



Program
13th IEEE International Symposium on Wearable Computers

4-7 September 2009, **Linz - AUSTRIA**

JKU
JOHANNES KEPLER
UNIVERSITY LINZ

Institute for
Pervasive Computing
Technology for People



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Welcome From Upper Austria



Josef Pühringer
Governor of Upper Austria

Wir in Oberösterreich haben uns das ehrgeizige Ziel gesetzt, bei den Ersten von Morgen dabei zu sein. Kreative Köpfe und gut ausgebildete Menschen im Land brauchen ein Fundament. Wir wollen daher unsere Forschungs- und Entwicklungsquote auf 4 Prozent des regionalen BIPs steigern.

Wer zu den Besten gehören will, muss in einer globalisierten Welt auch seine Türen für die Besten aus aller Welt weit aufmachen. Ich freue mich daher, dass dieses Symposium internationalen Wissenschaftlern ein Forum zum Austausch der neuesten Entwicklungen bietet. Ich heiße alle Gäste in Oberösterreich herzlich willkommen und danke den Veranstaltern für die aufwändigen Vorbereitungsarbeiten. Gemeinsam sorgen sie dafür, dass Zukunft in Oberösterreich bereits etwas früher als anderswo beginnt.

Dr. Josef Pühringer
Landeshauptmann

(Upper Austria has always targeted to be among the first of tomorrow. Creative minds and a highly educated society are fundamental for our country. We therefore will concentrate all our efforts to raise research and development funds to at least 4 % of the countries GDP.

Someone aiming to be among the best in a global world, must open the doors widely - for the best from all over the world. I am pleased, therefore, that this symposium offers an international forum for the exchange of the most novel scientific findings and developments. A warm welcome to all our guests who made their way to Upper Austria, and a thank you to the organizers for their careful prearrangements! It is their effort, to make the future happen in Upper Austria a bit earlier than anywhere else.)

Welcome From Linz

The importance of the Technological Science faculty of the Johannes Kepler University on the international research scene is emphasized by its hosting of the Symposium ISWC 09.

For this reason the city of Linz is happy to make a contribution to the organisation of this prestigious conference. The Director of the Institute for Pervasive Computing at the JKU, Univ.-Prof. Dr. Alois Ferscha, was involved in the conception of the Hotspot Initiative of the city of Linz in 2005. There are already 111 locations throughout the city where free internet surfing via WLAN is possible. It is particularly satisfying that the Kepler University and the Ars Electronica Center regularly co-operate in the realm of information and communications technology. This demonstrates yet again the significance of Linz as a city of technology.

It is an honour for us that Linz has been chosen as the venue for this symposium. I wish you all an interesting and pleasant stay in Linz, the European Capital of Culture in 2009.

Franz Dobusch
Mayor of Linz



Franz Dobusch
Mayor of Linz

Welcomes From the JKU



Ludwig Scharinger
Chairman of the Advisory Board
Johannes Kepler University Linz

Research and development constitutes a major factor in the sustained economic success of our companies. With numerous institutions and bodies such as the Johannes Kepler University and the Ars Electronica Center, Upper Austria and its capital city of Linz, offer an environment in which research, teaching, science and business can interact perfectly in the most modern of manners. In this connection, with unerring aim the Johannes Kepler University of Linz has directed its antennae towards practical matters. Accordingly, university research in Upper Austria has an immediate impact at corporate level. Research and development simultaneously represents a source of impulses, ideas and solutions in both the economic and social fields and as a consequence, the focus upon the realization of university results in practical terms is a major strength of Upper Austria as a business location.

International networking

Owing to the further intensification of teamwork and close co-operation with universities from around the world, the Johannes Kepler University of Linz enjoys an excellent reputation that extends far beyond Austria's frontiers. Particularly within an international context, it is vital that young scientists and innovative research projects be funded and supported. As an innovative research partner to the business sphere, the university has to deal with national and international developments of relevance to public administration and the world of work.

Attention focused on Upper Austria

For some 20 years, scientists have been studying the integration of computer systems into clothing and wearable computers represent a highly specialised and extremely dynamic area of research. With the holding of the 13th IEEE Symposium on Wearable Computers, the Institute for Pervasive Computing of the Johannes Kepler University of Linz has succeeded in focusing the attention of the international computer and communications technology research sector and industry on Upper Austria. The conference will present top international research projects from the wearable computers field, the scientific committee, comprised of some thirty representatives from the world's top research bodies and industrial research laboratories, having secured the outstanding quality of the contributions submitted.

Dr. Ludwig Scharinger

Chairman of the Advisory Board of the Johannes Kepler University of Linz

Welcomes From the JKU

JKU, the Johannes Kepler University Linz is the largest research and teaching institution in Upper Austria, and thus, as a centre of knowledge creation and transfer, contributes to the body of scientific research on an international level, as well as to the sustainable growth of Austria. Besides being engaged in research programmes of excellence worldwide, the JKU has also close links with business and industry and an international network of partners and cooperations. The Faculty of Engineering and Natural Sciences with about 50 departments in the fields of Computer Science, Mechatronics, Information Electronics, Technical Mathematics, Technical Chemistry and Technical Physics employs more than 230 academic staff and has generated more than 4300 graduates over the time span of its existence. Since the year 2000 it hosts the Excellence Initiative "Pervasive Computing", headed by Prof. Ferscha, consolidating the effort of 12 computer science research departments towards the field of Pervasive and Ubiquitous Computing. The Excellence Initiative has been the host of various international conferences and events, the most prominent among them being PERVASIVE 2004, held in Mai 2004 and bringing together more than 550 researchers from all over the world. It is a great pleasure for the JKU, to now host the most distinguished and renowned conference on Wearable Computing, ISWC'09 in cooperation with our strategic partner AEC (the Ars Electronic Center in Linz). The JKU being a first tier research institution in various fields of technology underpinning Wearable Computing research, like e.g. Nano Technology, Plastic Electronics, Surface Optics and Photonics, Smart Garments, Polymer Technologies, Radio and Antenna Design, Embedded Software Technologies, Automated Software Engineering, Energy Efficiency and Solar Systems, to name a few, welcomes you to ISWC'09!

Dr. Richard Hagelauer

Rector, Johannes Kepler University Linz



Richard Hagelauer

Rector

Johannes Kepler University Linz

Although being one of the youngest University in Austria, the Johannes Kepler University Linz has already established its position in research within Austria and at an international scale. Specifically, in the field of Mathematics and Computer Science, the JKU has reached international visibility and reputation as emphasized by numerous collaborations and projects. We strongly encourage and support our researches to engage and participate in services to the scientific community as this further sustains the international network of JKU. One of the effective ways to do this is acting as a host for international scientific events. Therefore I would like to thank the ISWC Scientific community for choosing Linz as location for their 2009 conference, and hope that this is only the starting point for future cooperation's and exchange of research with the Johannes Kepler University.

Dr. Gabriele Kotsis

Vice Rector of Research, Johannes Kepler University Linz



Gabriele Kotsis

Vice Rector of Research

Johannes Kepler University Linz

Message From the General Co-Chairs



Alois Ferscha

Johannes Kepler University Linz
Austria



Gerfried Stocker

Ars Electronica Center Linz
Austria

Welcome to the 13th International Symposium on Wearable Computers in Linz, Austria, welcome to the 30th Anniversary of the Ars Electronica in Linz, welcome to the 2009 Ars Electronica Festival, welcome to Linz 09, Linz 2009 European Capital of Culture, and welcome in the brand new Ars Electronica Center (AEC) – or artistic multimedia monument as we should say!

ISWC is the premier forum for wearable computing and issues related to on-body and worn mobile technologies, bringing together researchers, product vendors, fashion designers, textile manufacturers, users, and related professionals to share information and advances in wearable computing. ISWC'09 in particular attempted to broaden its scope to cooperative wearable systems, i.e. coordinated, spontaneously configured and networked multi-device service ensembles, as well as to include cell phones and the respective services and applications as they have become the most successful wearable computer to date. The ISWC'09 scientific program as it stands is a true and significant advance over what the community has seen as the state of the art, and as you will see from the book you hold in your hands, it lays ground for a whole new epoch of wearable computing research – we are really proud and honored to announce ISWC'09!

The volunteer efforts of many individuals have helped to bring ISWC'09 to success. The program co-chairs, Kent Lyons and Paul Lukowicz, together with a group of very renowned researchers in the Program Committee and far more than a hundred volunteer reviewers have assembled an excellent program that showcases the state-of-the-art in the Wearable Computing field. Lucy Dunny, Rene Mayrhofer and Daniel Roggen as Late Breaking Results Co-Chairs, Antonio Krüger and Horst Hörtner as Video Co-Chairs, Christa Sommerer and Sabine Seymour as Design Contest Co-Chairs as well as Kai Kunze as Proceedings Chair have solicited, discussed, selected, advised and finalized research contributions in the related submission formats, which you find in the Adjunct Proceedings of ISWC'09.

Already back in 2006 we proposed to host ISWC in the year 2009, when Linz was decided to be European Capital of Culture. After many iterations and decisions in the responsible boards and committees, suddenly in Fall 2008 Asim Smailagic, somehow an ISWC master mind, handed all this over to us with a single email containing a couple of hints (noticeably relieved), basically saying that the right things need to be done at the right time ;-). The floor was ours ...

