

The European Future Technologies Conference

# Science beyond Fiction

**fet09**

**21-23 April 2009 | Prague**

**[ec.europa.eu/fet09](http://ec.europa.eu/fet09)**



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European Commission  
Information Society and Media



# 'Science beyond Fiction'

Welcome to FET09, the new European Future Technologies Conference and Exhibition dedicated to frontier research in future and emerging information technologies. This event is a unique forum to share and learn about the state-of-the-art technology and to engage in new visions for long-term ICT research in Europe.

This conference is an opportunity for scientists, policy-makers, industry representatives and science journalists to discuss today's frontier science, tomorrow's technologies and the impact of both on citizens and society. By visiting the exhibition and the poster session, you will be able to 'touch and see' a diversity of novel and exciting early results from on-going multi-disciplinary research from all around Europe.

Enjoy the first ever FET Conference!

*«Europe is creative and inventive and has a tradition of producing world-class scientists. I invite you to engage and participate at this conference in discussions about future directions for frontier research in information and communication technologies. Let's work together to imagine how Europe can address key challenges and future benefits for our society.»*



**Viviane Reding,**  
Commissioner for Information  
Society and Media

*«Let us take the time we have together over the next three days to discuss with the wider future and emerging technologies research community on the challenges that lie ahead of us. This is our opportunity to share reflections and dreams about what we can achieve, and help others to understand better the value of what we strive for.»*



**Michel Cosnard** and  
**Paolo Dario,**  
Co-chairs of the Conference  
Programme Committee

## About Future and Emerging Technologies in the 7<sup>th</sup> Framework Programme

Since its launch in 1989 the European Commission's FET research initiative has served as a pathfinder in identifying and shaping radically new information technologies. With a funding of ca. 100 M€/year, it supports scientists and engineers to venture into uncharted areas beyond the frontiers of traditional ICT by fostering long-term, multi-disciplinary research collaboration at the highest level around novel research ideas and themes.

This research leads to radical transformation of ICT research agendas and fosters major technological, industrial and societal innovations in Europe. It brings up new research practices that change the way in which research is being conducted.

FET is implemented by means of thematic research in emerging visionary areas (FET-Proactive) and open, unconstrained exploration of novel ideas (FET-Open).

## 09.00 – 09.45 **Opening session** (Room: Zenit+Nadir)

**Henry Markram**, Ecole Polytechnique Fédérale de Lausanne, Switzerland  
“Shaping 21<sup>st</sup> Century Science & Society”

Innovations in ICT are giving rise to, and are shaped by, three major evolutions in the scientific method of the 21<sup>st</sup> Century: the industrialization of science; informatics-based science; and ultimately, simulation-based research. The synergies of future ICT and the sciences and the innovations that will make these capabilities accessible to the public could provide the foundation for society to face the global challenges.

## 09.45 – 10.15 **Welcome and Opening of the Exhibition**

**Mirek Topolánek**, Prime Minister of the Czech Republic  
**Viviane Reding**, European Commissioner for Information Society and Media

Coffee break - Foyer

## 10.45 – 11.30 **Highlights of Future and Emerging Technologies**

Moderation by **Antti Peltomäki**, Deputy Director General, European Commission, Brussels  
Introduction by **Wolfgang Boch** & **Aleš Fiala**, Heads of Units FET Proactive and FET Open, European Commission, Brussels  
**Paolo Darío**, Scuola Superiore Sant'Anna, Italy  
**Christoph Guger**, g.tech, Austria  
**David Lane**, University of Modena, Italy and Santa Fe Institute, USA

## 11.30 – 13.00 **Panel discussion**

**The value of multidisciplinary transformative research for future Information and Communication Technologies**

Most often ideas that radically transform current scientific thinking and technology emerge at the frontiers of disciplines. The panel will discuss the potential of cross-disciplinary collaboration for enriching the scientific and technological basis of information and communication technologies with new paradigms.

**Torsten Wiesel**, Secretary General, Human Frontier Science Programme, Strasbourg  
**Ivan M. Havel**, Director, Centre for Theoretical Study (CTS), Institute for Advanced Studies at the Charles University in Prague and the Academy of Sciences of the Czech Republic  
**Hiroshi Nagano**, Professor for Science and Technology Policy, National Graduate Institute for Policy Studies, Japan and Executive Director, Japan Science and Technology Agency (JST)  
**Michael Osborne**, Director of the International Futures Programme and the Global Science Forum, OECD, Paris  
**Dieter Fellner**, Director, Fraunhofer Institute for Computer Graphics Research, Darmstadt, Germany  
**Khalil Rouhana**, Head of Unit, Strategy for ICT Research and Innovation, European Commission, Brussels

Moderator: **Clive Cookson**, Science Editor, Financial Times, London

Lunch break - Brasserie Veduta – 2<sup>nd</sup> floor

## 14.30 – 15.15 **Anton Zeilinger**, University of Vienna, Austria ■ **“Quantum Information: The New Frontier”**

In the last decade quantum information has developed from a field of more philosophical interest to an area with vigorous development world-wide and a potential to revolutionize information technology. Anton Zeilinger will discuss the challenges and possibilities for quantum technologies in optics, computing, cryptography and communication in the future.

## 15.15 – 16.45 **Panel discussion**

**The way forward for strengthening multi-disciplinary research for future Information and Communication Technologies in Europe**

The panel will elaborate on what actions Europe should take to strengthen and consolidate its science & technology basis in ICT and further reflect on the main lines of actions of the Communication of the European Commission on “Moving the ICT frontiers - a strategy for research on future and emerging technologies in Europe” that will be announced by Commissioner Viviane Reding at the conference.

