**Foreword**

The light-hearted report of the travel troubles experienced by the recent PESC Plenary, see below, hides a deeper message.

The work of ESF, especially in peer review and Committees, is extraordinarily reliant on the time that busy people give up to attend ESF meetings. In the case of Helsinki, most of them found themselves giving up more time than they had allowed for, and were separated from families, and less importantly (I hope) work, for some days. As one would expect from top-level researchers and ex-students, originality, team working, leadership, prompt decision, and indeed humour, were highly evident. Score 4 out of 4, grade alpha plus.

The commitment to ESF, to PESC and to their research community by these leading researchers is most highly appreciated.

Neil Williams  
Head of Unit, Physical and Engineering Sciences

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**Important Opportunities**

**OPEN CALLS**

Call for ESF Research Conferences proposals (for conferences taking place in 2012)  
Deadline for submission: **15 September 2010 (Midnight CET)**  
> More information:  
http://www.esf.org/activities/esf-conferences/call-for-proposals.html

**ESF-COST Conference: Final Call for Applications / Papers**

**Future Internet and Society: A Complex Systems Perspective** - 2-7 October 2010, Italy

Chair: **Romualdo Pastor-Satorras** - Universitat Politècnica de Catalunya, ES  
Co-Chair: **Claudio Castellano** - CNR-ISC, Sapienza Università di Roma, IT

The digital revolution and the advent of the Internet are transforming the way we work, how we spend our free time. These phenomena are also changing how we communicate with each other and the way in which we establish and maintain our social relations. The relationship between Internet and society is complex and bidirectional, leading to a co-evolution of the two systems.

This conference will bring together experts in Information and Communication Technologies (ICT), social scientists, as well as experts in the area of complex systems. They will assess the state-of-the-art, identify new trends and envision future developments in the intertwined domains of future Internet and society.

Full conference programme and application form are accessible online from  
http://www.esf.org/conferences/10341  
Closing date for applications: **9 June 2010**
PESC Spring 2010 Standing Committee & Core Group meetings

Update on the 56th PESC Core Group and 31st Standing Committee meetings

PESC’s 2010 April meetings were held in Helsinki at the kind invitation of the PESC Chair, Professor Mats Gyllenberg and the Academy of Finland.

Among the agenda items were:

- The ranking of Research Networking Programme (RNP) proposals
- The presentation by the Chairs of the Research Networking Programmes “Multidisciplinary Frontiers of Magnetic Resonance (EMAR)” and “Harmonic and Complex Analysis and its Applications (HCAA)” of their programmes at mid-term and their planned activities for the future
- Five RNP final reports which were endorsed by the Committee
- The approval of PESC’s budget for Science Policy and Strategy
- Break-out group discussions on “Standing Committees in the future ESF” and “Issues for Interdisciplinary Research”.

PESC Membership Issues

The following have been welcomed as new members to the Standing Committee in early 2010:

**Professor Olle Eriksson**
Department of Physics, Uppsala University, Sweden

**Professor Charles André Hirlimann**
International Affairs, CNRS-INP, Paris, France

**Professor Stefan Jähnichen**
Software Engineering Research Group, Fakultät IV - Elektrotechnik und Informatik, Technische Universität Berlin, Germany

**Professor Heli Jantunen**
Microelectronics and Materials Physics Laboratories, University of Oulu, Finland

**Professor Marcela Morvova**
Department of Astronomy, Physics of the Earth and Meteorology, Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, Slovakia

**Dr. Christos Panayioutou**
Department of Electrical and Computer Engineering, University of Cyprus, Nicosia

**Professor Hubert van den Bergh**
Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland

The ESF and the PESC Standing Committee would like to sincerely thank Professor Yvonne Brandt Andersson, Professor Charalambs Charalambous, Professor Pascal Chossat, Professor Ivan Hubac, Dr. Fjola Jonsdottir, Professor Marc Parlange, Professor Kaisa Sere and Professor Dorothea Wagner for their contribution to the Committee’s work over the past years.

Core Group Membership

The following members have recently been appointed to the Core Group.

**Dr. Salim Belouettar** (Laboratoire de Technologies Industrielles, Centre de Recherche Paul Henri Tudor, Luxembourg)

**Professor Kenneth Ruud** (Department of Chemistry, University of Tromso, Norway)

**Professor Sauro Succi** (Institute for Applied Mathematics, CNR, Rome, Italy)

The Committee would like to thank Dr. Pasquale Lubrano for his commitment during his term on the Core Group.

