FET

through the keyhole

Future and Emerging Technologies in Europe
July 2008

"The best way to predict the future is to invent it." (Alan Kay)

In this issue

Although it may not be immediately apparent from looking up at the sky, it is summer time in Brussels, and that means it is time for the summer edition of FET through the keyhole! We hope you enjoy reading this summer edition.

In this issue we have collected a number of interesting news stories from the world of FET. In particular, this newsletter contains an announcement of the first-ever FET Conference, which will be held in Prague from 21-23 April 2009. This conference is designed to chart a course between science and policy at the frontier of future and emerging technologies research. Please mark the date in your diaries! We also include progress reports from projects, feedback on the calls we have launched and managed recently, and an up-to-date events calendar.

We wish you happy reading and a warm and sunny summer break!

The FET editorial team

FET Headlines

FET CONFERENCE 2009

The first-ever *FET Conference* will take place in Prague from 21-23 April 2009. The conference aims to be a European forum dedicated to visions and challenges as well as policy issues for frontier research in future and emerging information technologies. It will complement scientific conferences that are organised in specific domains by facilitating *cross-disciplinary dialogue and discussion*, and by establishing and strengthening links between research and policy.

CONFERENCE ANNOUNCEMENT
FET CONFERENCE 2009

Europe's forum dedicated to vision, challenges and policy issues for frontier research in emerging information technologies
Prague, Czech Republic - 21-23 April 2009

This FET Conference will become an important periodic *rendez-vous* for stakeholders to discuss scientific, societal and policy challenges in the domain of future & emerging information technologies.

A top quality programme built with wide community input and scientific contributions of a visionary nature will bring together around 500 participants, representing a broad multi-disciplinary scientific community, key policy makers as well as relevant industrial and societal stakeholders. The conference will feature a variety of fresh and lively activities - keynote speakers, round-table discussions, sessions focussed on new and emerging topics, an exhibition of research-in-progress showcases and an exciting evening programme will be mixed with opportunities for informal discussion and meeting, as well as brainstorming and spontaneous on-site self-organised sessions.

The evening program will promote an interactive and creative atmosphere hosted at different evening events throughout Prague.

The FET Conference is organised jointly by the European Commission, the Czech Technical University and the Academy of Sciences of the Czech Republic.

For more information as it becomes available:
http://ec.europa.eu/information_society/events/fet/2009

FET AT ICT 2008

ICT2008 Conference and Exhibition - Europe's biggest research event for information and communication technologies

Lyon, France - 25-27 November 2008

FET research will play a prominent role at this year´s ICT Conference 2008, which arguably could not be otherwise given this year´s conferene theme which is *"Inventing the Future"*. Sessions at the conference will cover major long term research trends such as new computing paradigms, embodied intelligence, new bio, neuro and nano frontiers, as well as their policy and societal implications. A number of FET research projects will exhibit their latest results.

A keynote presentation by A. Fert (Nobel Prize laureate 2007, and partner of the FET NANOSPIN project) on 'ICT Science Matters' will showcase European ICT excellence in action and outline the high potential of foundational research to deliver transformational impact for Europe.

The event will also provide the FET community with the opportunity to get first hand information on the new FET challenges that will be targeted as part of the ICT Work Programme 2009-2010, to meet together, and to network with the wider ICT community.

For more information on the conference:
http://ec.europa.eu/information_society/events/ict/2008

FET Funding Update

FET-PROACTIVE

The third ICT Call (published December 4th 2007) invited proposals for Integrated Projects (IP), Coordination and Support Actions (CSA) and/or Specific Targeted Research Projects (STREP) on 3 Objectives: "Science of Complex Systems for Socially Intelligent ICT" (COSI-ICT), "Embodied Intelligence" (EMBODYi) and "ICT Forever Yours" (ICT-FY). A total of 54 proposals were received, all of them eligible for evaluation. Statistics per objective are summarised in table 1.