**Michel Cosnard**, Chairman and CEO, INRIA, France  
**Qian Depei**, Beihang University, Science Advisor to Chinese 973 Programme  
**Mário Campolargo**, Director, Emerging Technologies and Infrastructures, European Commission  
**Jeannette Wing**, Assistant Director for Computer & Information Science and Engineering (CISE), National Science Foundation, USA  
**Jiří Drahoš**, President Academy of Sciences of the Czech Republic

Moderator: **Wolfgang Wahlster**, Director and CEO of the German Research Centre for Artificial Intelligence DFKI, Germany

Coffee break - Foyer

## 17.15 – 18.00 **Ehud Shapiro**, Weizmann Institute of Science, Israel ■ **“A Word-processor for DNA”**

What is the DNA equivalent of the Word processor? Ehud Shapiro will present novel operations on DNA molecules, and show that they provide a foundation for DNA processing as it can implement all basic text processing operations on DNA molecules including insert, delete, replace, cut & paste and copy & paste. This will be the first demonstration of a unified approach to DNA synthesis, editing, and library construction.

## 18.00 – 19.00 **Poster session (part 1)** – Foyer

## 20.00 **Welcome Dinner**

■ Bethlehem Chapel (Betlémská kaple)

## 09.00 – 10.30 **Plenary session** (Room: Zenit+Nadir)

**Henrik Ehrsson**, Karolinska Institute, Sweden  
“Two legs, two arms, one head. Who am I?”

How does our brain actually identify our own body? Henrik Ehrsson will describe how cognitive neuroscientists have recently begun to address this fundamental question, showing how we can learn to project ownership onto artificial bodies and simulated virtual ones; and even make two people have the experience of swapping bodies with one another. He will also discuss ground-breaking applications in the fields of virtual reality and neuro-prosthetics.

**Jeannette Wing**, National Science Foundation, USA  
“Computational Thinking and Thinking about Computing”

Computational thinking will be a fundamental skill used by everyone in the world in the coming decades. The field of computing is driven by technology innovation, societal demands, and scientific questions. Jeannette Wing will address the “Deep Questions in Computing,” as a guide to our technological future.

Coffee break - Foyer

## 11.00 – 12.30 **Parallel sessions**

**The ultimate robot**  
Room: Leo

Recent research has brought spectacular advances to robotics technologies and is raising big questions such as – what can a robot be ultimately be? The session aims at identifying technological and psychological hurdles as well as theoretical limits to the development of advanced robots for innovative applications such as the “conscious robot”, the “growable robot”, the “disappearing” robot, and many others.

### Speakers

**Aaron Sloman**, University of Birmingham, **Owen Holland**, University of Essex, **Tomohiro Shibata**, AIST Japan, **Tom Ziemke**, University of Skövde, School of Humanities & Informatics, Sweden.

### Organised by

**Alois Knoll**, Technical University of Munich, Germany,  
**Chris Melhuish**, Bristol Robotics Laboratory, UK

**Music and the brain**  
Room: Tycho

New technologies along with neurosciences have started to uncover some of the cognitive pathways and processes involved to understand how music is comprehensible and affective by the human brain. They also suggest new approaches to composing, performing and transmitting music. This session deals with these perspectives with speakers working at the forefront of music cognition and the interface of music and technology.

### Speakers

**Philip Ball**, Nature, London, UK, **Antonio Camurri**, Casa Paganini and University of Genova, Italy, **Stefan Koelsch**, University of Sussex, UK, **Jason Warren**, UCL London, UK

### Organised by

**Philip Ball**, Nature, London, UK

**Single atom functionality in electronic devices**  
Room: Virgo

With the shrinking of nano-circuits, the impact of atomistic variations becomes a major concern. Switches, memories and other more exotic quantum functions can be implemented if the electronic states of single atoms and could be controlled by external signals. The session will address questions shared by scientists concerning the variability in ultimate CMOS and by those involved in contacting single molecules or nanowires.

### Speakers

**Thomas Ihn**, EPFL, Switzerland, **Jan Van Ruitenbeek**, Leiden University, the Netherlands, **Klaus Ennslin**, ETH Zurich, Switzerland, **Silvano De Franceschi**, TU Delft and CEA-Grenoble, the Netherlands and France.

### Organized by

**Marc Sanquer**, CEA-Grenoble, France

**FET Flagships: big goals, big challenges, big projects**  
Room: Aquarius

FET flagships are proposals for new research programs that will address challenges in research and innovation requiring radical transformations of ICT for 2020 and beyond. They will present novel and ambitious goal-driven initiatives that should be transformed into a significant competitive advantage for Europe.

### Speakers

To be confirmed

### Organized by

**Dario Floreano**, Ecole Polytechnique Fédérale de Lausanne, Switzerland

**Agent-based technologies for innovative economic policy design**  
Room: Kepler

This session will deal with the perspectives offered by the use of agent-based technologies for the modelling and the simulation of economic policies and for the study of the impacts of economic policies, i.e., monetary, fiscal and innovation policies, on industrial competitiveness, economic growth and, more generally, on welfare.

### Speakers

**Silvano Cincotti**, University of Genoa, Italy, **Herbert Dawid**, Bielefeld University, Germany, **Kaan Erkan**, TUBITAK National Research Institute of Electronics and Cryptology, Turkey, **Mike Holcombe**, Sheffield University, UK.

### Organized by

**Silvano Cincotti**, University of Genova, Italy

## Reflective computing

Room: Taurus

The new generation of smart systems built with the reflective technology should understand users' emotions, needs, intentions and social situations and provide appropriate assistance in a discrete and personalized manner. How is this made technically possible? How do we manage cognitive states in a biocybernetic loop? All these questions and many more will be addressed in this session.