A whole crew of volunteer helpers started to become active at the Institut für Pervasive Computing, University of Linz, and the AEC, among them being Andreas Riener (Publicity Chair), Monika Scholl and Michaela Wimplinger (Local Arrangements), and in their respective roles Jakob Doppler, Judith Luckeneder, Dominik Hochreiter, Gerald Holl, Clemens Holzmann, Bernhard Wally and Doris Zachhuber. There is way too many to list them all, but accentuated must be Bernadette Emsenhuber, an artist of outstanding talent, for her design of the ISWC'09 artwork "Cooperative Wearables", and Michael Matscheko, an exceptionally gifted web engineer, for getting all the ISWC'09 bits and bytes online.

Last, but not at least, it is to say that ISWC'09 would not have come to this point without the endless engagement of our Finance Chair, Vice Rector of Research Prof. Gabriele Kotsis, on an overwhelming, depressing and frustrating front of "Baustellen". Thank you, Gabriele, for rescuing ISWC'09 from a situation of severe threat, and for making us look organized, whenever we weren't. Finally, our deepest thanks go to the people who submitted their research work to ISWC'09, the presenters, attendees and even spectators. Your being here is an indicator for the fact that ISWC is an active and vibrant research community.

The floor is yours - enjoy ISWC'09!

Alois Ferscha and Gerfried Stocker
ISWC 2009 General Co-chairs

Message From the PC Co-Chairs

On behalf of the Program Committee, we would like to welcome you to the Thirteenth International Symposium on Wearable Computers in Linz, Austria.

This year our program continues to represent the great breadth and depth of the wearable computing research field and its ever increasing maturity as a research discipline. We saw a very healthy increase in the number of submissions this year relative to the past few years showing ISWC is still a strong and healthy conference. We received a total of 92 submissions consisting of 47 eight page long papers, 21 four page notes and 24 two page posters. From that pool, the program committee accepted 13 long papers, six short papers and 12 posters. This represents a 28% acceptance rate for long paper submissions and an overall acceptance rate of 34% across all categories. So in addition to increasing the number of submissions this year, we also maintained ISWC's tradition of only accepting strong contributions to the field.

The choice of papers for the final program was the result the hard work of our 137 expert guest reviewers and our 23 technical program committee members who debated the merits and contributions of our numerous submissions. Furthermore, thanks goes to the nine PC members who agreed to help shepherd twelve submissions into their final form. Finally, many thanks go to the organizing committee and the General Chairs for assembling another great ISWC.

Thank you, and please enjoy ISWC 2009!

Kent Lyons and Paul Lukowicz
ISWC 2009 Program Committee Co-chairs



Kent Lyons
Intel Research
USA



Paul Lukowicz
University of Passau
Germany

Message From LBR & Video Chairs



Lucy Dunne
University of Minnesota
USA



Rene Mayrhofer
University of Vienna
Austria



Daniel Roggen
ETH Zurich
Switzerland



Antonio Krueger
DFKI Saarbrücken
Germany



Horst Hörtner
Ars Electronica Center Linz
Austria

Late Breaking Results

This year the IEEE International Symposium on Wearable Computers introduced a new submission category: Late-Breaking Results. The goal of this new category was to provide a forum for presentation of emerging research in very topical issues, innovative but untested ideas, and application-oriented results, in a tightly-focused format. In the tradition of late-breaking results categories, we sought a fresh, innovative, and high-quality program full of exciting ideas.

Our program includes 5 short papers, each focused on an emerging result. They span topics like mobile projected display, activity recognition, and electro-tactile display. The research presented is compelling, but preliminary: representing an interesting first step toward a new research direction. Nonetheless, the review process was rigorous and selective.

Each paper was peer-reviewed in a blind process by a panel of 3 reviewers and subsequently shepherded to assist authors with preparing the final version. We would like to thank the reviewers for their careful and thoughtful feedback, and (in some cases) for their additional support in the revision and shepherding process. We would also like to thank the conference organizers for their forethought in establishing the category and their excellent work in executing another successful ISWC conference. Lastly, thanks to the authors of all of our submissions for their contributions to this new category.

We hope that you will find the LBR category stimulating and thought-provoking. We look forward to many interesting conversations, and to a continued high caliber of work for ISWC 2010!

Lucy Dunne, Rene Mayrhofer, and Daniel Roggen
ISWC 2009 Late-Breaking Results Co-Chairs

Videos

This year the novel video paper track has been introduced to the IEEE International Symposium on Wearable Computing. The main goal of the track is to enable the community to share novel wearable computing systems, devices or just designs, as well as to demonstrate innovative styles of interaction or usability of those systems - in a lively format: as a video. The videos have been shown during the ISWC'09 night show - a special event in the frame of the 30th anniversary of the Ars Electronica and are available on the conference Video DVD. Furthermore, a written summary of each presentation appears in the „Advances in Wearable Computing“ book of the OCG, accompanying the conference proceedings.

We were able to accept five high quality video papers, which have been selected by a committee of international experts of our field and we sincerely hope, that you have enjoyed this new format as much as we did.

Antonio Krüger and Horst Hörtner
ISWC 2009 Video Chairs

Message From Demo & DC Chairs

Demos

The “Demos” category is one of the highlights of each International Symposium on Wearable Computers, providing a stage to show novel, “cool”, wearable computing devices on latest, cutting-edge research.

This years demo category contains 9 contributions covering a wide range of wearable computing related topics, ranging from programmable and RFID-enabled textiles and washable wearables to vibrating belts submitted by art, industry and university research institutions.

Each demonstration submission was reviewed based on the submitted summary and graphical material and was ranked on the basis of “coolness” and relevancy for ISWC - the most suitable submissions were selected for exhibition at the symposium.

We would like to thank the authors for their contribution and the quick response and close collaboration in the shepherding process.

We look forward for a interesting demo session at this years International Symposium on Wearable Computers and hope that ISWC is a successful international forum for the exchange of ideas and results between academia, industry, and art and that it will help to promote further progress in the field of wearable computing.

Enjoy the spirit of Linz and the numerous discussion and networking opportunities!

Andreas Riener
ISWC 2009 Demo Chair



Andreas Riener
Johannes Kepler University Linz
Austria

Design Contest

Interface and interaction design have their roots not only in human computer interaction engineering, but show also strong connections to media art, design and fashion. Products of interactive technologies increasingly spread into our private and professional lives, and fashionable wearables are described as ‘designed’ garments, accessories, or jewelry that combine aesthetics and style with functional technology. Marshall McLuhan had long ago promised such a synergy. He writes that “the electric age ushers us into a world in which we live and breathe and listen with the entire epidermis”.

The expressive value of fashionable wearables can be greatly heightened by the integration of technology. By incorporating electronics into a garment or the use of novel materials we can transform traditional fashion elements such as color, texture, and cut to include movement, touch, light, sound, and interactivity as new aesthetic interaction interfaces. Our clothing, accessories, and jewelry are the epidermal interfaces with which we can experience the world.

The Design Contest at ISWC2009 is a platform to showcase various such explorations that focus as much on the design aspect as on the appropriate technical advances.

Christa Sommerer und Sabine Saymour
ISWC 2009 Design Contest Chairs



Christa Sommerer
University of Art Linz
Austria



Sabine Seymour
Moondial
Austria

Committees

Organizing Committee

Conference Co-Chairs

Alois Ferscha, Johannes Kepler University Linz, Austria
Gerfried Stocker, Ars Electronica Center, Austria

Program Committee Co-Chairs

Kent Lyons, Intel Research, USA
Paul Lukowicz, University of Passau, Germany

Late Breaking Results Co-Chairs

Lucy Dunne, University of Minnesota, USA
Rene Mayrhofer, University of Vienna, Austria
Daniel Roggen, ETH Zurich, Switzerland

Video Co-Chairs

Antonio Krüger, DFKI Saarbrücken, Germany
Horst Hörtnner, AEC Linz, Austria

Design Contest Co-Chairs

Christa Sommerer, University of Art and Design Linz, Austria
Sabine Seymour, Moondial, Austria

Demo Chair

Andreas Riener, Johannes Kepler University Linz, Austria

Proceedings Chair

Kai Kunze, University of Passau, Germany

Financial Chair

Gabriele Kotsis, University of Linz, Austria

Publicity Chair

Andreas Riener, Johannes Kepler University Linz, Austria

Web and Artwork Co-Chairs

Bernadette Emsenhuber, University of Linz, Austria
Michael Matscheko, University of Linz, Austria

Local Arrangements

Monika Scholl, University of Linz, Austria
Michaela Wimplinger, Ars Electronica Center, Austria

Program Committee

Oliver Amft, ETH Zurich, Switzerland

Michael Beigl, TU Braunschweig, Germany

Leah Buechley, MIT, USA

Lucy Dunne, University of Minnesota, USA

Steve Feiner, Columbia University, USA

Jennifer Healey, Intel, USA

Holger Kenn, Microsoft EMIC, Germany

Cornel Klein, Siemens CT SE 2, Germany

Tom Martin, Virginia Tech, USA

Kenji Mase, Nagoya University, Japan

Joe Paradiso, MIT, USA

Cliff Randell, University of Bristol, UK

Daniel Roggen, ETH Zurich, Switzerland

Joachim Schaper, SAP, Germany

Bernt Schiele, TU Darmstadt, Germany

Dan Siewiorek, Carnegie Mellon University, USA

Asim Smailagic, Carnegie Mellon University, USA

Mark Smith, KTH, Sweden

Thad Starner, Georgia Tech, USA





Bruce Thomas, University of South Australia, Australia

Kristof Van Laerhoven, TU Darmstadt, Germany

Roy Want, Intel Research, USA

Jamie Ward, Lancaster University, UK

Program at a Glance

	Friday September 4	Saturday September 5	Sunday September 6	Monday September 7
	 LINZ'09 Side Events	 LINZ'09 Side Events	 LINZ'09 Side Events	 LINZ'09 Side Events
08:00		Registration Open	Registration Open	Registration Open
08:30				
09:00		Opening Ceremony		
09:30				
10:00		Keynote (Joe Paradiso, MIT)	Session 3 (HCI)	Session 5 (Systems and Applications II)
10:30				
11:00		Coffee Break	Coffee Break	Coffee Break
11:30				Design Contest (Gadget Show)
12:00	Registration Open	Session 1 (Systems and Applications I)	Session 4 (Context)	
12:30				Keynote (D.K. Arvind)
13:00				
13:30		Lunch	Lunch	Lunch
14:00				
14:30				
15:00	Tutorials (3 parallel tracks)	Session 2 (Smart Textiles)	Late Breaking Result	Closing Ceremony & Business Meeting
15:30				
16:00	Coffee Break	Coffee Break	Coffee Break	
16:30	Tutorials (3 parallel tracks)	1 Minute Madness	Videos	
17:00				Ars Electronica Center Tour
17:30		Posters	Demos	
18:00				
18:30				
19:00				
19:30	Prix Ars Electronica Gala			
20:00				
20:30		Klangwolke: The Flood	Conference Banquet	
21:00				
21:30				
22:00				

