FOREWORD

Dear Colleague,

Welcome to the **DATE 07** Conference Proceedings. DATE combines the world's leading electronic systems design conference and Europe's leading international exhibition for electronic design, automation and test, from system level hardware and software implementation right down to integrated circuit design. The *DATE 07 event* features a technical program with 78 sessions covering the latest in system design and embedded software, IC design methodologies and EDA tool developments, together with an exhibition with the leading EDA, silicon and IP providers showing their new products and services. Challenges that you all face or soon will face in your daily practice are the increasing design complexity of highly integrated systems, the introduction of reconfigurability and embedded software, and the control of power, reliability and variability in nanometer IC designs. All these issues will be addressed in this year's DATE event.

At its tenth anniversary, DATE 07 has again reached a record number (933) of submissions, compared to previous years and compared to other EDA conferences worldwide. With submissions coming from all five continents and almost fifty countries, DATE has truly become an international conference. DATE is now the world's premier event in electronic system design. The submissions have been reviewed by the more than 600 members of the Technical Programme Committee. After a thorough review and selection process (with an average of 4.6 reviews per paper), finally 208 papers were selected for presentation at the conference. In addition, 57 papers were selected for Interactive Presentations, which highlight quality work in progress. Together with the invited special sessions (panels, embedded tutorials and hot topic sessions) this has resulted in a **high-quality technical programme** with 78 sessions covering the latest in system design and embedded software, IC design methodologies and EDA tool developments. One of the main strengths of the conference is a wide but high-quality coverage of design, design automation and test topics, from the system level (including PCB and FPGA) to the integrated circuit level. In addition, for the third year a special **embedded software track** is offered to allow for the increasing importance of software in embedded systems. Compared with previous years, submissions in design, test and embedded software have grown significantly, showing a clear trend toward a holistic view and a comprehensive system design focus. This year, papers are organized in 4 major areas:

- D – Design Methods, Tools, Algorithms and Languages
- A – Application's Design
- T – Test Methods, Tools and Innovative Experiences
- E – Embedded Software

The DATE week opens on Monday April 16, 2006 at the Acropolis, Nice, France, with the offer of **pre-conference tutorials**. This year the five full-day tutorials cover topics of great interest to industrial designers. The first tutorial reviews the current state-of-the-art in NoC research and elaborates the main challenges for research and industrial applications. The second one provides detailed knowledge about the development of reconfigurable embedded systems from architecture and basic mechanisms up to high-level tools for system integration and application exploitation. The third tutorial discusses interactions between layout and manufacturability for devices and interconnects. Toward the system level, the tutorial discusses how on-die and on-wafer test and calibration structures can accelerate yield learning and adaptivity. The fourth tutorial introduces state-of-the-art technologies based on Simulink/Matlab for the design of multiprocessors on chip. The fifth tutorial starts by motivating the needs for and opportunities of Software

Defined Radios, then discusses the trends and most promising approaches to implement reconfigurable digital baseband processing as well as reconfigurable RF front-ends and finally concludes by showing how a cross-layer optimization methodology can be used to translate the flexibility and energy-scalability into low-energy operation. Furthermore, six half-day tutorials are also proposed, three in the morning and three in the afternoon, covering aspects related to system-level design, test, analog and mixed signal design, packaging and bio-electronics.

The main conference opens on Tuesday April 17, 2007 with two very interesting **keynote speeches**. Tohru Furuyama, General Manager at Toshiba, will talk about the challenges of digital consumer and mobile SoCs, and Alan Naumann, CEO of CoWare, will challenge Darwin's law by questioning whether design evolution stopped at RTL level. On the same day, the completely revamped **Executive Track** offers a series of panels with executives discussing their design needs: the fables companies, the consumer electronics market and the embedded automotive system designers.

On Wednesday April 18, 2007 a **special full-day track is devoted to Ubiquitous Communication and Computation**. Ubiquitous computing and communications bring the era where computing is part of everyday practices and natural environments at home, at work and in public spaces. By embedding computing resources and communicating seamlessly with them, we can hide the technology and provide services that are natural for humans to use. What was standard for a desktop computer technology in the early 80's is available for numerous embedded devices that are used in the devices, rooms and buildings. Connecting anything, anywhere all the time opens possibilities for numerous new services and solutions. The many options and opportunities set challenges for the design, interoperability and verification for these systems. The design process is one key success factor in creating these heterogeneous systems. To manage the high design complexity and to manage the high variety of the systems and technologies the design and test tools have to support the abstraction of heterogeneous implementations, distributed specification, interoperability testing and test activities in general. Also, the design of efficient communications solutions, co-design on several abstraction levels, and system architectures as well as the development and integration of standards are major success factors. This special day focuses on some key technical challenges and potential uses of the ubicom concepts. The sessions focus specifically on the applications, system architecture, communication and interoperability, security issues, power supply and power management issues.

