

ARTIST2 Newsletter n°2

Newsletter

July 26th, 2006



INTRODUCTION

This is the second edition of the newsletter for the ARTIST2 Network of Excellence on Embedded Systems Design (<http://www.artist-embedded.org/FP6/>).

This newsletter is meant to serve the larger embedded systems research and industrial community, by announcing events of interest (workshops, summer schools, high level events, selected publications for a wide audience).

We hope that by providing these pointers, this newsletter will contribute to our overall objective of integration and building excellence within the community.

Editorial

Joseph Sifakis - Artist2 Scientific Coordinator
Building Up the Community

Following the recent European Technology Platform ARTEMIS conference in Graz, we have made a decisive step towards the consolidation of the ARTEMIS Strategic Research Agenda (SRA). This defines priorities in embedded systems for the IST 7th Framework Programme.

We now know that Embedded Systems have been allotted a considerably increased budget in FP7. The first calls will be published over the course of 2007. Artemis is setting up Artemisia, a non-profit organization for the implementation of the SRA. The Artemisia bylaws call for three types of members: SME, Academic, and Corporate. It is important for the academic community to participate actively in this endeavor.

The conferences landscape in embedded systems design is also integrating and gaining structure. The Embedded Systems Week organized in Seoul October 22-27, federates three major conferences: CODES/ISSS, CASES, EmSoft. The number and quality of submissions received, are signs that this will be a very successful event. Next year, the Embedded Systems Week in Salzburg will bring together these conferences, to which others will be added.

Progress in structuring the area over the last four years has been substantial. We still need to move from a multi-disciplinary towards an integrated discipline. We believe that this can be achieved through increased interaction between existing Networks of Excellence, reinforced International Collaboration, and targeted projects focusing on fundamental aspects. ARTIST2 will propose and take actions to make concrete progress in these directions.

Subscription

Subscription is free of charge. If you would like to be added or removed from the subscription list, simply send a message to the editor:

Bruno.Bouyssounouse@imag.fr



Online

This newsletter is also available online:
<http://www.artist-embedded.org/FP6/ARTIST2Events/Publications/Newsletter/>

Table of Contents

<i>Introduction, Editorial.....</i>	<i>1</i>
<i>Workshops and Tutorials</i>	
• <i>Component-based Design .</i>	<i>2</i>
• <i>WESE'06</i>	<i>3</i>
• <i>Other Workshops/Seminars</i>	<i>4</i>
<i>Conferences</i>	
• <i>Embedded Systems Week..</i>	<i>5</i>
• <i>IST Event 2006.....</i>	<i>6</i>
• <i>RTSS 2006.....</i>	<i>6</i>
• <i>Date'07.....</i>	<i>6</i>
<i>Publications</i>	<i>7</i>
<i>Schools and Courses</i>	
• <i>ARTIST2 / UNU-IIST Spring School in China</i>	<i>8</i>
• <i>Upcoming Schools/Courses</i>	<i>9</i>
<i>Artemis FP7 ETP</i>	<i>10</i>
<i>Other European Projects.....</i>	<i>11</i>
<i>About the Artist2 NoE</i>	<i>12</i>

Workshops and Seminars

ARTIST2 Newsletter

July 26th, 2006



Foundations and Applications of Component-based Design

http://www.artist-embedded.org/FP6/ARTIST2Events/Events/Components_EmSoft/

Objectives and Scope

Discuss recent results on component-based design with emphasis on design frameworks for real-time systems encompassing heterogeneous composition and models of computation. Especially frameworks for handling non-functional and resource constraints, design under conflicting dependability criteria, trade-offs between average performance and predictability.

The workshop aims to gather together researchers from computer science and electrical engineering and will seek a synthesis between the underlying paradigms and techniques. The focus is not only on fundamental results but also on their implementation in methods and tools and their concrete application in areas such as automotive, avionics, consumer electronics and automation.



Registration

Please register for this workshop through the regular *Embedded Systems Week* registration: <http://www.it.uu.se/conf/EMSOF06/>

Topics

Challenges

The workshop will address specific challenges such as:

- Foundations and Expressiveness of System Description Formalisms:
 - *basic concepts,*
 - *component interaction,*
 - *resource modeling (energy, memory, time, ...),*
 - *combining synchrony vs. asynchrony, event-triggered/data-triggered/time triggered, separation of concerns;*
- Component-based Design, Methods and Tools:
 - *analysis methods (compositional verification techniques; resource usage);*
 - *design methods (property preserving structuring principles; refinement/implementation relations)*
 - *tradeoffs between predictability and efficiency*
 - *implementation methodologies and tools*
- Application Scenarios and Relevant Case Studies