General Information

Opening Hours

Friday	12:00 - 19:30
Saturday	08:00 - 18:30
Sunday	08:00 - 18:30
Monday	08:00 - 18:30



Registration

The registration desk is located at the first basement of the Ars Electronica Center. Use the blue (left) stairs to reach the registration desk. All conference participants who have not picked up their registration package before the tutorials have to present themselves at the registration desk prior to being allowed to attend the sessions.

Coffee Breaks & Lunch

Coffee & Sweets are offered in front of the lecture room during coffee breaks.

Lunch is included in the respective registration fees. Lunch buffets are offered on September 5 - 7 in the Landgraf Loft of the Hotel Landgraf which is the building after next building of the Ars Electronica Center. Hold the attached lunch vouchers prepared at entry.

Smoking Policy

ISWC'09 is a smoking-free conference. Smoking is only permitted outside the building.

Internet over WLAN

The AEC-Network provides open access to the internet over WLAN.

Electricity Supply

Electricity in Austria is supplied at 220V. Please make sure that you bring your adaptors or transformer if needed. We cannot guarantee the availability of appropriate adaptors or transformers.

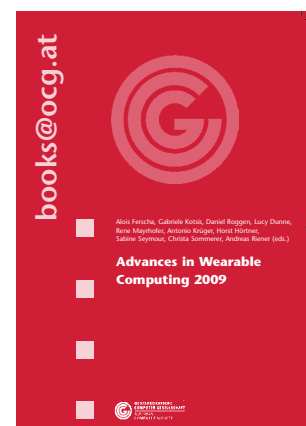
Journal Issues

The ISWC'09 Proceedings will be published by IEEE Computer Society Press as print proceedings, and on-line via IEEE Xplore Digital Library (approval pending). The ISWC'09 Adjunct Proceedings will be published by the OCG, an ISBN carrying publisher, in the book "Advances in Wearable Computing".

ISWC'09 Hotline

+43 664 23 21 299

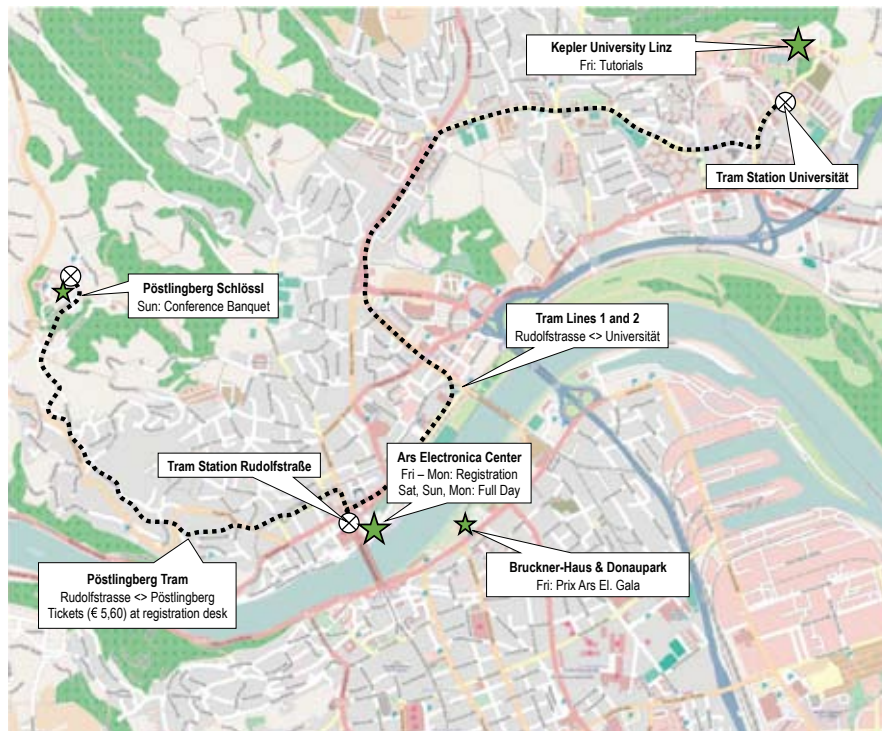
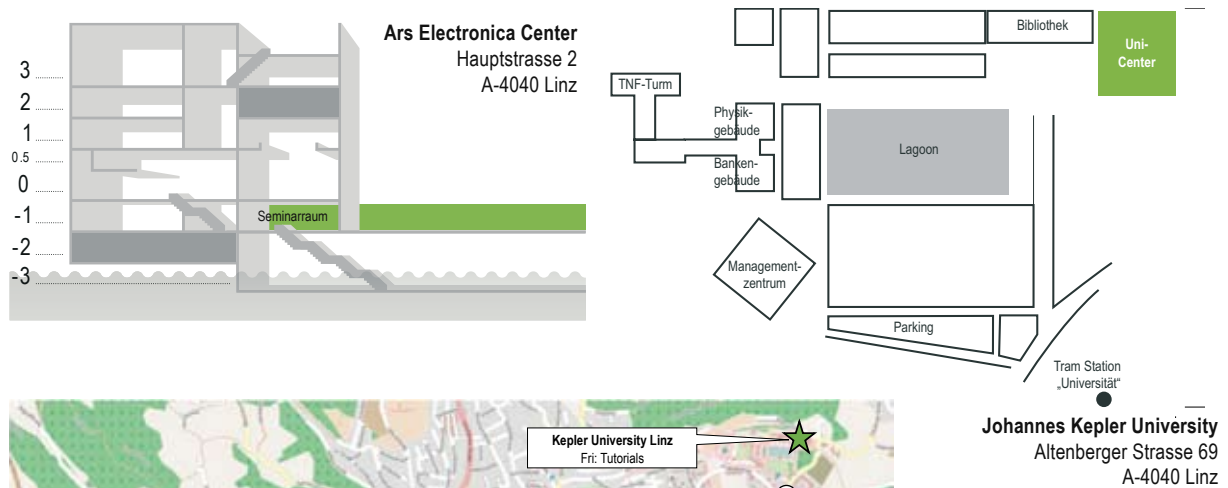
Andreas Riener



General Information

Location

The main conference will be held in the **Ars Electronica Center**. Point of interest is the **Seminarraum**, 1st basement. The tutorials will be held at the **Johannes Kepler University Linz, Uni Center Building**, 2nd floor.



Public Transportation

Linz AG Lines
www.linzag.at/linz/index_en.htm

Transport

Please use the attached tram Linz AG Line plan to find the way from your hotel to the conference side.

To the Ars Electronica Center: Tram No. 1, 2, 3 Station: Rudolfstraße

To the Johannes Kepler University Linz: Tram No. 1, 2 Station: Universität

To the Bruckner House: 17 min. walking distance

To the Pöstlingberg Schlössl: Bus No. 50b or Pöstlingberg Tram No. 50



Pöstlingberg Tram



Joe Paradiso
MIT Media Laboratory

A Decade of Exploration of Diverse Applications in Wearable Sensing

Although Wearable Computing has somewhat entered the mainstream through ubiquitous mobile devices, the predictions put forward by the wearable research community since its inception of a distributed wearable architecture that co-perceives the user's local environment and responds appropriately through a variety of channels hasn't yet materialized. Low power systems and lightweight networking strategies point the way to this transition however, and research is exposing vivid realizations that show the potential in uniting networked wearable systems to pervasive responsive media scattered throughout the environment - interfacing humans to the ubiquitous electronic „nervous system“ that sensor networks will soon extend across things, places, and people. This talk will overview work in happening in the MIT Media Lab's Responsive Environments Group that has explored aspects of this frontier, including „Cross Reality“ systems (integration of ubiquitous sensor/actuator networks with heavily populated online virtual worlds), using wearables to control pervasively captured and interactive media, controlling building utilities through wearable systems, and diverse applications of wearable sensing in medicine and interactive music/media performance.

Brief Biography

Joseph Paradiso is an Associate Professor of Media Arts and Sciences at the MIT Media Laboratory, where he directs the Responsive Environments group, which explores how sensor networks augment and mediate human experience, interaction, and perception. In addition, he co-directs the Things That Think Consortium, a group of industry sponsors and Media Lab researchers who explore the extreme fringe of embedded computation, communication, and sensing.