New this year and to emphasize that DATE is the major event for the designers, DATE07 features two invited sessions where Europe's famous consumer industry presents their best designs and design practices.

On Thursday April 19, 2007 a second **special full-day track focuses on Space and Aeronautics applications**. Space and Aeronautics have been innovative and technology pioneering industries in safety critical embedded systems for a long time, transferring state of the art concepts and technologies to other industries and setting standards in systems and software engineering. Recently, the fast growth of new high tech industries with mass markets has opened more and more opportunities for the space and aeronautics industries to transfer back a broad range of generic and high performance technologies, particularly in information and communication. Each transfer path has its own challenges, linked to different characteristics of each industry. The special day is illustrating these transfer challenges, and analyses what makes a difference in terms of:
- the value expected from the technology
- the nature and severity of the requirement set for the technology
- the role of the technology in the product context, being its hierarchy or its life-cycle

- the way technology is managed in the industrial context, being the development process or the 10
- internal and supply chain organisation

The special day is articulated around a keynote address, given by an executive representative of the European space and aeronautics industry. It introduces the strategic stakes and the international competitive landscape, for further development and understanding of the sizing dimensions of technology transfer all along the special day.

Seven special sessions complement the main conference program, with embedded tutorials, hot topics and panels on the most interesting issues today in electronic design. A first session looks at microprocessor architectures in the era of terascale integration. This raises the question addressed in a second session whether testing systems with multiple billions of transistors will be feasible. The increasing NRE cost of deep sub-micron silicon designs leads to the increased use of flexible application domain specific systems. This is discussed in two sessions, one looking at heterogeneous systems on chip and systems in package, the other covering the future of customizable processors. The evolution to nano-scale semiconductor process technologies ripples through into the design area. Two panels discuss its influence on mixed signal and digital design, respectively. A last special session sketches the pivotal place EDA takes in the European Technology Platforms Artemis and Eniac, which structure the European government funded research in enabling hardware and software technologies for embedded systems.

Friday April 20 is the day for the **DATE workshops**. DATE offers the possibility to attend workshops as a complement to the regular conference. Seven workshops will run in parallel, covering emerging and important design topics including UML for SoCs, software and compilers for embedded systems, secure embedded implementations, embedded system design, diagnostic services for networks-on-chip, FPGAs and reconfigurable systems, and robust computing with nano-scale devices. Each workshop is structured into presentations from highly distinguished academic and industrial researchers.

Finally, throughout the conference days the **DATE Exhibition** is open to designers. The more than hundred exhibitors include the leading EDA, silicon, FPGA and IP providers showing their new products and services. This year, we welcome a record number of start-up companies, clearly showing the healthiness of the community. In addition, there is an **Exhibition Theatre** featuring talks from engineering managers of the leading electronic manufacturers on first-hand design experiences of commercial EDA tools. This year, the **PCB symposium** will also take place on Thursday afternoon as part of the exhibition theatre programme. The exhibition program offers also **designers' solutions workshops**, which are short training sessions organized by vendors on specific topics such as closing the gap between design and test teams, transaction level modeling, IP verification, combining SystemC with SystemVerilog and DSP implementation techniques for FPGAs. The DATE week will also be a possibility for students and universities to show their research works, through the **PhD Forum** on Monday and the **University Booth** in the exhibition where hardware and software demonstrations will be shown by different universities on a rotation schedule. New this year is that the university booth is also open to demonstrate the pre-commercial results obtained in government funded projects.

The DATE 07 event's program will be particularly attractive to industrial designers, both at IC, FPGA and embedded system level, to researchers and academics as well as to design managers, and an increasing attendance is anticipated.

We therefore invite you to take full advantage of the many opportunities offered to you by DATE 07, to improve and extend your knowledge and/or business in electronic system's design and for socializing with peers and colleagues. We hope that you will fully enjoy this 10th anniversary of DATE.

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DATE 07 General Chair

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DATE 07 Programme Chair