



CECS Members participate in Designers' Forum at ASP-DAC 2010

- CECS

Highlights

- **CECS @ ASP-DAC**
- **Visitor Profile:**
Giovanni Ansaloni
- **Student Profile:**
Xu Han
- **CECS Hosts 9 Invited Talks in Fall '09**
- **Prof. Ahmed Eltawil hosts end of the year BBQ**

CECS Members and Affiliates attended and participated in special sessions at the 15th Asia and South Pacific Design Automation Conference (ASP-DAC 2010).



Professor Pai Chou was organizer and chair for January 19th's special session on *Techniques for Efficient Energy Harvesting and Generation for Portable and Embedded Systems*. This session included talks from Seoul National University, Hong Kong University of Science and Technology, ETH Zurich, and Purdue University.

Professor Doemer was Vice Chair for the Designers' Forum. The Designers' Forum, as described on the ASP-DAC web site, is conceived as a unique program that shares the design experience and solutions of real product developments among hardware/software designers and EDA academia/developers. The forum consists of four special sessions: SoC development, 3D IC integration, ESL design methodology, and embedded software development.

Professors Rainer Doemer and Andreas Gerstlauer were session organizers for Session 10D, the *Embedded Software Development for Multi-Processor Systems-on-Chip* session on January 21, 2010. Professor Gunar Schirner gave an oral presentation titled "System-level Development of Embedded Software."

Session 10D Information (from ASP-DAC web site):

While embedded system complexities continue to grow exponentially, the software content is constantly increasing, yet the productivity of developing such software is lagging behind that of hardware. In fact, software has become the most important part of the system. For most embedded systems today, it is the software that defines the overall speed, efficiency, power consumption, and capabilities of the system. However, the embedded

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VISITOR & STUDENT PROFILES

Visitor Profile: Giovanni Ansaloni

- Giovanni Ansaloni

I'm from Italy, and I'm currently visiting Bren School of Information and Computer Science at UCI as part of my PhD studies, under way at the University of Lugano (USI, Switzerland).

I obtained a Laurea (Master Degree) in Electronic Engineering at the University of Ferrara (Italy), followed by a post-graduate master in embedded systems design at ALaRI research institute (Lugano, Switzerland). Before enrolling in my PhD program, I worked as a hardware developer, dealing with automotive and infomobility applications, where I specialized in custom peripherals design on reprogrammable architectures.

My research is now focused on Coarse Grained Reconfigurable Arrays, a novel class of ICs able to efficiently marry computational efficiency and flexibility. I'm interested both in architectural exploration of the many design dimensions of CGRAs and on algorithms to automate mapping of applications onto them.

I'm advised at USI-Lugano by prof. Laura Pozzi, while at UCI I'm joining the research group of Prof. Nikil Dutt. My internship is an exceptional experience for my professional and human growth; I express my gratitude to all the people at CECS for sharing their research efforts with me, and for helping me out with the small day to day problems of getting used to a new environment.



Università
della
Svizzera
italiana

Student Profile: Xu Han

- Xu Han

I was born in the small city of Yangzhou, China. I received my bachelor's degree from Zhejiang University in Hangzhou, then traveled to the northern city of Stockholm, Sweden, and earned my master's degree in computer engineering.



I joined UCI in September, 2008. I am interested in the research area of embedded system modeling and design. Dr. Gunar Schirner helped me with my first project. We implemented a real-time MP3 decoder which can play back music in parallel to decoding, on Altera FPGA. From there, we concluded that modeling cache can be essential for real-time system designs, in the context of system-level design methodology.

Now I am working towards my PhD candidacy exam, and my advisor is Prof. Rainer Doemer. We are working with an example of H.264 decoder, which is much larger than the previous MP3 example. My PhD topic will be in the area of computer-aided re-coding for SoC specification but we are still in progress to define a specific topic.

Invited Talks

CECS Hosts 9 Invited Talks during Fall '09

- CECS Staff

During Fall '09, CECS hosted 9 invited talks from industry and academia. More information about the seminars and colloquiums below are available on the CECS web site.