After two years developing precision drift chambers at the Lab for High Energy Physics at ETH in Zurich, he joined the Draper Laboratory, where his research encompassed spacecraft control systems, image processing algorithms, underwater sonar, and precision alignment sensors for large high-energy physics detectors. He joined the Media Lab in 1994, where his current research interests include embedded sensing systems and sensor networks, wearable and body sensor networks, energy harvesting and power management for embedded sensors, ubiquitous and pervasive computing, localization systems, passive and RFID sensor architectures, human-computer interfaces, and interactive media. He has authored 200 articles and technical reports on topics ranging from computer music to power scavenging.

After receiving a BS in electrical engineering and physics summa cum laude from Tufts University, Paradiso became a K.T. Compton fellow at the Lab for Nuclear Science at MIT, receiving his PhD in physics there for research conducted at CERN in Geneva.

Wearable Computing: When Aspiration Meets Reality

Research in Wearable Computing has made good progress in recent years. There is, however, still a deficit between the aspiration for unobtrusive, extended-wear, on-body network of wireless sensors, which is context-aware and which operates in a “smart” environment, and the realities of sensor device miniaturization and battery lifetimes.

We will explore the potential of using wireless sensor networks in Wearable Computing, which is tempered by our experiences of research in Speckled Computing (www.specknet.org). The talk will be illustrated with videos of examples of applications of Speckled Computing in 3-D animation, healthcare, human-robot interface, and sports.

Brief Biography

DK Arvind is a Reader in the School of Informatics at the University of Edinburgh, Scotland, United Kingdom, and CITRIS Visiting Professor at the University of California at Berkeley (2007-11). He was previously for four years a Research Scientist in the School of Computer Science, Carnegie-Mellon University, Pittsburgh, USA. He is the founder Director and Principal Investigator of the Research Consortium in Speckled Computing (www.specknet.org) – a multidisciplinary grouping of computer scientists, electronic engineers, electrochemists and physicists drawn from five universities, to research the next generation of miniature wireless sensor networks. The Consortium has attracted research funding in the excess of £5.2 Million since 2004 from the Scottish Funding Council, and the UK Engineering and Physical Sciences Research Council (equivalent of the National Science Foundation in the US). In the past his research has been funded by EPSRC, US Office of Naval Research, Scottish Enterprise/Cadence Design Systems, Sharp, Hitachi, Panasonic/Matsushita, Agilent, ARM and SUN Microsystems. His research interests include the design, analysis and integration of miniature networked embedded systems which combine sensing, processing and wireless networking capabilities.



D.K. Arvind
School of Informatics
University of Edinburgh

Friday, September 4, 2009

12:00 - 18:00	Registration
14:30 - 16:00	Tutorials
16:00 - 16:15	Coffee Break
16:15 - 17:30	Tutorials
18:30 - 21:00	Prix Ars Electronica Gala

The program starts at 2.30 pm with the Tutorials. In the evening - at 6.30 pm - the „Prix Ars Electronica Gala“ takes place in the Brucknerhaus.

Tutorials

14:30 - 16:00

Speckled Computing

D.K. Arvind (School of Informatics, University of Edinburgh)

16:15 - 17:30

The Future of Mobile Map Interaction - GIS meets wearable computing

A. Krueger (German Research Center for Artificial Intelligence (DFKI))

Building activity recognition applications for the iPhone platform

K. Kunze, D. Bannach (ESL, University of Passau)

Prix Ars Electronica Gala

18:30 - 21:00

During the Ars Electronica Festival in September, the Golden Nicas, Awards of Distinction and Honorary Mentions are awarded with pomp at the Ars Electronica Gala. The winners of the Golden Nicas and Awards of Distinction are also invited to present their projects at the Prix Ars Electronica Forums which are held over a number of days. Webcasts of these forums are available at www.aec.at.

Speckled Computing

Abstract

A specknet is a collection of autonomous specks which provides distributed services: each speck is capable of sensing and processing the data under program control; the specks themselves are connected as a mobile wireless network which processes information in a distributed manner.

Specknets link the digital world of computers to the physical world of sensory data. A network of wearable Orient specks, for example, is capable of tracking the orientation of the body parts, or the position of the person in the environment, and this information can be stored, manipulated and accessed remotely over the internet.

The tutorial will cover three aspects of Speckled Computing:

- Speck platforms, including the hardware and firmware
- Application of the on-body Orient wireless motion capture system in the healthcare, animation and sports sectors
- The science underpinning the interpretation of sensor data in these applications.

The attendees will have access to the Orient motion capture system and will get hands-on experience in interactive animation of virtual characters and in the real-time control of a bipedal robot performing tasks such as walking, standing on a leg and waving of arms.

Brief Bio of the Presenter

DK Arvind is a Reader in the School of Informatics at the University of Edinburgh, Scotland, United Kingdom, and CITRIS Visiting Professor at the University of California at Berkeley (2007-11). He was previously for four years a Research Scientist in the School of Computer Science, Carnegie-Mellon University, Pittsburgh, USA. He is the founder Director and Principal Investigator of the Research Consortium in Speckled Computing (www.specknet.org) – a multidisciplinary grouping of computer scientists, electronic engineers, electrochemists and physicists drawn from five universities, to research the next generation of miniature wireless sensor networks. The Consortium has attracted research funding in the excess of £5.2 Million since 2004 from the Scottish Funding Council, and the UK Engineering and Physical Sciences Research Council (equivalent of the National Science Foundation in the US). In the past his research has been funded by EPSRC, US Office of Naval Research, Scottish Enterprise/Cadence Design Systems, Sharp, Hitachi, Panasonic/Mastushita, Agilent, ARM and SUN Microsystems. His research interests include the design, analysis and integration of miniature networked embedded systems which combine sensing, processing and wireless networking capabilities.



D.K. Arvind
School of Informatics
University of Edinburgh



Antonio Krueger
German Research Center
for Artificial Intelligence (DFKI)

The Future of Mobile Map Interaction - GIS Meets Wearable Computing

Abstract

Since 6000 years humans have used maps to navigate through space. Since then these maps have been supporting humans to perform a variety of other spatial tasks. Until a couple of decades ago most maps were drawn or printed on a piece of paper (or on material like stone or papyrus) of a certain size. This has changed dramatically. Nowadays most consumed maps are digital and presented on electronic devices. In this tutorial we will extrapolate from this situation and we will explore how the next generation of map devices and interaction styles will look like. This tutorial will explore new possibilities to navigate through maps using physical (whole body) gestures (e.g. multi-touch gestures) and discuss the challenges of map design and which arise from these interaction styles and the implications for the design of GIS software for mobile devices, large-scale multi-touch screens and wearable projectors.

Brief Bio of the Presenter

Antonio Krüger received a diploma in computer science and economics at Saarland University in 1995. Afterwards he joined the Cognitive Science Graduate Programme of the same University and finished it with a doctoral degree in 1999. His doctoral thesis was on the „Automated Abstraction of 3D-Graphics“. He was early involved in several Artificial Intelligence projects at the German Research Centre for AI (DFKI GmbH), and later from 1999-2003 at the Intelligent Systems Lab of Saarland University as a Senior Researcher. In 2000 he co-founded the Universityspin-off Eyed GmbH, a company focusing on mobile computing solutions. Within the company he is responsible for the technology transfer of university research. From 2004 to 2009 he was an associate professor for Geoinformatics and Computer Science at Münster University, Germany. From 2005 to 2009 he was elected managing director of the institute for Geoinformatics at the same University. Since 2009 Antonio Krüger has an appointment as a full professor for Computer Science at Saarland University. At the same time he is the Scientific Director of the „Innovative Retail Laboratory (IRL)“ at the German Research Center for Artificial Intelligence (DFKI) in Saarbrücken, Germany.

Antonio's main research areas are Intelligent User Interfaces and mobile and ubiquitous context-aware Systems. He worked on the automatic generation of graphics for technical documentations, intelligent navigation systems and personalized media generation. In this context he looked at generation processes that take into account both the limited technical resources of output devices and the limited cognitive resources of the users. More recent examples of his research come from the domain of mobile and ubiquitous computing. Here, Antonio is involved in projects on interactive display networks, mobile augmented reality and interactive surface computing.

Antonio is co-organising the annual Smart-Graphics Symposium and served on various program committees in the field of intelligent mobile systems, e.g. Intelligent User Interfaces, User Modeling, Ubicomp, Mobisys, and Pervasive Computing.

He is a designated Program Co-Chair of PERVASIVE 2010.

Building Activity Recognition Applications for the iPhone Platform

Abstract

In this tutorial we will discuss how to leverage the iPhone platform for experimental setups and applications in the field of context and activity recognition.

Starting with a short intro about the capabilities of the iPhone in terms of on-board sensors, computing power and accessibility, we discuss how to deal with context-aware application development for mobile devices. The participants can try to build a recognition system themselves recording sensor data, training classifiers, testing them offline and online.

Brief Bio of the Presenters

David Bannach is a doctoral candidate and a member of the research staff at the Embedded Systems Laboratory of the University of Passau. His research interests focus on software systems for context-aware computing. He received his diploma in computer science from ETH Zurich.

Kai Kunze is a doctoral candidate and a member of the research staff at the ESL University Passau. His research focus includes activity recognition in realistic scenarios, machine learning etc. He received his MSc. in computer science from IU Bruchsal. He interned at Sunlabs Europe, France and PARC, USA.



Kai Kunze

ESL
University of Passau



David Bannach

ESL
University of Passau

Saturday, September 5, 2009

08:00 - 18:00	Registration
08:30 - 09:45	Opening Ceremony
09:45 - 10:45	Keynote
10:45 - 11:15	Coffee Break
11:15 - 13:00	Session 1
13:00 - 14:30	Lunch
14:30 - 16:00	Session 2
16:00 - 16:30	Coffee Break
16:30 - 17:00	One Minute Madness
17:00 - 18:30	Posters
20:00 - 22:00	Klangwolke: The Flood

The Open Ceremony starts at 8.30 am, afterwards the conference will be opened with the first Keynote. After this Session 1 with 3 papers and Session 2 with 4 papers are following. The afternoon will close with "One Minute Madness" at 4.30 pm and the Presentation of Posters at 5 pm. In the evening takes place a great social event within the framework of "30 years Ars Electronica Festival", the "Visualisierte Klangwolke".

