasti, Gene Tsudik: Countering GAT-TACA: efficient and secure testing of fully-sequenced human genomes. ACM Conference on Computer and Communications Security, Chicago, Illinois, October 17-21, 2011: 691-702
Energy efficient computing	Tajana Rosing: Energy efficient computing in large scale systems. IEEE Custom Integrated Circuits Conference, San Jose, CA, September 19-21, 2011: 1
Memory Virtualization	L. Bathen, D. Shin, S-S. Lim, N. Dutt, "SPMVisor: Dynamic ScratchPad Memory Virtualization for Secure, Low Power and High Performance, Distributed On-Chip Memories" CODES+ISSS, Taipei, Taiwan, October 9-14, 2011:79-88 *(Best Paper Candidate)*
Voltage Scaling Realization	Shahin Golshan, Amin Khajeh, Houman Homayoun, Eli Bozorgzadeh, Ahmed Eltaweel and Fadi Kurdahi, "Reliability-Aware Placement in SRAM-Based FPGA for Voltage Scaling Realization in the Presence of Process Variations," CODES+ISSS, Taipei, Taiwan, October 9-14, 2011:257-266
Architecture	Garo Bournoutian and Alex Orailoglu, "Dynamic, Multi-Core Cache Coherence Architecture for Power-Sensitive Mobile Processors," CODES+ISSS, Taipei, Taiwan, October 9-14, 2011:89-98
Architecture	A. BanaiyanMofrad, H. Homayoun, and N. Dutt, "FFT-Cache: A Flexible Fault-Tolerant Cache Architecture for Ultra Low Power Voltage Operation," CODE+ISSS, Taipei, Taiwan, October 9-14, 2011:95-104
Architecture	Abbas BanaiyanMofrad, Houman Homayoun, Nikil Dutt: FFT-cache: a flexible fault-tolerant cache architecture for ultra low voltage operation. CASES, Taipei, Taiwan, October 9-14, 2011: 95-104
Process Variation	K. Amiri, A. Khajeh, A. M. Eltawil, and F. J. Kurdahi, "Process Variation Aware Transcoding for Low Power H.264 Decoding," Proceedings of the 9th IEEE Symposium on Embedded Systems for Real-time Multimedia, Taipei, Taiwan, October 2011
Security	Alfred Kobsa, Rishab Nithyanand, Gene Tsudik, Ersin Uzun: Usability of Display-Equipped RFID Tags for Security Purposes. ESORICS, Leuven, Belgium, September 12-14, 2011: 434-451
Real-Time SOA	Sen Zhou, Kwei-Jay Lin: A Flexible Service Reservation Scheme for Real-Time SOA. ICEBE, Beijing, China, October 19-21, 2011: 215-222
Cortical Networks	Jeffrey L. Krichmar, Nikil Dutt, Jayram Moorkanikara Nageswaran, Micah Richert: Neuromorphic modeling abstractions and simulation of large-scale cortical networks. ICCAD, San Jose, CA, November 7-10, 2011: 334-338
MPSoCs	Yen-Kuan Wu, Shervin Sharifi, Tajana Simunic Rosing: Distributed thermal management for embedded heterogeneous MPSoCs with dedicated hardware accelerators. ICCD, Amherst, MA, October 9-12, 2011: 183-189

PUBLICATIONS

The following papers were published by CECS affiliates between August 2011 to December 2011
(and unreported papers from previous eNews) - continued from page 5...

Focus	Title, Author, Publication
Architecture	Amr M. A. Hussien, Ahmed M. Eltawil, Rahul Amin, Jim Martin: Energy aware task mapping algorithm for heterogeneous MPSoC based architectures. ICCD, Amherst, MA, October 9-12, 2011: 449-450
Energy Harvesting	Sehwan Kim and Pai H. Chou,"Energy Harvesting by Sweeping Voltage-Escaladed Charging of a Reconfigurable Supercapacitor Array," ISLPED, Fukuoka, Japan, August 1-3, 2011:235-240
Solar Powered WES	D. Dondi, P. Zappi, T. Rosing,"A Scheduling Algorithm for Consistent Monitoring Results with Solar Powered High-performance Wireless Embedded Systems," ISLPED, Fukuoka, Japan, August 1-3, 2011:259-264
Power Minimization	R. Ayoub, U. Ogras, E. Gorbatov, Y. Jin, T. Kam, P. Diefenbaugh, T. Rosing, "OS-level Power Minimization Under Tight Performance Constraints in General Purpose Systems," ISLPED, Fukuoka, Japan, August 1-3, 2011:321-326
Memory-Side Acceleration	Jie Tang, Shaoshan Liu, Zhimin Gu, Chen Liu, Jean-Luc Gaudiot: Memory-Side Acceleration for XML Parsing. NPC, Changsha, China, October 21-23, 2011: 277-292
Security	L. Bathen and N. Dutt, "PoliMakE: A Policy Making Engine for Secure Embedded Software Execution on Chip-Multiprocessors," Proceedings of the 6th Workshop on Embedded Systems Security, Taipei, Taiwan, October, 2011
Deferred Workload	Muhammad Abdullah Adnan, Yan Ma, Ryo Sugihara, Rajesh Gupta: Dynamic Deferral of Workload for Capacity Provisioning in Data Centers. CoRR abs/1109.3839: (September 2011)
Linkability	Mishari Al Mishari, Gene Tsudik: Exploring Linkablility of Community Reviewing CoRR abs/1111.0338: (November 2011)
Data Networking	Steve DiBenedetto, Paolo Gasti, Gene Tsudik, Ersin Uzun: ANDaNA: Anonymous Named Data Networking Application CoRR abs/1112.2205: (November 2011)
Space and time efficiency	Shaoshan Liu, Ligang Wang, Xiao-Feng Li, Jean-Luc Gaudiot: Space-and-Time Efficient Parallel Garbage Collector for Data-Intensive Applications. International Journal of Parallel Programming 39 (4): 451-472 (October 2011)
Value Prediction on GPU	Shaoshan Liu, Christine Eisenbeis, Jean-Luc Gaudiot: Value Prediction and Speculative Execution on GPU. International Journal of Parallel Programming 39(5): 533-552 (October 2011)
Contention Managers	Brian Demsky: Using Discrete Event Simulation to Analyze Contention Managers. International Journal of Parallel Programming 39(6): 783-808 (December 2011)
Transactional Memory	Brian Demsky, Navid Farri Tehrany: Integrating file operations into transactional memory. J. Parallel Distrib. Comput. 71(10): 1293-1304 (October 2011)