Statutory Review of the ESF Standing Committees 2003-2008

In the framework of the quinquennial reviews of all ESF Standing Committees as set down in the ESF Statutes, PESC submitted its self-evaluation report covering the period 2003-2008 by the deadline of June 2009.

The review of all five Standing Committees was conducted by an independent Review Panel which examined and evaluated the activities of the Committees during the last months.
It also discussed possible future developments with the Standing Committee Chairs.

Its report was recently approved by the ESF Governing Council at its meeting in May 2010.

PESC’s self-evaluation report will be published at the end of August 2010 and PESC Member Organisations informed accordingly.

The Eruption of Volcanic Panic

The April 2010 PESC meeting will long be remembered by the participants by the cloud which cast its shadow over the second half of the meeting. Those who used their rest time before going out to the Committee dinner were full of what they had found on the internet: an Icelandic volcano, with the jaw-breaking name Eyjafjallajökull, was having a very interesting subglacial eruption and in the process had coughed millions of tons of tephra into the atmosphere at flight levels A to Z, and the whole lot was being blown to north-western Europe. There having been some teeth-clenching examples of aircraft engines not liking tephra, there was talk of airports being closed and flights cancelled.

Entering the meeting room at 0830 the next morning, everybody was busy with their laptops: not looking at their emails, or even their meeting papers, but planning their way home. Without a Russian visa, there is only one way – boat or, like our NSF Observer, wait a week for a flight. Discussion was not about ranking RNP applications, but about routes, timetables, connections and reservations. Once most people had sorted themselves out the Chair was able to reconvene the meeting at 1130 to finish the essential business. He’d lost half his strategic discussion, but then the GovCo got caught in the same cloud...

Three patterns emerged: the Turku-Stockholm ferry; Helsinki - northern Germany; Helsinki – Tallinn. The scenes at the ferry terminals and railway stations were biblical, booking systems were overwhelmed and taxi drivers waxed rich. The majority managed to get home Sunday night or Monday, suffering from what strangely felt like jet lag.

Pasquale’s powerpoint record of his journey back to Rome, via Stockholm, Hamburg, Basle, Zolten (oops) and Zurich was a welcome and amusing reminder of the ups and downs of journeys home. Many, including the ESF secretariat, have tales to tell.

The next PESC Plenary is October in Strasbourg. A boat excursion will be organised…. and a toast proposed.

Next Standing Committee Meeting

The next meeting of the PESC Standing Committee will take place on:

**14-15 October 2010**

at the ESF in Strasbourg, France

For the list of all forthcoming PESC meetings see: [http://www.esf.org/activities/esf-meetings/physical-and-engineering-sciences-pesc](http://www.esf.org/activities/esf-meetings/physical-and-engineering-sciences-pesc)

ESF 2010 Joint Round Table meeting

**Grand Challenges and Interdisciplinarity: Opportunities for Member Organisations and ESF in the developing European Research Area**

The 2010 joint Round Table meeting will bring together all five ESF Core Groups and Member Organisation Representatives with a special focus on Interdisciplinarity.

The meeting will take place on **17-18 June 2010** in Istanbul, Turkey, at the kind invitation of The Scientific and Technological Research Council of Turkey (TUBITAK).

The programme comprises key-note presentations as well as three working group sessions on “Creating the Environment”, “Strategy and Foresight” and “Research and Challenges” to both share experiences and to address issues and ways forward.

What’s New

6 new PESC Research Networking Programmes launched in 2010!

- Contact And Symplectic Topology (CAST)
- Gaia Research for European Astronomy Training (GREAT)
- Random Geometry of Large Interacting Systems and Statistical Physics (RGLIS) (launch meeting on 7 June 2010)
- New Approaches to Biochemical Sensing with Plasmonic Nanobiophotonics (PLASMON-BIONANOSENSE)
- Common perspectives for cold atoms, semiconductor polaritons and nanoscience (POLATOM) (launch meeting on 24 June 2010)
- New frontiers in millimetre / sub-millimetre waves integrated dielectric focusing systems (NEWFOCUS) (launch meeting on 10 June 2010)

EUROCORES NEWS

Status Report on the 2009 Call for EUROCORES Theme Proposals

From the Open Call for themes 2009, nine EUROCORES themes had been approved by the ESF Governing Council in October 2009 to be further developed into EUROCORES Programmes. The Calls for Outline proposals for 3 programmes in the PESC remit have been launched in January 2010:

- EuroGIIGA (Graphs in Geometry and Algorithms): 10 Outline Proposals received in March 2010
- EuroBioSAS (Bio-inspired Engineering of Sensors, Actuators and Systems): 18 Outline Proposals received in March 2010
- EuroSolarFuels (Molecular Science for a Conceptual Transition from Fossil to Solar Fuels): 7 Outline Proposals received in March 2010 (This programme is led by the Standing Committee for Life, Earth and Environmental Sciences- LESC).