Opening Ceremony

08:30 - 09:45

Welcome speech and officially open the conference:

Gerfried Stocker, General Co-Chair, AEC
Richard Hagelauer, Rector, JKU
Alois Ferscha, General Co-Chair, JKU
Kent Lyons and Paul Lukowicz, Program Committee Co-Chairs

Keynote

09:45 - 10:45

A Decade of Exploration of Diverse Applications in Wearable Sensing

Chair: Alois Ferscha

Joe Paradiso (MIT Media Laboratory)

Session 1: Systems & Applications I

11:15 - 13:00

Toward Achieving On-Site Programming

Chair: Asim Smailagic

Tsutomu Terada (Kobe University), Masakazu Miyamae (Westunitis, Co., Ltd.)

A Motion Recognition Method for a Wearable Dancing Musical Instrument

Minoru Fujimoto, Naotaka Fujita, Yoshinari Takegawa, Tsutomu Terada, Masahiko Tsukamoto (Kobe University, Japan)

LifeBelt: Silent Directional Guidance for Crowd Evacuation

Alois Ferscha, Kashif Zia (University of Linz)

Session 2: Smart Textiles

A Coarse Desktop Method for Evaluating Transmission of Vibration Through Textile Layers

Lucy Dunne (University of Minnesota)

14:30 - 16:00

Chair: Thad Starner

Stretchable Circuit Board Technology and Application

Rene Viero, Thomas Löher, Manuel Seckel (TU-Berlin), Christian Dils, Christine Kallmayer, Andreas Ostmann, Herbert Reichl (Fraunhofer IZM)

Inclusion of Fabric Properties in the E-Textile Design Process

Meghan Quirk, Tom Martin, Mark Jones (Virginia Tech)

RFID Textile and Map Making System for Large Area Positioning

Ryoko Ueoka (University of Tokyo), Atsuji Masuda, Tetsuhiko Murakami (Industrial Technology Center of Fukui Prefecture), Hideyuki Miyayama (Medical Japan Co., Ltd.), Hidenori Takeuchi, Kazuyuki Hashimoto (UTIC Co., Ltd.), Michitaka Hirose (University of Tokyo)

One Minute Madness

Posters, Videos and Demos are presented in one minute. Videos and Demos will be fully presented on Sunday, September 6, 16:30 - 18:30.

16:30 - 17:00

Chairs: Andreas Riener
Kristofer Van Laerhoven

Posters

An Exploration of Daily Routine Modeling based on Bluetooth and GSM-data

Ulrich Steinhoff, Bernt Schiele (TU Darmstadt)

17:00 - 18:30

Variability in foot-worn sensor placement for activity recognition

Jakob Doppler, Gerald Holl, Alois Ferscha (Institute for Pervasive Computing), Marquart Franz, Cornel Klein, Marcos dos Santos Rocha, Andreas Zeidler (Siemens AG, Corporate Research and Technologies, CT SE 2)

An Attachable ECG Sensor Bandage with Planar-Fashionable Circuit Board

Jerald Yoo, Long Yan, Seulki Lee, Hyejung Kim, Binhee Kim, Hoi-Jun Yoo (Korea Advanced Institute of Science and Technology)

Towards an Interactive Snowboarding Assistance System

Thomas Holleczeck, Christoph Zysset, Bert Arnrich, Daniel Roggen, Gerhard Tröster (ETH Zurich)

Posters cont.

Which way am I facing: Inferring horizontal device orientation from an accelerometer signal

Kai Kunze (Embedded Systems Lab University Passau), Kurt Partridge (PARC), Bo Begole (PARC), Paul Lukowicz (Embedded Systems Lab University Passau)

Web 2.0 Meets Wearable Augmented Reality

Thuong Hoang, Shane Porter, Benjamin Close, Bruce Thomas (Wearable Computer Lab, University of South Australia)

Heartphones: Sensor Earphones and Mobile Application for Non-obtrusive Health Monitoring

Ming-Zher Poh, Kyunghye Kim, Andrew Goessling, Nicholas Swenson, Rosalind Picard (The Media Laboratory, Massachusetts Institute of Technology)

Psychophysiological body activation characteristics in daily routines

Martin Kusserow (ETH Zurich), Oliver Amft (TU Eindhoven), Gerhard Tröster (ETH Zurich)

Design and implementation of an electronic textile jumpsuit

Tom Martin, Mark Jones, Justin Chong, Meghan Quirk, Kara Baumann, Leah Passauer (Virginia Tech)

A Naïve Technique for Correcting Time-Series Data for Recognition Applications

Tracy Westeyn (Georgia Institute of Technology), Peter Presti, Jeremy Johnson (Interactive Media Technology Center), Thad Starner (Georgia Institute of Technology)

Can a Mobile Phone in a Pocket Reliably Recognize Ambient Sounds?

Tobias Franke, Kai Kunze, Paul Lukowicz, Bannach David (University of Passau)

An extensible toolkit for context-aware mobile applications

Ben Clayton, Richard Hull, Tom Melamed, Rycharde Hawkes (Hewlett-Packard Labs)

Klangwolke: The Flood

20:00 - 22:00

The Klangwolke („cloud of sound“) is an elaborate light and sound show.

Linz is flooded – the KLANGWOLKE 2009 is putting it into the fabric of one of humanity's oldest narratives. Floods of water, floods of information, human floods: different motifs stake out a very large area.

The visualization will start at 9 pm in the Linzer „Donaupark“ (500 m from the conference venue). Best view is on the opposite side of the Danube, near the Brucknerhaus

For more information see <http://www.klangwolke.at/>

Sunday, September 6, 2009

The program starts at 9 am with 2 sessions, each with 4 papers. In the afternoon at 2.30 pm it is time for Late Breaking Results, followed by Demo and Video Presentations. In the evening we plan a conference banquet high above Linz at the Pöstlingberg.

08:00 - 18:00	Registration
09:00 - 10:45	Session 3
10:45 - 11:15	Coffee Break
11:15 - 13:00	Session 4
13:00 - 14:30	Lunch
14:30 - 16:00	Late Breaking Results
16:00 - 16:30	Coffee Break
16:30 - 17:00	Videos
17:00 - 18:30	Demos
19:30 - 22:00	Conference Banquet

Session 3: HCI

Clinical Implementation of a Head-Mounted Display of Patient Vital Signs

David Liu (University of Queensland), Simon Jenkins (Royal Adelaide Hospital), Penelope Sanderson (University of Queensland)

Getting the Picture: Examining how Feedback and Layout Impact Mobile Device Interaction with Maps on Physical Media

Derek Reilly (Georgia Institute of Technology), Kori Inkpen (Microsoft Research), Carolyn Watters (Dalhousie University)

A Comparison of Menu Configurations and Pointing Devices for use with Wearable Computers while Mobile and Stationary

Joanne Zucco, Bruce Thomas, Karen Grimmer-Somers (University of South Australia), Andy Cockburn (University of Canterbury)

Is It Gropable? - Assessing the Impact of Mobility on Textile Interfaces

James Clawson, Clint Zeagler, Scott Gilliland, Nicholas Komor, Noah Posner, Thad Starner (Georgia Institute of Technology)

09:00 - 10:45

Chair: Bruce Thomas

Session 4: Context

11:15 - 13:00

Chair: Steve Feiner

Unsupervised Classifier Self-Calibration through Repeated Context Occurrences: Is there Robustness against Sensor Displacement to Gain?

Kilian Förster, Daniel Roggen, Gerhard Tröster (ETH Zurich)

Multi-Graph Based Semi-Supervised Learning for Activity Recognition

Maja Stikic (Fraunhofer IGD), Diane Larlus, Bernt Schiele (TU Darmstadt)

An Analysis of Sensor-Oriented vs. Model-Based Activity Recognition

Andreas Zinnen, Ulf Blanke, Bernt Schiele (University of Darmstadt)

When Else Did This Happen? Efficient Subsequence Representation and Matching for Wearable Activity Data

Kristof Van Laerhoven, Eugen Berlin, Matthias Altmann (TU Darmstadt)

Late Breaking Results

14:30 - 16:00

Chair: Daniel Roggen

Preliminary Investigation of the Influence of Galvanic Skin Response on Stimulus Perception in Electro-tactile Interfaces

Christina Armstrong, Lucy Dunne (University of Minnesota)

Projection Stabilizing Method for Palm-top Display with Wearable Projector

Teppei Konishi, Keisuke Tajimi, Nobuchika Sakata, Shogo Nishida (Osaka University)

On-Body Multi-Sensor Analysis and Evaluation for Manufacturing Skill Training

Keita Kojima, Kenji Mase, Shogo Tokai (Fukui University), Tetsuya Kawamoto (Chukyo Television), Toshiaki Fujii (Tokyo Institute of Technology)

Preliminary Evaluation of Personal Adaptation Techniques in Accelerometer-Based Activity Recognition

Ren Ohmura, Naoyuki Hashida, Michita Imai (Keio University)

Stabilization Method for a Hip-mounted Projector Using an Inertial Sensor

Keisuke Tajimi, Teppei Konishi, Nobuchika Sakata, Shogo Nishida (Osaka University)

