IST-214373 ArtistDesign
Network of Excellence
on Design for Embedded Systems

Jointly-executed Programme of Activities for

Spreading Excellence

ArtistDesign Technical Coordinator:

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with inputs from all NoE participants

Policy Objective (abstract)

The visibility of the ArtistDesign research effort in embedded systems design is now worldwide. This has clearly creating a significantly stronger European embedded systems design community, as witnessed by the positive evolution of major conferences in the area, stronger involvement with industry, and interaction between research teams.

The Jointly-executed Programme of Activities for Spreading Excellence (JPASE) is a cornerstone in this effort.

Changes with respect to Y3 deliverable:
entirely new texts throughout the document, except for 1.1., 6.1, 6.2.

Versions

number	comment	date
1.0	First version delivered to the reviewers	Feb 4th 2011

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1. Vision and Strategy for Spreading Excellence - *Executive Summary*

1.1 Overall Vision and Strategy

Our actions for Spreading Excellence are at 2 levels:

- *Targeted towards affiliated partners*
  Affiliated partners are not core members in the consortium, but receive support for travelling to ArtistDesign meetings, and actively contribute to the implementation of the Joint Programme of Activities (JPA). These affiliated partners include industrial, SME, academic, and international collaboration affiliates.
- *Targeted towards the scientific and technical community in the large*
  This is achieved mainly bottom-up through the organisation of scientific events, publications, distribution of tools and components, industrial partnerships (not funded by ArtistDesign), education; and through the ArtistDesign web pages.
- *Targeted towards students*
  A particular focus has been placed on the ARTIST Summer Schools this year – with a truly outstanding programme of lecturers, and the innovation of providing the lectures in video form on the Artist website.

Regarding Scientific events, we distinguish between conferences and workshops, schools, and high-level events mainly for International Collaboration.

High Level Events for International Collaboration
High-level Events are intended to gather together the very best world-leading experts from academia and industry, to discuss progress on the state of the art, relevant work directions.

Three ArtistDesign members are on the steering board for the ARTEMIS European Technology Platform. In this capacity, they participate in working groups for defining the overall European long term strategy in the area.

Publications
The ArtistDesign community has pusrsued a very active publishing policy, with a strong presence in scientific journals and conferences, as attested by the extensive list of publications provided in this document. Publication of research is a bottom-up process, which may seem chaotic – but this is intrinsic to research.

Tools and Components
The ArtistDesign community plays a leading role in the distribution of software tools and components, on verification/validation tools. Some tools are distributed free of charge, such as UPAAL, IF. Others are commercialised, such as AbsInt, SymTA/S. For many other tools used in the platforms, and shared between the Artist partners, a common dissemination policy has not yet been defined.

Industrial Liaison
ArtistDesign has a wide array of affiliated industrial and SME partners (see the Thematic and Transversal Activity deliverables). Most of these partners have participated in some way in the ArtistDesign technical meetings and the overall effort. There is strong, high-level industry participation through the various Spreading Excellence events organised by ArtistDesign. Our active involvement in the European Technology Platform ARTEMIS also could have a significant and long-term impact.

We believe that the strong involvement of four main ArtistDesign partners in the SPEEDS Integrated Project has a very positive impact on progress in the state of the art, in component-based embedded systems engineering.

1.2 Affiliated partners

Affiliated partners are not core members in the consortium, but receive support for travelling to ArtistDesign meetings, and actively contribute to the implementation of the Jointly-executed Programme of Activities (JPA). These affiliated partners include industrial, SME, academic, and international affiliates.

1.3 Scientific and Technical Community in the Large

A description of the ArtistDesign's commmunity's interaction with other research teams is visibile in section 2.4 ("2.4 Interaction of the Cluster with Other Communities") of each Cluster deliverable, and in section 2.3 ("2.3 Other Research Teams") in the Transversal Integration Activity deliverable.

Interaction with these other scientific communities is achieved mainly bottom-up through the organisation of scientific events, publications, distribution of tools and components, industrial partnerships (not funded by ArtistDesign), education; and through the ArtistDesign web pages.

Our sponsoring policy aims specifically at enforcing integration of existing scientific events in the area. This is sought in particular through the Embedded Systems Week (http://www.esweek.org/), in which we play a crucial role.

Another concrete example is our action within the DATE conference (http://www.date-conference.com/), in which we are working to shift the emphasis towards becoming the central European conference on embedded systems design, in collaboration with the ARTEMIS European Technology Platform.

Regarding Scientific events, we distinguish between conferences and workshops, schools, and high-level events mainly for International Collaboration.

The ARTIST community now clearly leads the initiatives for organizing the most significant conferences in the area. In Europe, it has a very strong presence in the DATE conference, which is becoming the main conference on embedded systems within Europe. Over the past 9 years, 8 general chairs of DATE have been leading ARTIST members.

In international conferences, the ACM's flagship conference, EmSoft, has been initiated by leading members of ArtistDesign. Artist partners are also in leading positions for conferences as RTSS (Real-Time Systems Symposium), CODES/ISS, Workshop on Languages, Compilers, and Tools for Embedded Systems (LCTES). Further details regarding sponsoring, as well as specific events and publications are given in this document.

Artist partners are also active members of the ACM's SIGBED, and the IEEE's upcoming Special Interest Group on Embedded Systems currently being set up. Artist members actively work for structuring international events on embedded systems.

1.3.1 International Collaboration

International Collaboration has been one of the central activities pursued within ARTIST since 2003, and is described in detail in this document.

All of the recurring ARTIST International Collaboration events continue and be expanded within ArtistDesign in 2011. Further details about the schools are available in the section "Organisation of Schools".

1.3.2 Publications

The ArtistDesign community is extremely active in publishing in scientific journals and conferences, as attested by the list of joint publications provided in this document.

Joint publications seem to be a reliable measure of integration and building excellence between the partners.

1.3.3 Industrial Liaison

ArtistDesign has a wide array of affiliated industrial and SME partners, as described in the deliverables' "Affiliated Partners" sections. Most of these partners participate in some way in the ArtistDesign technical meetings and the overall effort. There is strong, high-level industry participation through the various Spreading Excellence events organised by ArtistDesign.

Our active involvement in the European Technology Platform ARTEMIS also could have a significant and long-term impact. Several ArtistDesign partners, including VERIMAG, BOLOGNA, OFFIS and TU Vienna, are actively involved in the ARTEMIS ETP. The ArtistDesign Strategic Management Board was actively consulted for finalizing the 2011 release of the ARTEMIS Strategic Research Agenda.

In addition, each ArtistDesign partner has an outstanding track record for interaction with industry. Globally, the ArtistDesign consortium has a very strong impact on European R&D in embedded systems. This impact is visible via the achievements in Integrated Projects and STREPs (see below).

1.3.4 Links with ARTEMISIA

ArtistDesign has strong links to ARTEMIS, through:

- Representation on the **ARTEMIS Industry Association Steering Board**:
  - Joseph Sifakis is the CNRS representative
  - Luca Beninni is the University of Bologna representative
- Partner membership in **ARTEMIS "B"** (Research Organisations & Universities) http://www.artemisia-association.org/member_status
  - Arne Skou is the Aalborg University representative
  - Denis Platter is the CEA representative
  - Joseph Sifakis is the CNRS-Verimag representative
  - Boudewijn Haverkort is the Embedded Systems Institute representative
  - Rudy Lauwereins is the IMEC representative
  - Jean-Pierre Banâtre is the INRIA representative
  - Eduardo Tovar is the Instituto Superior de Engenharia do Porto representative (Instituto Politécnico do Porto in ArtistDesign)
  - Gunnar Landgren is the KTH representative

- Bernhard Josko is the OFFIS representative
- Jan Madsen is the TU Denmark representative
- José Carlos Gómez Sal is the University of Cantabria representative
- Luca Benini is the University of Bologna representative
- Farid Ouabdesselam is the Université Joseph Fourier representative

- Strong *informal* links. For example, the ArtistDesign Strategic Management Board was asked to review and comment on the latest edition of the Strategic Research Agenda, published in 2011.
- Strong representation by ArtistDesign partners in ARTEMIS projects,

1.3.5 Course Materials

ArtistDesign disseminates recent, high-quality Course Materials via its web portal. We currently have materials
http://www.artist-embedded.org/artist/-Course-Materials-.html

This includes materials generated in ArtistDesign events, as well as pointers to high-quality materials from other sources.

2. International Collaboration

International Collaboration has been one of the central activities pursued within ARTIST since 2003.

2.1 International Collaboration Events planned in Y4 (2011)

The following International Collaboration Events will be funded by the NoE in Y4:

GREEMBED 2011
April 11th, 2011
Second Workshop on Green and Smart Embedded System Technology: Infrastructures, Methods and Tools.

Efficient production, transmission, distribution and use of energy is a fundamental requirement for our modern society and its economy. Most systems for monitoring and control of energy production, distribution and use are today interconnected and controlled by embedded devices. This offers the opportunity for the creation of new integrated systems offering new products, processes and services with greater efficiency and better situation awareness to end-users and service and infrastructure owners.

ARTIST Graduate School on RT Kernels for Microcontrollers – 2011
June 13th, 2011

The course has two main objectives:

- Introducing the most important concepts and methodologies used to develop a real-time embedded system, including fundamentals of real-time scheduling, control and distributed systems;
- Showing how to apply these concepts in practice, using an embedded platform and a real-time operating system to developed simple control applications and make experience with wireless sensor networks.

ARTIST Summer School in China 2011
August 8th, 2011 with complementary funding from IDEA4CPS and IOS/ISCAS

The Summer 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/or industrial experts.

JTRES – 2011
September 26th, 2011

Interest in real-time Java in both the research community and industry has recently increased significantly, 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 problems that still need to be solved in order to assure the success of real-time Java as a technology, and to report results and experiences gained by researchers.

2.2 International Collaboration Events organised and funded in Y3 (2010)

WSS'10
October 29th, 2010
http://www.artist-embedded.org/artist/-WSS-10-.html

An increasing amount of software is not written manually any more. Rather, software is synthesized from abstract models of the required functionality. As a result, the effort of generating software is reduced and software verification typically becomes easier.

- Software synthesis has been implemented in various disperse communities. The workshop aims at bringing the software generation and software synthesis communities together and at identifying research problems which should be addressed by the scientific community.

WESE'10
October 28th, 2010
http://www.artist-embedded.org/artist/-WESE-10-.html

As embedded system designs grow more complex and the time to market diminishes, quality embedded systems education becomes more and more important. This fifth workshop on the subject aims to bring researchers, educators, and industrial representatives together to assess needs and share design, research, and experiences in embedded systems education.

WFCD – 2010
October 24th, 2010
http://www.artist-embedded.org/artist/-WFCD-2010-.html

The workshop aims to discuss recent results on component-based design with emphasis on design frameworks for real-time systems encompassing heterogeneous composition and models of computation. 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.

Memocode 2010
July 26th, 2010
http://www.artist-embedded.org/artist/-Memocode-2010,1162-.html

The goal of MEMOCODE 2010, the eighth in a series of successful international conferences, is to gather researchers and practitioners in the field of the design of modern hardware and software system to explore ways in which future design methods can benefit from new results on formal methods.

ARTIST Summer School in China 2010
July 18th, 2010
http://www.artist-embedded.org/artist/-ARTIST-Summer-School-in-China-2010-.html

The Summer 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/or industrial experts.

ARTIST Summer School in Morocco – 2010
July 11th, 2010
http://www.artist-embedded.org/artist/-ARTIST-Summer-School-in-Morocco-.html

This summer school aims at providing a forum for graduate students, but also postgraduates, researchers, and professors, to get in-depth tutorials covering different aspects of the development cycle of embedded systems. This school is also an opportunity to share and discuss recent advances and trends in this field.

ARTIST Summer School South-America 2010
May 26th, 2010
http://www.artist-embedded.org/artist/-ARTIST-Summer-School-South-America-.html

This fourth edition of the school seeks to continue strengthening the cooperation between Europe and South America in the area of embedded systems, both at educational and research levels. For this purpose, the goal of the school is to provide state-of-the-art courses on embedded systems oriented towards advanced students and young researchers. It should also provide a pleasant atmosphere for research-related discussions among the participants.

2.3 Previous ARTIST International Collaboration Events organised and funded by the NoE

The following international collaboration events have been organised in the past by ARTIST:

WESE'09 – Workshop on Embedded Systems Education
October 15th, 2009 Grenoble, France, within ESWeek 2009
http://www.artist-embedded.org/artist/-WESE-09-.html

As embedded system designs grow more complex and the time to market diminishes, quality embedded systems education becomes more and more important. This fifth workshop on the subject aims to bring researchers, educators, and industrial representatives together to assess needs and share design, research, and experiences in embedded systems education.

WFCD - Foundations and Applications of Component-based Design 2009
October 11th, 2009 Grenoble, France, within ESWeek 2009
http://www.artist-embedded.org/artist/-WFCD-2009-.html

The workshop aims to discuss recent results on component-based design with emphasis on design frameworks for real-time systems encompassing heterogeneous composition and models of computation. 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.

IRTAW-14
October 7-9, 2009 Portovenere, Italy
http://www.artist-embedded.org/artist/-IRTAW-14-.html

For over 20 years the series of International Real-Time Ada Workshop meetings has provided a forum for identifying issues with real-time system support in Ada and for exploring possible

approaches and solutions, and has attracted participation from key members of the research, user, and implementer communities worldwide.

ARTIST Summer School in Europe 2009
September 7-11, 2009 Autrans (near Grenoble), France
http://www.artist-embedded.org/artist/-ARTIST-Summer-School-in-Europe-.html

The Summer 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/or industrial experts.

ARTIST School in South America 2009: Embedded Systems Design
August 3-7, 2009 Buenos Aires, Argentina
http://www.artist-embedded.org/artist/-ARTIST-SummerSchool-SouthAmerica-.html

The 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/or industrial experts.

ARTIST Summer School in China 2009
July 19-24, 2009 Tsinghua, China
http://www.artist-embedded.org/artist/-ARTIST-Summer-School-in-China-2009-.html

The Summer 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/or industrial experts.

Runtime Verification 2009
June 26-28, 2009 Grenoble, France (within ESWeek)
http://www.artist-embedded.org/artist/-Runtime-Verification-.html

The objective of RV'09 is to bring scientists from both academia and industry together to debate on how to monitor and analyze the execution of programs, for example by checking conformance with a formal specification written in temporal logic or some other form of history tracking logic.

WESE'08: WS on Embedded Systems Education
October 23rd, 2008 Atlanta, Georgia - USA (within ESWEEK)
http://www.artist-embedded.org/artist/-WESE-08-WS-on-Embedded-Systems-.html

As embedded system designs grow more complex and the time to market diminishes, quality embedded systems education becomes more and more important. This fourth workshop on the subject aims to bring researchers, educators, and industrial representatives together to assess needs and share design, research, and experiences in embedded systems education.

Workshop on Foundations and Applications of Component-based Design (WFCD'2008)
October 19th, 2008 Atlanta, Georgia (USA)
http://www.artist-embedded.org/artist/-Components-2008-.html

The workshop aims to discuss recent results on component-based design with emphasis on design frameworks for real-time systems encompassing heterogeneous composition and models of computation. 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.

ARTIST2 Summer School 2008 in Europe
September 8-12, 2008 Autrans (near Grenoble), France
http://www.artist-embedded.org/artist/-ARTIST2-Summer-School-2008-.html

The Summer 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/or industrial experts.

ARTIST2 South-American School for Embedded Systems 2008
August 25-29, 2008 Universidade Federal de Santa Catarina, Florianopolis, Brazil
http://www.artist-embedded.org/artist/-ARTIST-2-South-American-School-.html

The purpose of the school is to foster the well-established and dynamic research cooperation in the field of embedded systems between groups in Europe and South America, by allowing South-American students (specially graduate), to meet European researchers.

Artist2 Summer School in China 2008
http://www.artist-embedded.org/artist/-Artist2-Summer-School-in-China-.html
July 12-18, 2008 Shanghai, China

ARTIST2 has organized the 3rd edition of a school on Embedded Systems Design in Shanghai. This year, the school was organized in collaboration with the SEI/ECNU and the LIAMA.

ARTIST2 meeting on Integrated Modular Avionics
November 12-13, 2007 Roma, Italy
http://www.artist-embedded.org/artist/-ARTIST2-meeting-on-Integrated-.html

Integrated Modular Avionics (IMA) has set the principles of standardized components and interfaces of hardware and software in aircraft, applied for the first time in the development of the Airbus A380.

WESE'07: WS on Embedded Systems Education
http://www.artist-embedded.org/artist/-WESE-07-.html
October 4-5, 2007 Salzburg, Austria (within ES Week)

This third workshop on the subject has brought researchers, educators, and industrial representatives together to assess needs and share design, research, and experiences in embedded systems education.

Foundations of Component-based Design
http://www.artist-embedded.org/artist/-Foundations-of-Component-based-.html
September 30th, 2007 Salzburg, Austria - within EmSoft / ES Week

Discuss recent results on component-based design with emphasis on design frameworks for real-time systems encompassing heterogeneous composition and models of computation.

First European-SouthAmerican School for Embedded Systems
http://www.artist-embedded.org/artist/-First-European-SouthAmerican-.html
August 21-24, 2007 Universidad Argentina de la Empresa (UADE), Buenos Aires - Argentina

The purpose of the school is to foster the well established and dynamic research cooperations in the field of embedded systems between groups in Europe and South America, by allowing south-american students (specially graduate), to meet european researchers.

Artist2 / UNU-IIST School in China – 2007
http://www.artist-embedded.org/artist/-Artist2-UNU-IIST-School-in-China-.html
August 1-10, 2007 Suzhou (near Shanghai), China

ARTIST2 has organized, in collaboration with UNU-IIST, the 2nd edition of a school on embedded systems design in Suzhou (near Shanghai).

Artist2 - Foundations and Applications of Component-based Design
http://www.artist-embedded.org/artist/-Foundations-and-Applications-of-.html
October 26th, 2006 Seoul, South Korea

The workshop gathered researchers from computer science and electrical engineering to 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.

WESE'06 - Embedded Systems Education
http://www.artist-embedded.org/artist/-EmSoft-06-Workshop-on-Embedded-.html
October 26th, 2006 Seoul, Korea

This second workshop on the subject has brought researchers, educators, and industrial representatives together to assess needs and share design, research, and experiences in embedded systems education.

ARTIST2 / UNU-IIST Spring School in China 2006
April 3-15, 2006 Xi'an, China
http://www.artist-embedded.org/artist/-ARTIST2-UNU-IIST-China-School-.html

The first ARTIST / UNU-IIST Spring School gathered more than 50 participants, of which approximately 40 were students from the top universities in mainland China.

Joint US-EU-TEKES workshop
June 21-22 2006 Helsinki, Finland
http://www.artist-embedded.org/artist/Joint-US-EU-TEKES-workshop.html
Workshop held under the auspices of NSF, the EU's IST Program and Tekes, the Science and Technology Agency of Finland.

Artist International Collaboration Days 2003 - Trends in Embedded Systems Design
October 12th 2003 – Philadelphia

http://www.artist-embedded.org/artist/Artist-International-Collaboration,452.html

ACM - Special Issue on Education
http://www.artist-embedded.org/artist/ACM-Special-Issue-on-Education,449.html

This special issue of the ACM Transactions in Embedded Computing Systems aims to provide the basis for integrated undergraduate and graduate curricula covering the essential areas of knowledge for tomorrow's embedded systems engineers and researchers.
Guest Editors Alan Burns Alberto Sangiovanni-Vincentelli - UC Berkeley

ARTIST International Collaboration Days - 2005
July 7-8, 2005 Paris, France
http://www.artist-embedded.org/artist/ARTIST-INTERNATIONAL-COLLABORATION.html

Component-based Engineering for Embedded Systems
Transatlantic Research Agenda on Future Challenges in Embedded Systems Design

Conference on EU-Korea Collaboration on Embedded Systems
http://www.artist-embedded.org/artist/Conference-on-EU-Korea,450.html

The purpose of this workshop was to identify important topics in the area of Embedded Systems where strong synergy between Korean and EU teams would have the greatest benefit. The aim was to achieve a common understanding and background on which future collaborative actions and joint projects can be based.

Artist International Collaboration Days 2003 - Education in Embedded Systems Design
http://www.artist-embedded.org/artist/Artist-International-Collaboration,451.html
October 11th 2003 – Philadelphia

3. Organisation of Schools

3.1 Schools to be directly Organized and Funded by ArtistDesign in Y4

In its final year, ArtistDesign will organize the following summer schools (which are also considered as International Collaboration events).

- Summer School in Europe
  A flagship event for Artist. The school will be held in Aix-les-Bains, Sept 3-9th 2011.
- ARTIST Summer School in China 2011
  This will be the sixth edition of the school, to be held again in Beijing, but at IOS/ISCAS, August 8-12th 2011.
- ARTIST Graduate School on RT Kernels for Microcontrollers – 2011
  June 13-17, 2011 Pisa, Italy
- ARTIST Summer School on Energy Efficiency 2011
  July 25-29 2011 Povo, Trento, Italy

NB: This list is not necessarily exhaustive.

3.2 ARTIST Summer School in Europe 2010

September 5-10, 2010 Autrans (near Grenoble), France
http://www.artist-embedded.org/artist/-ARTIST-Summer-School-Europe-2010-.html

This sixth edition was a major event in the field of embedded systems design. Feedback has been quite positive: The technical programme was of high quality with ample time to go into detail on technical topics, the level of off-line discussions and contacts were excellent, and the social programme meshed well with the objectives and context of the school. We had 100 participants (out of 150 applicants) and 14 invited speakers. As a result, the school and the ArtistDesign NoE have increased in visibility and recognition.

We wish in particular to thank the speakers for the outstanding quality of the presentations and subsequent discussions. We also wish to thank the European Commission's Information and Communication Technologies (ICT) / 7th Framework Programme (http://cordis.europa.eu/fp7/ict/), which provided the complementary funding to make the school possible. We were able to increase the capacity to 100 participants and extend the length of the school to 6 days. The social programme allowed much time for informal interaction.

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

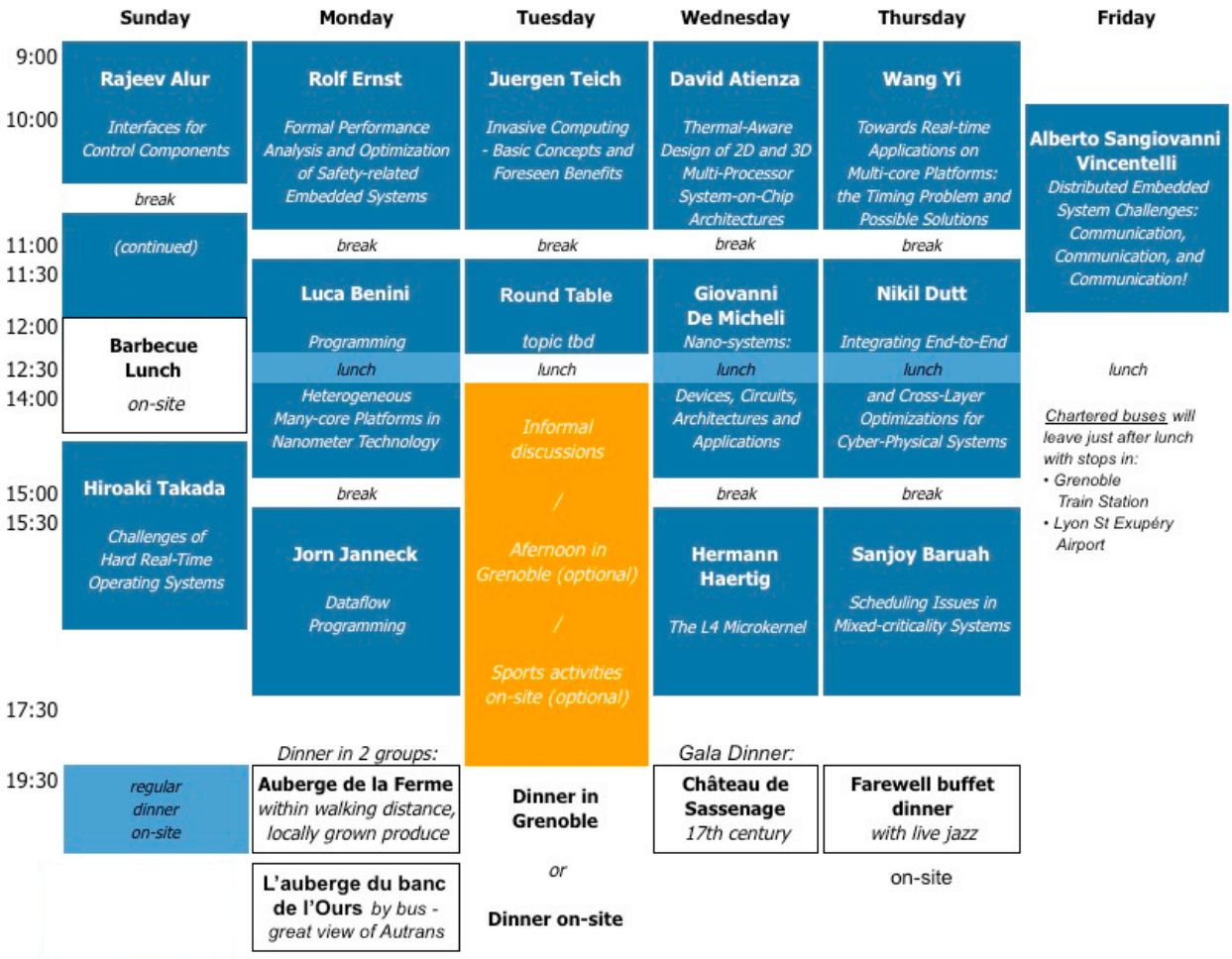
3.2.1 Overview

The ARTIST Summer School 2010 was held in the beautiful Vercors mountains in Autrans, near Grenoble, Sept 5-10. The school was organised by the ArtistDesign European Network of Excellence on Embedded Systems Design, which gathers 31 top European institutions. Artist's mission is to coordinate European research in the area around an ambitious joint research agenda, and to spread excellence through targeted events such as international workshops, schools and seminars.

Artist has a strong tradition in organising top-quality schools. This was the fith edition of yearly schools on embedded systems design, and is meant to be exceptional in terms of both breadth of coverage and invited speakers.

3.2.2 Speakers & Programme

This school brought together some of the best lecturers from Europe and the USA, in a one week programme, and was a fantastic opportunity for interaction.