**ARTIST2 Workshop -
October 26th at EmSoft'06**



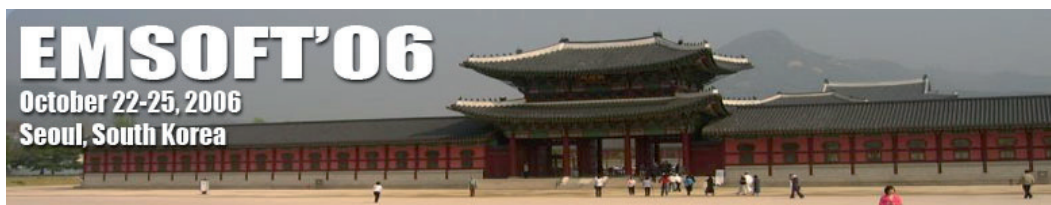
Accepted Talks

- Hans-Gerhard Gross and Arjan van Gemund, Delft University of Technology: **Bridging the Gap between Non-formal and Formal Software Component Requirements Specifications for Embedded System Engineering**
- Ananda Basu, Marius Bozga and Joseph Sifakis, VERIMAG. Gregor Gößler, INRIA Rhône-Alpes: **Component-based Construction of Real-time Systems in BIP**
- Janos Sztipanovits (Vanderbilt University and ISIS): **Towards the Compositional Specification of Semantics for Heterogeneous Domain-Specific Modeling Languages**
- Cheng-Yao Chen, Jason Schlessman, and Wayne Wolf, Princeton University: **Towards Accessible Real-Time Distributed Embedded Vision Middleware**
- Kai Richter and Marek Jersak, Symtavision GmbH. Arne Hamann and Rolf Ernst, **Technical University of Braunschweig: Scheduling Analysis in the Automotive Design Flow**
- Hugo Andrade, John Breyer, Gerardo Garcia, and Jacob Kornerup, National Instruments Corporation: **A Unified Graphical Representation and Tool for Design and Integration of Com Objectives ponents in Heterogeneous Distributed Real-Time Systems**
- Sankalita Saha, Dong-Ik. Ko, and Shuvra. S. Bhattacharyya, University of Maryland: **A Meta-modeling Framework for Dynamic Reconfiguration of Dataflow Graphs**
- Thomas A. Henzinger, EPFL and UC Berkeley. Slobodan Matic, UC Berkeley: **An Interface Algebra for Real-Time Process Graphs**
- Lothar Thiele, Ernesto Wandeler, and Nikolay Stoimenov, ETH Zurich: **Real-Time Interfaces for Composing Real-time Systems**
- Abhik Roychoudhury and P.S. Thiagarajan, National University of Singapore: **A Verification Framework for Interacting Process Classes**
- Ingo Stierand and Werner Damm, University of Oldenburg: **Cyclic Timed Interfaces**

Invited Speakers

- Edward A. Lee, UC Berkeley – *to be confirmed*
- Joern Janneck, XILINX – *to be confirmed*

EMSOF'06
October 22-25, 2006
Seoul, South Korea



Workshops and Seminars

Newsletter

July 26th, 2006



Important Dates

- Paper submission: August 8th, 2006
- Acceptance/rejection notification: September 1, 2006
- Final version: October 1, 2006
- Workshop: October 26, 2006

Submissions

Interested authors should submit a full paper (not to exceed 8 double column, single space pages) to:

Dr. Jeff Jackson
317 Houser Hall
The University of Alabama
Tuscaloosa, AL 35487-0286

Phone: (205) 348-2919

Email: jjackson@eng.ua.edu

- Please use the ACM SIG template in constructing your submission:
<http://www.acm.org/sigs/pubs/proceed/pubform.doc>
- Electronic submission is required, preferably as a PDF attachment to an email message.
- Please use the subject line "WESE2006 submission" in your submission email.

Workshop on Embedded Systems Education - WESE'06

<http://www.artist-embedded.org/FP6/ARTIST2Events/Events/WESE06/>

**ARTIST2 Workshop -
October 26th at EmSoft'06**



Overview

Embedded systems are inherently multi-disciplinary. Their design requires a large variety of skills from control and signal processing theory, electronics, computer engineering and science, telecommunication, etc., as well as application domain knowledge.

This has motivated a recent but ever growing interest in the question of educating specialists in this domain and this has also been recognized as a particularly difficult problem.

After a successful first event (WESE'05) in Jersey City, USA (2005), this second workshop aims to bring researchers, educators, and industrial representatives together to assess needs and share design, research, and experiences in embedded systems education.

Topics and Focus

Particular topics of interest include but are not limited to:

- Industrial needs regarding embedded systems education
- Embedded systems curricular design and implementation
- Control and signal processing issues
- Computer science issues
- Real-time computing issues
- Distributed systems issues
- Architecture and design issues
- Hardware/software co-design
- Hands-on experiences and labs
- Teaching embedded systems

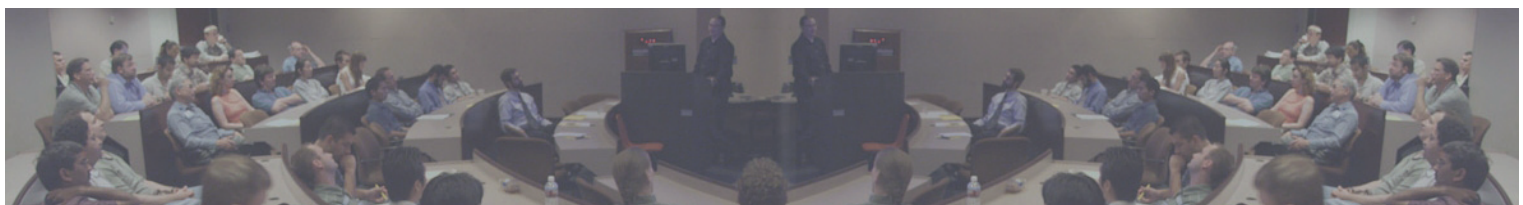
Organisation

Organizing Committee

- Jeff Jackson, The University of Alabama, USA
- Paul Caspi, Verimag-CNRS, France
- Jogesh Muppala, The Hong Kong University of Science and Technology, Hong Kong
- Wayne Wolf, Princeton University, USA
- John K. Zao, National Chiao Tung University, Taiwan

Program Committee

- Tom Conte, North Carolina State University, USA
- Mats Daniels, Uppsala University, Sweden
- Jen Davoren, The University of Melbourne, Australia
- Jin Hyung Kim, KAIST, South Korea
- Yann-Hang Lee, Arizona State University, USA
- Kenneth G. Ricks, The University of Alabama, USA
- Chi-Sheng (Daniel) Shih, National Taiwan University
- Hiroto Yasurra, Kyushu University, Japan



Workshops and Seminars

Newsletter

July 26th, 2006



Online Information

A complete description of all upcoming ARTIST-related events is available online:

<http://www.artist-embedded.org/FP6/ARTIST2Events/Events/>

International Collaboration

LONG TERM CHALLENGES IN HIGH CONFIDENCE COMPOSABLE EMBEDDED SYSTEMS

JOINT US-EU-TEKES WORKSHOP June 21-22 2006 Helsinki

<http://trust.eecs.berkeley.edu/euus/wiki/Euus/WorkshopAgenda>

The workshop is part of a series of workshops organized by IST and NSF. It gathered 65 international participants from leading institutions and companies from both Europe and the USA. The workshop program and slides are available through the link above.