Objective	Instrument	Eligible	Scored above all evaluation thresholds	Total grant requested (proposals above threshold; M€)
COSI-ICT	IP	27	8	42
	CSA	2	1	1
EMBODYi	IP	4	1	8
	STREP	9	5	13
ICT-FY	IP	12	5	27

Table 1: Summary statistics call 3

COSI-ICT PROPOSALS UNDER NEGOTIATION

ASSYST (CSA) addresses coordination of complex systems research and the associated research community, specifically in the area of techno-social systems. Retained projects will advance 'theoretical foundations of complexity science', 'data-driven simulation' and 'prediction and predictability' issues.

The topics covered by the IPs range from ambient intelligence **(SOCIONICAL)** over social communities/networks that relate through the use of ICT with emphasis on quality and trust **(QLECTIVES)** as well as emotions driving behaviour **(CYBEREMOTIONS)**, to modelling and predicting epidemic scenarios **(EPIWORK).**

ICT-FY PROPOSALS UNDER NEGOTIATION

The LivingKnowledge proposal addresses the 'knowledge, diversity and time' aspect of the call. **HATS, CONNECT** and **SecureChange** jointly cover both the areas of 'eternal systems' and 'secure and dependable software'.

EMBODYI PROPOSALS UNDER NEGOTIATION

The OCTOPUS (IP), Locomorph, VIACTORS, eMORPH, EVRYON, ANGELS (STREP) proposals cover the main areas of the call; 'morphology and behaviour' is well addressed, while the area of 'mind-body co-development' and 'co-evolution or design for emergence' is less well covered. The long-term vision of embodied intelligence is partly addressed as well as communication and the means of communication between separate sub-components comprising the embodied intelligence.

FET-OPEN

At the time of writing, FET-Open is busy with the launch of 8 new targeted research projects and 1 coordination and support action from batch 2. Most projects will start their work shortly after the summer break. The total grant awarded to the successful proposals was 16 M€ (for STREPs) and 0.5 M€ (for CSAs).

Research proposals received in this batch were broadly concentrated around two areas: (a) computer science, modelling, human-computer interaction and issues related to human factors, and (b) hardware-oriented areas such as nano- opto-electronics, quantum information processing and communication. The quality of proposals was considered to be very high – only 30% failed on one or other of the evaluation thresholds. The majority of proposals were from universities and research centres, although there was some participation of research-active SMEs, which was considered to be positive. There were also 8 third country partners involved in 7 proposals. The total grant requested by all the received proposals was 57 M€.

After batch 2, the total number of project grants awarded by FET-Open in Framework Programme is now 19 (17 STREP projects and 2 CSA projects). These projects have requested grants totalling 32 M€.

BATCH 2 RETAINED PROPOSALS

ECCELL aims to lay the foundation of micro- and nano-scale molecular information processing by creating the first electronically programmable chemical cell.

GOSPEL aims to enable slow and fast light propagation as a tunable feature in photonic devices, offering the necessary and often missing functionality of a time-delay/phase shift line in broadband ICT systems.

HIP addresses the problem of scaling quantum processors by attempting to build elementary hybrid atom-photon devices and develop the schemes for their

integration on platforms capable of being miniaturised and scaled up in functional networks.

HIVE is attempting to develop a non-invasive brain stimulation device to enable direct machine to brain communication.

MINOS targets an emerging field in photonics, namely micro- and nano-optomechanical cavities with the aim to exploit opto-mechanical effects to control light-matter interaction.

HIDEAS aims to exploit the high-dimensional multimodal entangled quantum states of the optical radiation field to significantly increase the information capacity of quantum communication, imaging and metrology.

NIW addresses the exploitation and integration of haptic, auditory, and to a lesser extent, visual modalities for generating new paradigms for foot-ground interaction using low-cost actuator based devices.

SCOPE plans to model, design, fabricate, and measure circuits where the single charge quantum plays the dual role of the flux quantum in classical Josephson junction circuits.

VISMASTER (CSA) aims to bring together European academic and industrial R&D excellence from data management, data analysis, spatial-temporal data, and human visual perception research to form a wider visualisation research community.