### Speakers

**Nikola Serbedzija**, Fraunhofer Institute FISRT, Germany, **Joyce Westerink**, Philips, the Netherlands, **Martin Wirsing**, LMU München, Germany, **Stephen Fairclough**, Liverpool John Moores University, UK.

### Organized by

**Nikola Serbedzija**, Fraunhofer Institute FIRST, Germany

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Lunch break - Brasserie Veduta - 2<sup>nd</sup> floor

## 14.00 – 15.30 Parallel sessions

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### Quantum information technologies

Room: Virgo

The combination of quantum physics with information science has created in the past ten years new and unprecedented means for communicating and computing. This session will highlight its most important recent results and will offer a clear perspective of further development towards its industrial dissemination and commercial exploitation ranging from metrology, imaging, security, telecommunications, etc.

### Speakers

**Rainer Blatt**, University of Innsbruck, Austria, **Philippe Grangier**, CNRS, Orsay, France, **Artur Ekert**, Oxford University, UK & National University of Singapore, **Tommaso Calarco**, University of Ulm, Germany.

### Organized by

**Vladimír Bužek**, Slovak Academy of Sciences  
**Elisabeth Giacobino**, Ecole Normale Supérieure and CNRS, Paris, France.

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### Embodied intelligence

Room: Leo

The principle of "embodiment" has shifted robotic research away from the traditional view which reduces adaptive behaviour to control and computation. It is based on the observation in nature that adaptive behaviour emerges from the complex and dynamic interaction between the body morphology, sensory-motor control, and environment. The session aims at discussing the scientific and technological state-of-the-art as well as future challenges in this field.

### Speakers

**Rolf Pfeifer**, University of Zurich, Switzerland, **Paolo Dario**, Scuola Superiore Sant'Anna, Pisa, Italy, **Kenji Suzuki**, University of Tsukuba, Japan, **Eugenio Guglielmelli**, University Campus Bio-Medico, Rome, Italy, **Chiara Bartolozzi**, Italian Institute of Technology, **Lijin Aryananda**, University of Zurich, Switzerland, **Alin Albu-Schaeffer**, DLR, Germany, **Frédéric Boyer**, Ecole des Mines de Nantes, France.

### Organized by

**Cecilia Laschi**, Scuola Superiore Sant'Anna, Pisa, Italy

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### Bridging the gap between the brain and the machine

Room: Tycho

Neuroscientists have significantly advanced brain-machine interface technology to the point where severely disabled people can now independently compose and send e-mails and operate a TV thanks to thought-control. Interactive scientific and artistic demonstrations will show the state-of-the-art and explore the future challenges and opportunities of brain-machine interface.

### Speakers

**Alexander Ya. Kaplan**, M.V. Lomonosov Moscow State University, Russia, **Olga Jafarova**, Siberian Branch of Russian Academy of Medical Sciences, Novosibirsk, Russia, **Janez Janša**, Aksioma Institute for Contemporary Art, Ljubljana, Slovenia, **Anders Sandberg**, Oxford University, United Kingdom, **Reinhold Scherer**, Institute for Neurological Rehabilitation and Research affiliated with the rehabilitation center Judendorf-Straßengel in Judendorf-Straßengel, Austria, **Pavel Smetana**, CIANT, International Centre for Art and New Technologies, Czech Republic

### Organized by

**Pavel Smetana**, CIANT, International Centre for Art and New Technologies, Czech Republic

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## Visions: key challenges for pervasive adaptation

Room: Aquarius

The session will consider some key challenges particularly associated with self-organising and adaptive pervasive computing environments, particularly to cover the following: designing scalable and context-aware systems; the challenge of runaway self-organisation; incorporating trust and other human-like behaviours into pervasive systems.

### Speakers

**Alois Ferscha**, Johannes Kepler Universität, Linz, Austria, **Michel Riguidel**, Ecole Nationale Supérieure des Télécommunications, Paris, France, **Jeremy Pitt**, Imperial College London, UK, **Ben Paechter**, Edinburgh Napier University, UK.

### Organized by

**Jennifer Willies**, Edinburgh Napier University, UK

## Modelling and guiding attention in an increasingly complex world

Room: Taurus

Today, out of the increasing amount of information intended for a particular human recipient, only a tiny fraction actually reaches that recipient. The purpose of this session is to initiate an interdisciplinary discussion on how future technologies could optimize the usage of human's visual attention.

### Speakers

**Ben Tatler**, University of Dundee, UK, **Miklós Kiss**, Volkswagen Aktiengesellschaft Group Research, Germany, **Rolf Coulanges**, Stuttgart Media University, Germany.

### Organised by

**Erhardt Barth**, University of Lübeck, Germany

## Complexity perspectives on innovation

Room: Kepler

As innovation lies at the heart of public policies, it becomes indispensable to take a closer look at the flaws in the theory of unidirectional progression from basic science to technology, innovation and development. The key ideas of the session will include the ontological uncertainty and the unpredictability of innovation processes; bootstrapping and positive feedback dynamics in innovation; innovation networks; developing and nurturing generative relationships; multilevel governance structures and innovation policies.

### Speakers

**David Lane** and **Margherita Russo**, University of Modena and Reggio Emilia, Italy, **Sander van der Leeuw**, Arizona State University, USA, **Denise Pumain**, University of Paris, Sorbonne, France.