EUROCORES S3T – Final Event

The final event of the S3T EUROCORES Programme “School and Symposium on Smart Structural Systems Technologies” was held on 6-9 April 2010 in Porto, Portugal (S3T-2010: http://paginas.fe.up.pt/~s3t).

The results of the three years work of the S3T programme have been summarized in a book published in April 2010.

EUROCORES SONS II – Final Events

The EUROCORES Programme SONS II “Self-Organised Nanostructures” held its final conference in Prague in October 2009.

A Workshop on “Functional Multiscale Architectures” took place in Bologna on 5-7 May 2010 with topics bridging self-organisation and graphene research and providing a link between SONS II and the new EUROCORES Programme EuroGRAPHENE “Maximizing the Impact of Graphene Research in Science and Innovation” which started its research and networking activities in Spring 2010.
Scientific Highlights

Forward Look Mathematics and Industry

The European Science Foundation through PESC, together with the European Mathematical Society (EMS), has been organising a consensus conference as part of the currently running Forward Look on the interactions and synergy between Mathematics and Industry. The conference took place in the headquarters of the Agencia Estatal Consejo Superior de Investigaciones Científicas (CSIC) in Madrid, on the 26th and 27th of April 2010.

The Conference was an official event of the Spanish Presidency of the European Union with more than 120 participants. It was inaugurated by José Manuel Fernández de Labastida, Director General de Investigación y Gestión del Plan Nacional from the Spanish Ministry of Science and Innovation. José Juan Sánchez Serrano, the Vice-President of the international relations of the CSIC was also in attendance with Ari Laptev, the President of the European Mathematical Society.

The Conference included invited presentations by some major European companies (Airbus, TOTAL, NIBC, Bayer, FerroAtlantica, MOX and KTN), a keynote presentation by Pierre-Louis Lions, 1994 Fields Medallist, a general survey on industrial mathematics by Professor Alfredo Bermúdez de Castro. The conference also offered the participants the possibility for a general discussion on the report and the corresponding Policy Recommendations.

More information as well as the draft report and success stories booklet can be found at the following address:

http://www.ceremade.dauphine.fr/FLMI/Consensus_Conference_Madrid/

Two articles on the conference appeared in the prestigious Spanish newspaper “El País”

http://www.elpais.com/articulo/sociedad/matematicas/hagan/visibles/elpepusoccie/20100517elpepusoc_10/Tes

http://www.elpais.com/articulo/ultima/matematica/solo/da/respuestas/ayuda/preguntar/elpepiult/20100524elpepiult_1/Tes

Event organized in the framework of the official agenda of the Spanish Presidency of the European Union

EUROCORES Programmes EuroQUAM and EuroQUASAR: Ultracold molecules in an optical lattice

Researchers from EuroQUAM and EuroQUASAR lead by Prof. Hanns-Christoph Nägerl at Innsbruck University succeeded in producing ultracold molecules trapped in an optical lattice and published the results in Nature Physics 6, 265 - 270 (2010). The molecular quantum gas is prepared in several steps. The starting point is a Bose-Einstein condensate of Cesium atoms which is loaded into an optical lattice formed by laser beams. The lattice parameters are subsequently tuned to achieve a setting where most of the sites are occupied by two atoms which are associated into weakly bound molecules via the Feshbach resonance. A four photon process is then used to bring the molecules to the vibrational and rotational ground state. The work opens prospects for the realisation of Bose-Einstein condensation of ground-state molecules and could be generalised to polar heteronuclear molecules in the future.
Achievements of the Research Networking Programme “Ultrafast Structural Dynamics in Physics, Chemistry, Biology and Material Science (DYNA)”

The aim of this programme was to create a network of scientists investigating ultrafast structural dynamics in physical, chemical and biological systems, including those developing new tools and methodologies to this purpose. In the five years of the DYNA programme and thanks, among others, to the incentives and encouragements it provided, the European landscape has dramatically changed. More groups have appeared that implement what were entirely novel tools five years ago: ultrafast electron and X-ray diffraction, ultrafast X-ray absorption spectroscopy (XAS), ultrafast multidimensional (MD) vibrational and electronic spectroscopies. In all these areas, Europe counted only a handful of research teams (e.g., only one in ultrafast XAS) or simply none (e.g. in ultrafast electron diffraction), while now it is at the forefront worldwide in ultrafast X-ray diffraction and XAS, and in MD spectroscopies.