La Vie des Projets

PROJECT HIGHLIGHTS

COGNIRON – THE CHIEF COOK ROBOT

The recently concluded COGNIRON integrated project studied the perceptual, reasoning and learning capabilities of robots. A major challenge was to provide a reference "Cognitive Architecture" for autonomous robots that interact with humans and provide services to them.

The consortium addressed this challenge by defining a large number of competences that such a robot might need, and then combined collections of these functions in a set of three "key experiments". The *Robot Home Tour* experiment demonstrated practical abilities for guided learning of 'human home environment' models. These models integrate information about the topological structure, appearance, functional structure and semantic labels of the environments. The *Curious Robot* experiment demonstrated cooperative task achievement, particularly for "fetch and carry" tasks. The *Learning Skills and Tasks* experiment focussed on arranging and interacting with objects.

COGNIRON started as a pathfinder of EC research initiatives in the area of service robotics. The consortium's work on embodied interaction has been a source of progress and a milestone in the global robotics research scene by allowing robots to operate reliably in real-world situations. The project has also highlighted the importance of mobile robot motion and posture as a non-verbal communication medium, thus enabling an entirely new area for research in human robot interaction. The contributions to solutions for the problem of visual navigation, effective path planning and human-aware task planning substantially advanced the state-of-the-art.

More recently, the field that was opened up by COGNIRON has become a mature research area in the FP6 call 6 ('Advanced Robotics') and FP7 Challenge 2 ('Cognitive Systems, Interaction, Robotics').
http://www.cogniron.org/
http://www.youtube.com/watch?v=FtjC-BXGgAE

SUBTLE – SWITCHING BY NOISE

All modern electronics is based on tiny switches, which can turn signals on and off. The smaller the switches are, the more complex and powerful circuits can be realized, and consequently, the more functions can be crammed into an electronic device. However, with increasing miniaturization an increasing fraction of the applied power is converted into heat that just adds to the ambient electrical noise. In common device concepts this noise deteriorates the performance.
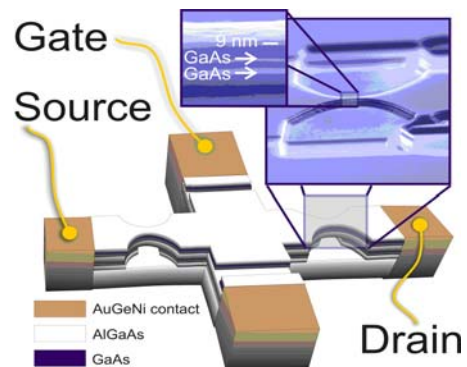

Fig. caption – Scheme of a quantum-gate transistor realized within the SUBTLE project. Two quantum wells, the upper serving as transistor channel and the lower as a gate, were grown with atomic precision. Contacts were defined by a new undercut technique, which allows to control the gate and the channel independently. (Source: the SUBTLE project).

Yet interestingly - and perhaps contrary to what one might think - there are cases where noise can be beneficial, and lead to improved signal to noise ratios (SR). The STREP project SUBTLE deals with nanoelectronic devices in which quantum-confined electron channels are so closely spaced to each other that a tuneable feedback action sets in. This positive feedback leads to switching voltages smaller than the thermal limit of classical field effect transistors stabilized by the electrical noise in the system. Such concepts based on non-linear transport phenomena might significantly improve electronic applications by lowering the energy consumption through sub-thermal switching and by increasing the reliability through better control of noise.

HAPTEX – NEW HAPTICS INTERFACE

European researchers have pioneered a breakthrough interface that allows users to touch, stretch and pull virtual fabrics in a way that it feels like the real thing. The new multi-modal software linked to tactile hardware and haptics devices have potential applications in shopping, design and human-machine interaction.

Creating the realistic sensation of deformable textiles required a huge amount of modelling. The project´s first big challenge was to take precise measurements of the tensile, bending and stretching properties of the material.