### Organized by

**David Lane**, University of Modena and Reggio Emilia, Italy

Coffee break - Foyer

## 16.00 – 17.30 Parallel sessions

### Collective robotics: adaptivity, co-evolution, robot society

Room: Leo

Collective robotics is a new research field where a large number of simple robots can collectively solve complex problems. Collectively working robots are not only very adaptive in behaviour and functionality, but can also undergo different evolutionary processes and are even able to evolve into artificial societies. The aim of the session is to give an overview of this research field, to introduce the latest developments and to demonstrate challenges faced by researchers.

### Speakers

**Paul Levi**, University of Stuttgart, Germany, **Dario Floreano**, EPFL, Switzerland, **Alan Winfield**, University of West England, UK, **Serge Kernbach**, University of Stuttgart, Germany.

### Organized by

**Serge Kernbach**, University of Stuttgart, Germany

### Collective social phenomena in techno-socio networks

Room: Aquarius

Societies are transforming into e-societies and techno-social networks are becoming an integral part of our modern lifestyle. The session will be devoted to methods for studying various processes running in e-societies, one of them being the collective emergence of emotions in e-communities as a spontaneous behaviour occurring in complex techno-social networks.

### Speakers

**Arvid Kappas**, Jacobs University, Germany, **Mike Thelwall**, University of Wolverhampton, UK, **Beatrice de Gelder**, Tilburg University, the Netherlands, **Paul Lukowicz**, Passau University, Germany, **Janusz Holyst**, Warsaw University of Technology, Poland.

### Organized by

**Janusz Holyst**, Warsaw University of Technology, Poland

### The frontiers of algorithmic complexity: classical vs quantum

Room: Virgo

This session discusses the notion of computationally hard problems from different perspectives: computer science, quantum computing and biology. New paradigms emerge at the interface between these disciplines and shed new light on computing.

### Speakers

**Mario Rasetti**, Fondazione ISI, Torino, Italy, **Gregory Chaitin**, IBM Research, Yorktown Heights, USA, **Paul Vitány**, Centrum Informatica en Wiskunde, Amsterdam, the Netherlands.

### Organized by

**Mario Rasetti**, Fondazione ISI, Torino, Italy

## Open source science

Room: Kepler

Web developments have radically changed the knowledge production process with unbounded storage capacities and unlimited ability to interact with peers. However scientific knowledge production and dissemination is still based on the traditional notion of a paper publication and on quality assessment by peer review. The session will explore how the research community could build from ICT to revolutionize the generation, evaluation and dissemination of scientific knowledge.

### Speakers

**Maurizio Marchese**, University of Trento, Italy, **Gloria Origi** and **Roberto Casati** CNRS, France, **Stefan Tai**, University of Karlsruhe, Germany.

### Organized by

**Fabio Casati**, University of Trento, Italy

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## Striving for realism in virtual worlds: sensation, perception, technology and the auditory brain

Room: Tycho

This symposium addresses the construction of identity and reality on the basis of body/space interaction. It will focus on the use of auditory 3D spaces as a new type of participant's experience. It is designed to stimulate multidisciplinary discussions at the interface between cognitive neuroscience, acoustics and Virtual Reality. Non-specialists will get a glimpse of the fascinating complexity of what is behind the everyday experience of being in a place.

### Speakers

**Isabelle Viaud-Delmon**, CNRS, Paris, France, **Peter Brugger**, Zurich University Hospital, Switzerland, **Olivier Warusfel**, IRCAM, Paris, France.

### Organized by

**Isabelle Viaud-Delmon**, CNRS, Paris, France

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## 17.30 – 19.00 Poster session (part 2) – Foyer

## 17.30 - 19.30 On the Fly Sessions

These spontaneously organised sessions are an opportunity to discuss relevant issues and topics that are not covered by the rest of the conference programme. Ideas for these sessions are provided by the conference participants. Final selection and room allocation will be done at the last minute, based on interest and availability.



## 09.00 – 10.30 Plenary session (Room: Zenit+Nadir)

### Alain Berthoz, Collège de France, Paris “New Frontiers between IST, Robotics and Cognitive Neuroscience”

How can Robotics and Cognitive Neuroscience merge to provide new insights into brain function and into potentially new developments in information and/or robotics technology? Alain Berthoz will address the questions of higher brain function, of recent discoveries on the neural basis of emotion and of new developments in brain recordings, for instance in epileptic patients.

### Albert-László Barabási, Centre for Complex Network Research at Northeastern and Department of Medicine, Harvard Medical School “From Networks to Human Mobility Patterns”

What are the laws governing human mobility? Albert-László Barabási will discuss a study that explores the trajectory of anonymous mobile phone users, showing the high degree of temporal and spatial regularity of human trajectories. He will also demonstrate how the individual travel patterns collapse into a single spatial probability distribution, indicating that despite the diversity of their travel history, humans follow simple reproducible patterns.

Coffee break - Foyer

## 11.00 – 12.30 Parallel sessions

### Presence: real actions in virtual environments Room: Taurus

Why do people smile at an avatar that is smiling at them, when they know full well that no real person is there? People tend to respond realistically to virtually generated sensory data and the session deals with the possibility of measuring this objectively and quantitatively. This touches basic science disciplines including neuroscience, computer science and engineering, psychotherapy, neuro-rehabilitation, and telepresence.

#### Speakers

**Giulio Ruffini**, Starlab Barcelona, Spain, **Martyn Bracewell**, Bangor University, UK, **Maria Victoria Sanchez-Vives** and **Mel Slater**, University of Barcelona, Spain, **Paul Verschure**, Universitat Pompeu Fabra, Spain.