This newsletter will provide a pointer to the workshop report as soon as it becomes available.

One of the main conclusions of the workshop was a general agreement to focus on unification and integration of communities rather than on multi-disciplinarity.

This focus should translate into actions for convergence between conferences and scientific events, as well as into action lines of the research agenda.

Other Upcoming Workshops and Seminars

The 4th Workshop on Java Technologies for Real-time and Embedded Systems

JTRES 2006
11-13 October
Paris, France

<http://www.artist-embedded.org/FP6/ARTIST2Events/Events/JTRES-2006/> *Sponsored and co-organized by Artist2.*

Over 90 percent of all microprocessors are now used for real-time and embedded systems. Higher-level programming languages and middleware are needed to robustly and productively design, implement, and validate them.

Designing dependable and predictable real-time embedded systems that optimize the use of limited resources is hard; building them on time and within budget is even harder. Evolutions in languages, tools, and methods should enable higher software productivity.

This can be achieved in part by shielding programmers from type errors, memory management, and steep learning curves. The Java programming language has become an attractive choice because of its safety, productivity, its relatively low maintenance costs, and the availability of well trained developers.

There is an increasingly growing interest in Real-Time Java in both the research community and the industry, because of its challenges and its potential impact on the development of embedded and real-time applications. The goal of the proposed workshop is to gather researchers working on real-time and embedded Java to identify the challenging problem that still need to be properly solved in order to assure the success of the of Real-Time Java as a technology, and to report results and experience gained by researchers.

Timing Analysis in the Industrial Development Process, workshop within ISO LA2006

TIMING ANALYSIS
1-day workshop,
Nov 15-19, 2006, Cyprus

<http://www.artist-embedded.org/FP6/ARTIST2Events/Events/Isola06/> *Sponsored and co-organized by Artist2.*

Many safety-critical embedded systems have to satisfy hard real-time constraints. These systems need sound methods and tools to derive reliable run-time guarantees. The guaranteed run times should not only be reliable, but also precise. The achievable precision is highly dependent on characteristics of the target architecture and on the software design and implementation method.

Experience has shown that a tight integration of Timing Analysis into the development process and the development tool chain improves the achievable precision.

This Special Track will be concerned with questions around the integration of timing analysis in the industrial development process.

Topics of interest:

- Positioning Timing Analysis in the development process,
- Implications for system design and implementation,
- Timing predictability of embedded systems,
- Validation of timing-analysis methods and tools,
- Degrees of time-criticality and corresponding methods.

Workshop organisers:

- Reinhard Wilhelm (Saarland University, Saarbrücken)
- Joern Schneider (Robert Bosch, Schwieberdingen)
- Jean Souyris (Airbus France)

Models of Computation and Communication

Models of Computation and Communication
November 16-17th
ETHZ Zurich, Switzerland

<http://www.artist-embedded.org/FP6/ARTIST2Events/Events/MoCC/> *Workshop organized by Artist2.*

The multi-disciplinary nature of embedded systems raises problems of communication and cooperation between several disciplines: software and hardware, computer science and engineering, real-time and distributed systems, telecommunication, control and signal processing etc. Each of these worlds have their own notion of such basic concepts as computation and communication which makes it difficult for designers to cooperate and achieve correct and efficient designs.

The workshop will gather recognised specialists from these disciplines to make inroads towards merging these concepts within some unified view.

This workshop is a closed one, based on invitations and the attendance is strictly limited to 40 persons.

If you wish to attend and/or participate, please send:

- Your name
- Affiliation
- Talk title and abstract
- or some words of motivation

to: Albert.Benveniste@inria.fr
before September 15th 2006.

ISO LA2006

Embedded Systems Week 2006

October 22-27, 2006 Seoul, Korea

One Registration - Three Conferences

Embedded Systems Week brings together conferences, tutorials and workshops centered on various aspects of embedded systems research and development.

Three leading conferences in the area - CODES+ISSS, EMSOFT and CASES - will 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.

<http://www.esweek.org/>

HARDWARE - SOFTWARE CODESIGN AND SYSTEM SYNTHESIS

CODES+ISSS

The International Conference on Hardware-Software Codesign and System Synthesis is the premier event in design of embedded systems hardware, software and tools. The conference proudly continues the tradition of being a high-quality forum for active discussion on current and innovative topics.

- High-level, architectural and system-level synthesis
- Hardware-Software co-design
- Specification languages and models
- Simulation and verification
- Power-aware design methodology
- Embedded systems architecture
- Multiprocessors and Network-on-chip
- Embedded software
- Application-specific design and algorithms
- Industrial practices and design case studies
- Emerging techniques



6TH ANNUAL ACM CONFERENCE ON EMBEDDED SOFTWARE

EMSOFT

Sponsored by Artist2.

EMSOFT is an annual ACM Conference on Embedded Systems Software sponsored by ACM SigBED (Special Interest Group on Embedded Systems).

It aims at covering all aspects of embedded software:

- Modeling and validation
- Design and implementation of embedded software
- Model-based software architecture and design
- Component-based design and analysis
- Programming languages and Compilers
- Software engineering and programming methodologies
- Scheduling and execution time analysis
- Operating systems and middleware
- QoS management and performance analysis
- Hardware-dependent software and interfaces
- Networked embedded systems and security
- Software for embedded multiprocessors
- Application areas e.g. automotive and avionics, etc.