Fig. caption – using the new interface, users can touch, stretch and pull fabrics as if they were really there. (Source: ICT Results)

"It is a multi-modal approach that has never been tried before..." (*Professor Nadia Magnenat-Thalmann, coordinator of the HAPTEX project*)

Science Daily – 31 January 2008

http://www.sciencedaily.com/releases/2008/01/080125233408.htm

FUNFACS – FINDING THE RIGHT SOLITON FOR FUTURE NETWORKS

FET researchers have completed a study of self-sustaining solitary light wave packets could result in a new generation of computers and optical telecommunications networks. The researchers have found that using light rather than electronic or magnetic devices to store and move data is quicker, more energy efficient and cost-effective, and that so-called cavity solitons could be the key to unlocking this technology.

A soliton is defined as a wave, which once formed, maintains its shape while it travels at constant speed. Soliton waves are localised within a region and are able to react with other solitons and emerge unchanged. This is in contrast to normal waves that diffuse over time over ever larger regions of space, a phenomenon called dispersion.

http://cordis.europa.eu/ictresults/index.cfm/section/news/tpl/article/BrowsingType/Features/ID/89731

PERADA – CALLS FOR FUNDING

The Pervasive Adaptation (PerAda) Coordination Action is launching calls for the funding of secondments and exchanges. These aim to encourage interaction between the various research disciplines that are active in pervasive adaptation and to stimulate greater cross-fertilisation of ideas between disciplines which have traditionally not worked closely together.

PerAda will reimburse travel and subsistence costs to help contribute to the cost of staff exchanges. The first call closed on 15 June 2008, with a total fund of €10,000 available. Four further calls will be announced every six months. The launch of the next one is planned in September (deadline of 1 December 2008). Further details can be found at: http://www.perada.eu/

QKD NETWORK GOES LIVE

The IP SECOQC targets the development of secure communication systems based on networked Quantum Cryptography (Quantum Key Distribution – QKD). The research concentrates on highly mature QKD links and innovative hard- and software for city-wide QKD networks, and builds on fundamental research from several FET projects: components for true single-photon sources and detectors have been developed by

SAWPHOTON and RAMBOQ, respectively; novel transmission concepts and new QKD schemes were delivered by EQCSPOT and RAMBOQ. In addition, the first successful bank wire transfer was made by the Descartes-prize winning project QUCOMM.

Now, SECOQC approaches its termination by the first live demonstration of a QKD network. It is embedded in the 3-days event "QKD Network Demonstration and Conference", which will take place in Vienna between October 8 and 10, 2008.

Seven technologically different QKD-links will be combined to form the SECOQC quantum backbone network, connecting five company sites of Siemens Austria. The demonstration will be followed by a 2-day scientific conference highlighting –amongst others– recently engineered highly mature QKD devices and networking, the ETSI standardisation initiative, and security proofs of QKD.

The building blocks necessary for bringing QKD networks to the market will be shown. Therefore existing business applications, like voice telephony and video conferencing will be secured by keys distributed over this QKD network.

Further information on:

http://www.secoqc.net/html/conference

Other links:

EQCSPOT
http://cordis.europa.eu/esprit/src/28139.htm

RAMBOQ
http://cordis.europa.eu/fetch?ACTION=D&CALLER=PROJ_IST&QM_EP_RCN_A=67044

QUCOMM
http://www.imit.kth.se/QEO/qucomm

SAWPHOTON
http://ntserv.fys.ku.dk/sawphoton1

BIO-ICT.ORG PORTAL LAUNCHED

Approximately 6 months after its launch, FET's Bio-ICT convergence initiative is getting up to speed. The initiative aims at developing new perspectives in ICT that exploit the understanding of information processing in biological systems or lead to systems that can be naturally combined with biological systems. The research communities involved have recently set up a joint web portal that will host links ranging from research-related documents to job offers. This is in line with the intention to cooperate beyond the border of the project itself.

http://www.bio-ict.org

RE-TRUST2008 CALL FOR CONTRIBUTIONS

The RE-TRUST project announces RE-TRUST 2008, their First International Workshop on Remote Entrusting, which will run from 15-16 October 2008. It will bring together researchers that are interested in various topics related to 'remote entrusting'. This novel paradigm has the specific objective of ensuring that code running on an un-trusted machine, is being executed in a trustworthy manner.