During the past 5 years, about 50 short visits and 15 exchange grants were supported, with particular attention to young scientists. In total, they amount to about 450 days and 125 weeks, respectively, of real international collaborations.

It is difficult to estimate the impact of these visits on the scientific production and future collaborations but at least 20 publications per years have been directly benefiting from this improved intra-Europe mobility.

Finally, the closing workshop of the ESF DYNA programme has been transformed into the first full international conference of the field (First International Conference on Ultrafast Structural Dynamics; Lausanne, 7-10 June 2010), bringing together all the most visible actors in the field.

Research Networking Programme “Multidisciplinary Frontiers of Magnetic Resonance (EMAR)”

The EMAR programme was created to foster the transnational collaboration in Europe in the field of Magnetic Resonance. Its instruments are the EUROMAR conferences, training activities and frontier workshops. The programme is supported by 18 member organizations from 16 countries.

Up to now it has organized networking activities that have been attended by more than 2000 participants, including the direct sponsoring of the participation of 350 students and post-docs in the EUROMAR conferences. These have become, with the help of the ESF programme, the leading conference of Magnetic Resonance in Europe and a reference Worldwide. In 2010 it has joined forces with ISMAR to promote the Word Wide NMR conference in Florence.

The following graph shows the attendance to the EUROMAR meetings. In magenta are the ESF supported meetings with the number of participants. The nationalities of the EMAR participants include 50 countries (26 European).
Currently running activities

EUROCORES

Origin of the Elements and Nuclear History of the Universe - EuroGENESIS
Start of Research and Networking phase
See http://www.esf.org/eurogenesis

Maximizing the Impact of Graphene Research in Science and Innovation - EuroGRAPHENE
Start of Research and Networking phase
See http://www.esf.org/eurographene

Cold Quantum Matter - EuroQUAM
Research and Networking phase
See http://www.esf.org/euroquam

Quantum Standards and Metrology - EuroQUASAR
Research and Networking phase
See http://www.esf.org/euroquasar

Synthetic Biology: Engineering Complex Biological Systems - EuroSYNBIO
Start of Research and Networking phase
See http://www.esf.org/eurosynbio

Friction and Adhesion in Nanomechanical Systems - FANAS
Research and Networking phase
See http://www.esf.org/fanas

Fundamentals of NanoElectronics - FoNE
Final Evaluation phase
See http://www.esf.org/fone

SONS 2
Final Evaluation phase
See http://www.esf.org/sons2

Smart Structural Systems Technologies – S3T
Research and Networking phase / Final Evaluation
See http://www.esf.org/s3t

Research Networking Programmes

31 RNPs currently active
For complete list see http://www.esf.org/pesc/programmes

RNP Mid-Term Reviews
In April 2010, the following two mid-term reviews were undertaken. During the PESC plenary meeting in Helsinki, the RNP Chairs presented the work accomplished by their programme and their future planned activities:

- Multidisciplinary Frontiers of Magnetic Resonance (EMAR) - http://www.esf.org/emar
- Harmonic and Complex Analysis and its Applications (HCAA) - http://www.esf.org/hcaa

RNP Final Reviews
In April 2010, the final reviews of the following five Research Networking Programmes were conducted:

- Electron Induced Processing at the Molecular Level (EIPAM)
- Global and geometrical aspects of nonlinear partial differential equations (GLOBAL)
- Experimental and Theoretical Design of Stimuli-Responsive Polymeric Materials (STIPOMAT)
- Middleware for Network Eccentric and Mobile Applications (MINEMA)
- Spectral Theory and Partial Differential Equations (SPECT)

Those Member Organisations that contributed to these RNPs will be notified of the outcome shortly.