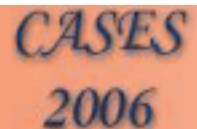


COMPILERS, ARCHITECTURE, AND SYNTHESIS FOR EMBEDDED SYSTEMS

CASES

It aims at covering all aspects of embedded software:

- Application and domain-specific embedded systems
- Compilation focusing on embedded architectures
- Customizable processors and DSPs
- Design, spec., and synthesis
- Dynamic compilation and managed runtime envs
- Instruction-level parallelism, including VLIW, EPIC and superscalar for embedded
- Integration and testing
- Heterogeneous multiprocessors on a chip
- Mem mgt, smart caches, compiler controlled mem
- Novel architectures and micro-architectures
- Low-power architectures, power vs. performance
- Profiling, measurement, and analysis techniques
- Reconfigurable embedded computing systems
- SW design for multiprocessor ES
- SoC and System-on-a-Programmable-Chip architectures, compilers and tools
- Validation, verification, and debugging techniques
- VLSI and circuit techniques
- Multi-processor system-on-chip (MPSoC)

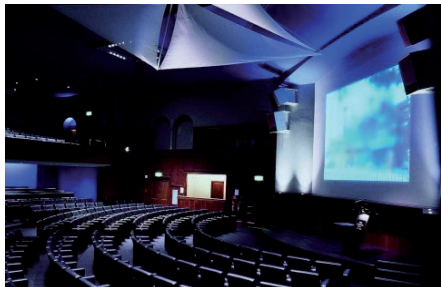


Embedded Systems Week

www.esweek.org

October 22-27, 2006

Seoul, Korea



See Also

MEMOCODE 2006

July 27-29, 2006

Embassy Suites, Napa, Californial

<http://memocode.irisa.fr/>

The Fourth ACM-IEEE International Conference on Formal Methods and Models for Codesign.

FORMAL METHODS 2006

McMaster University

Hamilton, Ontario -Canada

August 21 - 27, 2006

<http://fm06.mcmaster.ca/>

FM'06 is the fourteenth in a series of symposia to stimulate the use of, and research on, formal methods for software development.

FORMATS'06

September 25-27, 2006

La Sorbonne, Paris

<http://www.lsv.ens-cachan.fr/formats06/>

The aim of the 4th International Conference on Formal Modelling and Analysis of Timed Systems is to promote the study of fundamental and practical aspects of timed systems, and to bring together researchers from different disciplines that share interests in modelling and analysis of timed systems.

HSCC'07

April 3-5, 2007

Pisa, Italy

<http://hsc07.dii.unisi.it/>

The tenth International Conference on Hybrid Systems: Computation and Control (HSCC'07), is dedicated to research in embedded reactive systems involving the interplay between symbolic/switching and continuous dynamic behavior.

Other Upcoming Conferences

STRATEGIES FOR LEADERSHIP

IST EVENT 2006

21-23 November
Helsinki

<http://europa.eu/istevent>

IST 2006 includes a high-level conference conference, an Exhibition of cutting edge research results from across Europe and a programme of networking sessions and workshops, with the exhibition and networking programmes defined by participants via this website.

Three strands, but one overriding aim: to help achieving Europe's innovative potential in developing and rolling out Information and Communication Technologies (ICTs).

The Conference Programme opens with a first day devoted to high-level policy discussions on what governments and public policy can do to help ICT contribute to an innovative Europe, with Days Two and Three are devoted to the Seventh Framework Programme and other topics surrounding European research and innovation.

The Exhibition and Networking Programmes, however, are being defined using a «bottom-up» approach, based on proposals by companies, research institutions and other organisations from across Europe via this website. While the successful Exhibition proposals are now live, the Networking Sessions and Workshop Call for Proposals has just closed, allowing proposers to take the results of the Exhibition Call into account.

DESIGN, AUTOMATION AND TEST IN EUROPE

RTSS 2006

December 5-8, 2006

Rio de Janeiro, Brazil

<http://www.rtss.org/>
Sponsored by Artist2.

The 27th IEEE Real-Time Systems Symposium this year in Rio de Janeiro, remains the premier conference in the area of real-time systems design, analysis, implementation, evaluation, and case-studies, presenting innovations in the field with respect to theory and practice.

RTSS'06 continues to be an expansive and inclusive symposium, looking to embrace new and emerging areas of real-time systems research, including but not limited to scheduling; databases; observability; composability; security for RTSS; tools and reduction to practice; control and adaptive RT systems theory; testing and debugging; modeling; formal methods; communications (wireless, wireline, and sensor networks); power, thermal, and energy management; embedded systems; sensor and implantable devices; robustness; fault tolerance and robustness; intelligent behavior; time-sensitive robotics; emergency/disaster management; QoS support; real-time systems middleware.

RTSS also offers three special tracks:

- Real-Time Middleware and Software Engineering
- Hardware/Software Co-design
- Real-Time Communication and Sensor Networks

DESIGN, AUTOMATION AND TEST IN EUROPE

DATE'07

April 16-20 2007

Nice, France

<http://www.date-conference.com/>
Sponsored by Artist2.

The 10th DATE conference and exhibition is Europe's largest event for the design, test and manufacture of electronic systems and circuits.

The five-day event consists of

• TECHNICAL CONFERENCE

keynotes, scientific papers, interactive presentations, design records, discussion panels, hot-topics, tutorials and workshops.

This year there are two dedicated days of specially focused conference sessions in the following areas of design applications:

- » Ubiquitous Computing and Communications
- » Space and Aeronautics

A full list of topics is available online.

• EXHIBITION

April 17-19, 2007

Over 100 companies showing the best in design, verification and test tools and platforms for embedded systems and electronic devices, IP cores and design services.