“STP Engine, a C-based Programmable HW Core featuring Massively Parallel and Reconfigurable PE Array: its Architecture, Tool, and Real System Usecases”

by Dr. Masato Motomura, NEC Labs, Japan

Colloquium, December 14, 2009

[Abstract](http://www.cecs.uci.edu/eve_colloquium_details/lec_motomura_09_overview.htm) (http://www.cecs.uci.edu/eve_colloquium_details/lec_motomura_09_overview.htm)

“Concurrency and Communication: Lessons from the SHIM Project”

by Dr. Stephen A. Edwards, Columbia University

Seminar, November 18, 2009

[Abstract](http://www.cecs.uci.edu/eve Lec_and_sem_details/lec_edwards_09_overview.htm) (http://www.cecs.uci.edu/eve Lec_and_sem_details/lec_edwards_09_overview.htm)

“Advanced SoC Architectures for Multiple DRAMs (Enabled by 3D Die Stacking)”

by Dr. Sungjoo Yoo, POSTECH

Seminar, November 17, 2009

[Abstract](http://www.cecs.uci.edu/eve Lec_and_sem_details/lec_yoo_09_overview.htm) (http://www.cecs.uci.edu/eve Lec_and_sem_details/lec_yoo_09_overview.htm)

“Energy Efficient Computing”

by Prof. Tajana Simunic Rosing, Department of CSE, UC San Diego

Seminar, November 16, 2009

[Abstract](http://www.cecs.uci.edu/eve Lec_and_sem_details/lec_rosing_09_overview.htm) (http://www.cecs.uci.edu/eve Lec_and_sem_details/lec_rosing_09_overview.htm)

“NEC's Manycore Platforms for Low-Power Embedded System”

by Naoki Nishi GM, NEC Central Research Labs, Japan

Colloquium, November 12, 2009

[Abstract](http://www.cecs.uci.edu/eve_colloquium_details/lec_nishi_09_overview.htm) (http://www.cecs.uci.edu/eve_colloquium_details/lec_nishi_09_overview.htm)

“Why Circuits Fail”

by Dr. Sani R. Nassif, IBM Austin Research Labs

Seminar, November 10, 2009

[Abstract](http://www.cecs.uci.edu/eve Lec_and_sem_details/lec_nasif_09_overview.htm) (http://www.cecs.uci.edu/eve Lec_and_sem_details/lec_nasif_09_overview.htm)

“A Virtualization-Based Software Architecture for Real-Time Embedded Systems”

Dr. Sung-Soo Lim, Kookmin University, Korea

Colloquium, October 22, 2009

[Abstract](http://www.cecs.uci.edu/eve_colloquium_details/lec_sung-soo_lim_overview.htm) (http://www.cecs.uci.edu/eve_colloquium_details/lec_sung-soo_lim_overview.htm)

“Ultra Low-Power VLSI through Co-Optimization of Architecture and Circuit-Level Design”

Dr. Hiroshi Nakamura, University of Tokyo, Japan

Colloquium, October 19, 2009

[Abstract](http://www.cecs.uci.edu/eve Lec_and_sem_details/lec_nakamura_oct2009_overview.htm) (http://www.cecs.uci.edu/eve Lec_and_sem_details/lec_nakamura_oct2009_overview.htm)

“Power Efficient and Fault Tolerant Circuits and Systems Using Commodity FPGA”

Prof. Lei He, Electrical Engineering Department, UCLA

Colloquium, October 9, 2009

[Abstract](http://www.cecs.uci.edu/eve_colloquium_details/lec_lei_he_overview.htm) (http://www.cecs.uci.edu/eve_colloquium_details/lec_lei_he_overview.htm)



ASP-DAC 2010

CECS Members present Embedded Software Development Session at ASP-DAC 2010 continued from page 1...

software is typically only addressed as an afterthought and "shoe horned" into the device.

