

Proceedings



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Welcome Letter

Welcome to ICCD 2007!

On behalf of the Program Committee, we would like to welcome you to the 25th IEEE International Conference on Computer Design 2007! For its quarter centennial anniversary, the conference is being held in Lake Tahoe, California.

The International Conference on Computer Design encompasses a wide range of technical topics in the research, architecture, design, implementation, verification, and test of computer systems. Throughout its history, ICCD has retained its unique characteristics as the most diverse multi-disciplinary venue for academic and industry practitioners to discuss practical and theoretical work in the field of computer design.

The conference technical program consists of technical papers submitted to the Program Committee for evaluation and selection through a rigorous peer-review process, plus a number of Special Sessions and Invited Papers. The technical papers are submitted to one of five conference tracks: Computer Systems Design and Applications; Processor Architecture; Logic and Circuit Design; Tools and Methodology; and Verification and Test. The track committees are composed of technical experts in the discipline, who review and select the best submissions. On average, each paper receives four individual reviews. After the individual reviews are completed, each paper is discussed collectively by the track committee, to ensure equity and consistency in the selection process. The Program Chairs review the selections from the track committees and finalize the program.

ICCD is truly an international conference, with participation from researchers and developers from academic institutions, research laboratories, and industry design and development groups throughout the world. This year, the Program Committee received paper submissions from 25 different countries. Of the 259 papers submitted, the track committees accepted 88 papers (33 %) for inclusion in the conference proceedings and for presentation at the conference. In addition, the conference program includes special sessions on “Software Defined Radio (SDR) Technology”, “Three-Dimensional Integrated Circuits”, and on “Programmable Processors in Wireless Communication Systems.”

The conference program features three keynote presentations from luminaries in our field: Paul Dent from Ericsson, Yale N. Patt from the University of Texas at Austin, and Thomas H. Lee from Stanford University.

On behalf of the Organizing Committee, we would like to thank the track committee members, and especially the track committee chairs, for their dedication and diligence in selecting an exceptional set of technical presentations. The investment of their time and insights is very much appreciated. Of course, ICCD would not happen without the excellent papers from the authors. Thanks to all of them as well!

On a personal note, we would like to thank our colleagues on the organizing committee for their efforts, their support, and their camaraderie. The efforts of Robert Brayton, Vice Chair; Kee Sup Kim, Finance Chair; Sule Ozev, Publications Chair; Greg Byrd, Special Sessions Chair and Darshana Merchant, Creative Artwork and Web Design, are all very much appreciated. The insights

and assistance from last year's conference chair, Pranav Ashar, were also instrumental in helping us with this year's conference logistics.

We are indebted to the support and guidance from the IEEE Circuit and Systems Society and the IEEE Computer Society as well as the IEEE Publications and Conference Management staffs.

The outstanding conference program at ICCD 2007 is a result of many individuals who contributed their time and expertise leading up to the event. The culmination of their efforts is the technical interchange, informal discussion, and personal communication that can only occur at the conference itself. In that regard, we hope you have a rewarding and enjoyable time at the conference. Welcome to ICCD 2007!

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Dmitrij, Kissler, University of Erlangen-Nuremberg, Germany
Dirk Koch, University of Erlangen-Nuremberg, Germany
Selcuk Kose, University of Rochester, USA
Ramakrishnan Krishnan, Pennsylvania State University, USA
Steve, Krueger, Texas Instruments, USA
Ganghee Lee
Sunghyun Lee
Byeong Lee, Kil, Texas Instruments, USA
Hsien-Hsin, Lee, Georgia Institute of Technology, USA
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Gabe, Loh, Georgia Institute of Technology, USA
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Jennifer Mankin
Sanu Mathew, Intel Corporation, USA
Paul Mejia, UC Davis, USA
Andres Mellik, Tallinn Technical University, Estonia
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Shahnam Mirzaei, UCSB, USA
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Tinoosh Mohsenin, UC Davis, USA
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Young-Hwan Park
Vasilis Pavlidis, University of Rochester, USA
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Miodrag, Potkonjak, UCLA, USA
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Rajaraman Ramanarayanan, Intel Corporation, USA
Marco Antonio Ramirez
Wenjing Rao, University of California, San Diego, USA
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Jonathan Rosenfeld, University of Rochester, USA
Emre Salman, University of Rochester, USA
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Ioannis Savidis, University of Rochester, USA
Dana Schaa
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Balaram, Sinharoy, IBM, USA
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Christine Watnik, UC Davis, USA
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Hua Xiang, IBM, U.S.
Lin Xie, University of Wisconsin Madison, USA
Junjuan Xu, UCLA, US
Chia-Lin, Yang, National Taiwan University, Taiwan
Sami, Yehia, ARM, UK
Zhiyi Yu, UC Davis, USA
Zhiru Zhang, AutoESL, US
Xinping Zhu
Ling Zhuo, University of Southern California, USA