Sunday, September 6, 2009

Videos

Aurelia: The Elegant and Motivating Wearable Clothing

Corey Lee, On Ying Cheng, Denesa Yip, Michael Chui (Simon Fraser University)

16:30 - 17:00

Chair: Antonio Kueger

En passant Pick-up of Digital Give-Aways

Alois Ferscha, Wolfram Swoboda, Christoph Wimberger, Bernadette Emsenhuber (Johannes Kepler University Linz)

Real-time Posture Detection using Body Area Sensor Networks

Muhammad Quwaider, Subir Biswas, Jayanthi Rao, Anthony Plummer, Mahmoud Taghizadeh (Michigan State University)

SPECTACLES - Autonomous Wearable Displays

Alois Ferscha (Johannes Kepler University Linz), Simon Vogl (Research Studios Austria), Bernadette Emsenhuber (Johannes Kepler University Linz)

Sunday, September 6, 2009

Demos

17:00 - 18:30

Chair: Jamie Ward

Don't Code Just Stitch: A Series of Washable, Pre-programmed Hardware Solutions for Wearable Technology

Piem Wirtz, Simon de Bakker, Stan Wannet, Michel van Dartel (V2_ Institute for the Unstable Media, The Netherlands)

Techno-Shugei Club: Electronic-Fabric Crafts Based on the Concept of Device Arts

Tomofumi Yoshida, Kyoko Kasuya (University of Electro-Communications, Tokyo), Sachiko Kodama (Department of Human Communication, Tokyo)

Trikoton. The Voice Knitting Collection.

Magdalena Kohler, Hanna Wiesener, Hannes Nützmann, Achim Amann (University of the Arts, Berlin)

White Pages

Daniel Schulze, Hanna Wiesener (University of the Arts, Berlin)

Web 2.0 Meets Augmented Reality

Thuong N. Hoang, Shane R. Porter, Ben Close, Bruce H. Thomas (Wearable Computer Lab - University of South Australia)

Tactograms for Vibro-tactile Route Guiding

Andreas Riener, Markus Straub, Alois Ferscha (Institute for Pervasive Computing, Johannes Kepler University Linz)

Klight - An interactive dress with a novel stretchable circuit board technology

Christian Dils, Christine Kallmaye, Andreas Ostmann (Fraunhofer IZM), René Vieroth, Manuel Seckel, Thomas Löher (Technical University Berlin)

RFID Textile

Ryoko Ueoka (Research Center for Advanced Science and Technology, the University of Tokyo), Atsuji Masuda, Tetsuhiko Murakami (Industrial Technology Center of Fukui Prefecture, Fukui), Michitaka Hirose (Cyber Interface Laboratory, the University of Tokyo)

Ultrasonic Tag Recognition

Cliff Randell, Paul Duff, Michael McCarthy, Henk L. Muller (Department of Computer Science, University of Bristol)

Conference Banquet

19:30 - 22:00

The banquet will take place in the Pöstlingberg Schlössl (Pöstlingberg Castle) starting at 19:30. The à-la-carte restaurant presents itself in the impressive style at the turn of the 19th century. Particularly the bar, that formerly served as a library, is an eyecatcher.

Transportation

We recommend you enjoy a trip with the Pöstlingberg Tram. It leaves in 30 minute intervals. Round-trip tickets for the Pöstlingberg tram at discounted rates (Euro 5,60) are available at the registration desk. Please hold the exact amount prepared.

Note that the last tram back to the city center leaves at 22:30.

Monday, September 7, 2009

On Monday Session 5 with 4 papers will take place, followed by the Gadget Show and closed with the second Keynote. In the afternoon it's time for the Business Meeting. The conference ends at 4 pm.

08:00 - 12:00	Registration
09:00 - 10:45	Session 5
10:45 - 11:15	Coffee Break
11:15 - 12:00	Design Contest
12:00 - 13:00	Keynote
13:00 - 14:30	Lunch
14:30 - 16:00	Closing Ceremony & Business Meeting
at 16:00	AEC Highlights Tour

Session 5: Systems & Applications II

Development of a Lower Extremity Rehabilitation Aid utilizing an Insole-Integrated Load Sensor Matrix and a Sole-Embedded Measurement Node

Pekka Iso-Ketola, Tapio Karinsalo, Manu Myry, Aki Halme, Timo Salpavaara, Jukka Lekala, Jukka Vanhala (Tampere University of Technology)

Signal Processing Algorithm and Health Care Application for Wearable Sense of Balance Monitoring Headphones

Soichiro Matsushita (Tokyo University of Technology)

Potentials of enhanced context awareness in wearable assistants for Parkinson's disease patients with freezing of gait syndrome

Marc Bächlin, Daniel Roggen, Gerhard Tröster (ETH Zürich), Meir Plotnik, Nir Giladi, Jeffrey Hausdorff (TASMC, Tel Aviv)

A Distributed Wearable, Wireless Sensor System for Evaluating Professional Baseball Pitchers and Batters

Michael Lapinski (MIT Media Lab), Eric Berkson (Mass General Hospital), Thomas Gill (Mass General Hospital), Mike Rheingold (Boston Red Sox), Joseph Paradiso (MIT Media Lab)

09:00 - 10:45

Chair: Tom Martin

Monday, September 7, 2009

Design Contest

11:15 - 12:00

Chairs: Christa Sommerer
Sabine Seymour

DO YOU READ ME? A Pair of Interactive LED Fashion Prototypes

Joe Au, Jin Lam, Raymond Au, Kevin Hui (The Hong Kong Polytechnic University)

Anti-Paparazzi Fashion

Adam Harvey (New York University Interactive Telecommunications Program), Heather Knight (NASA/Jet Propulsion Laboratory), Tom Igoe (New York University Interactive Telecommunications Program)

The Textile Interface Swatchbook: A Toolkit for Creating and Implementing Electronic Fabric Based Interfaces

Nicholas Komor, Scott Gilliland, Clint Zeagler, Thad Starner (Georgia Institute of Technology)

Keynote

12:00 - 13:00

Chair: Gabriele Kotsis

Wearable Computing: When Aspiration Meets Reality

D.K. Arvind (School of Informatics, University of Edinburgh)

Closing Ceremony & Business Meeting

14:30 - 16:00

Come together for last talks and discussions.

AEC Highlights Tour

at 16:00

There will be guided tours for groups of 10 persons of 60 to 90 minutes.

For everyone who likes to enjoy a guided tour through the Ars Electronica Center, please register before at the registration desk and meet at 16:00 the AEC entry hall.

Prix Ars Electronica Gala

During the Ars Electronica Festival in September, the Golden Nicas, Awards of Distinction and Honorary Mentions are awarded with pomp at the Ars Electronica Gala. The winners of the Golden Nicas and Awards of Distinction are also invited to present their projects at the Prix Ars Electronica Forums which are held over a number of days. Webcasts of these forums are available at www.aec.at.



Friday, September 4, 2009
18:30 - 21:00
Brucknerhaus (Bruckner's House)
Untere Donaulände 7, Linz

Klangwolke: The Flood

The Klangwolke ("cloud of sound") is an elaborate light and sound show.

Linz is flooded – the KLANGWOLKE 2009 is putting it into the fabric of one of humanity's oldest narratives. Floods of water, floods of information, human floods: different motifs stake out a very large area.

For quite some time it has now been impossible to overlook or to ignore the warnings. Does Linz, the city on the Danube, have to cleanse and purge itself? Prophecies are doing the rounds; some had better be taken seriously, others are patently absurd. During the day streams of wondrous figures pass through the city. In the shape of animals and creatures of fable they mix with the city's inhabitants. And in the evening, in front of the Brucknerhaus, Armageddon is played out, a dramatic confrontation between catastrophe and salvation. Then come the same questions that attend every great flood: who survives and at what price? One thing is certain: special effects will not be in short supply nor music nor the magic of light; this is what people have come to expect of a self-respecting Cloud of Sound – and Linz can stay Linz for a long time to come, unharmed and open for the future.

The visualization will start at 9 pm in the Linzer „Donaupark“ (500 m from the conference venue). Best view is on the opposite side of the Danube, near the Brucknerhaus

For more information see <http://www.klangwolke.at/>



Saturday, September 5, 2009
20:00 - 22:00
Donaupark (Danubepark)

Conference Banquet

The banquet will take place in the Pöstlingberg Schloßl (Pöstlingberg Castle) starting at 19:30. The à-la-carte restaurant presents itself in the impressive style at the turn of the 19th century. Particularly the bar, that formerly served as a library, is an eyecatcher.

Transportation

We recommend you enjoy a trip with the Pöstlingberg Tram. It leaves in 30 minute intervals. Round-trip tickets for the Pöstlingberg tram at discounted rates (Euro 5,60) are available at the registration desk. Please hold the exact amount prepared.

Note that the last tram back to the city center leaves at 22:30.



Sunday, September 6, 2009
19:30 - 22:00
Pöstlingberg Schloßl

Side Events

Linz is European Capital of Culture 2009



Linz'09
www.linz09.at

No Austrian city has changed as dramatically as Linz has in recent years. Once a nice, quiet commercial town on the banks of the Danube, then the place that Adolf Hitler adopted as his hometown, and later a capital of heavy industry with all the side-effects and risks that entails, Linz today is a modern urban center with a flourishing economy and exceptional quality of life. A city where interesting things are happening and the future is taking shape right now. The mission of Linz 2009 European Capital of Culture is to be a part of this process: an initiative implementing sustainable urban development and a driving force for progress in promising directions. With its lineup of projects, Linz09 is giving a highly diversified narrative account of this city: Linz Welcome, Linz Capital, Linz Power, Linz Travel, Linz World, Linz Memory, Linz Knowledge, Linz Pleasure, Linz Holiday and Linz Dream. Past, present and future are reflected by the diverse facets of this ensemble. Europe and The World are two additional programmatic focal points meant to enable people to really feel the openness of this city. Below is a selection of projects during the conference weekend.