KEY DATES

- September 10, 2006
SUBMISSION DEADLINE for all technical papers, design records, tutorials and special session proposals
- November 10, 2006
Notification of acceptance
- December 8, 2006
Camera-ready papers due



Recent Roadmap and Position Papers

available on the Artist2 Web Portal

Online

Many external Roadmaps and Position Papers including these are available on the Artist web portal:

<http://www.artist-embedded.org/FP6/ExternalLinks/PositionPapers/>

Position Paper

IEEE Computer, 39(5):33-42, May 2006

The Problem With Threads

Edward A. Lee (UC Berkeley)

For concurrent programming to become mainstream, we must discard threads as a programming model. Nondeterminism should be judiciously and carefully introduced where needed, and it should be explicit in programs.

Concurrent programming is difficult, yet many technologists predict the end of Moore's law will be answered with increasingly parallel computer architectures—multicore or chip multiprocessors (CMPs). If we hope to achieve continued performance gains, programs must be able to exploit this parallelism.

Automatic exploitation of parallelism in sequential programs, through either computer architecture techniques such as dynamic dispatch or automatic parallelization of sequential programs, offers one possible technical solution. However, many researchers agree that these automatic techniques have been pushed to their limits and can exploit only modest parallelism. Thus, programs themselves must become more concurrent.

Understanding why concurrent programming is so difficult can help us solve the problem. The physical world is highly concurrent, and our very survival depends on our ability to reason about concurrent physical dynamics. This reasoning doesn't extend to concurrent programs because we have chosen abstractions that do not even vaguely resemble the physical world's concurrency.

We have become so used to these computational abstractions that we have forgotten they are not immutable. The difficulty of concurrent programming is a consequence of these abstractions, and if we can let go of them, the problem will be fixable.

ROADMAP HiPEAC NoE

THE HIPEAC ROADMAP ON EMBEDDED SYSTEMS

Roadmap Coordinator:
Stamatis Vassiliadis (TU Delft)
2006

The penetration of embedded systems is happening in almost every area, from low-price consumer electronics to high-end aerospace and avionics systems. The most common areas that the embedded systems cover are automotive, medical, communication, military, avionics, environmental, security, and consumer electronics.

In Europe specifically, many have recognized the strategic importance that embedded systems will have in the future and they are making significant investments in design tools and methodologies. The strength of Europe in major sectors such as telecommunication and automotive electronics should be exploited in order to be a major leader in the future embedded systems.

The major characteristic of the future embedded systems will be networking (or connectivity). As the desktop computers evolved from stand-alone systems to be connected to the whole world using Internet, in the same way the future embedded systems are going to be part of a network instead of being stand-alone devices. If the main current problem of inter-operability is resolved, the future systems will be able to communicate using the wired or wireless connections in a homogeneous manner.



POSITION PAPER INVITED PAPER FM06

EMBEDDED SYSTEMS DESIGN CHALLENGE

Thomas A. Henzinger (EPFL),
Joseph Sifakis (VERIMAG Lab)
June 2006

We summarize some current trends in embedded systems design and point out some of their characteristics, such as the chasm between analytical and computational models, and the gap between safety-critical and best-effort engineering practices. We call for a coherent scientific foundation for embedded systems design, and we discuss a few key demands on such a foundation: the need for encompassing several manifestations of heterogeneity, and the need for constructivity in design. We believe that the development of a satisfactory Embedded Systems Design Science provides a timely challenge and opportunity for reinvigorating computer science.

Computer Science is going through a maturing period. There is a perception that many of the original, defining problems of Computer Science either have been solved, or require an unforeseeable breakthrough (such as the P versus NP question). It is a reflection of this view that many of the currently advocated challenges for Computer Science research push existing technology to the limits (e.g., the semantic web; the verifying compiler; sensor networks), to new application areas (such as biology), or to a combination of both (e.g., nanotechnologies; quantum computing). Not surprisingly, many of the brightest students no longer aim to become computer scientists, but choose to enter directly into the life sciences or nanoengineering.

POSITION PAPER THE SOFTWARE CHALLENGE OF THE FUTURE ULTRA-LARGE-SCALE SYSTEMS

Linda Northrop, Bill Polak
(Carnegie Mellon SEI)
June 2006

The U. S. Department of Defense (DoD) has a goal of information dominance—to achieve and exploit superior collection, fusion, analysis, and use of information to meet mission objectives. This goal depends on increasingly complex systems characterized by thousands of platforms, sensors, decision nodes, weapons, and warfighters connected through heterogeneous wired and wireless networks. These systems will push far beyond the size of today's systems and systems of systems by every measure: nb lines of code; nb people employing the system for different purposes; amount of data stored, accessed, manipulated, and refined; number of connections and interdependencies among software components; and number of hardware elements.

The sheer scale of ULS systems will change everything. ULS systems will necessarily be decentralized in a variety of ways, developed and used by a wide variety of stakeholders with conflicting needs, evolving continuously, and constructed from heterogeneous parts. People will not just be users of a ULS system; they will be elements of the system. SW/HW failures will be the norm rather than the exception. The acquisition of a ULS system will be simultaneous with its operation and will require new methods for control.

Consequently, ULS systems will place unprecedented demands on software acquisition, production, deployment, management, documentation, usage, and evolution practices.

Schools and Courses

ARTIST2 Newsletter

July 26th, 2006

ARTIST2 / UNU-IIST Spring School in China

OVERVIEW

<http://www.artist-embedded.org/FP6/ARTIST2Events/Events/ChinaSchool/>

Models, Methods and Tools

The first ARTIST / UNU-IIST Spring School on Models, Methods and Tools for Embedded Systems has been held in Xi'an, China, April 3rd – 15th 2006.