3.2.3 Videos of the lectures

Videos from the lectures are available online:

http://www.artist-embedded.org/artist/Videos.html

3.2.4 Participants

Invited Speakers

Professor Rajeev Alur	University of Pennsylvania	USA
Professor David Atienza	EPFL	Switzerland
Professor Sanjoy Baruah	U. of North Carolina at Chapel Hill	USA
Professor Luca Benini	University of Bologna	Italy
Professor Giovanni De Micheli	EPFL	Switzerland
Professor Nikil Dutt	UC Irvine	USA
Professor Rolf Ernst	TU Braunschweig	Germany
Professor Dr. rer nat Hermann Härtig	Technische Universität Dresden	Germany
Dr. Jörn Janneck	United Technologies Research Center	USA
Professor Alberto Sangiovanni-Vincentelli	UC Berkeley	USA
Professor Hiroaki Takada	Nagoya University	Japan
Professor Dr.-Ing. Jürgen Teich	University of Erlangen-Nuremberg	Germany

Professor Wang Yi	Uppsala University	Sweden

Participants

Marco Paolieri	Barcelona Supercomputing Center	Spain
Eduardo Quiñones	Barcelona Supercomputing Center	Spain
Jaume Abella	Barcelona Supercomputing Center	Spain
Francisco J Cazorla	Barcelona Supercomputing Center	Spain
Sunil Malipatlolla	TU Darmstadt, Center For Advanced Security Research (CASED)	Germany
Martin Böhnert	Chair Of Operating Systems, University Of Freiburg	Switzerland
Cuong Viet Ngo	Chair Of Realtime Systems TU Kaiserslautern, Germany	Germany
Alie El-Din Mady	Cork Complex Systems Laboratory (CCSL), University College Cork (UCC)	Ireland
Omar Khazamov	Daghestan State Technical University	Russia
Martin Jaensch	Daimler AG	Germany
Andreas Kern	Daimler AG - University Erlangen-Nuremberg	Germany
Christoph Schmutzler	Daimler AG And Karlsruhe Institute Of Technology	Germany
Pontus Ekberg	Department Of Information Technology, Uppsala University	Sweden
Nan Guan	Department Of Information Technology, Uppsala University	Sweden
ShashiKanth Bobba	EPFL	Switzerland
Devesh B. Chokshi	ETH Zurich	Switzerland
Pratyush Kumar	ETH Zurich	Switzerland
Andreas Schranzhofer	ETH Zurich	Switzerland
Nikolay Stoimenov	ETH Zurich	Switzerland
Tiago Rogério Mück	Federal University Of Santa Catarina	Brazil
Jia Huang	Technical University Of Munich, Fortiss GmbH	Germany
Chuanxin Liu	Technical University Of Munich, Fortiss GmbH	Germany
Emil Cozac	Freescale Semiconductor	France
Carmen Alonso Montes	Fundación European Software Institute	Spain
FRITZ Gilles	Grenoble INP - LCIS	France
Kim Petersen	HDC	Sweden
Rosilde Corvino	INRIA	France
Istas Pratomo	INRIA/IRISA	France
Matthias Hagner	TU Braunschweig	Germany
Chris VanBuskirk	ISIS / Vanderbilt University	USA
Fredrik Asplund	KTH, Sweden	Sweden
Sagar Moreshwar Behere	Kungliga Tekniska Hogskolan	Sweden
Joao Craveiro	LaSIGE - University Of Lisbon	Portugal
Jeferson Souza	LaSIGE - University Of Lisbon	Portugal
Ke Jiang	Linkoping University	Sweden
Bogdan Tanasa	Linkoping University	Sweden

Adrian Alin Lifa	Linköping University	Sweden
Hu Xu	LSI-EPFL	Switzerland
Yinung Liu	Media IC & System Lab Of Graduate Institute Of Electronics Engineering	
Saad Mubeen	MRTC, Mälardalen University	Sweden
Rafia Inam	MRTC, Mälardalen University	Sweden
Yuki Ando	Nagoya University	Japan
Takuya Ishikawa	Nagoya University	Japan
Jason Tang	National Taiwan University	Taiwan
Maxime Louvel	Orange	France
Jonghun Yoo	Real-Time Operating Systems, Seoul National University	Korea
Jochen Ulrich Hänger	Robert Bosch	Germany
Toby Manefjord	Saab Avitronics	Sweden
Peter Backes	Saarland University	Germany
Dmytro Puzhay	Saarland University	Germany
Carl Rickard Holsmark	School Of Engineering, Jönköping University, Sweden	Sweden
Giovanni Funchal	STMicroelectronics-Verimag	France
Christoph Ficek	Symtavion GmbH Germany	Germany
Chafic Jaber	Telecom ParisTech - Freescale	France
Pikeroen Bernard	Thales	France
Madeleine Faugère	Thales	France
Krzysztof Sierszecki	The Mads Clausen Institute	Denmark
Dominique Borrione	TIMA Laboratory	France
Moritz Neukirchner	TU Braunschweig	Germany
Adam Lackorzynski	TU Dresden	Germany
Michael Roitzsch	TU Dresden	Germany
Stefan Schorr	TU Kaiserslautern	Germany
Reiner Hartenstein	TU Kaiserslautern	Germany
Anand Kotra	TU Kaiserslautern	Germany
Stefan Wallentowitz	TU Munchen, Institute for Integrated Systems	Germany
Sergio Ruocco	Universita Di Milano-Bicocca	Italy
Ana Pinzari	Université De Technologie De Compiègne	France
Suriayati Chuprat	Universiti Teknologi Malaysia (UTM)	Malysia
Felipe Restrepo	University Of Alicante CIF	Spain
Roberta Piscitelli	University Of Amsterdam	Netherlands
Peter Van Stralen	University Of Amsterdam	Netherlands
Michael Bohn	University Of Applied Science Trier	Germany
Christian Eltges	University Of Applied Science Trier	Germany
Andrea Bartolini	University Of Bologna	Italy
Daniel Medina Ortega	University Of Cantabria CIF	Spain
Mónica Puig-Pey González	University Of Cantabria CIF	Spain
Emanuele Toscano	University Of Catania	Italy

Christian Zebelein	University Of Erlangen-Nuremberg	Germany
Sérgio Lopes	University Of Minho	Portugal
Jorge Cabral	University Of Minho	Portugal
Bjorn B. Brandenburg	University Of North Carolina At Chapel Hill	USA
Armin Größlinger	University Of Passau	Germany
Oussama Tahan	University Of Technology Of Compiègne	France
Yusi Ramadian	University Of Trento, Italy	Italy
Tizar Rizano	University Of Trento, Italy	Italy
Kameswar Rao Vaddina	University Of Turku	Finland
Thomas Canhao Xu	University Of Turku	Finland
Khalid Latif	University of Turku, Finland	Finland
Timon Ter Braak	University Of Twente	Netherlands
Sara Vinco	University Of Verona	Italy
Gary Plumbridge	University Of York	UK
David George	University Of York	UK
Xiaoyue Pan	Uppsala University	Sweden
Martin Stigge	Uppsala University	Sweden
Laurie Lugrin	Verimag Laboratory	France
Abdellatif Tesnim	Verimag Laboratory	France
Romain Testylier	Verimag Laboratory	France
Jean Quilbeuf	Verimag Laboratory	France
Saddek Bensalem	Verimag Laboratory	France
Nicolas Berthier	Verimag Laboratory	France
Vassiliki Sfyrla	Verimag Laboratory	France

3.2.5 Organisation

- Scientific Coordinator: Joseph Sifakis
- Technical Coordinator: Bruno Bouyssounouse
- Programme Committee: ArtistDesign Strategic Management Board (http://www.artist-embedded.org/artist/-Strategic-Management-Board,938-.html)

3.2.6 Grants

Participants were charged 430€ for students, 650€ for non-students (VAT included). The remaining costs are covered by a grant paid for by ArtistDesign.

The registration costs + grant cover:

- Lodging and meals from Saturday dinner to Friday lunch
- Chartered buses to/from Lyon St Exupéry on Saturday Sept 4th and Friday Sept 10th.
- Courses NB: Any other costs such as air/train fare to/from Lyon St Exupéry airport or Grenoble city centre, taxis, meals/services not organized by the school must be covered independently by the participants.

3.2.7 *Poster for the school*

3.3 ARTIST Summer School in China 2010

July 18-23, 2010 Beida (Peking University) - Beijing, China
http://www.artist-embedded.org/artist/-ARTIST-Summer-School-in-China-2010-.html
The Summer 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/or industrial experts. 75 students attended.

3.3.1 Overview

The ArtistDesign European Network of Excellence on Embedded Systems Design will organize the 5th edition of a school on Embedded Systems Design at Peking University, Beijing, July 18-23, 2010.

This year, the school is organized in collaboration with Peking University and the LIAMA. It is open in priority to Chinese students. We believe that this will open opportunities for collaboration with Chinese research teams.

- **Contents**

  The school offers a full week consisting of four in-depth tutorials on state-of-the-art techniques for the design and analysis of embedded systems given by leading experts.

- **Objective**

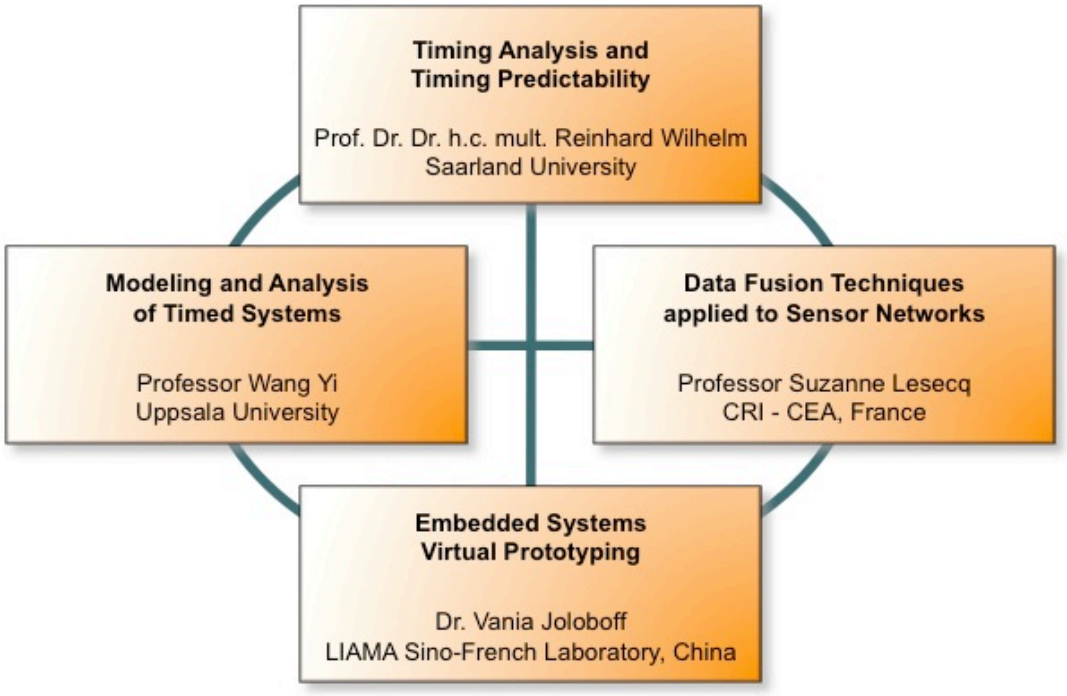
  We aim to provide a forum for young professors, lecturers, researchers, postgraduates (advanced master and PhD students) working in the fields of real-time communication, memory management, design, implementation, validation and performance analysis of embedded systems as well as engineers from industry with practical background with the development of embedded systems.

- **Targeted Audience**

  The school is open for participation for everybody, however, some previous training and/or experience in fundamentals of computer science as well as knowledge of computer architecture is required. Participants will be selected according to their CVs submitted to the organization committee.

3.3.2 Speakers & Programme

Top European lecturers from the ArtistDesign European Network of Excellence will provide a world-class programme.



Dr. Vania Joloboff

LIAMA Sino-French Laboratory, Tsinghua University, China

Vania Joloboff received a doctorate degree from University of Grenoble (France) and graduated from Ecole des Mines (France).

Prior to joining LIAMA, Vania Joloboff was Chief Technical Officer at Silicomp Group, with mission to develop business for Silicomp Group and to oversee Silicomp Group R&D program.

Formerly, Vania Joloboff was Technical Director at the Open Software Foundation heading development of the OSF Motif technology, which later was included in CDE desktop solution from HP, IBM and Sun Microsystems; and the Embedded Java group. Before joining OSF, Vania directed Bull (French computer manufacturer) Research Center at Sophia-Antipolis. He is the founder of the KOALA's group.

Course:

Embedded Systems Virtual Prototyping

Abstract:
An inherent property of embedded systems is that they combine hardware and software into a coherent apparatus that serves some function. The development of embedded systems require tools to design such combination of hardware and software, and to validate that the resulting product verifies the required properties. We define Virtual Prototyping as the technology that makes it possible to develop a virtual prototype of the system under design, which can be exercised and tested like the real device.

The real application software can be run over the virtual prototyping platform, engineers can explore design alternatives and test the application software. At the core of a virtual prototyping platform is a hardware simulation technology since the hardware functions must be simulated in order to run the software. The goal of this course is to explain various facets of virtual prototyping technology.

The course starts with an introduction to virtual prototyping and comparsion to other modeling techniques in a model driven engineering approach. Following, a quick review of of computer architecture fundamentals necessary to understand simulation concepts will be done. Next the course will present various hardware modeling techniques. This part includes an introduction to SystemC and Transaction Level Modeling (TLM), the two technologies most widely used in the industry, with examples drawn from real virtual prototypes.

The second part of the course will consist in reviewing various techniques that can be used to improve performance of virtual prototyping, using SystemC and TLM models, and show how virtual prototyping can be integrated with other formal methods tools to validate the final embedded system product.

The course will end with a short presentation of challenges for the future and directions for research in virtual prototyping.

Pre-requisite: The course is easier to follow for students who have some background in computer architecture and C++ programming experience, although it is not necessary.

Suzanne Lesecq

CRI - CEA, France

Suzanne LESECQ passed the “Agrégation” in Electrical Engineering in 1992. She received the PhD in Process Control from the Grenoble Institute of Technology, France, in 1997. She joined the University Joseph Fourier in 1998 where she has been appointed as Associate-Professor from 1998 to 2006 and full-time Professor from 2006 to 2009. She joined the CEA LETI in 2009. She has published more than 90 papers in world leading Conferences, International Journals, book chapters. Her topics of interest are Process Control and Fault Detection and Isolation, together with their safe implementation on control units.

Course:

Data Fusion Techniques applied to Sensor Networks

Abstract:

Data fusion is an information processing technique that aims association, combination, integration and blending of multiple data sources, representing a variety of knowledge and information, in order to provide resulting information better than the one obtained from all sources each considered separately.
The problem of the combination and the simultaneous use of data and information from multiple sources can be found in many fields of application often associated with the need of observing an environment from sensors more or less reliable, more or less accurate, and more or less effective. But in fact, the term data fusion extends to larger areas. It includes the combination of all sources of knowledge, whether from sensors, navigation systems, various

databases (map data, documentaries, digital terrain models, rules of expertise) or even analysis or previous data fusion.
During the tutorial, we will consider sensor fusion, i.e. fusion of data acquired from various sensors, possibly of different modalities. Various techniques will be first summarized, together with their numerically robust implementation.
Then the context of sensor fusion in a sensor network will be considered. Especially, the challenges (sensor positioning, computational capability of sensor node, data loss, etc.) that arise in this context will be presented.

Prof. Dr. Dr. h.c. mult. Reinhard Wilhelm

Saarland University, Germany

Research interests: Timing Analysis for Real-Time Systems, Static Program Analysis based on 3-valued logic, vulgo Shape Analysis, Compiler Construction, Algorithm Explanation.

Positions and Functions: Chair for Programming Languages and Compiler Construction at Saarland University, Scientific Director of Schloss Dagstuhl, the Leibniz Center for Informatics, Site Coordinator Saarbruecken in the AVACS Project, Coordinator of the Predator Project, Member of the Strategic Management Board for the Artist2 and ArtistDesign Networks of Excellence, Associate of AbsInt Angewandte Informatik GmbH, Member of the ACM SIGBED Executive Committee, Member of the Steering Committee of the International Conference on Embedded Software EMSOFT, Member at Large of the Steering Committee of the ACM Conference on Languages, Compilers, and Tools for Embedded Systems LCTES, Coorganizer of ARTIST workshop Reconciling Predictability with Performance (RePP), Member of the Scientific Advisory Board of CWI, Member of the Program Committees of SCOPES 2009, LCTES 2009, MEMOCODE 2009, RTSS 2008.

Course:

Timing Analysis and Timing Predictability

Abstract:
Hard real-time systems are subject to stringent timing constraints which are dictated by the surrounding physical environment.
A schedulability analysis has to be performed in order to guarantee that all timing constraints will be met ("timing validation"). Existing techniques for schedulability analysis require upper bounds for the execution times of all the system's tasks to be known.
These upper bounds are commonly called worst-case execution times (WCETs).
The WCET-determination problem has become non-trivial due to the advent of processor features such as caches, pipelines, and all kinds of speculation, which make the execution time of an individual instruction locally unpredictable. Such execution times may vary between a few cycles and several hundred cycles.

A combination of Abstract Interpretation (AI) with Integer Linear Programming (ILP) has been successfully used to determine precise upper bounds on the execution times of real-time programs.
The task solved by abstract interpretation is to compute invariants about the processor's execution states at all program points.

These invariants describe the contents of caches, of the pipeline, of prediction units etc. They allow to verify local safety properties, safety properties who correspond to the absence of "timing accidents". Timing accidents, e.g. cache misses, pipeline stalls are reasons for the increase of the execution time of an individual instruction in an execution state.

The technology and tools have been used in the certification of several time-critical subsystems of the Airbus A380. The AbsInt tool, aiT, is the only tool worldwide, validated for these avionics applications.

Professor Wang Yi

Uppsala University

Wang Yi is Professor and chair of embedded systems, and Director of the newly introduced Embedded Systems Masters' Program at Uppsala University. He obtained his PhD in computer science from Chalmers University of Technology in 1991. His research interests are in methods and tools for modelling, verification and implementation of embedded and real-time systems. He is a co-founder of the UPPAAL model checker. He is a co-founder of the UPPAAL model checker. He has been a program (co-)chair for TACAS, EMSOFT, FORMATS and HSCC, and an associate editor for IEEE transactions on computers, the Journal of Computing Science and Engineering, the Elsevier Journal of Systems Architecture, and the Journal of Computer Science and Technology. His current interests are mainly in real-time software development on multicore platforms. He is one of the principle investigators for the newly established UPMARC centre of excellence at Uppsala, devoted to new techniques and tools for programming multicore computer systems. He together with his students received the Best Paper Award of RTSS 2009.

Course:

Modelling and Analysis of Timed Systems

Abstract:

My lecture will include two parts:

- Part (1): Model Checking of Real-Time Systems

In the first part, I will give a tutorial on UPPAAL which is a model-checker for real-time systems using timed automata. The tool has been developed and maintained jointly by Uppsala University in Sweden and Aalborg University in Denmark. UPPAAL has been widely used in research, education and industrial environment for embedded systems design. In this tutorial, I will focus on the semantical and algorithmic aspects of the tool. The main topics include: transition systems, temporal Logics, the theory of timed automata, and algorithms and data structures implemented in UPPAAL for solving the verification problems efficiently. I will also outline a recent work on combining abstract interpretation and model checking techniques to solve the multicore WCET analysis problems, which is presented in details in the second part of this lecture.

- Part (2): Real-Time Systems on Multicores

Future processor chips will contain many CPU's, i.e., processor cores each of which may support several hardware threads working in parallel. The new architecture gives rise to the grand challenge for embedded software development to make the most efficient use of on-chip resources including

processor cores, caches, communication bandwidth in order to meet requirements of performance and predictability. In this talk, I will give an overview on the CoDeR-MP project at Uppsala in collaboration with ABB and SAAB to develop high-performance and predictable real-time software on multicore platforms. I will present the technical challenges including the multicore timing analysis problem and our proposed solutions dealing with shared L2 caches, bandwidth for accessing off-chip memory and multiprocessor scheduling. In particular I will present in details our recent work on fixed-priority multiprocessor scheduling. In 1973, Liu and Layland discovered the famous utilization bound for fixed-priority scheduling on singleprocessor systems. Since then, it has been a long standing open problem to find fixed-priority scheduling algorithms with the same bound for multiprocessor systems. Recently we have developed a partitioning-based fixed-priority multiprocessor scheduling algorithm with Liu and Layland's utilization bound, which can be used for real-time task assignment and scheduling for multicore systems.

3.3.3 Organisation

- **Scientific Committee**
  - Bouyssounouse, Bruno (Verimag Laboratory)
  - Mei Hong (Peking University) (to be confirmed)
  - Gu Ming (Tsinghua University Beijing)
  - He Jifeng (Academician of CAS, East China Normal University, Shanghai)
  - Jian Lv (Nanjing University) (to be confirmed)
  - Joloboff Vania (LIAMA)
  - Lin Huimin (Institite of Software, Beijing)
  - Sifakis Joseph (Verimag Laboratory)
  - Wang Ji (NUDT)
  - Wang Yi (Uppsala University)
  - Zhou Chaochen (Institite of Software, Beijing)
- **Institutions**
  - ARTIST NoE
  - LIAMA Sino French Lab in Computer Science, Automation and Applied Mathematics
    - Beida (Peking University)
      - Chinese
      - English
- **Local Organisation**
  - Vania Joloboff
  - Bouyssounouse Bruno (ArtistDesign European Network of Excellence)
  - Guo Yao (Peking University)
  - ZHANG Mei (LIAMA)

3.3.4 Grants

The ArtistDesign NoE paid all costs for the speakers (travel, lodging, meals).

All costs for students were handled locally:

- Registration fees for Master, PhD or Postdoc students amounts to 150 RMB, and 500 RMB for non-students. Registration fees include proceedings for the school, lunches, breaks and social events.
- Housing is provided on demand at Tsinghua's student dormitories at an additional 750 RMB for the duration of the school.
- The costs for speakers are covered by a grant paid for by the European Commission via the ArtistDesign Network of Excellence on Embedded Systems Design.

3.3.5 Poster for the School

3.4 ARTIST Summer School in South America 2010

May 26-28, 2010 Gramado, Brazil
http://www.artist-embedded.org/artist/-ARTIST-Summer-School-South-America-.html

3.4.1 Overview

The fourth edition of the ARTIST2 South-American School for Embedded Systems will occur in Gramado, Brazil, from May 26-28, at the convention center from the Federal University of Rio Grande do Sul (UFRGS). The school seeks to continue strengthening the cooperation between Europe and South America in the area of embedded systems, both at educational and research levels. For this purpose, the goal of the school is to provide state-of-the-art courses on embedded systems oriented towards advanced students and young researchers. It should also provide a pleasant atmosphere for research-related discussions among the participants.

Since its first edition in 2007, the school has been the ground for cross-fertilization between Europe and South America, students and researchers share and interchange knowledge and problems, in an open-minded way.

In 2010, the school was colocated with two one-day' workshops: the Real-Time Systems Workshop (May, 24) and the Embedded Systems Workshop (May, 25), forming the First South-American Embedded and Real-Time Systems Week.

3.4.2 Organisation Committee

- Jean-Marie Farines – UFSC/Brazil
- Leandro Buss Becker – UFSC/Brazil
- Luigi Carro – UFRGS/Brazil
- Alfredo Olivero – UNSAM/Argentina
- Scientific Committee
- Roberto Bevilacqua - UNSAM-CNEA/Argentina
- Bruno Bouyssounouse - VERIMAG/France
- Leandro Buss Becker – UFSC/Brazil
- Luigi Carro – UFRGS/Brazil
- Jean-Marie Farines – UFSC/Brazil
- George Lima - UFBa/Brazil
- Julius Leite - UFF/Brazil
- Rodrigo Santos, UNS/Argentina
- Joseph Sifakis – VERIMAG/France
- Flavio Wagner -UFRGS/Brazil

3.4.3 Associated Events

- Real-Time Systems Workshop (WTR)
  http://wtr2010.das.ufsc.br/
- Embedded Systems Workshop (WSE)
  http://sbrc2010.inf.ufrgs.br/index.php/en/wse
- Brazilian Symposium on Computer Networks and Distributed Systems (SBRC 2010)
  http://sbrc2010.inf.ufrgs.br/index.php/en

3.4.4 Invited Speakers

Tarek Abdelzaher, University of Illinois em Urbana-Champain (UIUC), USA

Distributed Cyber-physical Systems

An expanding frontier for computer scientists lies at the intersection of the logical and physical realms. As computing elements become embedded more pervasively in our environment, a new cyber-physical fabric arises in which distributed logical processing is deeply intertwined with the distributed physical environment in which it occurs. The course focuses on analysis of distributed cyber-physical systems. Special emphasis is made on analysis of interactions between system components in temporal, functional, and data spaces. Understanding such interactions and preventing them from degrading system performance is a major challenge towards making these systems predictable, reliable and efficient. The course covers the unfolding research challenges and directions in distributed cyber-physical systems, discusses common misconceptions, presents the underlying theoretical foundations, and sheds light on related recent results and technologies.

Franz Rammig, Universität Paderborn, Germany

The Future of Embedded Systems: Cyber Physical Systems or Cyber Biosphere?

Embedded Systems are heading into a degree of complexity which is far beyond today`s level. As most technical artifacts will be interconnected in some sense (“Internet of Things”) Embedded Systems of the future cannot be treated as isolated entities any longer. Two major tendencies to cope with this challenge can be observed. The first one takes its inspiration from the technical roots of Embedded Systems and Computer Communications. Systems are looked at from their technical nature but the traditional boundaries of Embedded Systems, especially to consider them as isolated systems are overcome by considering advanced communication technologies. This approach became well known under the name “Cyber Physical Systems (CPS)”. The second approach observes the existence of highly successful and relatively stable systems in form of our biosphere. So it seems to be wise to take inspirations from the achievement of nature. This approach became rather popular under the term “Biologically Inspired Systems” or “Organic Computing”. We will compare the two approaches to build the highly complex, highly sophisticated Embedded Systems of the future. As biologically inspired systems seem to be less intensively discussed in literature, the major emphasis will be laid on this approach. Inspirations from ant colonies, artificial hormone systems, and artificial immune systems will shortly be discussed using specific examples. Of course comparisons with the CPS approach will be made as well.

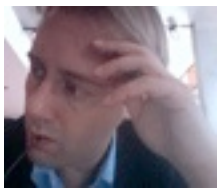
Sergio Yovine, CONICET-UBA, Argentina

Code generation of embedded systems: some issues, approaches and open problems

The purpose of this course is to discuss some problems related to code generation in the context of Model-Driven Engineering for embedded systems. In particular, we will talk about how to formally link the abstract notion of time with its implementation counterpart. We will give examples of

techniques that deal with specific instances of the problem. We will end with the overview of a formal end-to-end approach based on the concept of model transformation.

Gilles Sassatelli, LIRMM, France



Embedded Distributed Processing Systems: From Reconfigurable Computing to MPSoCs

This course will first review the basics of computer architecture and go through the successive evolutions in microprocessor architecture that aimed at improving performance. Concepts such as CISC, RISC, cache memories, MMU, vector / VLIW / superscalar architectures, ASIP will be covered emphasizing their applicability in embedded systems. Some basic knowledge on operating systems will also be given. Reconfigurable computing solutions will also be briefly discussed, including FPGAs and coarse grain reconfigurable systems. The course will especially emphasize on multiprocessor systems and review the fundamental characteristics such as homogeneous / heterogeneous, shared / distributed memories and the corresponding programming models. The concepts will be illustrated through the analysis of various embedded multiprocessor architectures (MPSoCs) used in current mobile terminals, and discuss the upcoming challenges to the design of low-power massively parallel embedded multiprocessor systems.

3.4.5 Participants

There were a total of 53 registered participants who were regularly present every day. Participants came from all over Brazil (15 universities and research centers were represented). 70% were students and 30% Faculty members and Research engineers in related technology areas. The scientific level of PhD and Master students was very good (many of them have already published scientific papers in conferences).

3.4.6 Financial support.

Besides ARTIST financial support to cover lecturers' travel and local expenses, organization costs were covered by SBRC funds.