This session deals with the issues to cope with the ever increasing complexity of embedded systems software. It presents different views by both industry and academia representatives on the challenges and potential solutions for embedded software development for multi-processor systems-on-chip (MPSoC). Two talks from the industrial perspective discuss the issues and challenges involved in developing commercial software for real-world embedded systems, followed by two talks from the academic community that outline promising approaches to automate and overcome key issues in software development for the future.

The first presentation discusses the challenges in developing embedded software across multiple platforms and specifically addresses portability issues in supporting multiple OSes for cell-phone applications. The second presentation addresses low-



power aspects in hardware-dependent software that can be optimized using advanced compilation techniques. The third presentation highlights the MAPS compiler, an integrated programming environment for multiple simultaneous applications on

MPSoC. MAPS supports both sequential and parallel programming models and targets efficient code generation for predefined heterogeneous MPSoC platforms. The fourth presentation presents research results on system-level modeling of embedded software and automatic code generation for an efficient implementation. Issues including device driver generation and efficient multi-tasking are addressed as well.

End of the Year BBQ hosted by Prof. Ahmed Eltawil

- CECS Staff

CECS Member Professor Ahmed Eltawil held an End of the Year BBQ on December 15, 2009 during the afternoon. The following are some pictures that were taken at the event.



CECS—promoting creativity and pursuing discovery!

Center for Embedded Computer 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.

CECS eNews

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The following papers were published by CECS affiliates between
September 2009 - December 2009
(and unreported papers from previous eNews).

- Automotive Radars** Vipul Jain, Fred Tzeng, Lei Zhou, Payam Heydari, "A Single-Chip Dual-Band 22-29-GHz/77-81-GHz BiCMOS Transceiver for Automotive Radars," *IEEE J. Solid-State Circuits*, vol. 44, no. 12, Dec. 2009.
- Parallel LPDC Decoding** Wen-Hsiang Hu, Chun-Yi Chen, Nader Bagherzadeh, "A Spectral-Based Partitioning Algorithm for Parallel LDPC Decoding on a Multiprocessor Platform," International SoC Design Conference, November 2009.
- HiperSense Dense Wireless Sensing and Data Visualization** Pai H. Chou, Chong-Jing Chen, Stephen F. Jenks, and Sung-Jin Kim, "[HiperSense: An Integrated System for Dense Wireless Sensing and Massively Scalable Data Visualization](#)," in *Lecture Notes in Computer Science (LNCS 5860), Proc. Workshop on Software Technologies for Future Embedded and Ubiquitous Systems*, Newport Beach, CA, November 16-18, 2009. pp. 252—263.
- Parallel LPDC Decoding** Wen-Hsiang Hu, Jun Ho Bahn, Nader Bagherzadeh, "Parallel LDPC Decoding on a Network-on-Chip Based Multiprocessor Platform," International Symposium on Computer Architecture and High Performance Computing October 2009.
- Algorithmic Loop Transformation** Mohammad Ali Ghodrati, Tony Givargis, "Efficient Dynamic Voltage/Frequency Scaling through Algorithmic Loop Transformation," International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS), pp. 203-209, Grenoble, October 2009.
- NAND Flash Partial Block Cleaning** S. Choudhuri, T. Givargis, "Deterministic Service Guarantees for NAND Flash using Partial Block Cleaning," *Academy Publisher Journal of Software (JSW)*, vol. 4, no. 7, pp. 728-737, September 2009.
- Control Flow in Loops** M.A. Ghodrati, T. Givargis, A. Nicolau, "Optimizing Control Flow in Loops using Interval and Dependence Analysis," *Springer Journal on Design Automation of Embedded Systems (DAES)*, vol. 13, no. 3, pp. 193-221, September 2009.
- Simultaneous MultiThreading** Kyueun Yi and Jean-Luc Gaudiot, "Network Application on Simultaneous MultiThreading Processors," *IEEE Transactions on Computers*, In Press, 2009.
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