#### Organized by

**Giulio Ruffini**, Starlab, Barcelona, Spain

### Unconventional computing Room: Virgo

Up to now, most current research in unconventional, non-classical, nature-inspired computation is purely theoretical and only a handful of working laboratory prototypes of unconventional computers exist so far.

#### Speakers and organizers

**Andrew Adamatzky**, University of the West of England, UK, **Milan Stojanovic**, Columbia University, New York, USA, **Jerzy Górecki**, Cardinal Stefan Wyszyński University, Warsaw, Poland.

### Trust and security interrelationship Room: Leo

This session proposes to investigate and discuss the inter-relationship between trust and security in the context of networking and distributed services, as this issue has been gaining importance with the rapid growth of services and of end-devices (e.g., computer, hand-held) that are connected through the Internet.

#### Speakers

**Alessandro Zorat** and **Yoram Ofek**, University of Trento, Italy, **Amir Herzberg**, Bar-Ilan University, Israel, **Bart Preneel**, Leuven University, Belgium, **Antonio Mana**, University of Malaga, Spain, **Ahmad-Reza Sadeghi**, Ruhr-University Bochum, Germany, **Paolo Tonella**, IRST – FBK, Italy.

#### Organized by

**Alessandro Zorat**, University of Trento, Italy

### Aesthetics as the heart of science Room: Tycho

As Einstein said, aesthetics is as important as logic for deep science. This session will investigate how creative processes in the arts could inspire new scientific methods. It will also discuss how new scientific paradigms can inspire artistic creation.

#### Speakers

**Paul Bourguine**, Ecole Polytechnique, France, **Jean Petitot**, Ecole Polytechnique, France, **Louis Bec**, Ecole des Arts et Métiers, Aix-en-Provence, France.

#### Organized by

**Paul Bourguine**, Ecole Polytechnique, France

### Self-powered nano-devices Room: Aquarius

The combination of energy harvesting technologies and of ultra-low-power electronics will enable applications in healthcare, sensor networks, safety-critical and environmental monitoring, etc. This session will focus on recent advances, challenges and impacts in energy harvesting technologies at the nanoscale. The aim is to bring together, in an interactive and multi-disciplinary talk, specialists willing to share their experience and visions and to build up a research community in self-powered nano-devices.

#### Speakers

**Gabriel Abadal**, Universitat Autònoma de Barcelona, Spain, **Zachary Davis**, Danmarks Tekniske Universitet, Denmark, **Javier Alda**, Universidad Complutense de Madrid, Spain, **Francesc Moll**, Universitat Politècnica de Catalunya, Spain.

#### Organized by

**Violeta Gràcia**, Universitat Autònoma de Barcelona

## Through the crystal ball: Europe's position in the digital revolution by 2030

Room: Kepler

The digital revolution is driving innovation and scientific progress, and interrelationships between science, technology and society are becoming increasingly complex. The session will aim at stimulating discussions on potential future scenarios in a world permeated and shaped by the digital revolution in a number of fields such as future electronics, bio-informatics, human computer confluence, future networks, gaming etc.

This session will be prepared by the COST Science Café with a talk on «What will your life be like in 2030?» moderated by Soulla Louca on Wednesday at 17.30 at the Brasserie Veduta.

### Speakers

**Gian-Mario Maggio**, **Sophie Beaubron**, **Zuzana Vercinska** and **Afonso Ferreira**, COST, European Science Foundation, Belgium, **Soulla Louca**, University of Nicosia, Cyprus, **Mieczyslaw Murasz-kiewicz**, Warsaw University of Technology, Poland, **Imrich Chlamtac**, Create-Net, Italy, **Henry Markram**, EPFL, Switzerland, **Giovanni Colombo**, Politecnico di Torino, Italy, **Maria Teresa Gatti**, STMicroelectronics, Italy, **Elina Hiltunen**, Nokia, Finland.

### Organized by

**Gian-Mario Maggio**, COST, European Science Foundation, Belgium

Lunch break - Brasserie Veduta - 2<sup>nd</sup> floor

## 14.00 – 15.30 Parallel sessions

### Bodily intelligent modular robots

Room: Leo

This session explores the concept and potential of bodily intelligent robots from a multidisciplinary perspective. The concept is introduced through examples from both embodied artificial intelligence and the evolution of form and function in nature. In addition one approach to the realisation of bodily intelligent robots based on modular robots will be presented, but others will be discussed with the audience.

### Speakers

**Kasper Støy**, University of Southern Denmark, **Rolf Pfeifer**, University of Zurich, Switzerland, **Peter Aerts**, University of Antwerp, Belgium, **Andre Seyfarth**, Friedrich Schiller University of Jena, Germany.

### Organized by

**Kasper Støy**, University of Southern Denmark

### Visual analytics – Mastering the information age

Room: Aquarius

Visual Analytics is an emerging research discipline aiming at making the best possible use of very large information loads in a wide variety of applications. The objective is to combine the strengths of intelligent automatic data analysis with the visual perception and analysis capabilities of the human user. The session presents the disciplines involved in this field, as well as the challenges and perspectives it offers.

### Speakers

**Jörn Kohlhammer**, Fraunhofer Institute for Computer Graphics Research, Germany, **Gennady Andrienko**, Fraunhofer Institute IAIS, Germany, **Daniel A. Keim**, University of Konstanz, Germany, **Margit Pohl**, Vienna University of Technology, Austria, **Kai Puolamäki**, Helsinki University of Technology, Finland, **Giuseppe Santucci**, University of Rome «La Sapienza», Italy.