3.4.7 Concluding remarks

This fourth edition was very successful, achieving the goals of the School of promoting scientific and academic cooperations in embedded systems among participants, including master and doctorate students:

- The courses were interactive and generated discussions, during the courses, coffee breaks and lunches, between participants and speakers.
- There were some meetings to discuss potential cooperative research projects.
- The joint organization with SBRC was positive:
  - allowing contacts between embedded systems researchers and network and distributed systems ones,
  - helping to atract participants from all over Brazil.
- The location of the School and two one-day Workshops in the same week, was very important to allow research presentations in real time and embedded system areas and facilitate contacts among students, south-american professors and foreign lecturers.

3.5 ARTIST Summer School in Morocco – 2010

3.5.1 Overview

The considerable and rapid evolution of microelectronics and nanotechnology has led to a rising miniaturization of embedded systems. This miniaturization trend has resulted in the development of tiny embedded systems which are being buried into more and more everyday objects. These smart devices will, in the near future, be omnipresent everywhere from clothes to homes, supermarkets, cars, public transports, industrial automation, environment, etc. being connected to each other, the users and other base systems using networks of diverse types.

Given the pertinence of this innovative technology, the dissemination of this key success factor in developing countries is very much motivated. In this respect,the ArtistDesign NoE, in collaboration with ENSIAS, is organizing a summer school on Embedded Systems in July 2010. This school, given by distinguished lecturers, offers a full week consisting of five in-depth tutorials on state-of-the-art techniques for the design and analysis of embedded and real-time systems and networks.

3.5.2 Programme

Professor Peter Marwedel
TU Dortmund, Germany

Course:
Model-based Embedded Systems Design

Abstract:
The tutorial day will start with an introduction to embedded and cyber-physical systems, introducing key terms of and a motivation for work in the area. Also, characteristics and challenges of the area will be presented. Next, the tutorial will provide an overview over different approaches for specifying systems. A brief introduction to state-machine-based, data-flow-based, discrete-event-based and imperative specification styles will be given. The advantages of model-based design will be shown. The third part of the tutorial will contain an overview over the steps (including mapping, evaluation, validition and optimizations) used in the design of embedded systems. The fourth and final part will focus on a more in-depth treatment of memory-architecture-aware techniques for mapping applications to execution platforms.

Overall, the tutorial day will be structured as follows:
- Introduction, Motivation and Overview
- Specification techniques for embedded systems
- Design flow for embedded systems
- Exploitation of the memory hierarchy

The first tutorial day will provide a context for the following days.

Professor Giorgio Buttazzo

Scuola Superiore Sant'Anna, Pisa, Italy

Course:

Real-Time Operating Systems and Task Scheduling

Abstract:

An increasing number of embedded computing systems (like, cellular phones, automotive control units, smart sensors, multimedia devices, etc.) requires the execution of several concurrent tasks dedicated to sensing, control and actuation. Most of such tasks must be executed within stringent timing constraints dictated by performance requirements. Often such systems have to work under limited resources (small computational power, small memory, limited energy, etc.).

As a consequence, the operating system, besides providing internal predictable mechanisms, must also use adequate policies for an efficient use of the available resources.

The objective of the course is to introduce fundamental methodologies and kernel mechanisms suited for the analysis and the development of embedded control systems working under timing and resource constraints.

Specific topics covered by the course include:

- task modeling;
- task scheduling;
- periodic task management;
- schedulability tests and response time analysis;
- protocols for accessing shared resources;
- server mechanisms to handle aperiodic activities.

Professor Lothar Thiele

ETH Zurich, Switzerland

Course:

Performance analysis in distributed real-time systems

Abstract:

During the system level design process of an embedded system, a designer is typically faced with questions such as whether the timing properties of a certain system design will meet the design requirements, what architectural element will act as a bottleneck, or what the on-chip memory requirements will be. Consequently it becomes one of the major challenges in the design process to analyze specific characteristics of a system design, such as end-to-end delays, buffer requirements, or throughput in an early design stage, to support making important design decisions before much time is invested in detailed implementations. This analysis is generally referred to as system level performance analysis. If the results of such an analysis are able to give guarantees on the overall system behavior, it can also be applied after the implementation phase in order to verify critical system properties.

One of the major requirements for models, methods and tools is their support for a modular, component-based design. This aspect covers as well the composition of the underlying hardware platform as well as the software design. Because of the import role of resource interaction, these components not only need to talk about functional properties but also about resource interaction.

The course will cover the following aspects of system level performance analysis of distributed embedded systems:

- Approaches to system-level performance analysis. Requirements in terms of accuracy, scalability, composability and modularity.
- Modular Performance Analysis (MPA): basic principles, methods and tool support.
- Examples that show the applicability: An environment to map applications onto multiprocessor platforms including specification, simulation, performance evaluation and mapping of distributed algorithms; analysis of memory access and I\O interaction on shared buses in multi-core systems.

Professor Luis Almeida

University of Porto, Portugal

Course:

Real-Time Communication in Embedded Systems

Abstract:

The proliferation of integrated communication interfaces within embedded computing platforms allowed an unprecedented level of distribution and integration that has been pushing frameworks such as Networked Embedded Systems (NESs), Wireless Sensor Networks (WSNs) and Mobile Ad hoc Networks (MANETs). In many applications, particularly involving transmission of live monitoring data, feedback control data or interactive multimedia data, there are timing constraints that must be respected for the application to be effective. This requires bounded responses not only from the processors but also from the network.

In this course we will analyse the concepts, techniques and technologies used at the network level to provide timely communication. In particular we will start from current trends in embedded systems design and from there we will address the timing issues in the network, the temporal control of communication, the protocol stack and its layers, we will revisit some related protocols covering both wired and wireless technologies, including CAN, FlexRay, Ethernet, WiFi and IEEE 802.15.4, we will analyse the traffic model and scheduling issues, and finally we will discuss some on-going related research projects.

Professor Brian Nielsen

Aalborg University, Denmark

Course:

Modeling, verification and testing in embedded systems

Abstract:

Testing and verification are complementary validation techniques: Whereas verification aims at proving properties of abstract system models, testing aims at checking actual implementations running on hardware and operating systems. Model-based testing is a novel testing approach that aims at automatically checking whether the implementation's behavior is correct compared to the behavior specified in the model. The system developer uses a test generation tool to analyze the system model to generate cases that can be executed on the implementation under test. It turns out that verification techniques and algorithms can be exploited to assist in the generation of sound and effective test cases, including state exploration techniques, reachability analysis well as game solving techniques.

Synthesis of test cases for embedded real-time systems is particularly challenging as it must deal with timing, non-determinism, and reduced observability and controllability. In this tutorial we introduce recent advances in model-based testing of real-time systems, including models, theory, principles, techniques, and tools. Specifically, we introduce timed automata as means for modeling timing requirements, notions of real-time conformance, principles for off-line and on-line generation of real-time test cases, and using the Uppaal tool-suite for these tasks.

Contents:

- Real-Time Modeling
— Introduction to timed automata (TA) and timed game automata (TGA)
- Real-Time Conformance
— Real-time extensions of the ioco testing theory
- Principles of verification and controller synthesis
- Off-Line Testing
— Off-line generation of (optimal) quantitative test-sequences and testing strategies (based on Priced TA and Timed Games)
— Test generation using Timed Games
- On-Line Testing
— Online real-time testing and monitoring; Case study
- Future Challenges

UPPAAL is a tool for modeling, simulating and verifying real-time systems, developed as a collaboration between Aalborg University and Uppsala University since the beginning of 1995.

UPPAAL Tron is a testing tool, based on the UPPAAL engine, allowing for on-line conformance testing of timed systems, mainly targeted for embedded software commonly found in various controllers. By on-line we mean that tests are derived, executed and checked simultaneously while maintaining the connection to the system in real-time.

3.5.3 Organisation

ENSIAS

- Hassan BERBIA
- Rdouan FAIZI
- Faissal EL BOUANANI
- Atman JBARI

ARTIST European Network of Excellence

- Luis Almeida
- Bruno Bouyssounouse

3.6 ARTIST Graduate Courses in Y3 (2010)

ARTIST Graduate School on RT Kernels for Microcontrollers
June 14-18, 2010 Scuola Superiore Sant'Anna - Pisa, Italy
http://www.artist-embedded.org/artist/-ARTIST-Graduate-School-on-RT-.html

The course had two main objectives:

- Introducing the most important concepts and methodologies used to develop a real-time embedded system, including fundamentals of real-time scheduling, control and distributed systems;
- Showing how to apply these concepts in practice, using an embedded platform and a real-time operating system to developed simple control applications and make experience with wireless sensor networks.

ARTIST Graduate Course: Automated Formal Methods for Embedded Systems – 2010
June 14-22, 2010 DTU - Lyngby, Denmark
http://www.artist-embedded.org/artist/-ARTIST-Graduate-Course-Automated,1182-.html

In the lectures, we will introduce a comprehensive set of state-based models as well as automatic procedures for their analysis. The exercise classes will complement this by providing hands-on experience with appropriate verification tools.

Quantitative Model Checking 2010
March 2-5, 2010 IT University Copenhagen, Denmark
http://www.artist-embedded.org/artist/-Quantitative-Model-Checking-2010-.html

The PhD school on quantivative model checking, QMC 2010, is organized by the European Network of Excellence ARTIST Design and the Danish VKR Center of Excellence MT-LAB and takes place at the IT University Copenhagen from 2 to 5 March 2010. It features lectures and other activities by world-renowned experts within the areas of real-time, probabilistic, and hybrid model checking.

3.7 Previous Schools and Seminars on Embedded Systems Design Organised by ARTIST

The following schools have been organised by Artist FP5, and the Artist2 FP6 Network of Excellence:

ARTIST Graduate Course: Automated Formal Methods for Embedded Systems - 2009
June 17-25, 2009 DTU - Lyngby, Denmark
http://www.artist-embedded.org/artist/-Automated-Formal-Methods-2009-.html

The aim of this course was to introduce advanced topics in connection with models, analysis and verification of embedded systems. The course will cover theory and applications, and hands-on experience with state-of-the-art tools.

ARTIST Graduate Course on Embedded Control Systems 2009
June 8-12, 2009 Scuola Superiore Sant'Anna - Pisa, Italy
http://www.artist-embedded.org/artist/-ARTIST-Embedded-Control-2009-.html

ARTIST2 Summer School 2008 in Europe
September 8-12, 2008 Autrans (near Grenoble), France
http://www.artist-embedded.org/artist/-ARTIST2-Summer-School-2008-.html

The Summer 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/or industrial experts.

ARTIST2 South-American School for Embedded Systems 2008
August 25-29, 2008 Universidade Federal de Santa Catarina, Florianopolis, Brazil
http://www.artist-embedded.org/artist/-ARTIST-2-South-American-School-.html

Second edition of the ARTIST South American School.

Artist2 Summer School in China 2008
July 12-18, 2008 Shanghai, China
http://www.artist-embedded.org/artist/-Artist2-Summer-School-in-China-.html

ARTIST2 has organized the 3rd edition of a school on Embedded Systems Design in Shanghai. This year, the school was organized in collaboration with the SEI/ECNU and the LIAMA.

Real-Time Kernels for Microcontrollers: Theory and Practice
June 23-25, 2008 Pisa, Italy
http://www.artist-embedded.org/artist/-Real-Time-Kernels-for-.html

The course on Real-Time Kernels for Microcontrollers aims to introduce the basic concepts of Real-time Systems targeted to Embedded Systems, which are often implemented using microcontrollers. The course will briefly illustrate the theoretical background of real-time scheduling, resource-aware techniques, and wireless communication based upon the IEEE 802.15.4 protocol.

ARTIST2 Graduate Course on: Automated Formal Methods for Embedded Systems 2008
June 16-24, 2008 DTU - Lyngby, Denmark
http://www.artist-embedded.org/artist/-Automated-Formal-Methods-for-.html

In the lectures, we will introduce a comprehensive set of state-based models as well as automatic procedures for their analysis. The exercise classes will complement this by providing hands-on experience with appropriate verification tools.

ARTIST2 Graduate Course on Embedded Control Systems
May 26-30, 2008 Stockholm, Sweden
http://www.artist-embedded.org/artist/-Graduate-Course-on-Embedded-.html

The course provides an account of state of the art theory and techniques that address the connection and integration of the areas of Control systems and Embedded systems.

First European-SouthAmerican School for Embedded Systems
August 21-24, 2007 Universidad Argentina de la Empresa (UADE), Buenos Aires – Argentina
http://www.artist-embedded.org/artist/-First-European-SouthAmerican-.html

The purpose of the school is to foster the well established and dynamic research cooperations in the field of embedded systems between groups in Europe and South America, by allowing south-american students (specially graduate), to meet european researchers.

Artist2 / UNU-IIST School in China - 2007
August 1-10, 2007 Suzhou (near Shanghai), China
http://www.artist-embedded.org/artist/-Artist2-UNU-IIST-School-in-China-.html

ARTIST2 will organize, in collaboration with UNU-IIST, the 2nd edition of a school on embedded systems design in Suzhou (near Shanghai).

ARTIST2 PhD Course on: Automated Formal Methods for Embedded Systems
June 4-12, 2007 DTU - Lyngby, Denmark
http://www.artist-embedded.org/artist/-ARTIST2-PhD-Course-on-Automated,851-.html

In the lectures, we will introduce a comprehensive set of state-based models as well as automatic procedures for their analysis. The exercise classes will complement this by providing hands-on experience with appropriate verification tools.

ARTIST2 Graduate Course on Embedded Control Systems
May 7-11, 2007 Lund, Sweden
http://www.artist-embedded.org/artist/-ARTIST-Graduate-Course-on-Embedded-.html

The objective of the course is to provide an overview of the main principles and technologies for supporting the development of embedded control systems.

Real-Time Microcontroller Systems: OSEK Standard and experiments on µcontroller devices
March 26-28, 2007 RETIS Laboratory, Scuola Superiore Sant'Anna, Pisa, Italy
http://www.artist-embedded.org/artist/-OSEK-Standard-and-Multicore-.html

Training course on Real-Time Systems for Microcontrollers: OSEK Standard and experiments on microcontroller devices *Organised in conjunction with Evidence Srl*

ARTIST2 - MOTIVES 2007
February 19-23, 2007 Trento, Italy
http://www.artist-embedded.org/artist/-MOTIVES-2007-.html

ARTIST2 Winter School 2007 offers foundational tutorials and lectures on exciting emerging technologies and industrial applications - given by leading scientific and industrial experts.

First European Laboratory on Real-Time and Control for Embedded Systems
July 10-14, 2006 Pisa, Italy
http://www.artist-embedded.org/artist/-First-European-Laboratory-on-Real-.html

Real-Time distributed embedded systems play a crucial role in our society including several application domains such as automotive, telecommunications, robotics, and multimedia systems. These systems generally work under precise timing constraints, to achieve the required level of performance and predictability. Consequently, embedded systems design requires expertise in several disciplines, including control theory, networking, real-time computing, and operating systems.

ARTIST2 / UNU-IIST Spring School in China 2006
April 3-15, 2006 Xi'an, China
http://www.artist-embedded.org/artist/-ARTIST2-UNU-IIST-China-School-.html

The first ARTIST / UNU-IIST Spring School gathered more than 50 participants, of which approximately 40 were students from the top universities in mainland China.

ARTIST2 Graduate Course on Embedded Control Systems
April 3-7, 2006 Prague, Czech Repbulic
http://www.artist-embedded.org/artist/-ARTIST2-Graduate-Course-on-.html

The objective of the Course is to provide an overview of the main principles and technologies for supporting the development of embedded control systems.

ARTIST2 Summer School 2005
September 29th - October 2nd 2005 Nässlingen, Sweden
http://www.artist-embedded.org/artist/-ARTIST2-Summer-School-2005-.html

ARTIST2 Summer School on Component & Modelling, Testing & Verification, and Statical Analysis of Embedded Systems

4. Organisation of Workshops

4.1 Workshops planned in Y4 (2011)

The following world-class workshops will be organised and funded by the NoE in Y4:

Rigorous Embedded Design 2011

April 10th, 2011 Salzburg, Austria (within EuroSys 2011)

The objective of the workshop is to discuss new methodologies for the rigorous design of embedded systems. Through a series of invited talks, the workshop will survey some of the challenges and emerging approaches in the area. A series of design flows will be presented. The workshop will mainly discuss performance analysis, correctness (high confidence and security), code generation, and modeling aspects (including timed scheduling and software/hardware interactions). Those concepts shall be illustrated with examples coming from the aeronautic, automotive, and robotic areas. Interactions between industrials and academic researchers will be facilitated through a series of open discussion sessions (maybe an interaction between theoretical and more practical presentations).

GREEMBED 2011

April 11th, 2011 Chicago, USA (within CPS Week 2011)

Second Workshop on Green and Smart Embedded System Technology: Infrastructures, Methods and Tools.

Efficient production, transmission, distribution and use of energy is a fundamental requirement for our modern society and its economy.

Most systems for monitoring and control of energy production, distribution and use are today interconnected and controlled by embedded devices. This offers the opportunity for the creation of new integrated systems offering new products, processes and services with greater efficiency and better situation awareness to end-users and service and infrastructure owners.

IRTAW-15

September 14-16, 2011 Liébana (Cantabria), Spain

The 15th International Real-Time Ada Workshop (IRTAW-15) will take place on September 14-16 of 2011 in Liébana (Cantabria), Spain, a nice mountain area by the "Picos de Europa" National Park.

JTRES - 2011

September 26-28, 2011 Kings Manor, York, England

Interest in real-time Java in both the research community and industry has recently increased significantly, 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 problems that still need to be solved in order to assure the success of real-time Java as a technology, and to report results and experiences gained by researchers.

4.2 Workshops organised and funded in Y3 (2010)

Synchron 2010
November 29th - December 3rd 2010 Villa Clythia, Fréjus – France
http://www.artist-embedded.org/artist/-Synchron-2010,1198-.html

Synchronous languages form a distinctive branch of Concurrency Theory. They are based on simple ideas of discrete logical time, explicit parallelism/concurrency and joint discrete reactions as operational behaviours. Their striking features is that such notions are provided to the plain designer him/herself, so that precise timing and time handling is seen as an integral part of functional design, not an extra-functional analysis and simulation afterthought addendum.

UML&FM'2010
November 16th, 2010 Shanghai, China
http://www.artist-embedded.org/artist/-UML-FM-2010-.html

The UML and formal methods communities have been working for a number of years to produce a practical (via UML) and rigorous (via formal methods) approach to software engineering.

UML is the de facto standard for modelling various aspects of software systems in both industry and academia, despite the inconvenience that its current specification is complex and its syntax imprecise. This third workshop will encourage new initiatives of building bridges between informal, semi-formal and formal notations.

WSS'10
October 29th, 2010 Scottsdale, Arizona (USA), within ESWeek 2010
http://www.artist-embedded.org/artist/-WSS-10-.html

An increasing amount of software is not written manually any more. Rather, software is synthesized from abstract models of the required functionality. As a result, the effort of generating software is reduced and software verification typically becomes easier.
Software synthesis has been implemented in various disperse communities. The workshop aims at bringing the software generation and software synthesis communities together and at identifying research problems which should be addressed by the scientific community.

WESE'10
October 28th, 2010 Scottsdale, Arizona (USA), within ESWeek 2010
http://www.artist-embedded.org/artist/-WESE-10-.html

As embedded system designs grow more complex and the time to market diminishes, quality embedded systems education becomes more and more important. This fifth workshop on the subject aims to bring researchers, educators, and industrial representatives together to assess needs and share design, research, and experiences in embedded systems education.

WFCD – 2010
October 24th, 2010 Scottsdale, Arizona (USA), within ESWeek 2010
http://www.artist-embedded.org/artist/-WFCD-2010-.html

The workshop aims to discuss recent results on component-based design with emphasis on design frameworks for real-time systems encompassing heterogeneous composition and models of computation. 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.

FIT 2010
August 30th, 2010 Paris, France (associated with CONCUR 2010)
http://www.artist-embedded.org/artist/-FIT-2010-.html

FIT stands for Foundations of Interface Technologies. Component-based design is widely considered as a major approach to developing systems in a time and cost effective way. Central in this approach is the notion of an interface. Interfaces summarize the externally visible properties of a component and are seen as a key to achieving component interoperability and to predict global system behavior based on the component behavior. To capture the intricacy of complex software products, rich interfaces have been proposed. These interfaces do not only specify syntactic properties, such as the signatures of methods and operations, but also take into account behavioral and extra-functional properties, such as quality of service, security and dependability. Rich interfaces have been proposed for describing, e.g., the legal sequences of messages or method calls accepted by components, or the resource and timing constraints in embedded software. The development of a rigorous framework for the specification and analysis of rich interfaces is challenging. The aim of this workshop is to bring together researchers who are interested in the formal underpinnings of interface technologies.

WCET 2010
July 6th, 2010 Brussels, Belgium (in conjunction with the 22nd Euromicro Conference on Real-Time Systems)
http://www.artist-embedded.org/artist/-WCET-2010-.html

Reliable WCET bounds are a necessary component for the construction and verification of dependable real-time systems. They are an input for doing task CPU allocation, creating task schedules, and performing schedulability analysis.

OSPERT 2010
July 6th, 2010 Brussels, Belgum (in conjunction with ECRTS10)
http://www.artist-embedded.org/artist/-OSPERT-2010-.html

Developers of Real-Time Operating Systems (RTOS) are faced with many challenges arising from two opposing needs: extreme optimisation of resource usage (processor, energy, network bandwidth, etc.) and dynamic configuration, flexible scheduling, component-based development and deployment, etc. While real-time systems continue to be used in many small embedded applications, real-time services are being introduced and used in general-purpose operating systems. Notable examples are the various flavours of Linux that provide support to time-sensitive applications.

ARTIST HW Platforms and MPSoC Technical Meeting
July 6-7, 2010 IMEC, Leuven, Belgium
http://www.artist-embedded.org/artist/-ARTIST-HW-Platforms-and-MPSoC-.html

Mapping Applications to MPSoCs 2010
June 29-30, 2010 St. Goar, Germany
http://www.artist-embedded.org/artist/-map2mpsoc-2010-.html

The aim of the workshop is to provide a forum for brainstorming and road-mapping the future of mapping applications to MPSoCs. Knowledge about constraints and directions for future MPSoC architectures should be collected. Existing mapping techniques should be briefly presented and analyzed. Directions for future research should be proposed and evaluated.

SCOPES 2010
June 28-30, 2010 Schloss Rheinfels, St. Goar, Germany
http://www.artist-embedded.org/artist/-SCOPES-2010-.html

13th International Workshop on Software and Compilers for Embedded Systems SCOPES focuses on the software generation process for modern embedded systems. Topics of interest include all aspects of the compilation process, starting with suitable modeling and specification techniques and programming languages for embedded systems. The emphasis of the workshop lies on code generation techniques for embedded processors. The exploitation of specialized instruction set characteristics is as important as the development of new optimizations for embedded application domains. Cost criteria for the entire code generation and optimization process include runtime, timing predictability, energy dissipation, code size and others. Since today's embedded devices frequently consist of a multi-processor system-on-chip, the scope of this workshop is not limited to single-processor systems but particularly covers compilation techniques for MPSoC architectures.

GREEMBED 2010
April 12th, 2010 Stockholm, Sweden, (in conjunction with CPSWEEK 2010)
http://www.artist-embedded.org/artist/-GREEMBED-2010-.html

Second Workshop on Green and Smart Embedded System Technology: Infrastructures, Methods and Tools.

Efficient production, transmission, distribution and use of energy is a fundamental requirement for our modern society and its economy. Most systems for monitoring and control of energy production, distribution and use are today interconnected and controlled by embedded devices. This offers the opportunity for the creation of new integrated systems offering new products, processes and services with greater efficiency and better situation awareness to end-users and service and infrastructure owners.

FESA 2010
April 12th, 2010 KTH, Stockholm (Sweden) (within CPS Week)
http://www.artist-embedded.org/artist/-FESA-2010-.html

Formalisms for Embedded Systems Architecture description & visualization:

- What key formalisms, ADL's and visual languages, for design of embedded systems are there and what are the trends?
- What is the maturity (languages, tools) and industrial adoption of such formalisms?
- What are the key outstanding research issues to pave way for larger scale industrial adoption?

WARM 2010
April 12th, 2010 Stockholm, Sweden (within CPS Week)
http://www.artist-embedded.org/artist/-WARM-2010-.html

The focus of WARM is software-based approaches to adaptive resource management for soft or adaptive embedded real-time applications, e.g., multimedia applications or non-safety critical control applications. Special emphasis will be given to multi-resource management, in particular including CPU time and power consumption. Special emphasis will also be given to multi-core platforms.

4.3 Workshops sponsored in Y3 (2010)

The following workshops were not organised as "ARTIST" workshops, but nonetheless received at least partial funding from the NoE.

CRTS 2010
November 30th, 2010 San Diego, CA, USA (co-located with RTSS 2010)
http://retis.sssup.it/crts2010/

The CRTS workshop provides a forum for researchers and technologists to discuss the state-of-the-art, present their works and contributions, and set future directions in compositional technology for real-time embedded systems.

SCOPES 2010
June 28-30, 2010 Schloss Rheinfels, St. Goar, Germany
http://www.scopesconf.org/scopes-10/

13th International Workshop on Software and Compilers for Embedded Systems SCOPES focuses on the software generation process for modern embedded systems. Topics of interest include all aspects of the compilation process, starting with suitable modeling and specification techniques and programming languages for embedded systems. The emphasis of the workshop lies on code generation techniques for embedded processors. The exploitation of specialized instruction set characteristics is as important as the development of new optimizations for embedded application domains. Cost criteria for the entire code generation and optimization process include runtime, timing predictability, energy dissipation, code size and others. Since today's embedded devices frequently consist of a multi-processor system-on-chip, the scope of this workshop is not limited to single-processor systems but particularly covers compilation techniques for MPSoC architectures.

Amir Pnueli Memorial Symposium
May 7-9, 2010 New York University (USA)
http://www.cs.nyu.edu/acsys/pnueli/

UML&AADL'2010
March 24th, 2010 University of Oxford, UK
http://www.artist-embedded.org/artist/-UML-AADL-2010-.html

Due to the even more increased complexity of distributed, real-time and embedded systems (DRE), the need for a model-driven approach is more obvious in this domain than in monolithic RT systems. The purpose of this workshop is to provide an opportunity to gather researchers and industrial practitioners to survey existing efforts related to behaviour modelling and model-based analysis of DRE systems. We will address all aspects of the representation, analysis, and implementation of Distributed, Real-time and Embedded systems (DRE) system behaviour and/or architecture models.