PUBLICATIONS

The following papers were published by CECS affiliates between August 2011 to December 2011 (and unreported papers from previous eNews) - continued from page 6...

Focus	Title, Author, Publication
MPSoC	Yuping Zhang, Chun Jason Xue, Chengmo Yang, Alex Orailoglu: Migration-aware adaptive MPSoC static schedules with dynamic reconfigurability. J. Parallel Distrib. Comput. 71(10): 1400-1410 (October 2011)
Routing	Karim M. El Defrawy, Gene Tsudik: Privacy-Preserving Location-Based On-Demand Routing in MANETs. IEEE Journal on Selected Areas in Communications 29(10): 1926-1934 (December 2011)
WSNs	Roberto Di Pietro, Claudio Soriente, Angelo Spognardi, Gene Tsudik: Intrusion-resilient integrity in data-centric unattended WSNs. Pervasive and Mobile Computing 7(4): 495-508 (August 2011)
Scheduling	Raid Zuhair Ayoub, Krishnam Raju Indukuri, Tajana Simunic Rosing: Temperature Aware Dynamic Workload Scheduling in Multisocket CPU Servers. IEEE Trans. on CAD of Integrated Circuits and Systems 30(9): 1359-1372 (September 2011)
Architecture	Mohamed M. Sabry, Ayse Kivilcim Coskun, David Atienza, Tajana Simunic Rosing, Thomas Brunschwiler: Energy-Efficient Multiobjective Thermal Control for Liquid-Cooled 3-D Stacked Architectures. IEEE Trans. on CAD of Integrated Circuits and Systems 30(12): 1883-1896 (October 2011)
Sensor Networks	Ryo Sugihara, Rajesh K. Gupta: Path Planning of Data Mules in Sensor Networks. TOSN 8(1): 1 (August 2011)
Process Variation	Avesta Sasan, Houman Homayoun, Ahmed M. Eltawil, Fadi J. Kurdahi: Inquisitive Defect Cache: A Means of Combating Manufacturing Induced Process Variation. IEEE Trans. VLSI Syst. (TVLSI) 19(9):1597-1609 (September 2011)
Optimization	Amin Khajeh, Ahmed M. Eltawil, Fadi J. Kurdahi: Embedded Memories Fault-Tolerant Pre- and Post-Silicon Optimization. IEEE Trans. VLSI Syst. (TVLSI) 19(10):1916-1921 (October 2011)
Cache-Memory Interface	Chengmo Yang, Alex Orailoglu: Full Fault Resilience and Relaxed Synchronization Requirements at the Cache-Memory Interface. IEEE Trans. VLSI Syst. 19(11): 1996-2009 (November 2011)
Power Reduction	Houman Homayoun, Avesta Sasan, Jean-Luc Gaudiot, Alexander V. Veidenbaum: Reducing Power in All Major CAM and SRAM-Based Processor Units via Centralized, Dynamic Resource Size Management. IEEE Trans. VLSI Syst. (TVLSI) 19(11):2081-2094 (November 2011)
Sleep Modes	Houman Homayoun, Avesta Sasan, Alexander V. Veidenbaum, Hsin-Cheng Yao, Shahin Golshan, Payam Heydari: MZZ-HVS: Multiple Sleep Modes Zig-Zag Horizontal and Vertical Sleep Transistor Sharing to Reduce Leakage Power in On-Chip SRAM Peripheral Circuits. IEEE Trans. VLSI Syst. (TVLSI) 19(12):2303-2316 (December 2011)
Optimization	Minyoung Kim, Mark-Oliver Stehr, Carolyn L. Talcott, Nikil Dutt, Nalini Venkatasubramanian: A Formal Methodology for Compositional Cross-Layer Optimization. Formal Modeling: Actors, Open Systems, Biological Systems 2011: 207-222
Routing	Karim M. El Defrawy, Gene Tsudik: ALARM: Anonymous Location-Aided Routing in Suspicious MANETs. IEEE Trans. Mob. Comput. 10(9): 1345-1358 (2011)

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Center for Embedded Computer Systems, University of California, Irvine

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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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