### Organized by

**Jörn Kohlhammer**, Fraunhofer Institute for Computer Graphics Research, Germany

### The body and the urban space

Room: Tycho

The urban space of the future will be saturated with both visible and hidden media that gather and transmit information. Will the technologically enriched environment adapt to accommodate human/city contact points? And, in response, will we choose to adapt and augment our own bodies in order to navigate around, and communicate with and through this information landscape?

### Speakers

**Ingi Helgason** and **Michael Smyth**, Edinburgh Napier University, UK, **Rod McCall**, Fraunhofer FIT, Sankt Augustin, Germany, **John Waterworth**, Umeå University, Sweden.

### Organized by

**Ingi Helgason**, Edinburgh Napier University, UK

### Neurofunctional materials

Room: Virgo

The session intends to show how scientists combine theoretical modelling of the cognitive pathways of brain activity with the technological aspects of the realization of bio-inspired complex molecular materials functionalized to process information in a highly parallel way.

### Speakers

**Victor Erokhin**, University of Parma, Italy, **David N. Reinhoudt**, University of Twente, the Netherlands, **Bernard Schölkopf**, Max Planck Institute of Biological Cybernetics, Tübingen, Germany.

### Organized by

**Victor Erokhin**, University of Parma, Italy

## Challenges and visions for global computing

Room: Taurus

We move towards software-intensive systems which have to dynamically adapt to new requirements, technologies or environmental conditions on a global scale. As a result, software development has become a very challenging discipline. In this context the session will address the following topics: frontiers of service-oriented computing, digital evidence to guarantee trustworthy mobile code and algorithmic challenges in global computing.

### Speakers

**Martin Wirsing**, Ludwig-Maximilians-Universität München, Germany, **Ian Stark**, University of Edinburgh, UK, **Christos Kaklamanis**, University of Patras, Greece.

### Organized by

**Martin Wirsing**, Ludwig-Maximilians-Universität München, Germany

## Language and the mind

Room: Kepler

The ultimate goal of research in language understanding is to build a computational model of brain processes, both functionally and spatially, and to find their quantitative characteristics. How can we get there and for what kind of applications? This session will explore challenges ranging from question answering to machine translation.

### Speakers

**Jan Hajič**, Charles University in Prague, Czech Republic, **Roger Moore**, University of Sheffield, UK, **Albert Kim**, University of Colorado at Boulder, USA.

### Organized by

**Jan Hajič**, Charles University in Prague, Czech Republic

Coffee break - Foyer

## 16.00 – 17.00 Closing session

### Award of the Best Exhibitor Prize

#### Closing address

**Ondřej Liška**, Minister of Education, Youth and Sports, Czech Republic

**Rudolf Strohmeier**, Head of Cabinet of the Commissioner for Information Society and Media

#### Closing Performance: Multimodal Brain Orchestra

The Multimodal brain orchestra explores the boundaries of direct brain driven creative expression. A six member orchestra will through their real-time physiological responses generate and control an interactive audio-visual spectacle that explores the depths of affective experience.

**SPECS**, Synthetic, Perceptive, Emotive and Cognitive Systems group

**Jonatas Manzolli**, Music Composition

**Behdad Rezazadeh**, Video art

**gTec**, Brain Computer Interface Technology

**SPECS**  
Synthetic, Perceptive, Emotive and Cognitive Systems group

Behdad Rezazadeh   g.tec   Jonatas Manzolli

**Multimodal Brain Orchestra**

FET 09 | 23 April 2009 | Prague

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# Posters Exhibition

## Tuesday, 21 April 2009 (part 1)

A closed-loop neural prostheses for vestibular disorders. **Silvestro Micera *et al.***

A computational model of language acquisition. **Lou Boves *et al.***

Ambient Multimodal Human-Computer interaction. **Gaetan Pruvost *et al.***

An Affective Channel for Companions. **Néna Roa Seiler *et al.***

Augmenting Human Communication. **Gianluca Zaffiro *et al.***

BIOTACT: Rethinking motor control-Insights from the nested-loop architecture of the rat whisker system. **Erez Simony *et al.***

BIOTACT: Towards a Novel Biomimetic Tactile Sensor. **Charlie Sullivan *et al.***

Brain Activity and Eye Movements in Translation. **Elena Andonova *et al.***

Computing, Cognition and Ambient Intelligence: Towards the city of the future. **Constantine Stephanidis *et al.***

CONNECT: Emergent Connectors for Eternal Software Intensive Networked Systems. **Valérie Issarny *et al.***

Content and timescale of neuronal signal in hippocampus during tactile categorization task. **Pavel Itskov *et al.***

Continuous Variables Quantum Information with Light. **Marek Petr**

Controlling a Virtual Smart Home by Means of a P300 BCI. **Shahab Daban *et al.***

CyberRat: a brain-chip interface for high-resolution bi-directional communication. **Stefano Girardi *et al.***

Dealing with Complexity in Heterogeneous Tracking Environments. **Peter Keitler *et al.***

De.Licio.bus: a folksonomy for city public transportation. **Vittorio Loreto**

Discovering and Exploiting Semantics in Folksonomies. **Rabeeh Abbasi *et al.***

Dispersion Relation Engineering for nanoscale control of light, heat, and sound. **John Cuffe *et al.***

Dynamics of activity during the maturation of neural network derived from human embryonic stem cells. **Jari Hyttinen *et al.***

Emerging Technologies and Education: Brain-Computer Interfaces for Science Popularization. **Daniel Perez-Marcos *et al.***

Energy transfer in bacterial photosynthetic complexes: An inspiration for development of novel electronic devices? **Vladimira Moulisová *et al.***

## Wednesday, 22 April 2009 (part 2)

Event-Driven Morphological Computation for Embodied Systems – eMorph. **Chiara Bartolozzi *et al.***