4.4 Previous ARTIST Workshops organised and funded by the NoE

4.4.1 Previous ARTIST Workshops in 2009

- Synchron 2010 *November 29th - December 3rd 2010*
- UML&FM'2010 *November 16th, 2010*
- WSS'10 *October 29th, 2010*
- WESE'10 *October 28th, 2010*
- ARTIST Summer School Europe 2010 *September 5-10, 2010*
- FIT 2010 *August 30th, 2010*
- Memocode 2010 *July 26-28, 2010*
- ARTIST Summer School in China 2010 *July 18-23, 2010*
- ARTIST Summer School in Morocco - 2010 *July 11-16, 2010*
- WCET 2010 *July 6th, 2010*
- OSPERT 2010 *July 6th, 2010*
- ARTIST HW Platforms and MPSoC Technical Meeting *July 6-7, 2010* Mapping Applications to MPSoCs 2010 *June 29-30, 2010*
- ARTIST Graduate School on RT Kernels for Microcontrollers *June 14-18, 2010*
- ARTIST Graduate Course: Automated Formal Methods for Embedded Systems - 2010 *June 14-22, 2010*
- ARTIST Summer School South-America 2010 *May 26-28, 2010*
- GREEMBED 2010 *April 12th, 2010*
- FESA 2010 *April 12th, 2010*
- WARM 2010 *April 12th, 2010*
- Quantitative Model Checking 2010 *March 2-5, 2010*

4.4.2 Previous ARTIST Workshops in 2008

- Mapping of Applications-to MPSoCs - ArtistDesign Working Meeting *November 27-28, 2008*
- Embedded Systems: Industrial Applications '08 *November 12-13, 2008*
- WS on Multicores: Theory and Practice *October 28th, 2008*
- UML&FM'08 *October 27th, 2008*
- WESE'08: WS on Embedded Systems Education *October 23rd, 2008*
- Workshop on Foundations and Applications of Component-based Design (WFCD'2008) *October 19th, 2008*
- ACES^{MB} 2008 *September 29th, 2008*
- ARTIST2 Summer School 2008 in Europe *September 8-12, 2008*
- ARTIST2 South-American School for Embedded Systems 2008 *August 25-29, 2008*
- Movep'08 *June 23-27, 2008*
- Real-Time Kernels for Microcontrollers: Theory and Practice *June 23-25, 2008*
- COMES 2008 *June 17-18, 2008*
- ARTIST2 Graduate Course on: Automated Formal Methods for Embedded Systems 2008 *June 16-24, 2008*
- Mapping Applications to MPSoCs 2008 *June 16-17, 2008*
- ARTIST2 Graduate Course on Embedded Control Systems *May 26-30, 2008*
- ArtistDesign Workshop on Design for Adaptivity *May 13-14, 2008*
- DataFlow Modeling for Embedded Systems 2008 *May 5th, 2008*
- APRES'08 *April 21st, 2008*
- SLA++P'2008 *April 5th, 2008*
- ARTIST2 Timing Analysis activity meeting

- Artist2 Summer School in China 2008 *July 12-18, 2008*
- MoCC 2008 *July 3-4, 2008*
- WCET'08 *July 1st, 2008*
- OSPERT 2008 *July 1st, 2008*

2008 *March 13th, 2008*

- ArtistDesign Automotive Systems Day 2008 *March 12th, 2008*
- ATESST Open Workshop *March 3rd, 2008*

4.4.3 Previous ARTIST Workshops in 2007

- Synchron 2007 *November 26-30, 2007*
- ARTIST2 meeting on Integrated Modular Avionics *November 12-13, 2007*
- WESE'07: WS on Embedded Systems Education *October 4-5, 2007*
- Foundations of Component-based Design *September 30th, 2007*
- Between Control and Software (in honor of Paul Caspi) *September 28th, 2007*
- First European-SouthAmerican School for Embedded Systems *August 21-24, 2007*
- Artist2 / UNU-IIST School in China - 2007 *August 1-10, 2007*
- FCC 2007 *July 4-5, 2007*
- ARTIST WS: Tool Platforms for ES Modelling, Analysis and Validation *July 1-2, 2007*
- ARTIST2 PhD Course on: Automated Formal Methods for Embedded Systems *June 4-12, 2007*
- 2nd Int'l ARTIST Workshop on Control for Embedded Systems *May 31st - June 1st 2007*
- ARTIST2 Graduate Course on Embedded Control Systems *May 7-11, 2007*
- Towards a Systematic Approach to Embedded System Design *April 20th, 2007*
- NeRES 2007 *April 2nd, 2007*
- Real-Time Microcontroller Systems: OSEK Standard and experiments on µcontroller devices *March 26-28, 2007*
- ARTIST2 - MOTIVES 2007 *February 19-23, 2007*

4.4.4 Previous ARTIST Workshops in 2006

- ARTIST2 Workshop on Basic Concepts in Mobile Embedded Systems *December 4-5, 2006*
- ARTIST2 Workshop on Timing Analysis in the Industrial Development Process (ISoLA 2006) *November 17th, 2006*
- MoCC - Models of Computation and Communication *November 16-17, 2006*
- Artist2 - Foundations and Applications of Component-based Design *October 26th, 2006*
- WESE'06 - Embedded Systems Education *October 26th, 2006*
- ATVA China 2006 *October 23-26, 2006*
- ARTIST2 Workshop on Requirements for Flexible Scheduling in Complex Embedded Systems *June 16th, 2006*
- ARTIST2 Workshop on Execution Platforms / Cluster Meeting *May 22-23, 2006*
- ARTIST2 Workshop on Specification and Verification of Secure Embedded Systems *May 18th, 2006*
- ARTIST2 / UNU-IIST Spring School in China 2006 *April 3-15, 2006*
- ARTIST2 Graduate Course on Embedded Control Systems *April 3-7, 2006*
- ARTIST2 Workshop Beyond AutoSar *March 23-24, 2006*

- First European Laboratory on Real-Time and Control for Embedded Systems *July 10-14, 2006*
- CORDIE'06: Concurrency, Real-Time and Distribution in Eiffel–like Languages *July 4-5, 2006*
- ARTIST Workshop at DATE'06 *March 10th, 2006*

4.4.5 Previous ARTIST Workshops in 2005

- ARTIST2 Summer School 2005 *September 29th - October 2nd 2005*
- WESE'05 - ARTIST2 Workshop on Embedded Systems Education *September 22nd, 2005*
- 31st EUROMICRO Conference - Special session: Model Driven Engineering (MDE) *August 30th - September 3rd 2005*
- ACM-IEEE MEMOCODE'2005 *July 11-14, 2005*
- IST/NSF: Transatlantic Research Agenda on Future Challenges in Embedded Systems Design *July 8th, 2005*
- EU/US: Component-based Engineering for Embedded Systems *July 7th, 2005*
- ARTIST Seminar on Adaptive Real-Time Systems *June 20-23, 2005*
- ARTIST Workshop at DATE'05 *March 11th, 2005*
- First S.Ha.R.K. Workshop *February 28th - March 4th 2005*

5. Keynotes, Tutorials provided to the Embedded Systems Community

ArtistDesign partners have a very deep impact on the global embedded systems community, as is attested in the following direct contributions.

5.1 Modeling and Validation

5.1.1 Modeling

Keynote: Computational Models for Concurrent Streaming Applications
Twan Basten - ASCI Winterschool on Embedded Systems 2010, Soesterberg, Netherlands, Soesterberg, Netherlands*, 17 March 2010*
http://www.asci.tudelft.nl/pages/events.php?event_id=1

Keynote: Kahn Process Networks and a Reactive Extension
Twan Basten - IEEE Summer School on Models for Embedded Signal Processing Systems, Leiden, Netherlands, 1 September 2010
http://www.lorentzcenter.nl/lc/web/2010/427/info.php3?wsid=427

Keynote: ***Building tomorrow's systems with industry as a laboratory***
Michael Borth - ICT Delta 2010, Rotterdam, Netherlands, 18 March 2010

Keynote: Architecture of Systems-of-Systems
Michael Borth - ESI Symposium, Eindhoven, Netherlands, 2 December 2010

Keynote: Performance prediction and design-space exploration for wafer scanners
MMB & DFT 2010, Essen, Germany, March 15, 2010.

Keynote: Predicting timing performance of wafer scanners
Bits and chips conference, Eindhoven, The Netherlands, November 11, 2010.

Keynote: System Architecting & Modeling
Roelof Hamberg - ESI Symposium, Eindhoven, The Netherlands, December 2 2010

Keynote: Model based design
Roelof Hamberg - Special Interest Group (ASML, Océ, Vanderlande, Philips Healthcare, ESI), Eindhoven, April 28, 2010

Keynote*:* Linking Healthcare Architecture to Requirements
Jozef Hooman - Care4Me workshop, Barcelona, 6 October 2010

Keynote: Time predictability from system-level design to task implementations in automotive applications,
Paolo Gai, Marco Di Natale, Huascar Espinoza, Francois Terrier, Sébastien Gérard, Reinhold Heckmann, Christian Ferdinand, Giacomo Gentile and Nicola Ariotti
SAE 2010 World Congress & Exhibition within the session System Level Architecture Design Tools and Methods, Detroit, MI, USA, 2010.

Key Note: DATE 2010, Everything is Connected.
Alberto Sangiovanni Vincentelli Dresden, March 9, 2010
http://www.ecsi.org/date-2010-conference/

Key Note: Plenary Talk at the CPS week in Stockholm, Cyber Physical Systems: the Dream of Dr. Frankenstein
Alberto Sangiovanni Vincentelli Stockholm, April 14, 2010
http://www.kth.se/ees/omskolan/organisation/centra/access/dls/cpsweekplenary-1.58510?l=en_UK

Key Note: 2010 Symposium on Industrial Embedded Systems (SIES) Conference, Connections, connections and connections. The problems of the embedded systems of the future
Alberto Sangiovanni Vincentelli July 7th, 2010
http://events.unitn.it/en/sies2010

Key Note: Emerging Technologies and Factory Automation (ETFA) 2010, Distributed System Design: A Nightmare 'in fieri'
Alberto Sangiovanni Vincentelli ,Bilbao, September 14, 2010
http://www.etfa2010.org/

Key Note: IEEE System on Chip Conference (SOCC) 2010, SoC Design as an Example of Component-Based Design of Distributed Systems
Alberto Sangiovanni Vincentelli Las Vegas, September 27, 2010
http://www.ieee-socc.org/SOCC2010/Program/program.html

Key Note: IEEE International Behavioral Modeling and Simulation Conference, Away from Plug and Pray towards Plug and Play in Analog-Mixed Signal Design: A Tale of Design Re-use
Alberto Sangiovanni Vincentelli, *San Jose', September 24, 2010*
http://www.bmas-conf.org/program.html

Invited Lecture: Thomas A. Henzinger,
The Quantitative Agenda in System Analysis, First International Workshop on Logics for System Analysis (LfSA), Edinburgh, United Kingdom, July 2010.

Invited Lecture: Thomas A. Henzinger
From Boolean to Quantitative Theories of Reactive Systems, Third International Workshop on Interaction and Concurrency Experiences (ICE), Amsterdam, The Netherlands, June 2010.

Invited Lecture: Thomas A. Henzinger
Quantitative Modeling and Verification, Amir Pnueli Memorial Symposium, New York, New York, May 2010.

Invited Lecture: Thomas A. Henzinger
From Boolean to Quantitative Notions of Correctness, 37th Annual Symposium on Principles of Programming Languages (POPL), Madrid, Spain, January 2010.

Keynote: Thomas A. Henzinger
Weighted Automata on Infinite Words, Highlights of AutomathA Conference, Vienna, Austria, November 2010.

Keynote: Thomas A. Henzinger
A Marketplace for Cloud Resources, Embedded Systems Week, Scottsdale, Arizona, October 2010.

Invited Lecture: Thomas A. Henzinger
Beyond Finite Automata, Eighth International Symposium on Automated Technology for Verification and Analysis (ATVA), Singapore, September 2010.

Invited Tutorial: Thomas A. Henzinger
Interface-based Design and Verification, Eighth International Symposium on Automated Technology for Verification and Analysis (ATVA), Singapore, September 2010.

Invited Talk: *Symbolic and Compositional Reachability for Timed Automata*
Kim G. Larsen, 4th Workshop on Reachability Problems, Brno, Czech Republic, August 27-29, 2010.

Invited Lectures: *Model-Based Verification and Analysis for Real-Time Systems.*
Kim G. Larsen, Summer School Marktoberdorf, Marktoberdorf, Germany, August 3-15, 2010.

Invited Talk: *Controller Synthesis from Timed Game Automata – from Theory to Practice*
Kim G. Larsen, Synthesis, Verification and Analysis of Rich Models, Edinburgh, Scotland, July 20, 2010**.**

Invited Talk: *Timing Analysis of Embedded Software Systems*
Kim G. Larsen, International Conference on Formal Verification of Object-Oriented Software, Paris, France, June 28-30, 2010.

Invited Talk: *Verification, Compositionality and Refinements for Real-Time Systems*
Kim G. Larsen, ACSD / PETRI NETS, Braga, Portugal, June 21-25, 2010.

Invited Talk: *Model-Driven Validation of Real-Time and Embedded Systems*
Kim G. Larsen, Dependable Systems? Who Cares? CTIT Symposium. Twente University, The Netherlands, June 1, 2010.

Invited Lectures: *Extensions of Timed Automata*
Kim G. Larsen, WATA. Weighted Automata: Theory and Applications, May 3-7, 2010, Leipzig, Germany.

Invited Talk: *Verifying LEGO: Validation and Synthesis of Embedded Software*
Kim G. Larsen, BCTCS, 26th British Colloquium for Theoretical Computer Science, 6-9 April 2010, Edinburgh.

Invited Lectures: *Validation, Performance Analysis and Synthesis of Embedded Systems*
Kim G. Larsen, AVACS, Automatic Verification and Analysis of Complex Systems, 1st AVACS Spring School, 15-19 March 2010, Oldenburg, Germany.

Invited Talk and Visit: Validation*, Performance Analysis and Synthesis of Embedded Systems*
Kim G. Larsen, CoSBi, The Microsoft Research-University of Trento, Centre for Computational and Systems Biology, 15-18 February, 2010.

Invited Talk: ***Priced Timed*** *Automata: Theory and Tools*
Kim G. Larsen, FSTTCS, IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science, December 15 to 17, 2009, IIT Kanpur, India

Invited Lecture: Alberto Sangiovanni Vincentelli
Research in Advanced Topics: Energy and Health,, Kick Off Meeting of the European Technology Institute for Information Technology, Trento, July 2010

Invited Lecture: Alberto Sangiovanni Vincentelli
Start-up and Innovations, Uni Roma 3, June 2010

Invited Lecture: Alberto Sangiovanni Vincentelli
How the Innovation System works in Silicon Valley, Italian National Research Council (CNR), October 2010.

Invited Lecture: Alberto Sangiovanni Vincentelli
Distributed System Design: A Nightmare Waiting to Happen, The Smith Distinguished Lecture, November 2010

Invited Lecture: *Multicore Embedded Systems: Challenges and Perspectives*
Wang Yi – the 12th International Conference on Formal Engineering Methods, Shanghai, Nov 16 - 19, 2010

Invited Lecture: *Modeling and Analysis of Timed Systems*
Wang Yi – Summer School on Model Checking, Chinese Academy of Sciences, Beijing, Oct. 2010.

Invited Lecture: *Model Checking of Real-Time Systems*
Wang Yi – VTSA School on Verification Technology, Systems and Applications, Luxembourg, Sept. 2010

Invited Lecture: *A UPPAAL Tutorial*
Wang Yi – The 10th International School on Formal Methods for the Design of Computer, Communication and Software Systems: Quantitative Aspects of Programming Languages, Bertinoro, Italy, 21-26 June 2010

Invited Lecture: *Towards Real-time Applications on Multi-core Platforms: the Timing Problem and Possible Solutions*
Wang Yi – ARTIST Summer School, Europe 2010, Autrans, France, Sept. 2010

Invited Lecture: *Towards Real-time Applications on Multi-core Platforms: the Timing Problem and Possible Solutions*
Wang Yi – ARTIST Summer School, China 2010, Beijing, July 2010

Conference: The 8th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS 2010), IST Austria, Klosterneuburg, Austria
8-10 September 2010
The conference was chaired by Thomas A. Henzinger and Krishnendu Chatterjee from IST Austria.
http://pub.ist.ac.at/formats2010/

Workshop: Formalisms for Description and Visualization of Embedded Systems Architectures, April 2010 as part of the CPS week at KTH in Stockholm
The workshop provided for hands-on experiences with selected formalisms including AADL, EAST-ADL (a UML profile for embedded systems), Transaction level hardware design; SystemC/VHDL, and Domain specific ADL's, using a meta-modeling environment where different formalisms can be created.
http://www.artist-embedded.org/artist/Overview,1937.html

Workshop: Green and Smart Embedded System Technology: Infrastructures, Methods and Tools
Associated with the Cyber-Physical System Week (Stockholm, Sweden, April 12, 2010), Organizing committee, general chairs, Alberto Sangiovanni Vincentelli, Huascar Espinoza, Marco Di Natale, Roberto Passerone
http://www.artist-embedded.org/artist/Overview,1928.html

Workshop: Software Synthesis
October 2010, as part of ESWEEK, at Phoenix, US, co-organized by A. Sangiovanni Vincentelli and P. Marvedel
The workshop aims at bringing these communities together and at identifying research problems which should be addressed by the scientific community.
http://www.esweek.org/

Panel: 2010 Design Automation Conference, Designing the Always-Connected Car of the Future,
Chair: Alberto Sangiovanni-Vincentelli
Automotive Electronic Control System (ECS) architectures are becoming increasingly complex: automotive OEMs are managing complexity by reusing legacy components and enabling new technologies; tier one suppliers are increasingly up-integrating features on the same computing platform; tier two suppliers are providing multi-core and other powerful technologies; academic institutions are doing research in new analysis, synthesis and optimization methods; and tool providers are trying to raise the level of abstraction for system modeling, analysis and optimization.
http://www.dac.com/conference+program.aspx

Workshop: IWBDA: International Workshop on Bio-Design Automation
Associated with DAC 2010, co-organizer and panel moderator, Alberto Sangiovanni Vincentelli, The Second International Workshop on Bio-Design Automation (IWBDA) at DAC brought together researchers from the synthetic biology, systems biology, and design automation communities. The focus is on concepts, methodologies and software tools for the computational analysis of biological systems and the synthesis of novel biological systems. Still in its early stages, the field of synthetic biology has been driven by experimental expertise; much of its success has been attributable to the skill of the researchers in specific domains of biology.http://cctbio.ece.umn.edu/wiki/index.php/IWBDA:International_Workshop_on_Bio_Design_Automation

Dagstuhl Seminar on Quantitative Models: Expressiveness and Analysis
Dagstuhl, January 18-22, 2010
The seminar identified three fundamental research areas, each addressing quantitative aspects, namely: weighted automata, timed and hybrids systems, and stochastic systems. The seminar was successful in bringing together 45 researchers from 13 countries discussing their recent research results and developments for quantitative models and their analysis.
Scientific organizer: Kim G. Larsen, Christel Baier, Manfred Droste, Paul Gastin.

PhD School: QMC
Quantitative Model Checking PhD School, Copenhagen, February 2-5, 2010
http://qmc.cs.aau.dk/qmc.html
The PhD school on quantitative model checking, QMC 2010, is organized by the European Network of Excellence ARTIST Design and the Danish VKR Centre of Excellence MT-LAB and takes place at the IT University Copenhagen from 2 to 5 March 2010. It features lectures and other activities by world-renowned experts within the areas of real-time, probabilistic, and hybrid model checking.
Programme Chairs : Kim G. Larsen, Joost-Pieter Katoen
Organizing Chair: Andrzej Wasowski
Publicity Chair: Uli Fahrenberg

Workshop: Gasics,2nd Workshop on Games for Design, Verification and Synthesis, 4 September, Paris, 2010, Co-located with CONCUR 2010.
http://www.lsv.ens-cachan.fr/Events/gasics10/
The aim of this workshop was to bring together researchers working on game-related subjects, and to discuss on various aspects of game theory in the fields where it is applied. The workshop was composed of two invited talks, together with contributed talks on the following (non-exhaustive) list of relevant topics:

- Adapted notions of games for synthesis of complex interactive computational systems
- Games played on complex and infinite graphs
- Games with quantitative objectives
- Games with incomplete information and over dynamic structures
- Heuristics for efficient game solving.

Organizers: Kim G. Larsen, Nicolas Markey, Jean-François Raskin, Wolfgang Thomas.

ISOLA'10 Track: Quantitative Verification in Practice. 18 October 2010, Heraclion, Crete.
http://isola-conference.org/isola2010/
Model checking has been widely accepted by industry for verifying correctness of hardware and software systems. Temporal logics as PSL have been accepted as IEEE standard, significant shortcomings have been established in standardised protocols, and software of forthcoming NASA missions have been thoroughly checked by tools such as SPIN. Most systems --- embedded systems in particular --- are subject to a multitude of quantitative constraints.
Track Organizers: Boudewijn Haverkort, Joost-Pieter Katoen, Kim G. Larsen

Tutorial at ESWEEK'2010, October 24, 2010, Scottsdale , Arizona, U.S.A.
EMSOFT Tutorial: Quantitative System Validation in Model-Driven Design, Lectures Holger Hermanns, Kim G. Larsen, Jean-Francois Raskin, Jan Tretmans,
The European Project Quasimodo (http://www.quasimodo.aau.dk/) develops theory, techniques and tool components for handling quantitative constraints in model-driven development of real-time embedded systems, covering in particular real-time, hybrid and stochastic aspects. This tutorial highlights the advances made, focusing on real industrial case studies tackled.

Workshop: Second IEEE International workshop UML and Formal Methods (UML&FM'2010) held in conjunction with the 12th International Conference on Formal Engineering Methods, ICFEM 2010
November 16th, 2010 Shanghai, China
The UML and formal methods communities have been working for a number of years to produce a practical (via UML) and rigorous (via formal methods) approach to software

engineering. UML is the de facto standard for modeling various aspects of software systems in both industry and academia, despite the inconvenience that its current specification is complex and its syntax imprecise. This third workshop has encouraged new initiatives of building bridges between informal, semi-formal and formal notations.
http://www.artist-embedded.org/artist/Overview,2099.html

Workshop: 1st international workshop on Model Based Engineering for Robotics (RoSym'10), co-located with MODELS'2010 and supported by Robotics Task Force at OMG.
Current engineering approaches for robotic systems have indeed been demonstrated to be insufficient to bypass following constraints that robotics embedded systems are currently facing: (i) the problem space is huge: as uncertainty of the environment and the number and type of resources available to the robot increase, the definition of the best matching between current situation and correct robot resource exploitation becomes overwhelming even for the most skilled robot engineer; (ii) the solution space is huge: in order to enhance robustness of complex robotic systems, existing cognitive methods and techniques need to exploit robotic-specific resources adequately. This means that the robotic system engineer should master highly heterogeneous technologies in order to integrate them in a consistent and effective way.
http://www.artist-embedded.org/artist/RoSym-2010,2158.html

Workshop: MoBE-RTES 2010
May 4th, 2010, organized in conjunction with ISORC 2010)
Model-Based Engineering (MBE) is evolving into a fully-fledged engineering discipline, with well-established standards, industrial-strength tools, and emerging theoretical foundations. Models are being used to specify the artifacts, structure, and behavior of complex and mission-critical systems in various domains. MBE provides the ability to, design, analyze, validate, and implement such systems using much higher levels of abstraction and computer-based automation than traditional approaches to software development. One of the most challenging domains for which MBE is a natural fit is the development of Real-time and Embedded Systems (RTES). The focus of this workshop is identifying the critical challenges in the RTES domain and how MBE techniques and standards can be used to overcome them.
The primary objective of the workshop was to bring together experts, researchers, and practitioners, from the embedded and real-time systems community as well from other relevant disciplines (e.g., hardware and systems designers), who are interested in the industrial application of MBE to embedded systems.
http://www.artist-embedded.org/artist/Overview,1896.html

5.1.2 Validation

Y. Falcone. You should Better Enforce than Verify (Tutorial). In RV'10: Proceedings of the 1st International Conference on Runtime Verification, Lecture Notes in Computer Science, Volume 6418, Pages 89-105, Malta, November 2010.

Wang Yi, invited talk, the 12th International Conference on Formal Engineering Methods, Shanghai, Nov 16 - 19, 2010.

Wang Yi, invited lectures, Summer School on Model Checking, Chinese Academy of Sciences, Beijing, Oct. 2010.

Wang Yi, Invited lectures, VTSA School on Verification Technology, Systems and Applications, Luxembourg, Sept. 2010

Wang Yi, invited lectures, The 10th International School on Formal Methods for the Design of Computer, Communication and Software Systems: Quantitative Aspects of Programming Languages, Bertinoro, Italy, 21-26 June 2010

Wang Yi, invited lectures, ARTIST Summer School, Europe 2010, Autrans, France, Sept. 2010

Wang Yi, invited lectures, ARTIST Summer School, China 2010, Beijing, July 2010.

Invited Talk: ***Systems Verification and Validation***
Kim G. Larsen, Complex Systems Design and Management, Paris, Cite, Universitaire, France, October 27-29, 2010.

Invited Talk: ***Symbolic and Compositional Reachability for Timed Automata***
Kim G. Larsen, 4th Workshop on Reachability Problems, Brno, Czech Republic, August 27-29, 2010.

Invited Lectures: ***Model-Based Verification and Analysis for Real-Time Systems.***
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Kim G. Larsen, AVACS, Automatic Verification and Analysis of Complex Systems, 1st AVACS Spring School, 15-19 March 2010, Oldenburg, Germany.

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Invited Talk: *Priced Timed Automata: Theory and Tools*
Kim G. Larsen, FSTTCS, IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science, December 15 to 17, 2009, IIT Kanpur, India.

Key Note: **DATE 2010, Everything is Connected.**
Dresden, March 9, 2010
Alberto Sangiovanni Vincentelli gave one of the two key notes at DATE, a leading conference in design technology with more than 1,000 attendants. The talk was about the importance of distributed systems in the world of the future, what problems we may have to face in this world and how to design complex distributed systems.

http://www.ecsi.org/date-2010-conference

Key Note: Plenary Talk at the CPS week in Stockholm, Cyber Physical Systems: the Dream of Dr. Frankenstein
Stockholm, April 14, 2010
Alberto Sangiovanni Vincentelli gave one of three Plenary Talks at CPS week 2010 that hosted 5 conferences and several workshops. The talk was about forward looking applications of Cyber Physical Systems and methodology to reduce the complexity of the design.
http://www.kth.se/ees/omskolan/organisation/centra/access/dls/cpsweekplenary-1.58510?l=en_UK

Key Note: 2010 Symposium on Industrial Embedded Systems (SIES) Conference, **Connections, connections and connections. The problems of the embedded systems of the future**
Trento July 7th, 2010
Alberto Sangiovanni Vincentelli gave the key note at the Conference stressing the problems that stem from emerging behavior of widely distributed embedded systems.
http://events.unitn.it/en/sies2010

Key Note: Emerging Technologies and Factory Automation (ETFA) 2010, Distributed System Design: A Nightmare 'in fieri'
Bilbao, September 14, 2010
Alberto Sangiovanni Vincentelli gave a key note at the Conference addressing the nightmares that may ensue from the distributed system design problems.
http://www.etfa2010.org/

Key Note: IEEE System on Chip Conference (SOCC) 2010, SoC Design as an Example of Component-Based Design of Distributed Systems
Las Vegas, September 27, 2010
Alberto Sangiovanni Vincentelli gave the key note at the main conference on systems on chip outlining the need for a rigorous component-based design methodology to address the design of very large chips.
http://www.ieee-socc.org/SOCC2010/Program/program.html

Key Note: IEEE International Behavioral Modeling and Simulation Conference, Away from Plug and Pray towards Plug and Play in Analog-Mixed Signal Design: A Tale of Design Re-use
San Jose', September 24, 2010
Alberto Sangiovanni Vincentelli gave the key note at this mainly analog design conference stressing the need for compositional reasoning in analog design thus enabling a better approach to analog design re-use.
http://www.bmas-conf.org/program.html

Tutorials: Model Based System Engineering at the 2010 Control and Decision Conference (CDC)
Atlanta, Georgia – December 15th-19th, 2010
Alberto Sangiovanni Vincentelli co-organized and co-chaired with John Baras of University of Maryland two tutorial sessions at the CDC 2010 where he also presented two talks on Platform-Based Design and Model Based Design in the context of industrial applications.