AWARDS & PRIZES

Congratulations to the following prize winners, all of whom are or have been associated in one or other way with FET:

- Andrea Ferrari (VIACARBON): Marie Curie Prize 2008
- Sten Grillner (NEUROBOTICS): Kavli-prize for Neuroscience 2008
- Anton Zeilinger (QUROPE, QAP): Isaac Newton medal of the Institute of Physics (London)
- Joseph Sifakis (ADVANCE): 2007 Turing Award
- Leandros Tassiulas (NET-ReFOUND): INFOCOM 2007 Achievement award

In Brief

OVERHEARD IN THE CAFETERIA

FET-Open is prototyping a new community and networking tool called caFETeria. Members of the broader FET community are welcome to join in and contribute to developing this tool.

Fig. caption: A screen shot from the caFETeria website (Source: http://caFETeria.ning.com)

The tool provides community members with the possibility to profile themselves and their work, to start conversations, to create groups of interest, to post blog entries, etc. The broad theme of the community is **conversations on the future of ICT**. With your help and support, the ambition is that this tool can evolve into a valuable networking and community-building tool for FET researchers.

Why not sign up and use the tool to tell the FET community something more about yourself and your research interests?
http://cafeteria.ning.com

FET WORKING GROUP

The Advisory Group for the ICT research programme (ISTAG) has recently set up a working group on Future & Emerging Technologies to provide strategic advice and orientations on long term foundational research. The focus of its activities is on effectively strengthening and broadening the science and technology basis of future information and communication technologies.

In its first report the group includes 15 recommendations that address sharpening the role of FET, its positioning with regard to other funding schemes, its visibility outside the scientific community, and potential topics for future FET-Proactive Initiatives (including mechanisms for their identification and implementation). The second report is being prepared and will provide recommendations on the FET Open scheme and its implementation as well as on improving the outreach, effectiveness and impact of FET in general. Both reports will become public in autumn 2008.

CULTIVATING A "FET SPIRIT"

Fig. caption: The FET spirit, captured on one slide (Source: FET-Open unit)

Apart from promoting great science, FET aspires to helping to cultivate a "new way of being" for FET researchers. FET has tried to characterise this through 12 apparent paradoxes:

- Publishing is also about influencing
- Learning is also about giving
- Solid methods, yes, but creative approaches too
- Disciplinary focus but the ability to cross boundaries
- FET researchers do it for Europe, but they also do it for themselves
- Perseverance is crucial, but change is too
- Curiosity is vital but so is generosity
- Let´s be responsible, but let´s also be rebels
- Work with the best, but involve the young
- Scientific excellence of course, as long as we also question excellence
- FET is hard work and it is also fun
- Concrete results within a broad vision

Why not share with us how you live through these paradoxes in *your* FET research? This discussion is taking place on caFETeria.

To contribute, click here and sign up:
http://cafeteria.ning.com/group/aboutfet/forum/topic/show?id=1081148%3ATopic%3A2246

New Books
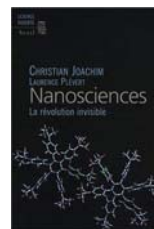
NANOSCIENCES, LA REVOLUTION INVISIBLE
Christian Joachim & Laurence Plévert
Editions du Seuil, 2008, pp. 192
ISBN 978-2-02-086703-0
http://www.editionsduseuil.fr/livre/Nanosciences/9782020867030
Christian Joachim (PICOINSIDE), Director of Research at CNRS and Head of the Nanoscience group at CEMES in Toulouse and Laurence Plévert, scientific journalist, co-authored a book about nanotechnologies. The authors address the facts they consider essential, both in terms of scale, physical properties and real opportunities to come, in this emerging area of nano-science. They set the context for a sound understanding of the extent and limits of the nano-world, whilst hinting at future technological possibilities and applications.
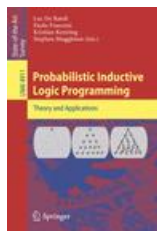
PROBABILISTIC INDUCTIVE LOGIC PROGRAMMING – THEORY AND APPLICATIONS