Keynote Presentation

Embedded Processors: Sharing Our Wish-Lists

by

Paul Dent, Ericsson

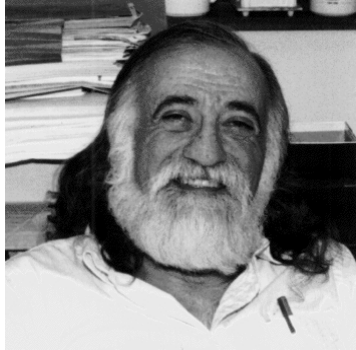


Paul Dent graduated in Electronics from Southampton University in England in 1964. He has worked 43 years in the field of radio design, and was awarded a Doctorate by his Alma Mater in 2001 in recognition of the record number of patents held in the field. Paul Dent has pioneered computer simulation of communications systems from the days of vacuum tube computers to the present, and computers and computing has held his interest second only to radio communications. He takes much joy therefore from the fact that these two disciplines are now tightly intertwined in current products. Since 1987 Paul Dent has been carrying out cellphone development and research for Ericsson, initially in Sweden, and in the USA since 1991.

Keynote Presentation

Microprocessor Performance, Phase 2: Harnessing the Transformation Hierarchy by

Yale N. Patt, The University of Texas at Austin



Yale Patt is a teacher at The University of Texas at Austin, where he also does research in microarchitecture and has consulted for microprocessor manufacturers for more than 30 years. He also holds the Ernest Cockrell, Jr. Centennial Chair in Engineering at Texas. He (with his PhD students) has been responsible for a number of innovations which are now taken for granted in most high-end microprocessors. HPS (at Micro-18 in 1985) was the first comprehensive microengine to introduce wide-issue, aggressive branch prediction, speculative out-of-order execution and in-order retirement to preserve precise exceptions. His two-level branch predictor, introduced at Micro-24 in 1991, has been adapted to just about every high end chip since Intel's Pentium Pro in 1995. Much as he enjoys research and consulting, Professor Patt's first love is teaching. He teaches the required freshman intro to computing to 400 students every other Fall, and the advanced graduate course in microarchitecture to PhD students every other Spring. Always the focus of his teaching is on understanding the fundamentals. He has earned the appropriate degrees from reputable universities and has received more than enough awards for his research and teaching. More detail is available at <http://www.ece.utexas.edu/~patt>.

Keynote Presentation

RF CMOS: A look backward and forward by

Thomas H. Lee, Stanford University



Thomas H. Lee received the S.B., S.M. and Sc.D. degrees in electrical engineering, all from the Massachusetts Institute of Technology in 1983, 1985, and 1990, respectively. He joined Analog Devices in 1990 where he was primarily engaged in the design of high-speed clock recovery devices. In 1992, he joined Rambus Inc. in Mountain View, CA where he developed high-speed analog circuitry for 500 megabyte/s CMOS DRAMs. He has also contributed to the development of PLLs in the StrongARM, Alpha and AMD K6/K7/K8 microprocessors. Since 1994, he has been a Professor of Electrical Engineering at Stanford University where his research focus has been on gigahertz-speed wireline and wireless integrated circuits built in conventional silicon technologies, particularly CMOS. He is an IEEE Distinguished Lecturer of both the Solid-State Circuits and Microwave Societies. He holds 35 U.S. patents and authored *The Design of CMOS Radio-Frequency Integrated Circuits* (now in its second edition), and *Planar Microwave Engineering*, both with Cambridge University Press. He is a co-author of four additional books on RF circuit design, and also cofounded Matrix Semiconductor.