Workshop: Green and Smart Embedded System Technology: Infrastructures, Methods and Tools (GREEMBED) at the Cyber-Physical System Week
Organizing committee, general chairs, Alberto Sangiovanni Vincentelli, Huascar Espinoza, Marco Di Natale, Roberto Passerone
Stockholm, Sweden, April 12th, 2010,

Energy-efficient systems offer unique challenges to the embedded system community, from system-level design to dynamic and adaptive controls, optimization of architectures and communication, real-time and reliable services as well as reusable software components and systems.
Energy efficient solutions include both local and global smart solutions. Smart embedded solutions merge ubiquitous computing and the Internet of Things, i.e., the technology integration with sensors, actuators, micro-chips, micro- and nano-embedded systems that allow for collecting, filtering and producing more and more information locally, to be further consolidated and managed globally according to business functions and services. Locally, embedded systems provide information on energy consumption of every energy consuming appliance in a single location (e.g., home, building, vehicle) to be provided in real-time, in a user friendly way, thereby empowering citizens to take decisions that lead to energy savings. Globally, energy efficient solutions include smart grid concepts, which require dynamic controls for balancing and organizing production from renewable and conventional sources, negotiating, purchasing and routing power requests, but also regulating, balancing and controlling the amount of electrical power that systems consume. From the system-level design perspective, there is a need for simulation, modelling, analysis, and monitoring methods and tools to facilitate an integrated system approach.
http://www.artist-embedded.org/artist/Overview,1928.html

Panel: 2010 Design Automation Conference, Designing the Always-Connected Car of the Future
Anaheim, California, June 15th, 2010
The panel was co-organized and chaired by Alberto Sangiovanni Vincentelli. The automotive industry is introducing novel features, such as seamless vehicle-to-vehicle and vehicle-to-infrastructure connectivity to improve in vehicle driver safety (e.g., forward collision) and comfort (e.g., routing to avoid congestion) while facing stricter government regulations, and shortened time-to-market. As a result, automotive Electronic Control System (ECS) architectures are becoming increasingly complex. To cope with these challenges and opportunities, the entire automotive supply chain is engaged as follows: automotive OEMs are managing complexity by reusing legacy components and enabling new technologies; tier one

suppliers are increasingly up-integrating features on the same computing platform; tier two suppliers are providing multicore and other powerful technologies; academic institutions are doing research in new analysis, synthesis and optimization methods; and tool providers are trying to raise the level of abstraction for system modeling, analysis and optimization.

http://www.dac.com/conference+program.aspx

Dagstuhl Seminar on Quantitative Models: Expressiveness and Analysis
Dagstuhl, January 18-22, 2010
The seminar identified three fundamental research areas, each addressing quantitative aspects, namely: weighted automata, timed and hybrids systems, and stochastic systems. The seminar was successful in bringing together 45 researchers from 13 countries discussing their recent research results and developments for quantitative models and their analysis.

Scientific organizer: Kim G. Larsen, Christel Baier, Manfred Droste, Paul Gastin.

PhD School QMC
Quantitative Model Checking PhD School, Copenhagen, February 2-5, 2010
http://qmc.cs.aau.dk/qmc.html

The PhD school on quantivative model checking, **QMC 2010**, is organized by the European Network of Excellence ARTIST Design and the Danish VKR Center of Excellence MT-LAB and takes place at the IT University Copenhagen from 2 to 5 March 2010. It features lectures and other activities by world-renowned experts within the areas of real-time, probabilistic, and hybrid model checking.
Programme Chairs : Kim G. Larsen, Joost-Pieter Katoen
Organizing Chair: Andrzej Wasowski
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Gasics Workshop 2nd Workshop on Games for Design, Verification and Synthesis, 4 September, Paris, 2010, Co-located with CONCUR 2010.
http://www.lsv.ens-cachan.fr/Events/gasics10/
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- Game ith incomplete information and over dynamic structures
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Model checking has been widely accepted by industry for verifying correctness of hardware and software systems. Temporal logics as PSL have been accepted as IEEE standard, significant shortcomings have been established in standardised protocols, and software of forthcoming NASA missions have been thoroughly checked by tools such as SPIN. Most

systems ---embedded systems in particular--- are subject to a multitude of quantitative constraints.
Track Organizers: Boudewijn Haverkort, Joost-Pieter Katoen, Kim G. Larsen

Tutorial at ESWEEK'2010, October 24, 2010, Scottsdale , Arizona, U.S.A.
EMSOFT Tutorial: Quantitative System Validation in Model-Driven Design, Lectures Holger Hermanns, Kim G. Larsen, Jean-Francois Raskin, Jan Tretmans,
The European Project Quasimodo (http://www.quasimodo.aau.dk/) develops theory, techniques and tool components for handling quantitative constraints in model-driven development of real-time embedded systems, covering in particular real-time, hybrid and stochastic aspects. This tutorial highlights the advances made, focussing on real industrial case studies tackled.

5.2 Software Synthesis, Code Generation and Timing Analysis

5.2.1 Software Synthesis and Code Generation

Course: Retargetable Compilation
Lugano, Switzerland, Feb. 16-19 & Feb 23-25, 2010
Objectives: Spreading excellence in memory-architecture aware compilation and processor retargetability beyond ArtistDesign partners.
Presenters: Peter Marwedel (TU Dortmund), Rainer Leupers (RWTH Aachen)
Other participants: about 20 students
Conclusion: The new, extended format turned out to be very useful.
http://www.alari.ch

ICT 4 Energy Efficiency
Brussels, Belgium – Feb. 23rd, 2010
IMEC representatives and P. Marwedel participated at a forum on energy efficiency organized by the Commission of the European Communities. The goal was to provide a contribution in the area of energy efficiency for embedded systems.

IFIP WG 2.11 (Program Generation)
St. Andrews, Scotland, March 1-3rd, 2010
C. Lengauer presented the proposal for a priority research programme "Manycore"
http://resource-aware.org/do/view/WG211/M8Schedule

D-CON
Bamberg, Germany, March 4-5th, 2010
C. Lengauer gave the keynote on polyhedral loop parallelization at the concurrency workshop.
http://concurrency-theory.service.tu-berlin.de/joomla/d-con/d-con-2010

Cebit
Hannover, Germany – March 9th, 2010
P. Marwedel participated at a panel at the Cebit fair. The purpose was to contribute an embedded systems view on energy efficiency issues of ICT.

Winter school course: Rainer Leupers, Cool MPSoC Design

ASCI Winter School 2010, Soesterberg, The Netherlands – Mar 16-18,2010

Wireless multimedia terminals are among the key drivers for MPSoC platform evolution. R. Leupers gave a lecture on Cool MPSoC Design in ASCI winter school on embedded system. Wireless multimedia terminals are among the key drivers for MPSoC platform evolution. Heterogeneous multi-processor architectures achieve high performance and can lead to a significant reduction in energy consumption for this class of applications. However, just designing energy efficient hardware is not enough. Programming models and tools for efficient MPSoC programming are equally important to ensure optimum platform utilization. Unfortunately, this discipline is still in its infancy, which endangers the return on investment for MPSoC architecture designs. RWTH Aachen has analyzed the programming methodology requirements for heterogeneous MPSoC platforms and R. Leupers has outlined the approaches taken in MAPS compiler project at RWTH Aachen.

http://www.asci.tudelft.nl/pages/events.php?event_id=1

Special Session: Rainer Leupers (organizer), Cool MPSoC Design

DATE 2010, Dresden – March 11th, 2010

The problems of programming MPSoCs (as already described for the ASCI Winter School above), were also discussed at a special session at DATE. On one hand there is a need of maintaining and gradually porting a large amount of legacy code to MPSoCs. On the other hand, special C language extensions for parallel programming as well as adapted process network programming models provide a great opportunity to completely rethink the traditional sequential programming paradigm for sake of higher efficiency and productivity. MPSoC programming is more than just code parallelisation, though. Besides energy efficiency, limited and specialized processing resources, and real-time constraints also growing software complexity and mapping of simultaneous applications need to be taken into account. The purpose of this session was to analyze the programming methodology requirements for heterogeneous MPSoC platforms and to outline new approaches. With emphasis on wireless applications, this special session has provided a blend of academia/industry presentations, including contributions from innovative startup companies in that domain. This way, it has aimed at consolidation of real life requirements and novel solutions, and stressed the need for intensified and cooperative research activities in MPSoC programming.

http://www.date-conference.com/

Meeting: Brief meeting at DATE

DATE 2010, Dresden – March 11th, 2010-12-10

Participants of the cluster, including members from RWTH Aachen, TU Berlin, TU Dortmund, and IMEC meet at DATE on March 11th. They discussed the state of cooperation, in particular preparations for the MAP2MPSoC flagship workshop at Rheinfels castle in June.

Poster session at DATE 2010

Dresden, Germany – March 12th, 2010

The presentation during the Friday poster session at DATE was focused on the automatic parallelization step developed in the MNEMEE project. Furthermore, the embedding of this technique into the integrated toolflow has been presented to the audience.

Industrial Workshop

Stockholm, Sweden – April 12th, 2010

L. Thiele, P. Marwedel, AbsInt and other members of the PREDATOR project organized an industrial workshop during the Cyber-physical systems week.

Seminar 10191 on Program Composition and Optimization: Autotuning, Scheduling, Metaprogramming and Beyond

Schloss Dagstuhl, May 9-12, 2010

C. Lengauer participated in this seminar on new paradigms for parallel programming. Its purpose was to bring together researchers from the two communities of software composition and program optimization. Domain-specific approaches for embedded systems were also discussed.

http://www.dagstuhl.de/de/programm/kalender/semhp/?semnr=10191

Joint demo at ACE/Compaan Booth at DAC 2010 (Anaheim), "Mapping Streaming Applications onto OMAP"

Anaheim, US - June 13-18, 2010

RWTH Aachen (Germany) and Compaan/ACE (Netherlands) have worked together to couple Compaan's technology (HotSpot Parallelizer) which transforms sequential C code into parallel process networks with the MAPS compiler towards real-life heterogeneous MPSoC backends. A joint demo has been established in this year's DAC (June 2010) to exhibit mapping multiple streaming applications to a commercial multi-processor SoC, the Texas Instruments OMAP 3530. The MAPS (MPSoC Application Programming Studio) project is a research effort to tackle the challenge of programming heterogeneous MPSoCs, ranging over multi-application modelling, efficient scheduling/mapping and code generation. This joint work enables a complete mapping and compilation flow of streaming Kahn Process Networks (KPN) applications for the OMAP architecture. The demo showed practical scenarios such as quick mapping exploration, parallelizing sequential part and dynamic mapping, using both tools and was well received in the DAC exhibition.

http://www.dac.com

Tutorial: SystemC for Holistic System Design

Anaheim, CA – June 18th, 2010

At this year Design Automation Conference (DAC), Jürgen Teich organized a Friday tutorial covering the topic "SystemC for Holistic System Design with Digital Hardware, Analog Hardware, and Software".

Workshop: Software & Compilers for Embedded Systems (SCOPES) 2010

St. Goar, Germany – June 28-29, 2010

SCOPES focuses on the software generation process for modern embedded systems. Topics of interest include all aspects of the compilation process, starting with suitable modelling and specification techniques and programming languages for embedded systems. The emphasis of the workshop lies on code generation techniques for embedded processors. The exploitation of specialized instruction set characteristics is as important as the development of new optimizations for embedded application domains. Cost criteria for the entire code generation and optimization process include run time, timing predictability, energy dissipation, code size and others. Since today's embedded devices frequently consist of a multi-processor system-on-chip, the scope of this workshop is not limited to single-processor systems but particularly covers compilation techniques for MPSoC architectures.

SCOPES 2010 was the 13th workshop in a series of workshops initially called "International Workshop on Code Generation for Embedded Processors". The name SCOPES has been used since the 4th workshop. The scope of the workshop remains software for embedded systems with emphasis on code generation (compilers) for embedded processors.

SCOPES 2010 was organized by Ed Deprettere Leiden University and was held back-to-back with the MAP2MPSoCs workshop. http://www.scopesconf.org/scopes-10

Keynote: Rainer Leupers, System Level MPSoC Design: A Bright Future for Compiler Technology?

SCOPES 2010, St. Goar, Germany – June 29th, 2010-12-02

R. Leupers delivered a keynote speech regarding system level MPSoC design in the SCOPES 2010. Looking back at the SCOPES history, compiler research for embedded processors started out in the 1990s with two major ambitions: (1) more architecture aware code optimizations to better support specialized target machines such as DSPs, and (2) higher flexibility to enable compiler retargeting over a wide range of machines. These research efforts have led to numerous results, many of which are part of industrial products today. So, what is left to do in embedded compilers and who -in a world with "free" tools like GCC and LLVM- will pay for them? Naturally, the evolution of embedded processor architectures demands for a never-ending stream of code optimization innovations. However, he argued that the current trend towards ESL design of embedded MPSoC platforms opens up the most promising new opportunities for compiler research, going far beyond the obvious problem of sequential code partitioning. Increasingly complex software stacks, consolidation of the MPSoC platform market, and higher design abstraction levels induce many interesting novel compiler technology use cases, some of which have been highlighted in the keynote.

http://www.scopesconf.org/scopes-10/

Meeting: 3rd Workshop on Mapping Applications to MPSoCs, 2010

St. Goar, Germany – June 29-30, 2010

This is the flagship workshop of this cluster. For the second edition, it was possible to attract researchers from all over the world as presenters. New participants included researchers from the Universities of l'Aquila, Munich, Leuven and Karlsruhe as well as industrial representatives, for example from Lantiq. This way, we managed to establish links to key researchers outside the network and potential new affiliate members. The workshop is now a key forum for discussions in this area. Attendees expressed their strong interest to continue this series of informal workshops as a platform for discussions.

http://www.artist-embedded.org/artist/-map2mpsoc-2010-.html

Tutorial: Rheinfels MNEMEE tutorial

St. Goar, Germany – June 30th, 2010

The MNEMEE toolflow was demonstrated for the second time in a MNEMEE workshop collocated with 3nd Workshop on Mapping of Applications to MPSoCs and the SCOPES Workshop. The placement of these workshops facilitated the attendance of the industrial and academic workshop participants. Besides an introductional part where an overview of the whole toolflow has been presented, interactive presentations of the MNEMEE tools have been shown by each partner.

Workshop: Application-specific Systems, Architectures and Processors

Rennes, France, – July 7-9, 2010

The conference covers the theory and practice of application-specific systems, architectures and processors. It builds upon traditional strengths in areas such as arithmetic, cryptography, compression, signal and image processing, application-specific instruction processors, etc. ASAP 2010 was co-organized by Jürgen Teich.

Tutorial: Model-Based Embedded Systems Design

Rabat*, Morocco – July 12th, 2010*

P. Marwedel presented a full-day tutorial on model-based design of embedded systems at the first African ArtistDesign Summer School.
http://www.artist-embedded.org/artist/Overview,1958.html

Tutorial: Invasive Computing - Basic Concepts and Foreseen Benefits

Autrans, France, September 7th, 2010

Jürgen Teich presented a novel paradigm for organizing the computations of large scale MPSoCs of the future at the ARTIST Summer School Europe 2010. The main idea of Invasive Computing relies on the vision that applications will organize themselves and spread their computational load at run-time on processors, communication and memory resources in phases called invasion, and, depending on available degree of parallelism, dynamically changing user objectives or in dependence of the state of the underlying hardware such as temperature profile, load, permissions, or faultiness, again retreat from these.

http://www.artist-embedded.org/artist/Overview,2064.html

Tutorial: Scottsdale MNEMEE tutorial

Scottsdale, US – October 24th, 2010

Members of the teams from Dortmund, TU Eindhoven and IMEC presented results of the MNEMEE workshop at ESWEEK. A tool flow for memory optimizations was demonstrated as a Sunday-Tutorial related to this series of Conferences. The format of a half-a-day tutorial provided in-depth presentations of the tools and techniques developed in MNEMEE.

Workshop: 6th Workshop on Embedded Systems Education, 2010

Scottsdale, US, – October 28th, 2010

Embedded system education is still a very young area and frequently restricted to teaching the details of microcontroller programming. A long-term objective of this workshop is to improve the visibility of work in the area and to stimulate the introduction of broader curricula. In 2010, P. Marwedel was again the main organizer of the workshop. Visibility was improved by the inclusion of the proceedings in the ACM digital library. Presenters included top researchers from the US and Asia. The workshop was run by Kenneth Ricks (University of Alabama) and Bruno Bouyssounouse (IMAG).

http://www.artist-embedded.org/artist/-WESE-10-.html

Workshop: Compiler-Assisted System-On-Chip Assembly, 2010

Scottsdale, US, – October 28 th, 2010

The Workshop on Compiler-Assisted System-On-Chip Assembly gives researchers working on compilation and synthesis of systems-on-chip a venue to learn about the work of their peers and discuss ongoing research in detail. CASA 2010 puts a special emphasis on compilation techniques for designing Multi-Processor SoCs (MPSoCs). The workshop has been organized and run by Christian Haubelt (University of Erlangen-Nuremberg) and Andreas Gerstlauer (University of Texas, Austin).

Workshop: 2nd Workshop on Software Synthesis, 2010

Scottsdale, US, France, – October 29th, 2010

An increasing amount of software is not written manually any more. Rather, software is synthesized from abstract models of the required functionality. Software synthesis has been implemented in various disperse communities. The workshop aimed at bringing these communities together. Presenters at this workshop presented industrial as well as academic results. The workshop was organized by P. Marwedel and A. Sangiovanni-Vincentelli and run by A. Sangiovanni-Vincentelli.

http://www.artist-embedded.org/artist/-WSS-10-.html

5.2.2 Timing Analysis

Invited Talk: *Peter Marwedel, Heiko Falk:* **Reconciling compilers and timing analysis**
Industrial Workshop and Exhibition at the CPSWEEK 2010
Stockholm, Sweden – April 12, 2010

Most embedded/cyber-physical systems have to respect timing constraints. Ensuring meeting such constraints is currently typically based on a trial-and-error procedure involving many time-consuming software generation attempts. In this talk, we will demonstrate how the integration of timing analysis into a compiler for an automotive processor can provide a systematic path toward optimized worst-case execution times and can cut down costs.

http://www.mrtc.mdh.se/CPSweek/industrialWS/

Workshop : 10th Int'l Workshop on Worst-Case Execution Time Analysis (WCET'10)
Brussels, Belgium – July 6th, 2010
On July 6th, 2010, thirty-five people met in Brussels, Belgium, to hold the 10h International Workshop on Worst-Case Execution Time Analysis (WCET'10, http://www.artist-embedded.org/artist/WCET-2010.html). The workshop was organised as a satellite event of the 22nd Euromicro Conference on Real-Time Systems (ECRTS'10, http://ecrts.eit.uni-kl.de/ecrts10). ArtistDesign supported the workshop by paying the travel costs of the invited speaker, Dr. Jean Souyris (Airbus), as well as the costs of printing and distributing the proceedings and putting them online). ArtistDesign participants presented several of the workshop papers.

Workshop : 8th IFIP Workshop on Software Technologies for Future Embedded and Ubiquitous Systems (SEUS 2010)
Waidhofen/Ybbs, Austria, October 13-15, 2010

The 8th IFIP Workshop on Software Technologies for Future Embedded and Ubiquitous Systems was held in Waidhofen an der Ybbs, Austria. Thirty-four researchers and practitioners met to present and discuss novel contributions to the state-of-the-art and the state-of-practice in the field of embedded and ubiquitous computing systems. The workshop program included a number of presentations by representatives from ArtistDesign partners.
http://pan.vmars.tuwien.ac.at/seus2010/index.html

Tutorial: *Heiko Falk, Peter Marwedel:* **Reconciling Compilers and Timing Analysis for Safety-Critical Real-Time Systems – the WCET-aware C Compiler WCC**
International Symposium on Code Generation and Optimization (CGO 2011)
Chamonix, France, April 03, 2011

Timing constraints must be respected for safety-critical real-time applications. Traditionally, compilers are unable to use precise estimates of execution times for optimization, and timing properties of code are derived after compilation. A number of design iterations are required if timing constraints are not met. We propose to reconcile compilers and timing analysis and to create a worst-case execution time (WCET) aware compiler in this way. Such WCET-aware compilers can exploit precise WCET information during compilation. This way, they are able to improve the code quality. Also, we may be able to avoid some of the design iterations.

In this tutorial, we present the integration of a compiler and a WCET analyzer, yielding our WCET-aware compiler WCC. We are then considering compiler optimizations for their potential to reduce the WCET, assuming that the WCET is now used as the cost function. Considered optimizations include loop unrolling, register allocation, scratchpad memory allocation, memory content selection and cache partitioning for multi-task systems.
http://www.cgo.org/cgo2011/tutorials.php

5.3 Operating Systems and Networks

5.3.1 Resource Aware Operating Systems

Tutorial: Graduate Course on Embedded Control Systems: Theory and Practice
Scuola Superiore Sant'Anna, Pisa, Italy – June 14-18, 2010

Objectives: The course was aimed at providing the fundamental concepts of real-time computing systems, including scheduling, resource management and timing analysis; introducing the OSEK/VDX standards, taking as a reference implementation the Erika Enterprise kernel; showing how to apply such concepts in practice, with examples based on the Flex platform and the Microchip dsPIC DSC microcontrollers; teaching participants how to develop simple control applications using Erika Enterprise with code generation from functional models.

Organizers: Giorgio Buttazzo (Scuola Superiore Sant'Anna), Ettore Ricciardi (ISTI-CNR, Pisa).

URL: http://www.artist-embedded.org/artist/ARTIST-Embedded-Control-2009.html

ARTEMIS Summit (Held joinly with ITEA2)
Gennt, Belgium – October 26-27, 2010
iLAND annual project presentation.

WARM Workshop (Held joinly with RTAS 2010)
Stockholm, Sweden – April 12th, 2010
Presentation of iLAND ARTEMIS project highlights and achievements.

Miscellaneous

- The Scuola Superiore Sant'Anna of Pisa has been involved in a standardization effort for including the SCHED_DEADLINE scheduler into the mainline Linux kernel. To achieve this goal, some core kernel developers, such as Thomas Gleixner (responsible for the i386 support) and Paul McKenney (responsible for the Read-Copy-Update synchronisation machinery into Linux), have been invited to fruitful technical meetings about the real-time support in the Linux kernel.
- The Scuola Superiore Sant'Anna of Pisa joined the OSADL "Open Source Automation Development Lab", focusing on the use of open-source in the real-time and automation industry.
- The Scuola Superiore Sant'Anna of Pisa organised training events about the IRMOS Real-Time scheduler, specifically:
  - a 1-hour training seminar co-located with General Assembly meetings of the IRMOS Project at the University of Southampton;
  - a 2-hour training seminar during the WATERS 2010 workshop, co-located with the ECRTS 2010, in Bruxelles;
  - a 3-hours training seminar during the 12th Real-Time Linux Workshop (RTLWS 2010), in Nairobi (Kenya), at the University of Strathmore;

- Professor Stefan M. Petters at the Polytechnic of Porto, Portugal was chair of the 6th International Workshop on Operating System Platforms for Embedded Real-Time Applications (OSPERT 2010).
- Prof. Lucia Lo Bello was Track co-Chair for the “Information Technology in Automation” Track at the 15th IEEE International Conference on Emerging Technologies and Factory Automation (ETFA), Bilbao, Spain. (URL: http://www.etfa2010.org/).

5.3.2 Scheduling and Resource Management

Keynotes

Professor L. Almeida. A Dynamic Scheduling Approach to Designing Flexible Safety-Critical Systems. Seminar at McMaster University, Hamilton, Canada, 4th June 2010.

Professor L. Almeida. Hierarchical Distributed Architectures for Autonomous Mobile Robots: A Case Study. Invited talk at the Singapore Polytechnic, 16 March 2010.

Professor Luis Miguel Pinho of the Polytechnic of Porto, Portugal gave the keynote talk "Real-time Programming Paradigms and Languages" at the 16th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2010).

Marisol García-Valls, ARTEMIS Summit (Held joinly with ITEA2), *Gennt, Belgium – October 26-27, 2010.*

Marisol García-Valls, Discussion Pannel on "Services vs components in real-time embedded systems modeling", International Workshop on Distributed Architecture modeling for Novel component based Embedded Systems, DANCE 2010 *Tozeur, Tunisia – May 30th, 2010*

Marisol García-Valls, WARM Workshop (Held joinly with RTAS 2010), *Stockholm, Sweden – April 12th, 2010.*

Workshops

DATE 2010 Friday Workshop, http://conferenze.dei.polimi.it/depcp/2010/index.html, Designing for Embedded Parallel Computing Platforms: Architectures, Design Tools, and Applications. Dresden, Germany, March 12, 2010.

Marisol García-Valls and Francisco Gómez MolineroSpecial Session on Reconfigurable Networked Embedded Systems, 15th International Conference on Emerging Tecnologies and Factory Automation, ETFA 2010. 13-16 September, Bilbao (SPAIN).

Alejandro Alonso-Muñoz and Marisol García-Valls, Special Session on Quality of Service and Resource Management, 15th International Conference on Emerging Tecnologies and Factory Automation, ETFA 2010. 13-16 September, Bilbao (SPAIN).

Rob Davis, Workshop on Real-Time Systems Open Problems, at ECRTS 2010.

5.3.3 Real-Time Networks

Invited talk: Luis Almeida, *Hierarchical Distributed Architectures for Autonomous Mobile Robots: A Case Study*
Institution: Singapore Polytechnic
Singapore – 16 March 2010

Addresses the benefits of using hierarchical approaches in the design of distributed embedded systems and focuses on a specific case study that refers to a team of mobile robots.

Conference: ETFA 2010 – 15th IEEE Conference on Emerging Technologies in Factory Automation
Bilbao, Spain – September 14-17, 2010

This conference included several tracks with directed involvement of activity members, namely Lucia Lo Bello from **Catania** that co-chaired the track on Information Systems in Automation, Julian Proenza from **Mallorca** that co-chaired the track on Industrial Communication Systems and Josep Fuertes from **Catalonia** that co-chaired the track on Automation Manufacturing Systems. Two special sessions were organized at this conference by Marisol Garcia-Valls from **UC3M** on reconfigurable networked embedded systems and QoS resource management, respectively.
http://www.etfa2010.org

Workshop : RTN 2010 – 9th Workshop on Real-Time Networks
Conference name : ECRTS 2010 – 22nd EUROMICRO Conference on Real-Time Systems
Brussels, Belgium – June 30, 2009

This workshop was the 9th in its series and focused on the current technological challenges of developing communication infrastructures that are real-time, reliable, pervasive and interoperable. It provides a relaxed forum for discussing those challenges taken has basis a restricted set of papers and a couple of invited keynotes.
http://www.hurray.isep.ipp.pt/rtn10/index.php/

Workshop : SOCNE 2010 – 5th IEEE Workshop on Service Oriented Architectures in Converging Networked Environments
Perth, Australia – April, 2010

Lucia Lo Bello from **Catania** was the Program co-Chair of the workshop.
http://www.socne.org

Workshop : WARM 2010 –Workshop on Adaptive Resource Management
Conference name : CPSWEEK 2010 – Cyber-Physical Systems Week
Stockholm, Sweden – April 12, 2010

This workshop was co-organized by the activities in this cluster and the activity on Designing for Adaptivity.
http://www.artist-embedded.org/artist/New-article,2075.html

Track: Distributed and Embedded Networked Control
Conference name : INDIN 2010 – 8th IEEE Conference on Industrial Informatics
Osaka, Japan –*13-16 July, 2010*

This Track was co-chaired by Josep Fuertes from **Catalonia**
http://indin2010.ist.osaka-u.ac.jp/

Special Session: Networked-based Control Systems
Conference name : IECON 2010 – 36th IEEE Conference on Industrial Electronics
Phoenix, USA – 7-10 November, 2010

This Special Session was co-chaired by Josep Fuertes from **Catalonia**
http://iecon2010.njit.edu/index2.html

Special Session: Networked-based Control Systems
Conference name : ICIT 2010 – IEEE Conference on Industrial Technology
Viña del Mar, Chile – 10-12 December, 2010

This Special Session was co-chaired by Josep Fuertes from **Catalonia**
http://www.icit2010.usm.cl/

Special Session: Human System Interaction and Wireless Sensor Networks
Conference name : HSI 2010 – 3rd Int. Conference on Human System Interaction
Rzeszow, Poland – 13-15 May, 2010

This Special Session was co-chaired by Lucia Lo Bello from **Catania**
http://hsi.wsiz.rzeszow.pl

Conference name : ICESS 2010 – 7th IEEE Conf. on Embedded Software and Systems
Bradford, UK– June 29th - July 1st, 2010

Marisol Garcia-Valls from **UC3M** was Workshop co-chair.
http://www.scim.brad.ac.uk/~ylwu/ICESS2010/

Tutorial : Luis Almeida, *Real-Time Communication for Embedded Systems*
Institution: Course at ENSIAS, Ùniversity Mohammed V
Rabat, Morrocco – 20-22 December, 2010

20h course covering the concepts, techniques, technologies and applications of real-time networks.