80+1 – A Journey around the World



© Architecture, Diemar Tolierian

Until September 6, 2009
Ars Electronica Center and Linz's
Main Square (Hauptplatz)
www.80plus1.org

Phileas Fogg showed little concern for the actual people or places through which he traveled: He was entirely focused on winning his wager with the club members. Jules Verne's heroes were as much the rail engine and steamship as they were Fogg and his resourceful valet Passepartout. With only small dashes of compassion, anger, and (ultimately) love to keep things spicy, Jules Verne crafted a timely and relevant cliffhanger based almost entirely on new, not yet- familiar technologies. But suppose we were to take a fresh look at Jules Verne's famous narrative and ask: How would we redo it today? What are the new global-scale technologies and what do they enable? What's the wager? What constitutes global-scale meaning and relevance? One answer clearly has to do with the Internet and global networks in general, in that they enable telematics and virtuality to replace physical travel. An 80-day virtual voyage around the world need not be physically contiguous, traveling from physical point to physical point by land, sea, or even air. "Hyper travel" is possible, moving from place to place, perhaps based on theme rather than geography, as quickly as a cut in a movie. The technologies for live, interactive, immersive two-way experiences are worthy of creative exploration.

Ars Electronica Festival



September 3 - 8, 2009
Ars Electronica Center
Everywhere in Linz
<http://www.aec.at/>

In 2009 the ARS ELECTRONICA Festival will remain true to itself – adding only one little twist: the theme will be the future – the future of the world and, embedded in the large picture, the future of Linz. 2009 will be wholly dominated for Ars Electronica by the newly built and massively enlarged 'Museum of the Future' – a venue for exhibitions, events, networking and educational activities as much as for research and development. The new building enables us to address a swathe of new topics and content and to offer a tight schedule of interdisciplinary conferences, exhibitions and workshops. Finally, in 2009, Ars Electronica will also be celebrating the 30th anniversary of its creation. Whilst our history is honoured with a great new digital archive, we will be giving over the Festival for Art, Technology and Society itself entirely to 'Zukunft/Future', which will not only grapple with the great allure of daring extrapolations of the future but also with the concept of the future as such – the way we deal with it and the strongly divergent future perspectives that have their origins in the global civilizations and societies of the 21st century and that, in their turn, reflect back on us. **Free Ars Electronica Festival Pass are included in conference registration.**

The New Ars Electronica Center

Ars Electronica's outstanding international reputation assures it a place in the limelight during Linz's term as European Capital of Culture in 2009. The city is now creating an appropriate architectural setting for this starring role by expanding the Ars Electronica Center. The planning is the work of Treusch architecture, Vienna. A new, multilevel wing is being erected immediately adjacent to the existing building. The two structures will be wrapped in a backlit glass shell that creates a unitary architectural ensemble. This cityscape highlight will function as a transparent light sculpture in its own right and the architectural counterpart of the Lentos across the Danube. The plaza extending parallel to Kirchengasse in the direction of the Parish Church provides the AEC complex with an attractive venue for public events. The eastern end curves upward and features steps/tiered seating; the space directly below this will house the Ars Electronica Futurelab. Generously dimensioned exhibition spaces will be located beneath the plaza. The expanded Ars Electronica Center will feature approximately 6,500 m² of space, almost 4,000 m² more than the current facility. The groundbreaking ceremony on March 1 will get this „construction site of the future“ officially underway. Completion is set for the end of 2008, just in time for the kickoff of the Capital of Culture year.



All the year 2009
Wed - Fri: 9 am to 5 pm,
Sat - Sun: 10 am to 6 pm,
Mon - Tue: Closed

Hauptstrasse 2
4040 Linz

<http://www.aec.at/>

The Inquisitive Museum

Curiosity drives the Lentos Kunstmuseum to get in touch with the world. Creative personalities and artists are cordially invited to come up with new impulses and to engage in brainstorming on the future of the institution ‚museum‘. The museum is a time-hallowed institution. In the course of its very long history its characteristic components, such as the roles played by visitors and staff, its methods of (re)presentation, exhibition techniques, etc. have all tended to become somewhat stereotypical. From time to time it is therefore highly commendable to give fresh eyes from outside the chance to examine the status quo – in order to make changes and surprises possible. In our case it is the Lentos that feels inquisitive and that casts around in search of new projects and sustainable reforms. Its point of departure will be the exchange with visitors on the one hand and a number of different interest groups on the other. This exchange will be underpinned by the conviction that both questioning its purpose and its functions and finding and realizing new definitions are all part of a museum's *raison d'être*. THE INQUISITIVE MUSEUM wants to be taught a lesson or two by its artists and users. The project kicks off with an invitation to artists and groups of artists and creative individuals from Linz, from other parts of Austria and from European countries to focus on the Lentos and feed it with new impulses.



All the year 2009
10 am – 6 pm daily
Thu 10 am – 9 pm

Lentos Kunstmuseum
Ernst-Koref-Promenade 1
4020 Linz

<http://www.lentos.at>

About the Organizers

About the Institute for Pervasive Computing



The Institute for Pervasive Computing (at the Johannes Kepler University Linz, JKU) is among the first research institutions worldwide to address the research issues arising from networked embedded systems being integrated into objects and environments of everyday life systematically and from different angles of perspective. Headed by Alois Ferscha since his start at the JKU in the year 2000, now more than 15 permanent researchers contribute to the lines of research at the department, ranging from Networked Embedded Systems and Architectures (pervasive, mobile, ubiquitous and wearable computing; autonomic computing and wireless embedded systems; ambient intelligence), to Coordination and Interaction (coordination models; cooperative and opportunistic sensing, goal oriented cooperative systems, ensembles of digital artefacts and “networks of things”; implicit and explicit interaction, spontaneous interaction; self-organization and self-management), to Distributed and Embedded Systems Software (programming paradigms, OO distributed software models, component technologies/frameworks, service oriented architectures, multiagent systems, and embedded and real-time software) and Parallel and Distributed (Interactive) Simulations (parallel/distributed discrete event simulation, distributed interactive simulation, web-based simulation, real-time simulation, simulation-aided multiuser environments).

The department has also focussed research activities within the Pervasive Computing domain aligned along Awareness (identity management, localization and positioning, tagging, tracking and authentication), Intelligence (machine learning and pattern recognition, reasoning and planning), Appliances (“smart things”, “smart environments”, tangible interaction, wearable computers), Natural Interfaces (multimodal interaction, gestural interaction, haptics, olfactory interaction) and Software Architecture (middleware, service management, coordination architectures). The department is well interwoven with international (EU funded projects PANORAMA, SOCIONICAL, OPPORTUNITY, Beyond The Horizon, InterLink, CRUISE) and national (funded projects SPECTACLES, PowerSaver, Wireless Campus, MobiLearn) research, but also tight cooperations with industrial stakeholders (SIEMENS Project FACT, IBM Project VRIO). Over the years the department has grown, and two new -more application oriented subinstitutions have been founded: RIPE, the Research Institute for Pervasive Computing in the Softwarepark Hagenberg, and PCA, the Pervasive Computing Applications research studio in Linz and Vienna.

Among the “living” Pervasive Computing system findings are software frameworks for context awareness (Siemens CON) and cooperative sensing (OPPORTUNITY), wearable see through displays (“SPECTACLES”), wearable vibro-tactile notification systems (“LifeBelt”), public community displays with wireless remote controls (“WebWall”, “Digital Graffiti”, “CouponCollector”), geo-enhanced, augmented reality mobile navigation systems (“SmartRoad”, “DigitalPheromones”), RFID based realtime notification systems (Berlin Marathon, Vienna City Marathon), wearable computing and embedded internet application frameworks (“DigitalAura”, “SmartCase”, “DigiScope”), wireless activity recognition systems (“PowerSaver”, “ShoeSensor”, smart “CarKey”), tangible user interfaces (“TA Cube”, “SpaceSwitch”), etc.

The research initiative of the department has lead to a consolidated research program - also at the level of the whole University - the “Exzellenzinitiative Pervasive Computing” (under the leadership of A. Ferscha). By pooling the competencies of about 12 departments at the Science and Engineering school, as for instance system theory and signal processing, integrated circuits (microprocessor techniques), system and software engineering, formal languages and compiler implementation, data analysis and biometrics, network engineering, communication and distributed systems, tele-media and tele-cooperation, computergraphic, augmented reality, knowledge-based systems, and information systems, an important step was set towards the development and establishment of an international scientific theme leadership.

About the Organizers

About the Johannes Kepler University

In 1966, the Johannes Kepler University (JKU) was founded as a college of social sciences, economics and business (Hochschule für Sozial- und Wirtschaftswissenschaften). Today, the JKU is a cutting edge-training centre for 15,000 students, which have the possibility to choose from 22 different fields of study. More than 110 professors and 455 scientific staff members secure an optimal student mentoring relationship at the JKU.

The university's core competencies nowadays lie in Social Sciences, Economics and Business and Law, as well as in Engineering and Natural Sciences. The multidisciplinary variety and interdisciplinary co-operation of these scientific fields of study result in forward-looking synergy effects.