Exploring the Computational Limits of Adaptive Networked Populations of Tiny Artefacts. **Ioannis Chatzigiannakis *et al.***

From locomotion to cognition. **Matej Hoffmann *et al.***

Fundamental Mechanisms Of Noise-Supported Quantum Transport In Light Harvesting Molecules. **Filippo Caruso *et al.***

GeoPKDD – Geographic Privacy-aware Knowledge Discovery. **Fosca Giannotti *et al.***

How to Design Self-Organizing Systems? **Wilfried Elmenreich *et al.***

Is Gaussian Quantum Error Correction Possible? **Julien Niset *et al.***

Logarithmic Arithmetic in Today's Computing. **Milan Tichý *et al.***

May AR Manipulate Users Subconsciously? **Marcus Tönnis *et al.***

Mimicking the Processing of Chemical Information of the Insect Olfactory System. **Agustín Gutiérrez *et al.***

Modeling Multiscale Complex Systems: a methodological approach. **Alfons G. Hoekstra *et al.***

Modeling the brain using rings of quasiperiodic oscillators. **Edward A. Rietman *et al.***

Molecular nanomagnets for information technologies: challenges, achievements and perspectives. **Marco Affronte**

Neocortical Neurotechnologies. **Henry Kennedy *et al.***

Neural encoding of face-categories in the macaque temporal cortex. **Rodrigo Sigala *et al.***

Neurarm: a robotic model of the human arm for neuroscientific investigation. **Tommaso Lenzi *et al.***

Novel Nature Inspired Techniques in Electrocardiogram Clustering. **Miroslav Bursa *et al.***

OPPORTUNITY: activity and context awareness in opportunistic open-ended sensor environments. **Daniel Roggen *et al.***

Optimized quantum state discrimination of optical coherent states. **Christoffer Wittmann *et al.***

Parasitic Tracking: Finding new uses for existing infrastructure. **Manuel Huber**

Position reconstruction of rats by the use of neural spike information from hippocampal place cells. **Stefan Schaffelhofer *et al.***

Proxemics with Multiple Dynamic Virtual Characters. **Joan Llobera *et al.***

Quantum Processing Photonic States in Optical Lattices. **Christine A. Muschik *et al.***

Realistic Responses to Virtual Crowds. **Nuria Pelechano *et al.***

Reality as simplicity. **Giulio Ruffini**

SecureChange: Security Engineering for Lifelong Evolvable Systems. **Fabrice Bouquet *et al.***

Social Impact Theory based Optimizer with 1D Topology. **Martin Macaš *et al.***

SOCIALNETS: Harnessing adaptive human social structures for tomorrow's wireless networks. **Stuart M. Allen *et al.***

Swarmanoid: Initial Results. **Marco Dorigo *et al.***

The Effect of Lower Spine Muscle Activation of Walking on a Narrow Beam in Virtual Reality. **Angus Antley *et al.***

The Human hand: from biomechanics to neurorehabilitation. **Azzura Chiri *et al.***

The neuro-robotics paradigm: NEUROExos, a case of study. **Nicola Vitiello *et al.***

Theoretical Simulations on Conductivity and Resistivity of Carbon Nanotubes and CNT-Ni Interconnects Using Effective Media Approach. **Yu.N. Shunin**

Thin film and fibrillar polymeric electrochemical elements for bio-inspired information processing. **Tatiana Berzina *et al.***

Thinking multimedia and creativity in green education. **Sorin Ionitescu *et al.***

T-LIFE: Therapeutic Learning of Facial Emotions. **Verónica Orvalho *et al.***

Towards a New Computational Paradigm: Mapping Biological Neural Networks onto Neuromorphic Hardware. **Daniel Brüderle *et al.***

Towards Integrated Model Engineering and Analysis of Ubiquitous Bigraphical Reactive Systems in Systems Biology and Service-oriented Information Systems. **Arne J. Glenstrup *et al.***

Ultrafast all-optical switching in organic photonics. **Jenny Clark *et al.***

Understanding Movement by Visual Analytics Methods. **Natalia Andrienko *et al.***

Understanding the Dynamics in Tagging Systems. **Klaas Dellschaft *et al.***

VIATORS - Variable Impedance ACTuation systems embodying advanced interaction behaviours. **Alin Albu-Schaeffer *et al.***

Visual processing unraveled in the human brain using natural viewing behaviour. **Jan Bernard C. Marsman *et al.***

Which Odorant Properties Are Most Relevant to Perception? **Benjamin Auffarth *et al.***

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# Register your vote for the Best Exhibit at FET09!

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You will find your voting slip in your plastic badge.

Please return your voting slip to the European Commission Information Stand by Wednesday 22<sup>nd</sup> of April 7.30 p.m