Tutorial : Luis Almeida, *Real-Time Networks*
Event: ArtistDesign Summer School in Morocco, 2010
Rabat, Morocco – 11-16 July, 2010

6h course covering the techniques, technologies and applications of real-time networks with a focus on traffic scheduling issues.
http://www.artist-embedded.org/artist/-ARTIST-Summer-School-in-Morocco.html/

Tutorial : Luis Almeida, *Real-Time Networks*
Event: Graduate Course on Real-Time Networks 2010
Scuola Superiore Sant'Anna, Pisa, Italy – 26-30 April, 2010

30h course (20h lectures + 10h lab) covering the techniques, technologies and applications of real-time networks with a focus on traffic scheduling issues.

5.4 Hardware Platforms and MPSoC

5.4.1 Platform and MPSoC Design

Keynote : ARTEMIS - Deriving Research Problems from Complex Societal Challenges (Rolf Ernst, TU Braunschweig)
ARTEMIS Summer Camp
Rome, Italy - June 10, 2010

The ARTEMIS Industry Association for R&D actors in embedded systems in Europe is the meeting place where key industry and R&D actors identify topics for major R&D project proposals and form consortia. In his keynote speech at the ARTEMIS Summer Camp 2010, Rolf Ernst discussed how to derive research problems from complex societal challenges and anticipated that the new area of embedded systems-of-systems will be driven by comprehensive societal challenges rather than by individual application domains. In this context robust networks of embedded systems, mixed criticality networks, and autonomous systems requiring new design processes have been identified as resulting scientific challenges.

http://www.artemisia-association.org/presentations_2

Keynote : Certification of Trusted MPSoC Platforms (Rolf Ernst, TU Braunschweig)
International Forum on Embedded MPSoC and Multicore, MPSoC'2010
Gifu, Japan - June 29, 2010

The MPSOC event brings together key R&D actors from the different fields required to design embedded Multiprocessor SoC (MPSoC) and Multi-core SoC. In his talk Rolf Ernst presented some of the main challenges regarding system integration on MpSoCs. Safety critical system integration on MpSoCs becomes more difficult due to physical resource sharing and thus may have to face increasing certification costs in comparison to distributed systems. Solutions from an academic point of view were suggested.

http://www.mpsoc-forum.org/2010/agenda.html#Lectures

Keynote : Safety, Efficiency and Autonomy – Mastering Conflicting trends in Embedded Systems Design. (Rolf Ernst, TU Braunschweig)
DIPES Conference 2010
Brisbane, Australia - September 20, 2010

The 7th IFIP Conference on Distributed and Parallel Embedded Systems (DIPES 2010) was hosted as part of the IFIP World Computer Congress WCC 2010. Rolf Ernst gave a keynote presentation on current research results and future trends in the field embedded system design with focus on safety, efficiency and autonomy.

http://wcc2010.com/DIPES2010/index.html

Keynote : Embedded Systems Research for Complex Societal Challenges, (Rolf Ernst, TU Braunschweig)
ESI Symposium 2010
Eindhoven, Netherlands - December 2, 2010

On December 2, 2010, ESI the Embedded Systems Institute located at the university campus in Eindhoven had the third annual symposium. The symposium covered a wide range of applied research topics on embedded systems and was organized together with Point One, an open association of high-tech industry and knowledge institutes with research and development in the Netherlands on nanoelectronics, embedded systems, and mechatronics. In this keynote Rolf Ernst highlighted design challenges due to increasing system complexity and due to requirements for integration and certification of mixed-critical embedded systems.

http://www.esi.nl/symposium/

Keynote : Smart Distributed Sensors for Adaptive Green Services (Davide Brunelli, UNIBO)
2010 18th IEEE/IFIP International Conference on VLSI and System-on-Chip - VLSI–SoC
Madrid, Spain - 27–29 September 2010

VLSI-SoC 2010 is the 18th in a series of international conferences sponsored by IFIP TC 10 Working Group 10.5, IEEE CEDA and CASS that explores the state-of-the-art and the new developments in the field of Very Large Scale Integration (VLSI), System-on-Chip (SoC) and their designs. Abstract :*Public administrations, enterprises and citizens are increasingly going green and are looking to the information technology as the way to reduce energy consumption and to become more environmentally responsible. In particular reducing buildings overall energy consumption is certainly on of the major effort. Distributed and pervasive sensing and monitoring will play a key role in achieving this goal and will pose novel research challenges in distributed monitoring such as how the space is used, how the data is compressed and how controlling devices are interfaced. The talk will present examples and case studies of architectures for Green Computing leveraging connected sensing systems, networks, and devices.*

http://www.vlsi-soc.com/

Keynote : P2012: Designing many-core platforms for silicon-efficient embedded multimedia computing (Luca Benini, UNIBO)
5th symposium on Computer Architecture and Digital Systems CADS2010
Tehran, Iran - September 23-24, 2010

Abstract :*Programmability is a key requirement for fast time-to-market and agile adaptation to rapidly evolving multimedia standards and customer expectations. Unfortunately, programmable architectures come with order-of-magnitude computational density and energy efficiency gaps with respect to custom-fit hardware. Is there a way to escape the flexibility vs. efficiency dualism? Is nano-scale silicon technology adding new facets to this "no free lunch" view? In this talk I will describe the architectural foundations of STMicroelectronics Platform 2012 project and provide some insight on how we hope to give positive answers to these fundamental questions*

http://cs.ipm.ac.ir/cads2010/index.jsp

Mini-Keynote : A Bio-Inspired Reconfigurable Hardware Architecture Supporting Self-organisation and Self-healing (Jan Madsen, DTU)
10th International Forum on Embedded MPSoC and Multicore
Gifu, Japan, july 2010

Electronic devices based on modern chip technology are susceptible to both transient and permanent failures due to increased integration and to process variability of the chip technology. In this talk, we will present a reconfigurable hardware platform, which is capable of Self-organisation and Self-healing based on biological principles. The platform is a multicore chip, where each core acts as a cell. An application is compiled into a compact representation resembling the biological DNA. Self-organisation allows the cells of the platform to autonomously determine their functionality from the DNA based on their position. In case of a cell failure, other cells are able of detect this and re-establish the lost functionality at a nearby idle-cell through the sharing of DNA, effectively obtaining Self-healing of the platform.
http://www.mpsoc-forum.org/2010/index.html

Keynote : Schedule Memory Access, not Threads (Martin Schoeberl, DTU)
10th International Forum on Embedded MPSoC and Multicore
Gifu, Japan - july 2010
Chip-multiprocessing is considered the future path for performance enhancements in computer architecture. Eight processor cores on a single chip are state-of-the art and several hundreds of cores on a single die are expected in the near future. General purpose computing is facing the challenge how to use the many cores. However, in embedded real-time systems thread-level parallelism is naturally used. We assume a system where we can dedicate a single core for each thread. In that case classic real-time scheduling disappears. However, the threads, running on their dedicated core, still compete for a shared resource, the main memory. A time-sliced memory arbiter is used to avoid timing influences between threads. The schedule of the arbiter is integrated into the worst-case execution time (WCET) analysis. The WCET results are used as a feedback to regenerate the arbiter schedule. Therefore, we schedule memory access instead of CPU time.
http://www.mpsoc-forum.org/2010/index.html

Tutorial : Hardware/Software Codesign of Embedded Systems using GEZEL (Jan Madsen and Gilberto F. Marchioro, DTU)
28th Norchip Conference
*Tampere, Finland – 14.11.*2010
This tutorial presents a model-driven approach to hardware/software codesign based on the open-source GEZEL framework (language and tools) from Virginia Tech. The GEZEL language is a cycle-based hardware description language based on the Finite-State-Machine with Datapath (FSMD) model. The GEZEL tools offer stand-alone hardware simulation, cosimulation, and code-generation into synthesizable (VHDL) code. GEZEL allows for the inclusion of new userdefined cosimulation interfaces, through user-defined library-block extensions in C++, which allows the modeling and simulation of IP-blocks.
The tutorial will cover the basics of the GEZEL language and how to build cosimulation systems based on ARM cores. Recent work at DTU Informatics on how to extend the GEZEL framework with support for formal hardware verification will be presented. Finally, the usage of GEZEL for an Embedded Systems course targeting bachelor software students at their third semester, will be addressed.

Seminar: Wireless Sensor Networks (Jan Madsen, DTU)
Special Interest Group on Green-IT, Infinit innovation network on ICT
*Lyngby, Denmark – 17.11.*2010
DTU organized the a seminar on wireless sensor networks, with focus on how this technology can help monitoring climate and environmental changes, and monitoring the “health” of building constructions. The event had 24 participants, where half were from industry. One of the presentations were given by Jan Buetel from ETHZ.
http://www.infinit.dk/dk/nyheder_og_arrangementer/arrangementer/afsluttede_aktiviteter/20101011_01.htm

Tutorial : R. DAVID, CEA LIST, Multi-core architectures design space analysis for embedded systems
RSP 2010 : 21st IEEE International Symposium on Rapid System Prototyping
Firfax, USA

Tutorial: Embedded Systems and their Physical Environment – Sensor Networks in Environmental Applications: A key Application
DATE 2010

Dresden, Germany – 9.3. – 11.3.2010

The tutorial was organized by partner EPFL (Giovanni DeMicheli). The talk presented joint results with UNIBO on energy harvesting and their use in sensor network applications in harsh environments.

Tutorial: Embedded Software for SoC Design
ASPDAC 2010

Taipeh, Taiwan – 18.1. – 21.1.2010

For many emerging embedded applications, high performance is required: High-quality multimedia processing in consumer electronics, software defined radio in communications systems, or real-time diagnostics in medical systems are typical examples. A frequent choice for digital signal processing systems will be heterogeneous multiprocessor system-on-chip (MPSoCs) because of their computational power, programmability, and low power dissipation. Software development plays a central role in handling the increasing complexity of applications implemented on MPSoCs. Productively programming heterogeneous. The tutorial provided an overview about the major challenges in multiprocessor software development. We will present a taxonomy of software design flows based on this analysis, review current MPSoC software design flows and classify them based on the associated challenges. As an example, a design flow is presented that integrates a modular performance analysis method into the MPSoC programming environment. The result is an MPSoC software design flow that allows to automatically generating the system implementation together with an analysis model for system verification.

Summer School: Models for Embedded Signal Processing Systems.
Leiden University and Lorentz Center
Leiden, The Netherlands – 30.8.2010 - 3.9.2010

During the system level design process of an embedded system, a designer is typically faced with questions such as whether the timing properties of a certain system design will meet the design requirements, what architectural element will act as a bottleneck, or what the on-chip memory requirements will be. Consequently it becomes one of the major challenges in the design process to analyze specific characteristics of a system design, such as end-to-end delays, buffer requirements, or throughput in an early design stage, to support making important design decisions before much time is invested in detailed implementations. This analysis is generally referred to as system level performance analysis. If the results of such an analysis are able to give guarantees on the overall system behavior, it can also be applied after the implementation phase in order to verify critical system properties.
The course covered the following aspects of system level performance analysis of distributed embedded systems: Approaches to system-level performance analysis. Requirements in terms of accuracy, scalability, composability and modularity. Modular Performance Analysis (MPA): basic principles, methods and tool support. Examples that show the applicability: An environment to map applications onto multiprocessor platforms including specification, simulation, performance evaluation and mapping of distributed algorithms; analysis of memory access and I\O interaction on shared busses in multi-core systems.

Invited Lecture: Formal Performance Analysis and Optimization of Safety-related Embedded Systems (Rolf Ernst, TU Braunschweig)
Artist Summer School Europe 2010
Autrans, France - September 6, 2010

The lecture was given at the Artist Summer School Europe organized by the Artist Design European Network of Excellence on Embedded Systems Design. An important part of the lecture was allocated to outline safety requirements and to present the impact of fault tolerance and fail-safe mechanisms on real-time systems properties. Possible solutions for the analysis and optimization of mixed-critical systems were discussed. *(Further topics addressed in this lecture are related to the activity report on Platform and MPSoC Analysis and on the report on Design for Adaptivity Activity)*

http://www.artist-embedded.org/artist/Invited-Speakers,2065

Presentation: Challenges of Mapping Real-Time Streaming Applications to General-Purpose Many-cores
ArtistDesign Workshop on Mapping Applications to MPSoCs 2010
Schloss Rheinfels, St. Goar, Germany, June 29-30, 2010

Jonas Diemer (TU Braunschweig) gave a presentation on the mapping of real-time applications in a general-purpose system with minimal support for quality-of-service.

http://www.artist-embedded.org/artist/Program,1822.html

Presentation: Predictablity in General-Purpose Many-Cores
Intel® European Research & Innovation Conference, ERIC 2010
Braunschweig, Germany, September 21-22, 2010

At the ERIC Conference, a Poster presentation was given by Jonas Diemer (TU Braunschweig) on novel network-on-chip architectures that enable future general-purpose many-core to efficiently execute real-time applications with guaranteed timing requirements. This topic was also presented at the parallel 10-year Jubilee of Intel Braunschweig, who funded the corresponding project COMPOSE.

http://www.intel.com/corporate/education/emea/event/irc/deu/

Invited Talk: Mastering Mixed Criticality - A Growing Challenge in Embedded Systems Integration (Rolf Ernst, TU Braunschweig)
Symtavision News Conference 2010
Braunschweig, Germany – September 29 - 30, 2010

The SymTA/S NewsConference is an annual event organized by the Symtavision GmbH that brings together engineers, managers, technology experts and researchers in the field of embedded real-time systems. Rolf Ernst was invited to present current research results to this audience.

http://www.symtavision.com/newsconference2010.html

Invited Paper : R. DAVID, CEA LIST, Resources management in multi- and many-cores architectures: Issues and trends, invited paper, VLSI-SOC Conference, Madrid, Spain, 2010

5.4.2 Platform and MPSoC Analysis

Keynote : P2012: A many-core platform for 10Gops/mm2 multimedia computing (Luca Benini, UNIBO)
21st IEEE International Symposium on Rapid System Prototyping (RSP)
Fairfax, Virginia, USA - June 8-11, 2010

The IEEE International Symposium on Rapid System Prototyping (RSP) explores trends in Rapid Product Development of Computer Based Systems. Its scope ranges from formal methods for the verification of software and hardware systems to case studies of actual

software and hardware systems. It aims to bring together researchers from the hardware and software communities to share their experiences and to foster collaboration of new and innovative Science and Technology.

http://www.rsp-symposium.org/rsp2010/index.html

Keynote : Many-core platforms for embedded computing: 2012 and beyond (Luca Benini, UNIBO)
S02-XXI Jornadas de Paralelismo, JP2010 (SARTECO) - CEDI Congeso Espanol di Informatica
Valencia, SPAIN– 7-10 September 2010

Abstract :*Programmability is a key requirement for fast time-to-market and agile adaptation to rapidly evolving multimedia standards and customer expectations. Unfortunately, programmable architectures come with order-of-magnitude computational density and energy efficiency gaps with respect to custom-fit hardware. Is there a way to escape the flexibility vs. efficiency dualism? Is nano-scale silicon technology adding new facets to this "no free lunch" view? In this talk I will describe the architectural foundations of STMicroelectronics Platform 2012 project and provide some insight on how we hope to give positive answers to these fundamental questions*

http://cedi2005.ugr.es/2010/contenido.php?apartado=organizacion&sub=presentacion/

Tutorial: Modeling and Analyzing Real-Time MutIriprocessor Systems
ESWEEK 2010
Scottsdale, USA – 24.10.2010
The presentation introduced the component-based approach that has been developed in ArtistDesign as a joint activity of UBS and ETHZ. The presentation hase been given by Lothar Thiele (ETHZ).

Workshop: Temperature Aware 3D MPSoC
Lausanne, Switzerland – 26.11.2010
The workshop has been organized by David Atienza (EPFL). The porpuse was to discuss various approaches to analyze the temperature of complex 3D MPSoC systems. The focus of this event was on the comparison of various levels of abstraction and the corresponding analysis models and methods.

Tutorial: Performance Analysis of Distributed Embedded Systems
*Rabat, Morocco – 11.7. – 16.7.*2010
The tutorial was part of the ArtistDesign School in Morocco. The presentation introduced the component-based approach that has been developed in ArtistDesign as a joint activity of UBS and ETHZ. The presentation hase been given by Lothar Thiele (ETHZ).

Invited Lecture: Formal Performance Analysis and Optimization of Safety-related Embedded Systems
(Rolf Ernst, TU Braunschweig)
Artist Summer School Europe 2010
Autrans, France, September 6, 2010

The lecture was given at the Artist Summer School Europe organized by the Artist Design European Network of Excellence on Embedded Systems Design. An important part of the lecture was dedicated to formal performance analysis in general, and with a focus on required

analysis extensions that allow the application of performance analysis methods to safety related system design. *(Further topics addressed in this lecture are related to the activity reports on Platform and MPSoC Design and on the Design for Adaptivity Activity)*

http://www.artist-embedded.org/artist/Invited-Speakers,2065

Invited Talk: Providing Real-Time Guarantees on Multi-Core Processors
(Simon Schliecker/ Mircea Negrean, TU Braunschweig)
Symtavision NewsConference 2010
Braunschweig, Germany – September 29 -39, 2010

The SymTA/S NewsConference is an annual event organized by the Symtavision GmbH that brings together engineers, managers, technology experts and researchers in the field of embedded real-time systems. Compared to previous years, the 4th edition of the Symtavision NewsConference has been expanded by a technical day, with parallel practice and research tracks. TU Braunschweig was invited to present current research results on real-time analysis methods for multi-core systems.

http://www.symtavision.com/newsconference2010.html

Tutorial: Modeling and Analyzing Real-Time Multiprocessor Systems
(Simon Schliecker, TU Braunschweig, Lothar Thiele, ETHZ and other participants)
Embedded Systems Week (ESWeek) 2010
Scottsdale AZ, USA, October 24 -29, 2010

Embedded Systems Week is an exciting event which brings together conferences, tutorials, and workshops centred on various aspects of embedded systems research and development. The tutorial at ESWeek 2010 was given by Lothar Thiele (ETHZ), Simon Schliecker (TU Braunschweig), Marco Bekooij (NXP semiconductors), Maarten Wiggers (University of Twente) and Edward A. Lee (University of California Berkeley). This tutorial presented an overview and positioning of four recently proposed approaches for timing constraints verification in real-time multiprocessor systems.

http://www.esweek.org/

Invited seminar: Promises and limitations of 3-D integration (Axel Jantsch, Matthew Grange, and Dinesh Pamunuwa)
Natinal University of, Defense Technology
Changsha, China, December 2010

Invited seminar: Memory architecture and management in a NoC platform (Axel Jantsch, Xiaowen Chen, Abdul Naeem, Yuang Zhang, Sandro Penolazzi, and Zhonghai Lu)
Fudan University, Shanghai, China*, December 2010*
Nanjing University, China, *December 2010*

Invited talk**: Network on Chip Technology for Telecom Applications** (Axel Jantsch)
Fudan-Huawei Workshop, Shanghai, China*, December 2010*

Invited lecture**: Predictable communication performance in on-chip networks** (Axel Jantsch)
University of Turku, Finland, December 2010

Keynote : R. DAVID, CEA LIST, Low Power management in embedded multi-core architectures
MPSOC
Gifu, Japan, july 2010

Abstract :Due to the complexity increase of embedded applications, multi-core systems on chip (MPSOC) are becoming the mainstream for architecture design. Indeed, according to ITRS, the number of cores in high-end systems will exceed 100 cores in 2012. With an expected 32% a year increase in the number of cores per die, the concept of multi-cores will even evolve to many-cores in the coming years. Managing complexity in such system is a challenge that cannot be talked only by off-line application analysis and compilation techniques. In fact to deal with variability coming from technology as well as advance embedded application that are highly data-dependant, runtime resources management strategies have to be put in place. This talk deals with this new challenge of dynamically managing tens to hundreds of core. In particular this talk will focus on the power management of such devices.

Seminar: Energy Harvesting (Jan Madsen and Michael R. Hansen, DTU)
Special Interest Group on Green-IT, Infinit innovation network on ICT
*Lyngby, Denmark – 11.6.*2010
DTU organized the SIG seminar on energy harvesting. The event had 55 participants, where half were from industry.
http://www.infinit.dk/dk/nyheder_og_arrangementer/arrangementer/afsluttede_aktiviteter/20100531_01.htm

Seminar: Safety-Critical Systems (Paul Pop, DTU)
Special Interest Group on Safety-Critical Systems, Infinit innovation network on ICT
*Lyngby, Denmark – 12.2.*2010
Embedded systems are increasingly used in safety-critcal application areas, such as medical, railway, military, aerospace and factory systems, where a failure can endanger human life or the environment. Safety-critical embedded systems are becoming more complex, and use software and hardware to implement part of their functions. This is the reason why the national innovation network InfinIT is starting an interest group on safety-critical systems. The objective of the seminar is to present the current challenges in developing safety-critical systems and to identify the focus of the interest group. The event had 40 participants, where more than half were from industry.
http://www.infinit.dk/dk/nyheder_og_arrangementer/arrangementer/afsluttede_aktiviteter/20100125_01.htm

Course: Automated Formal Methods for Embedded Systems (Jan Madsen and Michael R. Hansen, DTU)
ARTIST Graduate Course
Lyngby, Denmark – June 14-28 2010
DTU organized the ARTIST graduate course on automated formal methods for embedded systems. The event had 12 participants. The topics covered were, model-based development and validation of multi-robot cooperative systems, Simulation of Networked Embedded Control Systems Using TrueTime, logical approach to modelling and analysis of resource constraints, and specification and verification with proof scores in CafeOBJ.

Seminar: Model-Based Design (Jan Madsen and Michael R. Hansen, DTU)
Company workshop at KK-Electronics
*Ikast, Denmark – 8.12.*2010
DTU organized a company seminar for 22 software engineers at KK-Electronics. The aim was to give an overview of model-based design of embedded systems. The company develops windturbine controllers for Siemens Windpower, Vestas and other manufactures of windmills.

Seminar: Embedded/Safety Critical Systems (Jan Madsen, DTU)
IEEE Denmark
Copenhagen, Denmark – 1.11.2010
For some years embedded systems for safety critical applications have increasingly taken over important functions in our working and everyday life. One reason for this to happen is obviously the ability of such systems to relieve humans from the burden of constant monitoring processes in detail and taking corrective actions if needed. Moreover, the potential of such systems to eliminate human errors is getting increasingly important as keeping track and overview of the many variables encountered in the evermore complex environment of the modern society is difficult for a human mind, if not impossible. At the same time, real life examples show system design failures that have caused safety critical systems to respond with unintended actions, in case a system state is allowed appear in unforeseen situations. Introducing the seminar with a lecture on Embedded Systems, Professor Jan Madsen, IMM/DTU, is also addressing this dilemma along with the research on Embedded Systems carried out at his Institute. To illustrate the applications of embedded systems in an engineering context, IDA and IEEE Denmark has succeeded in getting acceptance of speakers from industry within the fields of Space, Aviation, Railways and Medicine.
http://meetings.vtools.ieee.org/meeting_view/list_meeting/2963

Workshop: SYSMODEL Modeling Methodologies (Paul Pop, DTU, Ingo Sander, KTH)
SYSMODEL
Kista, Stockholm – May 27-28.2010
Workshop on modeling methodologies for the ForSyDe modeling framework. Identification and planning of industrial use cases, to evaluate the capabilities of the modeling framework.

Workshop: ForSyDe Modeling Workshop
SYSMODEL
Kista, Stockholm – Feb 1-2.2010
Joint workshop between KTH and DTU on the development of the ForSyDe modelling framework.

Workshop: ASAM Design Flow (Jan Madsen, DTU)
ASAM
Cagliari, Sardinia – Sept. 23-24.2010
DTU and TUBS participated in the 2-day ASAM workshop aimed at defining the design flow and tool integration for the ASAM project.

Keynote : De Micheli, Giovanni: *Nanosystems: devices, circuits, architectures and applications*.
Conference name International Symposium on Circuits and Systems (ISCAS)
May 30 - June 2nd, 2010.
The IEEE International Symposium on Circuits and Systems (ISCAS) is the world's premier networking forum of leading researchers in the highly active fields of theory, design and implementation of circuits and systems.