The school gathered more than 50 participants, of which approximately 40 were students from the top universities in mainland China: Peking University; Nangjing University; Institute of Software, Chinese Academy of Science; East China Normal University; Southwest University; Xidian University; Wuhan University; Northwest University; ZhengZhou University; Northwest Polytechnical University; National University of Defense Technology.

The local organisation and logistics were of high quality, thanks to the excellent contribution from the Northwest Polytechnical University at Xi'an. The main lecturers for the school were four European researchers from ARTIST2 (Prof. Lothar Thiele, Peter Marwedel, Joseph Sifakis, Wang Yi). The slides from these lectures are available online (via the link above).

These main lectures were usefully complemented by seminars from distinguished Chinese researchers: Prof. Zhou Chaochen, He Jifeng and Zhiming Liu.

Given the success of this first edition, it has been decided to organise a second ARTIST2 school in China, near Shanghai in 2007.

LECTURERS



Prof. Dr. Peter Marwedel
University of Dortmund
Germany



Dr. Joseph Sifakis
VERIMAG Laboratory
Grenoble, France



Prof. Dr. Lothar Thiele
ETH Zurich
Switzerland



Prof. Dr. Wang Yi
Uppsala University
Sweden

ORGANISATION

Joint EU-China Organisation

The ARTIST2 / UNU-IIST / China Spring School was initialized and organized jointly by:

- the ARTIST2 Network of Excellence (European Commission's IST programme),
- the International Institute for Software Technology of the United Nations University (UNU-IIST, Macao), and
- North West Polytechnic University (NWPU, China).

Sponsoring and Support

It was sponsored by the European Commission, NWPU, and UNU-IIST.

In China, it was supported by the following major research institutions:

- Shanghai Embedded Systems Institute (SESI);
- Chinese Academy of Sciences' ISCAS laboratory;
- China Computer Foundation (CCF) Technical Committee on Theoretical Computer Science.

ARTIST2



Information Society
Technologies



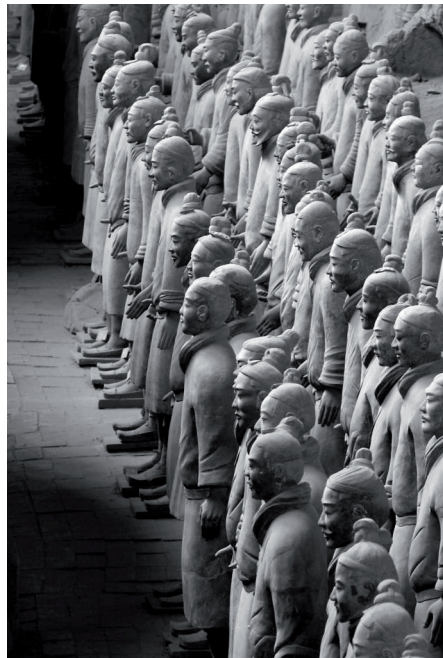
United Nations
University

International Institute for
Software Technology



China School in 2007

Given the success of this first edition, it has been decided to organise a second ARTIST2 school in China, near Shanghai in 2007.



Schools and Courses

Newsletter

July 26th, 2006



Upcoming Schools and Courses

International School on Foundations of Security Analysis and Design

FOSAD 2006
Sept 10-16: Bertinoro, Italy

<http://www.artist-embedded.org/FP6/ARTIST2Events/Events/FOSAD06/> *Sponsored and co-organized by Artist2.*

Security in computer systems and networks emerged as one of the most challenging research areas. The International School on Foundations of Security Analysis and Design (FOSAD) has been one of the foremost events established with the goal of disseminating knowledge in this critical area.

The main aim of the FOSAD school is to offer a good spectrum of current research in foundations of security - ranging from programming languages to analysis of protocols, from cryptographic algorithms to access control policies and trust management - that can be of help for graduate students and young researchers from academia or industry that intend to approach the field.

Advanced Digital Systems Design

ADSD 2006
Sept 25-29: EPFL, Switzerland

<http://www.artist-embedded.org/FP6/ARTIST2Events/Events/ADSD/> *Sponsored and co-organized by Artist2.*

This course aims at illustrating to designers of complex embedded systems the most interesting emerging design technologies. The addressed techniques will be crucial to design multimillion-transistor Systems-on-Chip and other state-of-the-art embedded products.

The course spans from purely digital-design topics to some compiler-related issues: the purpose is to expose the fundamental methodological link between these two facets of the design process.

Only a deep understanding of the strengths of both hardware and software techniques can guarantee the design of successful embedded systems meeting challenging real-time or energy constraints approach the field..

MOdelling, TestIng, and Verification for Embedded Systems

MOTIVES 2007
Feb 19-23: Trento, Italy

ARTIST2 Winter School 2007

The Winter School offers a number of foundational tutorials, accompanied by a selection of lectures on exciting emerging technologies and industrial applications - given by leading scientific and industrial experts.

This 5-day winter school is for young researchers working or wanting to work in modelling, validation, synthesis and performance analysis of embedded systems, as well as engineers from industry with a practical background in design, control and testing of embedded systems.

The Winter School is organised by the ARTIST2 Network of Excellence, with strong contributions from three of its research clusters: Real-Time Components, Testing & Verification and Compilers & Timing Analysis.

The school is open for participation for everybody, although some previous training and/or experience in the fundamentals of computer science and a knowledge of computer architectures is required.