The JKU is one of the younger institutions in the Austrian higher education system and constitutes a new type of university. The university's characteristic basic orientation is determined by multidisciplinary variety and interdisciplinary co-operation in close connection with business and society. The Johannes Kepler University is the only university in Austria to combine this variety within a modern convenient campus setting. The JKU leads the field in the application of the latest information and communication technologies, including the use of multimedia and e-learning-offers as an alternative to the classical on-campus studies, which removes time-related and spatial barriers (i.e. for working students). The implementation of the wireless campus also emphasizes the JKU's pioneering role in this forward-looking sector.

Following the international model, an academic Science Park with a very modern five-building complex and a total usage area of 64,000m² is under development. In total, approx. 1,000 researchers will work in this Science Park. It will contribute significantly to the success of the Johannes Kepler University and to the reputation of the state of Upper Austria.



About the Ars Electronica Center

It's part of Ars Electronica's nature to constantly seek out what's new. In going about this, however, attention is never on art, on technology or on society singly while excluding the other two. Instead, the focus is always on complex changes and interrelationships at the nexus of all three. For three decades now, Ars Electronica has been living out this curiosity, a sense of inquisitiveness that is constantly manifesting itself in new and unexpected ways—as speculative futuristic scenarios or provocative actionism, philosophical debates or analytical scrutiny of current developments. At all times, Ars Electronica defines its artistic-scientific mission as working together with the public as well as working to educate the public. Regardless of periodic changes in content and inevitable structural updates, the fundamental orientation remains the same—the focus is constantly on the issues of critical importance to our society.

The Ars Electronica Center opened in 1996 as a prototype of a "Museum of the Future". Its mission is to utilize interactive forms of mediation. The new Ars Electronica Center is a one-of-a-kind facility. Its uniqueness is betokened by its external form. This bold architectural statement is an instant highlight within the Linz cityscape's ensemble, yet it still sets itself apart at first—none of its edges run parallel, everything appears skewed, elements simultaneously pulling apart and merging together. A structure that's constantly assuming new forms depending on the perspective from which it's viewed. And one that withholds revelation of its scope and dimensions until the moment of direct physical encounter.



Linz – Upper Austria



Linz

No other Austrian city has changed as dramatically as Linz has in recent decades. What's emerged is a modern urban centre with a flourishing economy, a city where the quality of life is exceptional. In 2009, a trip to Linz will be especially rewarding because the city on the Danube will be serving as European Capital of Culture and showing off what makes this such a special place.

The capital of the Province of Upper Austria is situated astride the Danube. With a population of 190.000, Linz is Austria's third largest city and links the Mühlviertel region that stretches north to the Czech border with the rolling hills that extend to the Austrian Alps in the south. The Linz Metropolitan Area is the hub of a thriving regional economy; the number of jobs in Linz exceeds the city's population. Here, technology, industry and high ecological standards are no contradiction: Linz is one of Austria's most environmentally-friendly communities with green spaces making up 60% of the city. Linking up industry, culture and nature will play an essential role in the Linz09 programme.

Upper Austria

Upper Austria is one of the nine federal states of Austria. Upper Austria borders on Germany and the Czech Republic, as well as on the other federal states like Lower Austria, Styria, and Salzburg. With an area of 11,980 km² and 1.3 million inhabitants, Upper Austria is the fourth largest Austrian federal state by land area and third largest by population. It is a big province, divided into very rural areas in its provincial countryside and thoroughly urban places around its industrial hubs. Traditional celebrations and festivals are usually associated with religious ceremonies.

The capital Linz has become an innovative and creative place in the past 20 years. One of the most famous festivals of Austria is held here in summer, the Ars Electronica, a festival of digital art. A different kind of festival can be found in the Salzkammergut: Here the 19th century heritage from the early days of Austria's tourism are celebrated in traditional music performances. The most important one is the Operettenfestival (Operetta festival) of Bad Ischl. Beyond that, the Salzkammergut has a distinct local culture that extends into the Salzburg and Styrian parts of this region – where you find plenty of authentic folk culture.

Attractions of Upper Austria



- Gmunden & Lake Traunsee
- Hallstatt: Old Town, Salt Mines, Lake Hallstättersee
- Mauthausen, former concentration camp
- Baroque Abbeys: St. Florian, Wilhering, Kremsmünster
- Museums: Ars Electronica Center, Lentos, O.K., Schlossmuseum, Nordico
- Salzkammergut: Gosau, Bad Goisern, Bad Ischl
- Steyr & National Park Kalkalpen
- Freistadt & Mühlviertel
- Inn Towns: Braunau, Schärding, Obernberg & Ried
- Almtal Valley: Scenery & Hiking



Artwork by Bernadette Emsenhuber

The Artwork of ISWC'09 suggests wearable computing technology not only serving as single user, but the spontaneous interaction among wearables of multiple users. The green ribbon abstracts everywhere worn technology, which adapt any body shape and part. The poses of the figures and their appearance in a group indicate the prospective new era of wearable computing technology: cooperative wearables.

The photography, made by Rudolf Brandstätter, shows the new Ars Electronica Center finished at the end of 2008, and built as contribution to Linz09. It is the main venue of ISWC'09.

Notes

Friday, September 4		Saturday, September 5		Sunday, September 6		Monday, September 7	
12:00	Registration Open	08:00	Registration Open	08:00	Registration Open	08:00	Registration Open
		08:30					
		09:45	Opening Ceremony	09:00	Session 3: HCI Clinical Implementation of a Head-Mounted Display of Patient Vital Signs D. Liu, S. Jenkins, P. Sanderson Getting the Picture D. Reilly, K. Inghen, C. Walters A Comparison of Menu Configurations and Pointing Devices for use with Wearable Computers while Mobile and Stationary J. Zucco, B. Thomas, K. Girmmer-Somers, A. Cockburn Is it Grapple? - Assessing the Impact of Mobility on Textile Interfaces J. Clawson, C. Zeigler, S. Gilliland, N. Komor, N. Posner, T. Stamer	09:00	Session 5: System & Applications II Development of a Lower Extremity Rehabilitation Aid utilizing an Insole-Integrated Load Sensor Matrix and a Sole-Embedded Measurement Node P. Iso-Kekola, T. Kannisto, M. Myrj, A. Haimo, T. Sajaniara, J. Lekkala, J. Vartiola Signal Processing Algorithm and Health Care Application for Wearable Sense of Balance Monitoring Headphones S. Matsushita Potential of enhanced context awareness in wearable assistants for Parkinson's disease patients with freezing of gait syndrome M. Bachlin, D. Roggen, G. Troster, M. Pomik, N. Gliadi, J. Hausdorff A Distributed Wearable, Wireless Sensor System for Evaluating Professional Baseball Pitchers and Batters M. Lapinski, E. Berelson, T. Gill, M. Rhenigold, J. Paradiso
		10:45	Keynote A Decade of Exploration of Diverse Applications in Wearable Sensing J. Paradiso	10:45	Session 4: Context Unsupervised classifier self-calibration through repeated context occurrences K. Foster, D. Roggen, G. Troster Multi-Graph Based Semi-Supervised Learning for Activity Recognition M. Slika, D. Lariu, B. Schiele An Analysis of Sensor-Oriented vs. Model-Based Activity Recognition A. Zinnen, U. Blanke, B. Schiele When Else Did This Happen? Efficient Subsequence Representation and Matching for Wearable Activity Data K. Van Laerehoven, E. Berlin, M. Altmann	11:30	Design Contest Do you need me? A Pair of Interactive LED Fashion Prototypes J. Au, J. Lam, R. Au, K. Hui Anti-Paparazzi Fashion A. Harvey, H. Knight, T. Igoe The Textile Interface Sketchbook: A Toolkit for Creating and Implementing Electronic Fabric Based Interfaces N. Komor, S. Gilliland, C. Zeigler, T. Stamer
		11:15	Coffee Break	11:15	Coffee Break		
			Session 1: Systems & Application I Toward Achieving On-Site Programming T. Terada, M. Miyayama A Motion Recognition Method for a Wearable Dancing Musical Instrument M. Fujimoto, N. Fujita, Y. Takegawa, T. Terada, M. Tsukamoto LifeBelt: Silent Directional Guidance for Crowd Evacuation A. Ferscha, K. Zia				
			Lunch @ Landgraf Loft	13:00	Lunch @ Landgraf Loft	12:00	Keynote Wearable Computing: When Aspiration Meets Reality D. K. Avniad
		13:00					
		14:30	Tutorials @ JKU Spectek Computing D.K. Avniad The Future of Mobile Map Interaction - GIS meets wearable computing A. Krueger Building Activity Recognition Applications for the iPhone Platform K. Kunze, D. Barnack	14:30	Session 2: Smart Textiles A Coarse Desktop Method for Evaluating Transmission of Vibration Through Textile Layers L. Dunne Stretchable Circuit Board Technology and Application R. Verroth, T. Lohrer, M. Seckel, C. Dis, C. Kalmeyer, Andreas, H. Reich Inclusion of Fabric Properties in the E-Textile Design Process M. Quirk, T. Martin, M. Jones RFID Textile and Map Making System for Large Area Positioning R. Usoka, A. Masuda, T. Murakami, H. Miyayama, H. Takeuchi, K. Hashimoto, M. Hirose	13:00	Lunch @ Landgraf Loft
			Coffee Break	16:00	Coffee Break	15:30	Closing Ceremony & Business Meeting
16:00		16:00					
16:15		16:30	1 Minute Madness				
		17:00	Posters				
17:30		18:30		18:30	Ars Electronica Center Tour <i>Free admission</i>		
18:30				19:30			
	Prix Ars Electronica Gala Brucknerhaus (Bruckner's House) <i>Free entry after ticket reservation!</i>	20:00					
19:00			Klangwolke: The Flood Donaupark (Danube Park)		Conference Banquet Postlberg Schloss (Postlberg Castle)		