The Symposium will focus on circuits and systems employing nanodevices (both extremely scaled CMOS and non-CMOS devices) and circuit fabrics (mixture of standard CMOS and evolving nano-structure elements) and their implementation cost, switching speed, energy efficiency, and reliability.

http://www.iscas2010.org/index.php?option=com_content&view=section&id=31&Itemid=131#keynote1

Keynote : De Micheli, Giovanni: Nanosystems for a healthier and safer tomorrow
Conference name Symposium on Transformational Information Engineering and Science

Singapore, Nanyang Technological University, January 28-29, 2010

This symposium brings together diverse and notable experts to discuss the technical and societal implications of the ubiquitous systems people now rely upon -- billions of times each day -- to transform information from one domain to another. These "transformations" occur every time a cell phone converts electronic signals into sound, a shopper encrypts a credit card number online or a moviegoer's eye converts moving pictures into information the brain can process.

http://www.ntu.edu.sg/ISNE/event/TIES/Pages/ProgrammeDetails.aspx

5.5 Transversal Integration

5.5.1 Design for Adaptivity

Keynotes

Keynote: Control for Embedded Systems (Karl-Erik Årzén, ULUND)

The First Virtual Control Conference 2010 (VCC-10), Sep 22, 2010

http://www.vcc-10.org/

Keynote: Safety, Efficiency and Autonomy – Mastering Conflicting Trends in Embedded Systems Design (Rolf Ernst, TU Braunschweig)

DIPES Conference, Brisbane, Australia, September 20, 2010

Keynote:"ARTEMIS - Deriving Research Problems from Complex Societal Challenges"

(Rolf Ernst, TU Braunschweig)

ARTEMIS Summer Camp

Rome, Italy, June 10, 2010

The ARTEMIS Industry Association for R&D actors in embedded systems in Europe is the meeting place where key industry and R&D actors identify topics for major R&D project proposals and form consortia. In his keynote talk at the ARTEMIS Summer Camp 2010, Rolf Ernst highlighted the need for new design processes of adaptive embedded systems that requires (partially) autonomous systems that should have self-optimization, self-healing and self-protection capabilities to work in unreliable network environments. *(see also the activity report on Platform and MPSoC Design)*

http://www.artemisia-association.org/presentations_2

Keynote: Embedded Systems Research for Complex Societal Challenges,

(Rolf Ernst, TU Braunschweig)

ESI Symposium 2010

Eindhoven, December 2, 2010

On December 2, 2010, ESI the Embedded Systems Institute located at the university campus in Eindhoven, Netherlands, had the third annual symposium. The symposium covered a wide range of applied research topics on embedded systems and was organized together with Point One, an open association of high-tech industry and knowledge institutes with research and development in the Netherlands on nanoelectronics, embedded systems, and mechatronics. In this keynote Rolf Ernst highlighted the need for introducing in-field design support for safe updates and reconfiguration, and presented a proposal for a self-protecting update process. (see also the activity report on Platform and MPSoC Design)

http://www.esi.nl/symposium/

Courses and Tutorials

Tutorial: Sampling in Event-driven Control Systems (Manel Velasco, UPC)

In the CDC2010 satellite workhop "Co-design of Control and Real-Time Computing: Perspectives, Techniques and Research Directions"

http://ee.nd.edu/faculty/vgupta/research/funding/gtcdc10_workshop.html

Tutorial: Real-Time Calculus
Pisa, Italy, 22.3.-23.3. 2010
The two-day tutorial was given by ETHZ (Lothar Thiele) in cooperation with SSSA (Giorgio Buttazzo)
The objectives of the course were to:

- Introduce the concepts of compositional real-time analysis to graduate students
- Provide basic concepts of interface-based design
- Discuss applications in on-line adaptation of system characteristics

Graduate Course on Embedded Control Systems: Theory and Practice
Scuola Superiore Sant'Anna, Pisa, Italy – June 14-18, 2010

URL: http://www.artist-embedded.org/artist/Overview,2037.html

Objectives for the course: The course was aimed at:

1. providing the fundamentals concepts of real-time computing systems, including scheduling, resource management and timing analysis;
2. introducing the OSEK/VDX standards, taking as a reference implementation the Erika Enterprise kernel;
3. showing how to apply such concepts in practice, with examples based on the Flex platform and the Microchip dsPIC DSC microcontrollers;
4. teaching participants how to develop simple control applications using Erika Enterprise with code generation from functional models.

Organizers:

- Giorgio Buttazzo - Scuola Superiore Sant'Anna, Italy
- Pau Marti - Technical University of Catalonia, Barcelona, Spain

- Ettore Ricciardi – ISTI-CNR, Pisa

Workshops and Special Sessions

Workshop: First International Workshop on Adaptive Resource Management (WARM 2010), Cyber-Physical Systems Week 2010, April 12, 2010, Stockholm, Sweden

The focus of WARM was software-based approaches to adaptive resource management for soft or adaptive embedded real-time applications, e.g., multimedia applications or non-safety critical control applications. Special emphasis was given to multi-resource management and to multi-core platforms.

The programme included 8 submitted presentations, 3 invited presentations and one keynote on challenges and solutions for adaptive resource management in cyber-physical systems given by Prof Raj Rajkumar, CMU.

Organizers:

- Prof. Giorgio Buttazzo, Scuola Superiore Sant'Anna, Pisa
- Prof. Gerhard Fohler, TU Kaiserslautern
- Prof. Alan Burns, University of York
- Prof. Luis Almeida, University of Porto
- Prof. Karl-Erik Årzén, Lund University
- Prof. Michael Gonzalez Harbour, University of Cantabria

URL: http://www.artist-embedded.org/artist/Theme.html

Special Session: QoS and Resource management in adaptable real-time systems 15th IEEE International Conference Emerging Technologies and Factory Automation in Bilbao, September 2010.

Organizers:

- Alejandro Alonso, Universidad Politécnica de Madrid,
- Marisol García Valls, Universidad Carlos III de Madrid

Invited Lectures and Presentations

Invited Lecture: Formal Performance Analysis and Optimization of Safety-related Embedded Systems

(Rolf Ernst, TU Braunschweig)

Artist Summer School Europe 2010

Autrans, France, September 6, 2010

The lecture was given at the fifth edition of the Artist Summer School Europe organized by the Artist Design European Network of Excellence on Embedded Systems Design. An important part of the lecture was the presentation of a proposal for system self-protection against system performance failures due to incorrect system updates or extensions. *(Further topics addressed in this lecture are related to the activity report on Platform and MPSoC Analysis and Design)*

http://www.artist-embedded.org/artist/Invited-Speakers,2065

Invited Presentation: Adaptivity and Resource Control in Embedded Systems (Karl-Erik Årzén, ULUND)

LCCC Workshop on Adaptation and Learning in Autonomous Systems. Lund Sweden, April 22, 2010.

An overview of adaptivity and resource control in embedded system was given.

http://www.lccc.lth.se/index.php?page=workshop-program-WS04

Invited Presentation: Synthesizing real-time implementations from abstract specifications based on timed automata (Jacques Combaz, Joseph Sifakis and Tesnim Abdellatif, VERIMAG)

Workshop on Software Synthesis (WSS'10), ESWEEK 2010, Scottsdale, Arizona, USA:

A general model-based implementation method for real-time systems was presented based on the use of two models .

- An abstract model representing the behavior of real-time software as a timed automaton. The latter describes user-defined platform-independent timing constraints. Its transitions are timeless and correspond to the execution of statements of the real-time software.
- A physical model representing the behavior of the real-time software running on a given platform. It is obtained by assigning execution times to the transitions of the abstract model.

5.5.2 Design for Predictability and Performance

Key Note: **DATE 2010, Everything is Connected.**

Dresden, March 9, 2010

Alberto Sangiovanni Vincentelli gave one of the two key notes at DATE, a leading conference in design technology with more than 1,000 attendants. The talk was about the importance of distributed systems in the world of the future, what problems we may have to face in this world and how to design complex distributed systems.

http://www.ecsi.org/date-2010-conference

Invited Talk: *Peter Marwedel, Heiko Falk:* **Reconciling compilers and timing analysis Industrial Workshop and Exhibition at the CPSWEEK 2010**
Stockholm, Sweden – April 12, 2010

Most embedded/cyber-physical systems have to respect timing constraints. Ensuring meeting such constraints is currently typically based on a trial-and-error procedure involving many time-consuming software generation attempts. In this talk, we will demonstrate how the integration of timing analysis into a compiler for an automotive processor can provide a systematic path

toward optimized worst-case execution times and can cut down costs. http://www.mrtc.mdh.se/CPSweek/industrialWS/

Invited talk: *Alain Girault*: **Predictable multithreading of embedded applications using PRET-C**. Workshop on New Perspectives in Engineering and Computing for Embedded Mission Critical Systems, Thalès, Palaiseau, France, November 2010.

Key Note: Plenary Talk at the CPS week in Stockholm, Cyber Physical Systems: the Dream of Dr. Frankenstein

Stockholm, April 14, 2010

Alberto Sangiovanni Vincentelli gave one of three Plenary Talks at CPS week 2010 that hosted 5 conferences and several workshops. The talk was about forward looking applications of Cyber Physical Systems and methodology to reduce the complexity of the design.

http://www.kth.se/ees/omskolan/organisation/centra/access/dls/cpsweekplenary-1.58510?l=en_UK

Key Note: 2010 Symposium on Industrial Embedded Systems (SIES) Conference, Connections, connections and connections. The problems of the embedded systems of the future

Trento July 7th, 2010

Alberto Sangiovanni Vincentelli gave the key note at the Conference stressing the problems that stem from emerging behavior of widely distributed embedded systems.

http://events.unitn.it/en/sies2010

Key Note: Emerging Technologies and Factory Automation (ETFA) 2010, Distributed System Design: A Nightmare 'in fieri'

Bilbao, September 14, 2010

Alberto Sangiovanni Vincentelli gave a key note at the Conference addressing the nightmares that may ensue from the distributed system design problems.

http://www.etfa2010.org/

Key Note: IEEE System on Chip Conference (SOCC) 2010, SoC Design as an Example of Component-Based Design of Distributed Systems

Las Vegas, September 27, 2010

Alberto Sangiovanni Vincentelli gave the key note at the main conference on systems on chip outlining the need for a rigorous component-based design methodology to address the design of very large chips.

http://www.ieee-socc.org/SOCC2010/Program/program.html

Key Note: IEEE International Behavioral Modeling and Simulation Conference, Away from Plug and Pray towards Plug and Play in Analog-Mixed Signal Design: A Tale of Design Re-use

San Jose', September 24, 2010

Alberto Sangiovanni Vincentelli gave the key note at this mainly analog design conference stressing the need for compositional reasoning in analog design thus enabling a better approach to analog design re-use.

http://www.bmas-conf.org/program.html

Presentation: Predictablity in General-Purpose Many-Cores
Intel® European Research & Innovation Conference, ERIC 2010
Braunschweig, Germany, September 21-22, 2010

At the ERIC Conference, a Poster presentation was given by Jonas Diemer (TU Braunschweig) on novel network-on-chip architectures that enable future general-purpose many-core to efficiently execute real-time applications with guaranteed timing requirements. This topic was also presented at the parallel 10-year Jubilee of Intel Braunschweig, who funded the corresponding project COMPOSE.

http://www.intel.com/corporate/education/emea/event/irc/deu/

Tutorial: Architectural Aspects of Deriving Performance Guarantees
ISCA 2010
Saint Malo, France – 20.6.2010

Embedded systems are typically reactive systems that are in continuous interaction with their physical environment to which they are connected through sensors an actuators. Examples are applications in multimedia processing, automatic control, automotive and avionics, and industrial automation. Therefore, many embedded systems must meet real-time constraints, i. e. they must react to stimuli within a time interval dictated by the environment. It becomes apparent that heterogeneous and distributed embedded real-time systems as described above are inherently difficult to design and to analyze because of the tight interaction between computation, communication and the available resources.

In the presentation, we covered the following aspects of system level performance analysis of distributed embedded systems: Approaches to system-level performance analysis. Requirements in terms of accuracy, scalability, composability and modularity. Modular Performance Analysis (MPA): basic principles, methods and tool support. Examples that show the applicability: An environment to map applications onto multiprocessor platforms including specification, simulation, performance evaluation and mapping of distributed algorithms; analysis of memory access and I\O interaction on shared busses in multi-core systems.

Tutorials: Model Based System Engineering at the 2010 Control and Decision Conference (CDC)

Atlanta, Georgia – December 15th-19th, 2010

Alberto Sangiovanni Vincentelli co-organized and co-chaired with John Baras of University of Maryland two tutorial sessions at the CDC 2010 where he also presented two talks on Platform-Based Design and Model Based Design in the context of industrial applications.

Workshop: Green and Smart Embedded System Technology: Infrastructures, Methods and Tools (GREENEMBED) at the Cyber-Physical System Week

Organizing committee, general chairs, Alberto Sangiovanni Vincentelli, Huascar Espinoza, Marco Di Natale, Roberto Passerone

Stockholm, Sweden, April 12th, 2010,

Energy-efficient systems offer unique challenges to the embedded system community, from system-level design to dynamic and adaptive controls, optimization of architectures and communication, real-time and reliable services as well as reusable software components and systems.

http://www.artist-embedded.org/artist/Overview,1928.html

Workshop: 8th IFIP Workshop on Software Technologies for Future Embedded and Ubiquitous Systems (SEUS 2010)
Waidhofen/Ybbs, Austria, October 13-15, 2010

The 8th IFIP Workshop on Software Technologies for Future Embedded and Ubiquitous Systems was held in Waidhofen an der Ybbs, Austria. The workshop program included a number of presentations by representatives from ArtistDesign partners. Presenters from ArtistDesign presented new predictability measures for real-time software, as well as strategies for constructing time-predictable hardware and software. A discussion on how to design temporally predictable systems for the automotive domain was one of the highlights of the workshop.
http://pan.vmars.tuwien.ac.at/seus2010/index.html

Workshop: The 8th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS 2010),
IST Austria, Klosterneuburg, Austria. 8-10 September 2010

Timing aspects of systems from a variety of computer science domains have been treated independently by different communities. Researchers interested in semantics, verification and performance analysis study models such as timed automata and timed Petri nets, the digital design community focusses on propagation and switching delays while designers of embedded controllers have to take account of the time taken by controllers to compute their responses after sampling the environment. Timing-related questions in these separate disciplines do have their particularities. However, there is a growing awareness that there are basic problems that are common to all of them. In particular, all these sub-disciplines treat systems whose behaviour depends upon combinations of logical and temporal constraints; namely, constraints on the temporal distances between occurrences of events. The aim of FORMATS 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. The conference was chaired by Thomas A. Henzinger and Krishnendu Chatterjee from IST Austria. http://pub.ist.ac.at/formats2010/

Summer School: UPMARC Summer School on Multicore Computing,
Uppsala, Sweden, June 21-24, 2010
The objective of the school is to offer tutorials related to parallel programming and multicore computing. This year covered lectures on predictable scheduling (by John Andersson), on predictable sharing in parallel programs (by Tobias Wrigstad), and several lectures on issues connected with distributed memory systems and their impact on programming.
http://www.it.uu.se/research/upmarc/summerschool10

Panel: 2010 Design Automation Conference, Designing the Always-Connected Car of the Future

Anaheim, California, June 15th, 2010

The panel was co-organized and chaired by Alberto Sangiovanni Vincentelli. The automotive industry is introducing novel features, such as seamless vehicle-to-vehicle and vehicle-to-infrastructure connectivity to improve in vehicle driver safety (e.g., forward collision) and comfort (e.g., routing to avoid congestion) while facing stricter government regulations, and shortened time-to-market. As a result, automotive Electronic Control System (ECS) architectures are becoming increasingly complex. To cope with these challenges and opportunities, the entire automotive supply chain is engaged as follows: automotive OEMs are managing complexity by reusing legacy components and enabling new technologies; tier one suppliers are increasingly up-integrating features on the same computing platform; tier two suppliers are providing multicore and other powerful technologies; academic institutions are doing research in new analysis, synthesis and optimization methods; and tool providers are trying to raise the level of abstraction for system modeling, analysis and optimization. http://www.dac.com/conference+program.aspx

5.5.3 Integration Driven by Industrial Applications

ESI:

Lecture: Model-Based Testing with Labelled Transition Systems: There is Nothing More Practical than a Good Theory

6th TAROT Summer School on Software Testing

Graz (A), June 21 2010.

Jan Tretmans gave an overview of the theory for model-based testing with transition systems with applications to fully automatic testing of the new biometric passport and to conformace testing of a wireless sensor network node.

http://tarot2010.ist.tugraz.at/

Lecture: An Introduction to Model-Based Testing

De Nederlandse Testdag

Leiden (NL), November 4 2010.

Invited presentation: Jan Tretmans gave an introduction to model-based testing as primer of the model-based testing session at the Dutch Testing Day.

http://www.testdag.nl/

Presentation: From Model to Test - Model-Based Testing of Wireless Sensor Network

Bits & Chips Embedded Systems 2010

Eindhoven (NL), November 11, 2010.

Nodes Jan Tretmans presented the ideas and principles of model-based software testing where a specification model is used to automatically generate test cases. An an application he

demonstrated how model-based testing was applied to conformance testing of an access protocol of a wireless sensor network node.

http://www.embedded-systemen.nl/

Presentation: Model-Based Testing

Dagstuhl Seminar 10111 on Practical Software Testing: Tool Automation and Human Factors

Dagstuhl (G), March 17 2010.

Jan Tretmans gave an introduction to model-based testing as opening of the model-based testing session.

http://drops.dagstuhl.de/opus/portals/index.php?semnr=10111.

Presentation: ECO Testing for Components

Dagstuhl Seminar 10111 on Practical Software Testing: Tool Automation and Human Factors

Dagstuhl (G), March 17 2010.

Jan Tretmans explained how model-based testing can be applied to testing of provided and required interfaces of components.

http://drops.dagstuhl.de/opus/portals/index.php?semnr=10111

Presentation: A Theory of Model-Based Testing - and How ioco Goes eco

MBT 2010 - Int. Workshop on Model-Based Testing,

Paphos (Cyprus), March 21 2010

Jan Tretmans discussed the need for a well-defined and sound theory of model-based testing, and how this brings many benefits, also practical ones. Component-based testing was presented as an application area of model-based testing.

http://react.cs.uni-sb.de/mbt2010

Workshop: Testing, Models, and Model-Based Testing

Océ Technologies Internal Workshop.

Venlo (NL), November 30 2010.

Jan Tretmans discussed the use of models in testing, and in particular model-based testing applied to OCE's printer controllers.

Tutorial: Quantitative System Validation in Model Driven Design

Embedded Systems Week

Phoenix (USA), 24 October 2010.

H. Hermanns, K.G. Larsen, J.-F. Raskin and J. Tretmans gave a half-day tutorial handling the highlights and advances made in the Quasimodo project. The following was presented: theory, techniques, and tool components for handling quantitative constraints in model-driven

development of real-time embedded systems, covering in particular real-time, hybrid, and stochastic aspects.

http://delivery.acm.org/10.1145/1880000/1879062/p301-hermanns.pdf?key1=1879062&key2=3982371921&coll=DL&dl=ACM&CFID=754920&CFTOKEN=93964264

Tutorial: Software Testing

EJCP - Ecole Jeunes Chercheurs de Programmation

Dinard/Rennes (F), May 25, 2010

Jan Tretmans gave a one-day tutorial on software testing divided into two parts at the EJCP - Ecole Jeunes Chercheurs de Programmation. The first part was devoted to general principles and the state of practice in software testing. The second part concentrated on the theory of model-based testing and how models of software can be used to algorithmically generate test suites.

http://ejcp2010.inria.fr./

Workshop: Lightweight simulation models

Vanderlande Industries

Veghel, February 24, 2010

A workshop moderated by Jacques Verriet (ESI), Robert-Jan Bijl (Vanderlande) and Roelof Hamberg (ESI) to introduce industrial participants in defining simulation models.

Workshop: System architecture for adaptive systems

Océ Technologies

March 23, 2010

A workshop led by Gerrit Muller, Roelof Hamberg, Jacques Verriet (ESI) to define the possibilities for adaptive systems in the Océ system architecture.

Workshop: Model based design

Special Interest Group ESI

Eindhoven, April 28, 2010

During this workshop architects and engineers of several high-tech companies, such as ASML, Océ, Vanderlande, Philips Healthcare identified with ESI their challenges on model-based design. Three ESI research fellows participated in the discussions, namely: Jozef Hooman, Jeroen Voeten, Roelof Hamberg

Lecture: Multiform design framework

Industry Advisory Panel of FP7 Multiform project

Eindhoven, November 18, 2010.

Presentation by Hristina Moneva, Roelof Hamberg and Teade Punter (ESI) of the data structure, concepts as well as design prototype for the industrial participants that visited an information market at ESI premises.

Lecture: Applications of POOSL in industry

Eindhoven University of Technology

Eindhoven, May 11, 2010

Lecture about a set of applications in which the POOSL tooling was used. The lecture was provided by Roelof Hamberg (ESI)

Workshop: Vanderlande Storage Systems Strategy & Roadmap

Eindhoven University of Technology

Eindhoven, July 19, 2010

Creation of a roadmap for storage systems within Vanderlande Industries. Roelof Hamberg (ESI) facilitated the workshop, while Vanderlande employees were participants.

Presentation: System Architecting & Modeling

ESI symposium

Eindhoven, December 2, 2010
Presentation Roelof Hamberg about model development during early design phases in Océ Technologies and Vanderlande Industries.

IMEC:

Workshop: SDR Forum 2010 European Reconfigurable Radio Technologies Workshop and Product Exposition

Mainz, Germany – June 23/25 2010

Speaker: Tom Vander Aa gave a talk on ADRES: flexible high-performance baseband processor

Workshop: SDR Forum 2010 European Reconfigurable Radio Technologies Workshop and Product Exposition

Mainz, Germany – June 23/25 2010

Liesbet Van der Perre gave a talk on Spectrum sensing solutions for mobile devices

Workshop: Networking Lecture Series in Deutsche Telekom Labs

Speaker: Liesbet Van der Perre

Berlin, Germany – September 27 2010

Liesbet Van der Perre presented Green radios for a sustainable future internet

Keynote: International Symposium on VLSI Technology, Systems and Applications (VLSI-TSA)

Speaker: Pol Marchal
Hsinchu, Taiwan - 26-28 April, 2010

Keynote: Paving the Road for Low-Cost 3D TSV IC Design

Abstract: We investigate key design issues of a low-cost 3D Cu-TSV technology: impact of TSV on MOS devices and interconnect, reliability, thermal hot spots, ESD, signal integrity and impact on circuit performance. We experimentally verify their importance and offer solutions or propose changes in current design practices to enable low-cost systems.

http://vlsitsa.itri.org.tw/2010/Program/

Invited talk: International Solid-State Circuits Conference (ISSCC)

San Francisco, USA - February 7th 2010

Pol Marchal gave a talk on "3D TSVs Ready for design!"

http://140.116.156.14/web/files/news/isscc_2010.pdf/

Workshop: Custom Integrated Circuits Conference (CICC)

Invited talk: Verifying Electrical/Thermal/Thermo-mechanical Behavior of a 3D Stack – Challenges and Solutions

Speaker: Pol Marchal

San Jose, USA - 20-22 September 2010

Abstract: We describe the design challenges for a low-cost 130nm 3D CMOS technology with 5µm diameter at 10µm pitch Cu-TSV. We investigate electrical, thermal and thermo-mechanical issues encountered in 3D. The electrical yield and ESD of TSVs is reviewed and designers are advised how to ensure yield and reliability. For thermal and thermo-mechanical we'll indicate based on experimental characterization, the importance of extending the chip package co-design flow with thermo-mechanical simulations of the chip stack. We propose a new design flow which leverages information captured by smart samples.

http://www.ieee-cicc.org/Sessions-Complete-10.pdf

Tutorial: The International Symposium on Quality Electronic Design (ISQED)

Tutorial: Paving the road for 3D TSV Design

Speaker: Pol Marchal

San Jose, USA - March 22th 2010

Abstract: In this tutorial, we'll indicate the key design issues of a low-cost 3D Cu-TSV technology: impact of TSV on MOS devices and interconnect, reliability, thermal hot spots, ESD, signal integrity and impact on circuit performance. We will show experimental results, indicating their importance and offer solutions or propose changes in current design practices to enable low-cost systems.

http://www.svtii.com/ISQED2010_Tutorials.htm#Paving_the_Road_for_3D_TSV_Design

Workshop: International Microwave Symposium

Invited talk: Riding the mm-waves, destination many Gbits/s

Speaker: Piet Wambacq

Anaheim, USA, 23-28 May, 2010

http://www.ims2010.org/techpgm_details.html/

Workshop: International Microwave Symposium - Radio Frequency IC Symposium Workshop

Invited talk: CMOS *radio integration for high-datarate 60GHz applications*

Speaker: Piet Wambacq

Anaheim, USA, 23-28 May, 2010

http://www.ims2010.org/techpgm_details.html/

Workshop: GPU Technology Conference 2010 (GTC 2010)

Title: Maximizing throughput of Barco's GPU-enabled video processing server

September 20-23, San Jose, CA, USA

Speaker: Maja D'hondt

http://www.nvidia.com/object/gpu_technology_conference.html

Keynote: Strategies for Embedded Computing Research

Speaker: Werner Damm

Vienna, Austria - 18-19 March, 2010

Keynote: The German Embedded Systems Roadmap

Abstract: The National Roadmap Embedded Systems was written by a Steering Board comprising members from key industrial and academic stakeholders in the area of Embedded Systems (Daimler, EADS, Siemens, OFFIS, Fraunhofer IESE, TU Munich). It comprises input from experts from more than 30 industrial and academic partners as well as from all relevant business associations (BITKOM, VDI, VDE, VDMA, ZVEI). The roadmap has been published in December 2009 and is used as a guideline for future R&D activities in the area of Embedded Systems. In this keynote the content of the roadmap was presented (sociatal and econimic challenges, contribution of Embedded Systems in overcoming these challenges, technology and process innovations needed, recommendations for politics and industry) and its roll-out in future R&D activities was shown. http://www.cosine-ist.org/index.php?id=18

Invited talk: BITKOM Symposium Embedded Systems

Berlin, Germany – November 4th 2010

Werner Damm gave a talk on "Challenges and Strategic Research Topics"

http://www.bitkom.org/de/veranstaltungen/62218_65424.aspx

TRENTO:

Key Note: DATE 2010, Everything is Connected.

Dresden, March 9, 2010

Alberto Sangiovanni Vincentelli gave one of the two key notes at DATE, a leading conference in design technology with more than 1,000 attendants. The talk was about the importance of distributed systems in the world of the future, what problems we may have to face in this world and how to design complex distributed systems. http://www.ecsi.org/date-2010-conference

Key Note: Plenary Talk at the CPS week in Stockholm, Cyber Physical Systems: the Dream of Dr. Frankenstein

Stockholm, April 14, 2010

Alberto Sangiovanni Vincentelli gave one of three Plenary Talks at CPS week 2010 that hosted 5 conferences and several workshops. The talk was about forward looking applications of Cyber Physical Systems and methodology to reduce the complexity of the design.
http://www.kth.se/ees/omskolan/organisation/centra/access/dls/cpsweekplenary-1.58510?l=en_UK

Key Note: 2010 Symposium on Industrial Embedded Systems (SIES) Conference, Connections, connections and connections. The problems of the embedded systems of the future

Trento July 7th, 2010

Alberto Sangiovanni Vincentelli gave the key note at the Conference stressing the problems that stem from emerging behavior of widely distributed embedded systems.

http://events.unitn.it/en/sies2010

Key Note: Emerging Technologies and Factory Automation (ETFA) 2010, Distributed System Design: A Nightmare 'in fieri'

Bilbao, September 14, 2010

Alberto Sangiovanni Vincentelli gave a key note at the Conference addressing the nightmares that may ensue from the distributed system design problems.

http://www.etfa2010.org/

Key Note: IEEE System on Chip Conference (SOCC) 2010, SoC Design as an Example of Component-Based Design of Distributed Systems

Las Vegas, September 27, 2010

Alberto Sangiovanni Vincentelli gave the key note at the main conference on systems on chip outlining the need for a rigorous component-based design methodology to address the design of very large chips.

http://www.ieee-socc.org/SOCC2010/Program/program.html

Key Note: IEEE International Behavioral Modeling and Simulation Conference, Away from Plug and Pray towards Plug and Play in Analog-Mixed Signal Design: A Tale of Design Re-use

San Jose', September 24, 2010

Alberto Sangiovanni Vincentelli gave the key note at this mainly analog design conference stressing the need for compositional reasoning in analog design thus enabling a better approach to analog design re-use.

http://www.bmas-conf.org/program.html

Tutorials: Model Based System Engineering at the 2010 Control and Decision Conference (CDC)

Atlanta, Georgia – December 15th-19th, 2010

Alberto Sangiovanni Vincentelli co-organized and co-chaired with John Baras of University of Maryland two tutorial sessions at the CDC 2010 where he also presented two talks on Platform-Based Design and Model Based Design in the context of industrial applications.