Exploratory Workshops

10 workshops are being funded in 2010:

Foundations Of Autonomic Computing For Traffic Management Systems
14-16 April 2010, Durham, United Kingdom

Manipulation Of Biomaterials Surface By Plasma Processing
co-funded by EMRC
26-30 May 2010, Iasi, Romania

The Almost Gaussian Universe
9-11 June 2010, Gif-Sur-Yvette, France

Organic Bioelectronics
co-funded by LESC
14-16 June 2010, Trento, Italy

Mathematical Aspects Of The Physics With Non-Self-Adjoint Operators
30 August-3 September 2010, Prague, Czech Republic
Cosmogony Of Agns: Unifying Approaches For The Next Decade
31 August-3 September 2010, Brindisi, Italy

Microreactor Technology For Healthcare Applications - MITHRA
26-28 September 2010, Fiesa, Slovenia

Dissipative Systems: Entropy Methods, Classical And Quantum Probability
1-3 November 2010, Vienna, Austria

PESC decided, in October 2009 to support two additional Workshops which could not be funded by the ESF Exploratory Workshops Scheme as PESC Strategic activities:

- Spacetime as a Statistical System: From Quantum Discreteness To Classical Continuum
  21-23 July 2010, Potsdam, Germany

- Polyoxometalate-Based Nanoscale Devices
  28-30 July 2010, Newcastle upon Tyne, United Kingdom

2010 Strategic Workshop with the PESC Core Group and Convenors of Exploratory Workshops

Following the successful strategic workshops held in February 2009 with Convenors of Exploratory Workshops, which resulted in PESC setting aside part of its strategy budget to provide up to 5 k€ each for Exploratory Workshops follow-up activities, a strategic meeting involving the PESC Core Group and Convenors of Exploratory Workshops held during the year 2009 will be organised in Frankfurt, Germany on 1 September 2010.

The meeting is meant to identify potential input into existing Standing Committee activities or the development of new activities and will give Exploratory Workshops Convenors the opportunity to present the results of their workshops as well as the outcome of follow-up activities awarded by PESC in 2009.

Research Conferences

The 2010 ESF Conferences Scheme Programme comprises the following conferences covering topics that are within the PESC remit:

- Joint ESF-EMRS-EUCHEMS-EPS Conference
  European Energy Conference
  Barcelona, Spain, 20-23 April 2010

- ESF-FWF Conference in Partnership with LFUI
  Putting our Solar System in Context: Origin, Dynamical and Physical Evolution of Multiple Planet Systems
  Obergurgl, Austria, 25-30 April 2010

- ESF Mathematics Conference in partnership with EMS and ERCOM
  Algebraic Methods in Dynamical Systems
  Bedlewo, Poland, 16-22 May 2010

- ESF-FWF Conference in Partnership with LFUI
  Quantum Engineering of States and Devices: Theory and Experiments
  Obergurgl, Austria, 5-10 June 2010

- ESF-FMSH Entre-Sciences Conference in partnership with UPCAM
  Global Change Research II: Environmental Crisis, Energy Issues and Global Regulation Policies
  Ile de Porquerolles, France, 11-16 June 2010

- ESF-EMS Conference
  Symmetries and Integrability of Difference Equations (SIDE – 9)
  Varna, Bulgaria, 14-18 June 2010

- ESF Mathematics Conference in Partnership with EMS and ERCOM
  Teichmüller Theory and its interactions in Mathematics and Physics
  Bellaterra, Barcelona, Spain, 28 June-3 July 2010
ESF-CERN Cargese Summer School in High Energy Physics and Astrophysics
String Theory: Formal Developments and Applications
Cargese, France, 21 June - 3 July 2010

ESF-FWF Conference in Partnership with LFUI
Nanotechnology for Sustainable Energy
Obergurgl, Austria, 4-9 July 2010

ESF Mathematics Conference in partnership with EMS and ERCOM
Highly Oscillatory Problems: From Theory to Applications
Cambridge, United Kingdom, 12-17 September 2010
(closing date: 12 June 2010)

ESF-COST High Level Research Conference
Future Internet and Society: Complex Networks Perspective
Acquafredda di Maratea, Italy, 3-8 October 2010
(closing date: 9 June 2010)

ESF-COST High-Level Research Conference
Natural Products Chemistry, Biology and Medicine III
Acquafredda di Maratea, Italy, 5.9 - 10.9 2010
(closing date: 6 June 2010)

Recent Publications

Nuclear Physics News
(Volume 20, May 2010)
NuPECC Expert Committee
> More information:
http://www.esf.org/nupecc

New Trends and Applications of the CASIMIR Effect (CASIMIR)
An ESF Research Networking Programme
Download casimir.pdf (1.1 MB)

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Staff changes in the Physical and Engineering Sciences Unit (PES)

For the PESC Newsletter, visit the website at:
http://www.esf.org/pesc

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