**The three best exhibits will receive:**

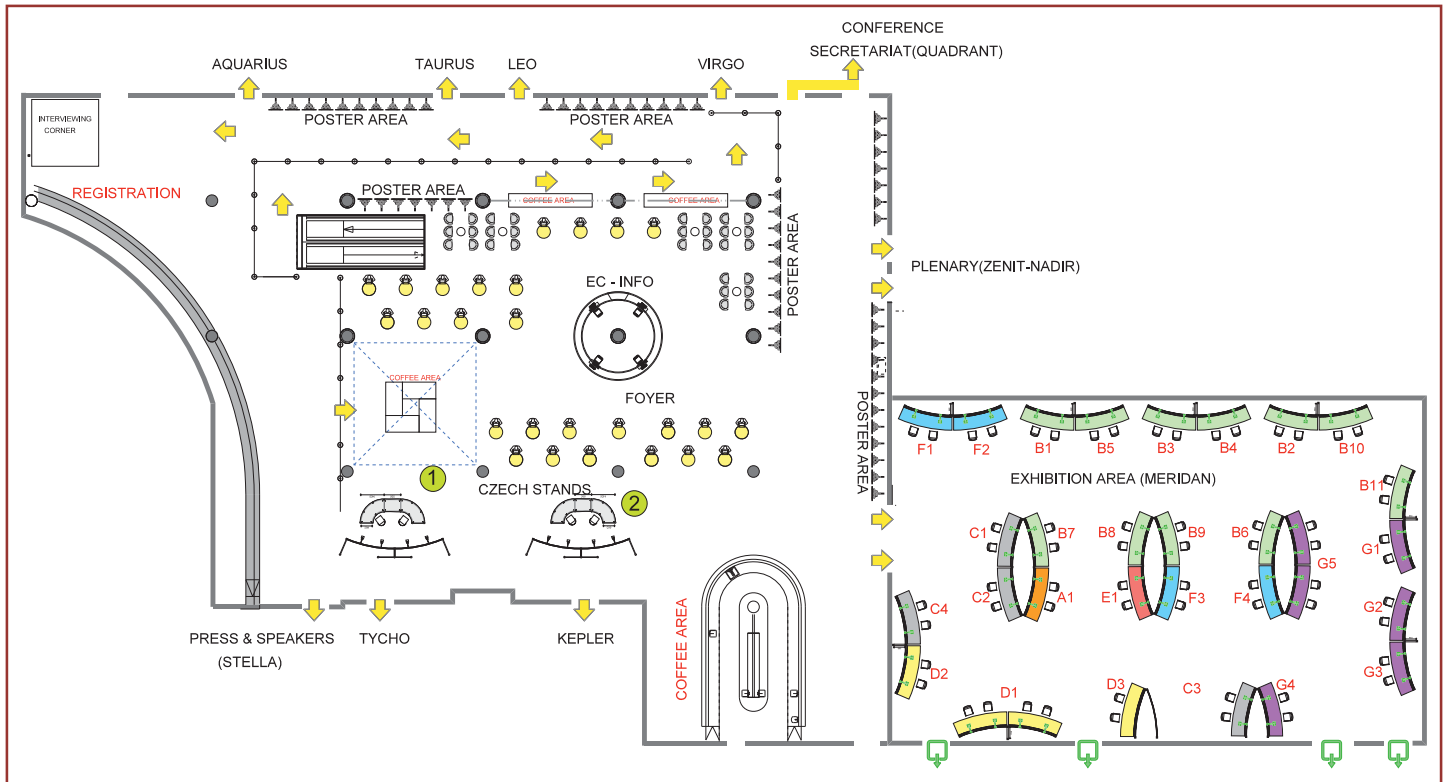
**a FET trophy awarded by the European Commission**



**and a financial prize of 8.000€ shared by the winners and kindly sponsored by**



# Exhibition



**A1** - Your worldwide ICT support network (IDEAL IST)

**B1** - Closing the Loop of Sound Evaluation and Design (CLOSED)

**B2** - Reflective assistant

**B3** - Natural voice dialog interfaces for consumer electronic devices (Interactive TV, MP3 players, in-car navigation)

**B4** - Mobile Attentive Interfaces in Urban Scenarios (MOBVIS)

**B5** - Previews of Natural Interactive Walking (preNIW)

**B6** - Demonstrating companions: persistent, personalised, multimodal interfaces to the internet (COMPANIONS)

**B7** - Human-computer systems for the study of cognition and translation (EYE-to-IT)

**B8** - Talking with the World Wide Web (Voice2Web)  
Talking with an avatar on a mobile client (3D Mobile Internet)

**B9** - "More than words" (PASION)

**B10** - Interaction and Presence in urban environments (IPCity)

**B11** - Gaze-contingent displays and gaze-based interaction (GazeCom)

**C1** - Symbiotic Evolutionary Robot Organisms (SYMBRION)

**C2** - A day in the life of XPERO robot (XPERO project demo)

**C3** - The Cognitive Robot Companion (COGNIRON)

**C4** - Bio-inspired artefacts for neuroscientific studies on locomotion and new technology (LAMPETRA)

**D1** - Smart home control with Brain-Computer Interface (BCI)  
Position reconstruction with place cells (Rat-GPS)  
Rehabilitation Gaming and Activity Monitoring System (RGS)

**D2** - Rehabilitation of a discrete sensory motor learning function by a prosthetic chip (ReNaChip)

**D3** - Starlab - A FET SME

**E** - Turing Game Approach to Measure and Advance Machine Intelligence (T-GAME)

**F1** - Metamaterials in Europe (MetaEurope)

**F2** - QUBIT Applications (QAP)

**F3** - Disposable Dot Field Effect Transistor for high speed si integrated circuits (d-DotFET)

**F4** - Million Frame per second, time-correlated single photon camera (MEGAFRAME)

**G1** - Ubiquitous computing modules for complex systems modelling (Ubidules@home)

**G2** - Accelerators of Advanced Algorithms for Image Processing (AAA\_IP)

**G3** - Rigorous Engineering of Service-Oriented Software (SENSORIA)

**G4** - Globally-available Internet-connected ambient spaces (CTI)

**G5** - 3DTV and Digital Holography - Dream or future reality (HOLO 3DTV)  
Multimodal human-computer interaction and industrial control systems (MHCIICS)  
Efficient representation of dynamic meshes (3D animation compression)

[ec.europa.eu/fet09](http://ec.europa.eu/fet09)