Workshop: Green and Smart Embedded System Technology: Infrastructures, Methods and Tools (GREEMBED) at the Cyber-Physical System Week

Organizing committee, general chairs, Alberto Sangiovanni Vincentelli, Huascar Espinoza, Marco Di Natale, Roberto Passerone

Stockholm, Sweden, April 12th, 2010,

Efficient production, transmission, distribution and use of energy are fundamental requirements for our modern society and the challenge of a green, low carbon economy. Embedded systems have an important role to play in increasing the energy efficiency and in reducing carbon emissions to sustainable growth. Indeed, most systems for monitoring and control of energy production, distribution and use are today interconnected and controlled by embedded devices, in areas such as industrial manufacturing, transportation systems, building automation, domestic appliances and more. This offers the opportunity for the creation of new integrated systems offering new products, processes and services with greater efficiency and better situation awareness to end-users and service and infrastructure owners.
http://www.artist-embedded.org/artist/Overview,1928.html

Panel: **2010 Design Automation Conference, Designing the Always-Connected Car of the Future**
Anaheim, California, June 15th, 2010
The panel was co-organized and chaired by Alberto Sangiovanni Vincentelli. The automotive industry is introducing novel features, such as seamless vehicle-to-vehicle and vehicle-to-infrastructure connectivity to improve in vehicle driver safety (e.g., forward collision) and comfort (e.g., routing to avoid congestion) while facing stricter government regulations, and shortened time-to-market. As a result, automotive Electronic Control System (ECS) architectures are becoming increasingly complex.
http://www.dac.com/conference+program.aspx

Workshop: IWBDA: International Workshop on Bio-Design Automation at 2010 DAC
Anaheim, California, June 14th
Alberto Sangiovanni Vincentelli co-organized and chaired the panel on the future of the field in synthetic biology. The Second International Workshop on Bio-Design Automation (IWBDA) at DAC brought together researchers from the synthetic biology, systems biology, and design automation communities. The focus is on concepts, methodologies and software tools for the computational analysis of biological systems and the synthesis of novel biological systems. Still in its early stages, the field of synthetic biology has been driven by experimental expertise; much of its success has been attributable to the skill of the researchers in specific domains of biology. There has been a concerted effort to assemble repositories of standardized components. However, creating and integrating synthetic components remains an ad hoc process. The field has now reached a stage where it calls for computer-aided design tools. The electronic design automation (EDA) community has unique expertise to contribute to this endeavour. This workshop offered a forum for cross-disciplinary discussion, with the aim of seeding collaboration between the research communities.
http://cctbio.ece.umn.edu/wiki/index.php/IWBDA:International_Workshop_on_Bio_Design_Automation

Workshop: Software Synthesis, as part of ESWEEK, co-organized by A. Sangiovanni Vincentelli and P. Marwedel
Phoenix, US, October 2010
An increasing amount of software is not written manually any more. Rather, software is synthesized from abstract models of the required functionality. As a result, the effort of generating software is reduced and software verification typically becomes easier.
Software synthesis has been implemented in various disperse communities. The workshop aims at bringing these communities together and at identifying research problems which should be addressed by the scientific community. http://www.esweek.org/

TU Dortmund:

Forum: ICT 4 Energy Efficiency
Brussels, Belgium – Feb. 23rd, 2010
IMEC representatives and P. Marwedel participated at a forum on energy efficiency organized by the Commission of the European Communities. The goal was to provide a contribution in the area of energy efficiency for embedded systems.

Forum: Cebit
Hannover, Germany – March 9th, 2010
P. Marwedel participated at a panel at the Cebit fair. The purpose was to contribute an embedded systems view on energy efficiency issues of ICT.

Workshop: Industrial Workshop
Stockholm, Sweden – April 12th, 2010
L. Thiele, P. Marwedel, AbsInt and other members of the PREDATOR project organized an industrial workshop during the Cyber-physical systems week.

Workshop: 10th International Workshop on Worst-Case Execution Time Analysis, 2010
Brussels, Belgium – July 6th, 2010, in connection with ECRTS 2010
Objectives for the meeting: To present and discuss recent work in WCET analysis of all kinds of systems by static or dynamic methods.

Organizer: Björn Lisper (Mälardalen)
Other participants: About 35
Conclusions: this year, the workshop had several contributions concerning WCET analysis for multicore systems, and the use of model checking techniques for timing analysis, in addition to the more traditional timing analysis topics. An invited talk by Dr. Jean Souyris from Airbus gave an industrial perspective on timng analysis of safety-critical software.

http://www.artist-embedded.org/artist/-WCET-2010-.html

Tutorial: Model-Based Embedded Systems Design

Rabat, Morocco – July 12th, 2010

P. Marwedel presented a full-day tutorial on model-based design of embedded systems at the first African ArtistDesign Summer School.

http://www.artist-embedded.org/artist/Overview,1958.html

Workshop: 2nd Workshop on Software Synthesis, 2010

Scottsdale, US, – October 29th, 2010

Objectives for the meeting: An increasing amount of software is not written manually any more. Rather, software is synthesized from abstract models of the required functionality. Software synthesis has been implemented in various disperse communities. The workshop aimed at bringing these communities together.
Organizer: Peter Marwedel (TU Dortmund); Alberto Sangiovanni-Vincentelli
Other participants: About 10
Conclusions: Presenters at this workshop presented industrial as well as academic results. Attendees agreed on the necessity of more work in this area.

http://www.artist-embedded.org/artist/-WSS-10-.html

USAAR:

Workshop: Industrial Workshop at CPSWEEK2010

An industrial workshop was held at CPSWEEK 2010 in Stockholm. The second half of the workshop was devoted to predictability results. The purpose of the event was raising awareness in the industry to the problems of predictability.

6. ArtistDesign Web Portal

6.1 Objectives and Background Information

The ArtistDesign Web Portal is a major tool for Spreading Excellence within the Embedded Systems Community. Its aim is rather ambitious: to be the focal point of reference for events and announcements of interest to the embedded systems community.

The web portal disseminates information about contacts (ArtistDesign core and affiliated partners), the ArtistDesign JPA activities, as well a fairly thorough set of links to sites of interest to the embedded systems community.

As can be seen, a great deal of effort has been put into the web site, both for ergonomics / graphical quality, as for the contents.

The web site includes several features that help keep it coherent and up to date:

- Authorised users (principally, the ArtistDesign partners) can access the back end of the site to modify and update information directly. The changes are immediately visible on the site, which greatly streamlines the updating process.
- It's possible to track changes and go back to previous versions of individual web pages.
- Events are automatically sorted by date, and transferred to 'Past Events'. When appropriate.
- Structural information (hierarchy of pages) is maintained automatically.
- Ergnomics are set for the entire site. The "look and feel" of the site is always homogeneous thoughout the site. It's possible to change these ergonomics, and these changes are applied homogeneously throughout the site, via automated machanisms.
-

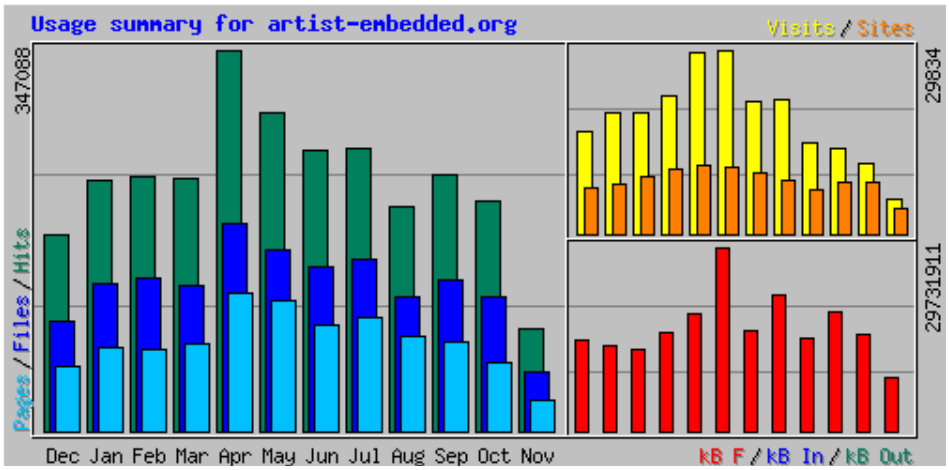
6.2 Structure

The structure of the ArtistDesign web site is visible on the Site Map: http://www.artist-embedded.org/artist/spip.php?page=plan).

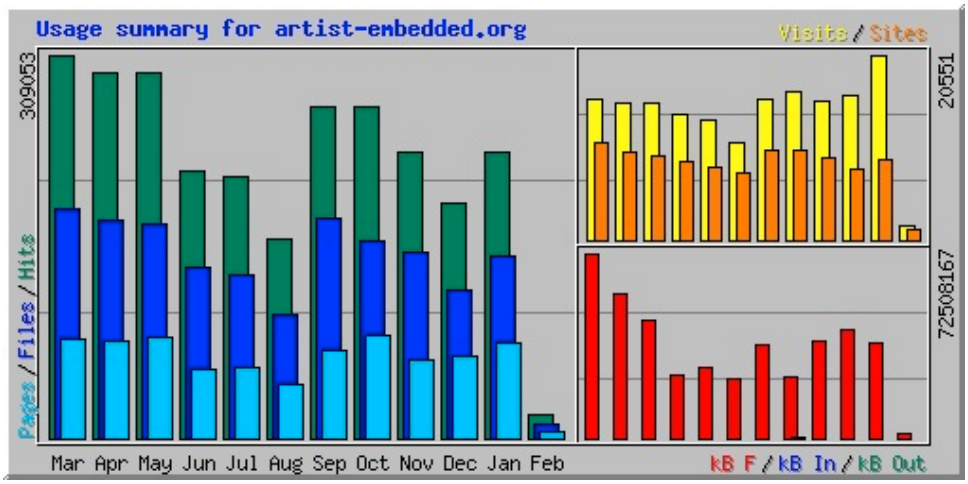
6.3 Analysis of Visits to the Portal

6.3.1 Number of Visits Overall

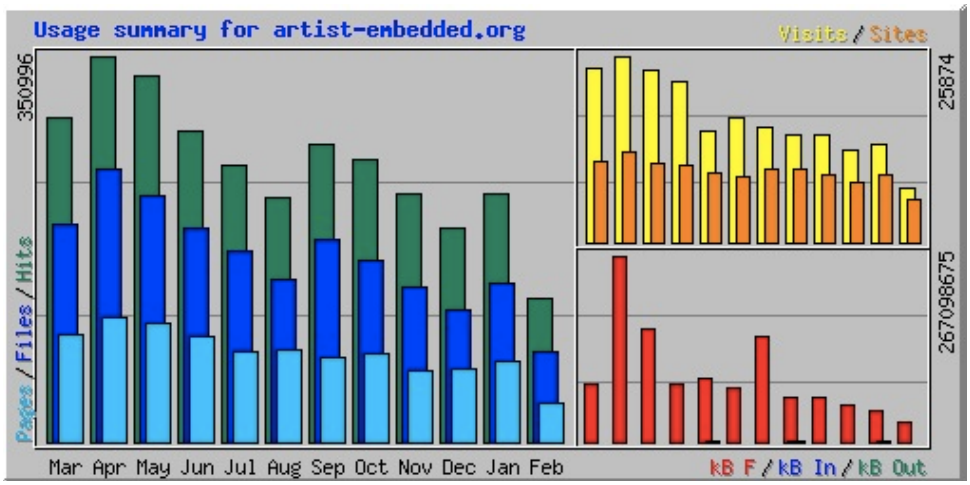
Year 1



Year 2



Year 3



The main conclusion from this analysis is that visits to the site are largely driven by the ARTIST events organised (workshops, conferences, schools), and that this drives visits to the other sections: “Embedded Systems Links”, and “Research and Integration”.

Overall, Year1 and Year3 saw a greater number of visits to the web portal than in Year2.

Such yearly variations do not necessarily imply that the portal has had less impact. For example, if key information (eg: the program or registration or venue) is missing from a workshop page, then it can logically be expected that visitors will return often, generating *more* traffic for what is, finally, *lower* impact and useability.

It is important to note that a deep analysis of the pertinence and effectivity of the web portal would need to go beyond the numerical analysis provided here. The real impact of a website is in whether or not the members of the community find the information relevant, and how it helps them in their daily tasks.

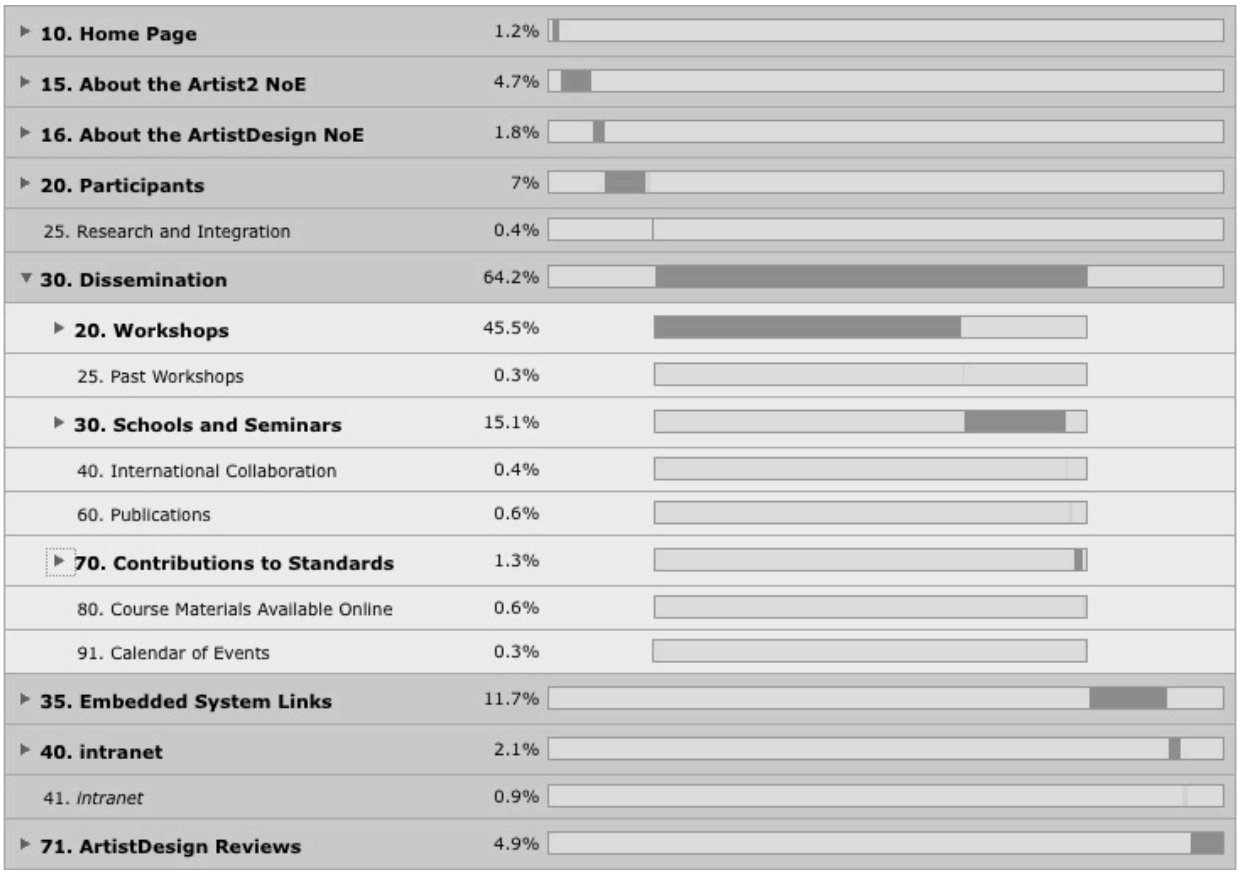
6.3.2 Visits Distribution within the site

The tables below show the distribution of visits to the various parts of the portal.

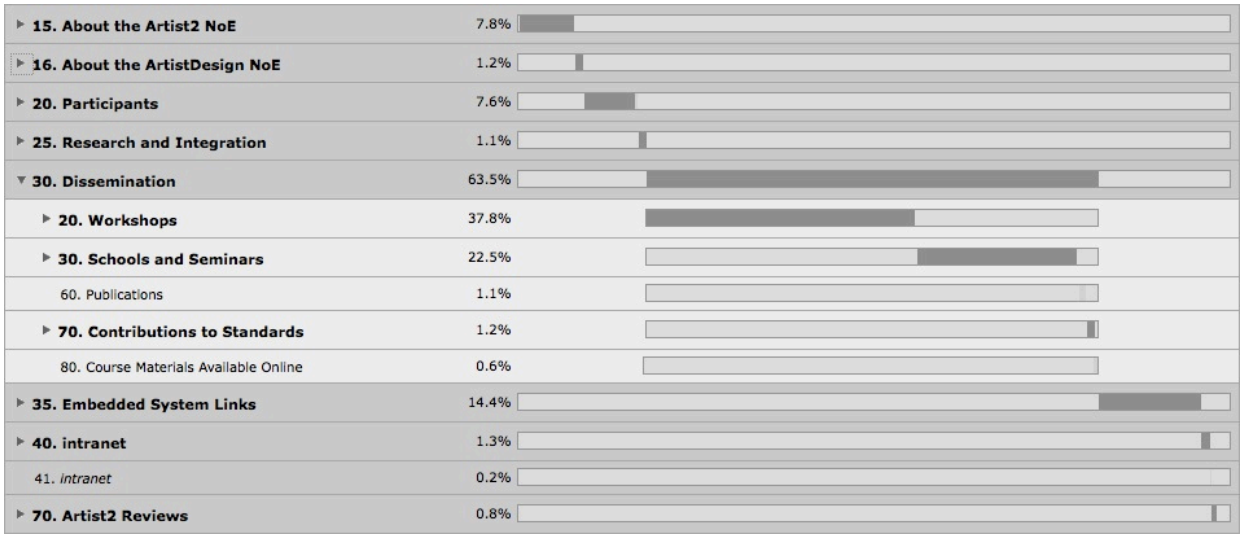
Year 1

▶ 15. About the Artist2 NoE	1.5%
▶ 20. Participants	10.8%
▶ 25. Research and Integration	7.4%
▼ 30. Dissemination	54.5%
▶ 20. Workshops	31.7%
▶ 30. Schools and Seminars	19.1%
60. Publications	2.1%
▶ 70. Contributions to Standards	1.6%
▼ 35. Embedded System Links	20.4%
10. Journals	2.5%
▶ 20. Conferences	1.8%
30. Standards	0.7%
▶ 35. Tools and Platforms	3.7%
▶ 40. Main Projects	2.7%
50. Position Papers	1.2%
55. Roadmaps	0.9%
60. Newsletters and Magazines	1%
▶ 70. Announcements	5.6%
▶ 40. intranet	1.1%
▶ 70. Artist2 Reviews	3%
71. ArtistDesign Reviews	0.6%
76. Reporting on Mobility	0.7%

Year 2


10. Home Page 1.2%
15. About the Artist2 NoE 4.7%
16. About the ArtistDesign NoE 1.8%
20. Participants 7%
25. Research and Integration 0.4%
30. Dissemination 64.2%
20. Workshops 45.5%
25. Past Workshops 0.3%
30. Schools and Seminars 15.1%
40. International Collaboration 0.4%
60. Publications 0.6%
70. Contributions to Standards 1.3%
80. Course Materials Available Online 0.6%
91. Calendar of Events 0.3%
35. Embedded System Links 11.7%
40. intranet 2.1%
41. Intranet 0.9%
71. ArtistDesign Reviews 4.9%

Year 3


15. About the Artist2 NoE 7.8%
16. About the ArtistDesign NoE 1.2%
20. Participants 7.6%
25. Research and Integration 1.1%
30. Dissemination 63.5%
20. Workshops 37.8%
30. Schools and Seminars 22.5%
60. Publications 1.1%
70. Contributions to Standards 1.2%
80. Course Materials Available Online 0.6%
35. Embedded System Links 14.4%
40. intranet 1.3%
41. Intranet 0.2%
70. Artist2 Reviews 0.8%

7. Joint Papers

7.1 Thematic Cluster: Modeling and Validation

7.1.1 Activity: Modeling

[AJL*10] Andreas Abele, Rolf Johansson, Henrik Lönn, Yiannis Papadopoulos, Mark-Oliver Reiser, David Servat, Martin Törngren and Matthias Weber. The CVM Framework - A Prototype Tool for Compositional Variability Management. VAMOS'2010, 4th Int. Workshop on Variability Modelling of Software-intensive Systems, Linz, Austria, ICB report 37:101-108, ISSN 1860−2770

[BCG+10] Roderick Bloem, Krishnendu Chatterjee, Karin Greimel, Thomas A. Henzinger, Barbara Jobstmann: Robustness in the Presence of Liveness. CAV 2010: 410-424

[BDGLPY10] Gerd Behrmann, Alexandre David, Kim Guldstrand Larsen, Paul Pettersson and Wang Yi. Developing UPPAAL over 15 years. Journal: Software - Practice and Experience, Wiley Publisher, 2010.

[BFLM10] Patricia Bouyer, Uli Fahrenberg, Kim G. Larsen, and Nicolas Markey. Timed automata with observers under energy constraints. In *Proceedings of the 13th ACM International Conference on Hybrid Systems: Computation and Control, HSCC 2010, Stockholm*, pages 61–70. ACM, 2010.

[CDLLPW10] B. Caillaud, B. Delahaye, K.G. Larsen, A. Legay, M.L. Pedersen, and A. Wasowsk. Compositional Design Methodology with Constraint Markov Chains. In International Conference on Quantitative Evaluation of SysTems (QEST'10), Williamsburg, Virginia, USA, September 2010.

[CKSDLLLW11] Benoit Caillaud, Joost-Pieter Katoen, Falak Sher, Benoit Delahaye, Kim G. Larsen, Axel Legay, Mikkel Larsen Pedersen, and Andrzej Wasowski. Abstract probabilistic automata. In *Proceedings of 12th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI)*, 2011

[BJ10] Simon Bliudze, Joseph Sifakis: Causal semantics for the algebra of connectors. Formal Methods in System Design 36(2): 167-194 (2010)

[CdAH10] Krishnendu Chatterjee, Luca de Alfaro, and Thomas A. Henzinger, "Qualitative concurrent parity games," ACM Transactions on Computational Logic, in press.

[CDEH+10] Krishnendu Chatterjee, Laurent Doyen, Herbert Edelsbrunner, Thomas A. Henzinger, and Philippe Rannou, Mean-payoff automaton expressions," Proceedings of the 21st International Conference on Concurrency Theory (CONCUR), Lecture Notes in Computer Science 6269, Springer, 2010, pp. 269-283.

[CDGH10] Krishnendu Chatterjee, Laurent Doyen, Hugo Gimbert, and Thomas A. Henzinger, "Randomness for free," Proceedings of the 35th International Symposium on Mathematical Foundations of Computer Science (MFCS), Lecture Notes in Computer Science 6281, Springer, 2010, pp. 246-257.

[CDH10] Krishnendu Chatterjee, Laurent Doyen, and Thomas A. Henzinger, "Qualitative analysis of partially observable Markov decision processes," Proceedings of the 35th International Symposium on Mathematical Foundations of Computer Science (MFCS), Lecture Notes in Computer Science 6281, Springer, 2010, pp. 258-269.

[CDHR10] Krishnendu Chatterjee, Laurent Doyen, Thomas A. Henzinger, and Jean-Francois Raskin, Generalized mean-payoff and energy games," Proceedings of the 30th Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS), Lecture Notes in Computer Science, Springer, 2010.

[CHJS10] K. Chatterjee, T. A. Henzinger, B. Jobstmann, R. Singh: Measuring and Synthesizing Systems in Probabilistic Environments. CAV 2010: 380-395

[CHP10] Krishnendu Chatterjee, Thomas A. Henzinger, and Vinayak S. Prabhu, "Timed parity games: Complexity and robustness," Logical Methods in Computer Science, in press.

[CFJ*10] Philippe Cuenot, Patrik Frey, Rolf Johansson, Henrik Lönn, Yiannis Papadopoulos, Mark-Oliver Reiser, Anders Sandberg, David Servat, Ramin Tavakoli Kolagari, Martin Törngren, Matthias Weber (invited paper, under review). The EAST-ADL Architecture Description Language for Automotive Embedded Software. Invited chapter in the book Model-Based Engineering of Embedded Real-Time Systems. Holger Giese, Bernard Rumpe, Bernard Schätz (eds). LNCS 6100. 2010

[DLLNWb10] Alexandre David, Kim G. Larsen, Axel Legay, Ulrik Nyman, and Andrzej Wasowski. Timed i/o automata: a complete specification theory for real-time systems. In *Proceedings of the 13th ACM International Conference on Hybrid Systems: Computation and Control, HSCC 2010, Stockholm, Sweden, April 12-15, 2010*, pages 91–100, 2010

[DLLNWc10] Alexandre David, Kim G. Larsen, Axel Legay, Ulrik Nyman, and Andrzej Wasowski. Ecdar: An environment for compositional design and analysis of real time systems. In *Proceedings of 8th International Symposium on Automated Technology for Verification and Analysis (ATVA)*, 2010

[DLNLW10] A. David, K.G. Larsen, U. Nyman, A. Legay, and A. Wasowski. *Methodologies for specification of real-time systems using timed i/o automata.* In Proceedings of FMCO 2009, Lecture Notes in Computer Science. To appear.

[GHKS10] Rachid Guerraoui, Thomas A. Henzinger, Michal Kapalka, and Vasu Singh, "Transactions in the jungle," Proceedings of the 22nd Annual Symposium on Parallel Algorithms and Architectures (SPAA), ACM Press, 2010, pp. 263-272.

[GIKHS10] A. Ghosal, D. Iercan, C.M. Kirsch, T.A. Henzinger, and A. Sangiovanni-Vincentelli. Separate Compilation of Hierarchical Real-Time Programs into Linear-bounded Embedded Machine Code. Science of Computer Programming, 2010.

[MLK10] O. Maler, K.G. Larsen, and B. Krogh. On zone-based analysis of duration probabilistic automata. In *Proceedings of INFINITY, International Workshop on Verification of Infinite-State Systems*, 2010

[PWR*10] Papadopoulos Y. Walker M., Reiser M-O, Weber M., Servat D., Abele A., Johansson R., Lonn H., Torngren M., Sandberg A. Automatic Allocation of Safety Integrity Levels, 8th European Dependable Computing Conference – CARS workshop, Valencia, Spain, April, ACM Publications, 2010.

[SCL*10] Anders Sandberg, DeJiu Chen, Henrik Lönn, Rolf Johansson, Lei Feng, Martin Törngren, Sandra Torchiaro, Ramin Tavakoli-Kolagari, Andreas Abele. Model-based Safety Engineering of Interdependent Functions in Automotive Vehicles Using EAST-ADL2. Safecomp 2010.

[SEV*10] Rickard Svenningsson, Henrik Eriksson, Jonny Vinter and Martin Törngren. Model-Implemented Fault Injection for Hardware Fault Simulation. Models Workshop on Model-Driven Engineering, Verification and Validation (at the Models Conf., Oct. 3, 2010).

[SVE*10] Rickard Svenningsson, Jonny Vinter, Henrik Eriksson, Martin Törngren. MODIFI: A MODel-Implemented Fault Injection Tool. Safecomp 2010.

7.1.2 Activity: Validation

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7.4 Thematic Cluster: Hardware Platforms and MPSoC

7.4.1 Activity: Platform and MPSoC Design

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