Luc de Raedt, Paolo Franconi, Kristian Kersting & Stephen Muggleton (eds.)
Springer, 2008, pp. 341
ISBN 978-3-540-78561-1
http://www.springer.com/computer/artificial/book/978-3-540-78651-1

This recent book is the main result of the FET APRIL II project on Application of Probabilistic Inductive Logic Programming, which ended in 2007. The book explores the question of how to combine probability and logic with learning. This question is gaining increased attention in disciplines including knowledge representation, reasoning about uncertainty, data mining and machine learning. The emerging field of study which it describes is known as statistical relational learning and probabilistic inductive logic programming.

Forthcoming Events

Upcoming FET-Proactive Cluster Reviews

Global Computing
3-7 November – Barcelona (ES)

Simulation & Properties of Complex Systems
13-16 October – Brussels (BE)

2ND PEACH SUMMER SCHOOL ON PRESENCE TECHNOLOGIES AND APPLICATIONS
9-11 July 2008 – Dubrovnik (HR)
http://school.peachbit.org

AMAST 2008 INTERLINK WORKSHOP
28-29 July 2008 – Urbana-Champaign (USA)
http://www.ercim.org/interlinkworkshops

TNT2008 CONFERENCE
1-5 September 2008 – Oviedo (ES)
http://www.tntconf.org/2008/index.php?conf=08

PERADA SUMMERSCHOOL ON PERVASIVE ADAPTATION
7-13 September 2008 – Rimini (IT)
http://www.perada.eu/summerschool08.htm

NEUROINFORMATICS 2008
7-9 September 2008 – Stockholm (SE)
http://www.neuroinformatics2008.org

BARCELONA COGNITION, BRAIN AND TECHNOLOGY SUMMER SCHOOL
8-22 September 2008 – Barcelona (ES)
http://mtg33.upf.es/bcncs

QUROPE WORKSHOP ON QUANTUM/CLASSICAL CONTROL IN QUANTUM INFORMATION
13-20 September 2008 – Otranto (IT)
http://qccqi.df.unicam.it

MUSIC, SCIENCE, AND THE BRAIN
27 September 2008 – Plymouth (UK)
Final open event of the FP6 EmCAP project
http://neuromusic.soc.plymouth.ac.uk/Symposium.html

SECOQC QKD NETWORK DEMONSTRATION AND CONFERENCE
8-10 October 2008 – Vienna (AT)
http://www.secoqc.net/html/conference

RE-TRUST 2008 - FIRST INTERNATIONAL WORKSHOP ON REMOTE ENTRUSTING
15-16 October, 2008 – Trento (IT)
http://www.re-trust.org

PRESENCE 2008
16-18 October – Padova (IT)
http://presence2008.org

PERADA WORKSHOP ON PERVASIVE ADAPTATION
(in conjunction with SASO2008)
21 October 2008 – Venice (IT)
http://www.perada.eu/firstworkshop.htm

INFORMATION AND BROKERAGE CONFERENCE ON INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE EU'S 7TH FRAMEWORK PROGRAMME
21-23 October 2008 – Moscow (RU)
Contact persons: Stephan.Pascall@ec.europa.eu – David.Guedj@ec.europa.eu – Aymard.de-Tourzalin@ec.europa.eu

PEACH INDUSTRY EVENT
12-13 November – Torino (IT)
http://www.peachbit.org

ICT 2008 EVENT: 'I'S TO THE FUTURE
25-27 November – Lyon (F)
http://ec.europa.eu/information_society/events/ict/2008

FET CONFERENCE 2009
21-23 April 2009 – Prague (CZ)
http://ec.europa.eu/information_society/events/fet/2009

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About this Newsletter

FET through the keyhole is published periodically by the FET-Proactive and FET-Open units at the **European Commission, Directorate General Information Society and Media** in Brussels (BE).

We are always looking for interesting stories from the world of FET research. Please contact the editors if you would like us to consider any news item for publication.

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ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/fet/fet-nl-03_en.pdf