Steering Committee

- Bengt Jonsson (Uppsala Univ., Sweden)
- Kim G. Larsen (Aalborg Univ., Denmark)
- Reinhard Wilhelm (Saarland University, Germany)

Organizational Committee:

- Bruno Bouyssounouse (Verimag, France)
- Luigi Palopoli (Scuola Superiore S. Anna, Italy)
- Jan Reineke (Saarland University, Germany)

Online

Past and upcoming Artist2 schools are visible online:

<http://www.artist-embedded.org/FP6/ARTIST2Events/SummerSchools/>

Past Schools and Courses

- 1st European Lab on RT and Control for ES: *July 10-14th, 2006: Pisa, Italy*
- ARTIST2 Graduate Course on Embedded Control Systems: *Prague, April 3-7th, 2006*
- ARTIST Summer School on Component Modelling, Testing & Verification and Static Analysis for ES: *Sept 29th - Oct 2nd, 2005, Uppsala, Sweden*
- IFAC Summer School on Control, Computing and Communication: *June 27th-July 1st, 2005: Prague, Czech Republic*
- ARTIST Seminar on Adaptive Real-time Systems, with emphasis on Real-Time Control Systems: *June 20-23, 2005 : TU Catalonia, Barcelona, Spain*



European Technology Platform

Newsletter

July 26th, 2006



ARTEMIS

OBJECTIVES

ARTEMIS aims to secure employment in Europe and reinforce European industry's leading position in Embedded Systems technology, thereby yielding both direct and indirect benefits to the European citizen.

To achieve these aims, Artemis will:

- Accelerate the pace of innovation and address the fragmentation of the market by countering the fragmentation of R&D efforts across Europe, private and public, by means of a common and compelling Strategic Research Agenda (SRA)
- Propose practical and efficient structures for stimulating Embedded Systems R&D by implementing a Joint Technology Initiative (JTI) under article 171 of the Treaty, thereby:
 - » Nurture an innovation eco-system based around world-class Centres of Excellence, gathering systems integrators, technology providers (SMEs and academia) with the capacity to rapidly turn research achievements into innovative products, processes and services for the global market
 - » Promote Embedded Systems as a respected curriculum for higher-education
 - » Ensure that these strategic directions are properly coordinated, to form the backbone of a true European Research Area.

ANNUAL CONFERENCE

May 22 - 24, 2006

Graz, Austria

The event has been attended by nearly 250 participants from large companies, SMEs, governments, Academia and research Institutes.

The 2 day conference provided a great opportunity to all the stakeholders to receive in-depth information and to discuss different topics including:

- The Strategic Research Agenda, which defines the research priorities that will stimulate European success in Embedded Systems.
- Industry's involvement in the JTI, which is a new and innovative funding scheme for transnational R&D.

Presentations are available on the ARTEMIS website (see above).

STRATEGIC RESEARCH AGENDA

The SRA is a master document that draws on the conclusions of all Artemis working groups. In many ways, it is a research program stating our goals and targets over the next 10 years, with a description of all resources Artemis partners may leverage. Every company, research institution and government body involved, may therefore turn to the SRA for guidance on how to efficiently interact in the Artemis efforts, and for a better understanding of the role of each category of stakeholder.

ARTEMIS ORCHESTRA CONTEST

To demonstrate the capabilities of Embedded Systems and to inform the broad public about their significance, ARTEMIS launches: "Artemis Orchestra", a contest aimed at universities, research teams and technology Institutions.

Built on longstanding European traditions in music, the contest challenges participants to create devices that play real musical instruments with the help of various embedded technologies.

It will comprise several categories and allow different levels of sophistication among the participants.

ARTEMIS encourages participants to develop their own solutions and designs, making it as small and cheap as possible. It is not prohibited to use a PC, but if some other competitor has used a device which is closer to the domain of embedded systems they will have a distinct advantage.



Overview

The European Technology Platform ARTEMIS - Advanced Research and Technology for Embedded Intelligence and Systems - was launched in mid-2004 with the overall aim to ensure that Europe realises its potential in the new markets for intelligent products, processes and services by achieving world leadership in seamlessly connected embedded systems.

<http://www.artemis-office.org/>

Other Artemis Events

- SRA Summer Camp, July 6-7, Genval, Belgium
- Executive Board Meeting, September 6th, Brussels
- Joint Steering Board/ Mirror Group September 21st, Brussels

ARTEMIS Members:



Other European Projects

Newsletter

July 26th, 2006



Other European Networks of Excellence

High-Performance Embedded Architecture and Compilation

HiPEAC

Sept 2004 - Aug 2008
<http://www.hipeac.net/>

HiPEAC addresses the design and implementation of high-performance commodity computing devices in the 10+ year horizon, covering both the processor design, the optimising compiler infrastructure, and the evaluation of upcoming applications made possible by the increased computing power of future devices.

The objectives of HiPEAC are to ensure the visibility of European institutions in the high performance embedded marked, and to promote the integration of research efforts in a common direction. Visibility will be achieved through dissemination of our work under a common HiPEAC label that will raise the awareness of our coordinated research effort. Integration will be achieved through a set of coordinated actions targeted at building a strong community of researchers, and the adherence to a commonly agreed research roadmap that will be strongly influenced by European industry and leading worldwide research institutions. HiPEAC will also provide the means for easy collaboration among members, and rapid dissemination of knowledge among the community, as well as strengthening the relationships between academia and European industry.



Hybrid control: heterogeneity and complexity of networked embedded systems

HYCON

Sept 2004 - Aug 2008
<http://www.ist-hycon.org/>

HYCON aims to establish a durable community of leading researchers and practitioners who develop and apply the hybrid systems approach to the design of networked embedded control systems.

Hybrid systems provide a scientific paradigm to systematically address the analysis, modelling, simulation, synthesis, and optimisation of digital controllers for physical plants.

The long-lasting result will be a European Institute of Hybrid Systems (EIHS), designed to become a worldwide focal point for hybrid systems research. The partners span a broad range of expertise, from applied mathematics and computer science to advanced control applications. They share an integrating approach based on the concept of a dynamical system, which provides the basis for understanding and mastering the complexity and heterogeneity issues arising in the design of large distributed networked embedded control systems. The network will contribute significantly to bridge the gap between traditional control engineering and embedded system design.



Coordination Action

Cooperating Embedded Systems for Exploration and Control, with Wireless Sensor Networks

Embedded WiSeNts

Sept 2004 - Dec 2006
<http://www.embedded-wisents.org/>

Wireless sensor networks (WSNs) consist of objects, individually capable of simple sensing, actuation, communication, and computation. More generally, these networks can cooperate amongst themselves and with other individual intelligent objects, other networks, other controllers, or even users via proper interfaces.

A number of studies are available through the link above:

- **Applications and applications scenarios**
Cooperating object applications, scenarios.
- **Paradigms for algorithms and interactions**
Fundamental design paradigms, algorithms and interaction patterns.
- **Vertical Systems Functions**
Domain-oriented functionalities.
- **System Architectures and Programming Models**
Programming models and system architecture for Cooperating Objects.
- **Visions for Innovative Applications**
Potential future application areas.
- **Critical Evaluation of Research Platforms for Wireless Sensor Networks**
Survey of the practical capabilities of a number of advanced platforms.



About Artist2

Newsletter

July 26th, 2006



Joining Artist2

To promote Excellence and Integration within the European embedded systems community, Artist2 accepts Affiliated Partners, who may participate in the Artist2 activities (research, integration, spreading excellence).

Costs incurred by Affiliated Partners are generally not eligible for funding. Because of this, hard requirements such as producing the deliverables are waived.

The criteria for acceptance are :

- As is the case for Artist2 core participants, the work done within the teams must be world-class, and have a significant impact on work done in external teams.
- The Affiliated Partners must participate actively in specific Artist2 research or integration activities.
- The cluster leader and scientific coordinator must approve.

The complete list of Affiliated Partners is visible here:

<http://www.artist-embedded.org/FP6/Partners/>

In some cases, Affiliated Partners have become Core Partners over the course of the project.

About Artist2

<http://www.artist-embedded.org/FP6/>

Strategic Objectives

PURPOSE

The objective of the ARTIST2 Network of Excellence is to strengthen European research in Embedded Systems Design, and promote the integration of this emerging discipline.

APPROACH

ARTIST2 implements an international and interdisciplinary effort to participate in establishing Embedded Systems Design as a discipline, combining competencies from electrical engineering, computer science, applied mathematics, and control theory. The ambition is to compete on the same level as equivalent centres in the USA (Berkeley, Stanford, MIT, Carnegie Mellon), for both the production and transfer of knowledge and competencies, and for the impact on industrial innovation.

The ARTIST2 Network of Excellence gathers together the best European teams from the composing disciplines, and aims to forge a scientific community. This objective is achieved by integration around a Joint Programme of Activities, aiming to create critical mass from these selected European teams.

CLUSTER TOPICS

ARTIST2 addresses the full range of challenges related to Embedded Systems Design, covering all aspects, ranging from theory through to applications:

- Real-Time Components
- Adaptive Real Time
- Compilers and Timing Analysis
- Execution Platforms
- Control for Embedded Systems
- Testing and Verification

ARTIST2 Core Partners

Verimag Laboratory (Joseph Sifakis) • Caisse des Dépôts et Consignations (Jean-Noel Forget) • RWTH Aachen (Rainer Leupers) • Aalborg University / CISS (Kim Larsen) • Absint (Christian Ferdinand) • University of Aveiro (Luis Almeida) • University of Cantabria (Michael Gonzalez Harbour) • CEA (François Terrier) • Centre Fédéré en Vérification (Pierre Wolper) • Czech Technical University (Zdenek Hanzalek) • University of Dortmund (Peter Marwedel) • Denmark Technical University (Jan Madsen) • ETH Zurich (Lothar Thiele) • France Télécom R&D Jacques Poulou) • INRIA (Albert Benveniste) • Swedish Royal Institute of Technology (Martin Torngren) • Linköping University (Petrus Eles) • CNRS/LSV Cachan (Philippe Schnoebelen) • University of Lund (Karl-Erik Arzen) • Mälardalen University (Björn Lisper) • OFFIS (Werner Damm) • PARADES (Alberto Sangiovanni Vincentelli) • UP Madrid (Juan de la Puente) • Saarland University (Reinhard Wilhelm) • ST Microelectronics (Christian Bertin) • Eindhoven University of Technology (Martin Rem) • TU Vienna (Hermann Kopetz) • TU Braunschweig (Rolf Ernst) • University of Twente (Ed Brinksma) • University of Bologna (Luca Benini) • Uppsala University (Bengt Jonsson) • UP Valencia (Alfonso Crespo) • University of York (Alan Burns) • Polytechnic University of Porto (Eduardo Tovar) • Ecole Polytechnique Fédérale de Lausanne (Tom Henzinger) • University of Pisa (Giorgio Buttazzo) • ACE (Joseph van Vlijmen) • Tidorum (Niklas Holsti) • University of Kaiserslautern (Gerhard Fohler)

About the Newsletter

PURPOSE

The ARTIST2 Newsletter is widely distributed within the European Embedded Systems research and industrial community, with information about important events of interest (workshops, summer schools, high level events, selected publications for a large audience, etc).

SUBMITTING ANNOUNCEMENTS

Anyone may submit announcements or articles for publication. Any information submitted for publication in the newsletter becomes public information, with no rights or restrictions imposed by the original author.

Information submitted will be edited and modified as best suits the needs of the community, at the editor's discretion.

Please note that this procedure will probably evolve over time. Be sure to check the latest issue for up-to-date instructions.

Privacy Policy

ARTIST2 maintains a very strict privacy policy. Under no circumstances will we provide our mailing list to any other party, including the Artist2 partners.

To add or remove persons from the mailing list, simply send a message originating from the mailbox to be added or removed to the editor

Bruno.Bouyssounouse@imag.fr