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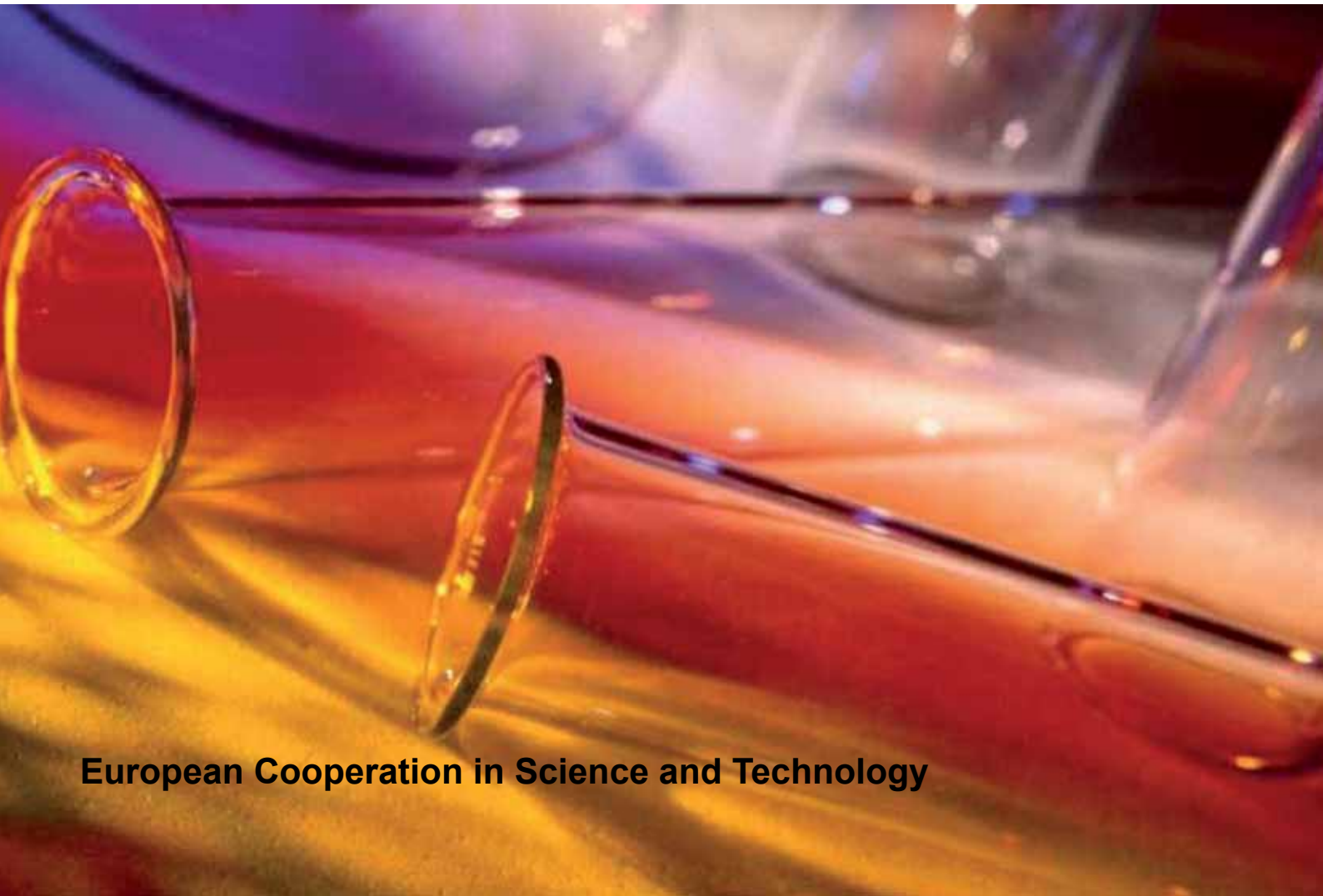
COST

Annual Report 2009



European Cooperation in Science and Technology

THE PAST AND PRESENT OF COST

1. COST in brief

COST - "European CO-operation in the field of Scientific and Technical Research" - is the longest running and widest European intergovernmental mechanism for cooperation in research.
Established by an exchange of letters in 1969-1970 followed by the Ministerial Conference of 19 European States on 22-23 November 1971, COST currently helps the scientific communities of 35 European countries* (including all EU Member States and candidate countries) cooperate in common research projects (Actions), supported by national funds.
* COST member states: Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, former Yugoslav Republic of Macedonia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Republic of Serbia, Slovenia, Slovakia, Spain, Sweden, Switzerland, Turkey, United Kingdom; COST cooperating state: Israel.
COST is a cornerstone for the development of the European Research Area (ERA) and instrumental in achieving the objectives set by the Lisbon Agenda. It is a unique instrument with a clear role in the ERA which notably provides:

- a European "exploratorium" of new ideas in the most promising fields of research, thus functioning as a generator of initiatives in the Framework Programmes and as a potential source of industrial applications, for instance in EUREKA;
- a high-level scientific network able to tackle problems of societal importance;
- a framework able to ensure scientific excellence in networking European researchers;
- an effective tool to coordinate nationally funded research activities, encouraging synergy and work sharing and avoiding duplication and gaps, thus allowing a more efficient use of national resources. A" multiplier effect" is achieved: with the funds provided for COST networking a volume of research activities worth about 100 times more;
- an active partner in the European "neighbourhood" policy towards the scientific communities of the EU's neighboring countries;
- an asset for the EU RTD policy in its relation to the rest of the world.

The confirmed confidence and enthusiasm in the COST research community, and the support assured from the EU's Framework Programmes, represent an important opportunity for the scientific community on a world basis also in the future.

2. COST Characteristics

- "Bottom up approach" (the initiative of launching a COST Action comes from the European researchers themselves)
- "à la carte participation" (only countries interested in the Action participate)
- "coordination of research capacity" using the network of national coordinators and Domain Committees
- "openness to non-European participation"
- "flexible structure" (easy implementation and light management of the research initiatives)

are the main characteristics of COST. As a precursor of advanced multidisciplinary research COST has a very important role for the realisation of the European Research Area (ERA), anticipating and complementing the activities of the Framework Programmes, constituting a "bridge" towards the scientific communities of emerging countries, increasing the mobility of researchers across Europe and fostering the establishment of scientific excellence. COST is organised in nine domains:

- Biomedicine and Molecular Biosciences
- Chemistry and Molecular Sciences and Technologies
- Earth System Science and Environmental Management
- Food and Agriculture
- Forests, their Products and Services
- Individuals, Societies, Cultures and Health
- Information and Communication Technologies
- Materials, Physics and Nanosciences
- Transport and Urban Development

However, COST also supports and encourages "Trans-Domain" activities which do not readily fit in any single Domain. COST contributes to reduce fragmentation in research investments in Europe, and opening the European Research Area to cooperation on a world basis.

3. The COST Structure at present

The Committee of Senior Officials (CSO) is the main decision-making body and is composed of representatives from all COST Member States. The Domain Committees (DCs) are responsible for particular research domains, and are also made up of representatives of all COST countries. The Management Committees (MCs) - one for each Action - are formed by national experts nominated by the countries participating in the Action, and coordinate the activities of the Action, reporting to the relevant Domain Committee. The CSO secretariat is provided by the General Secretariat of the Council of the European Union, thus underlining the intergovernmental character of COST. The scientific and administrative Secretariat to the COST Domain Committees and to the COST Actions is provided by the COST Office in Brussels, run by the European Science Foundation (ESF) as the Implementing Agent of COST.

4. The COST Actions

"European Concerted Research Actions"- COST Actions - are networks centered around research projects nationally funded in fields that are of interest to at least five COST countries. COST Actions cover basic and pre-competitive research as well as activities of public utility.
Every COST Action has objectives, defined goals and clear deliverables. They achieve results through network building and coordination activities such as meetings, workshops, training schools and short-term scientific missions. COST Actions operate across a wide spectrum of scientific fields, are often multi-disciplinary in nature, and often continue beyond the normal four-year duration of COST funding. Today there are more than 200 ongoing COST Actions and there have been about 500 Actions over the years.

5. COST Open Call

A COST Open Call, with two collection dates per year, is used to attract the best proposals for new COST Actions. The call is thematically open and proposals playing a precursor role for other European programmes and/or initiated by early-stage researchers are particularly welcome, as are inter-disciplinary proposals not fitting readily into a single Domain.
Proposals are assessed in two stages. The top ranked Preliminary Proposals are invited to submit a Full Proposal, which is peer reviewed according to established assessment criteria. The time between the collection date and the approval of the best Full Proposals is approximately 6 months.

6. Scientific Quality Control

The scientific quality control of COST Actions is carried out by the COST Domain Committees assisted by the COST Office, according to the COST "Guidelines for Assessment, Monitoring, Evaluation and Dissemination of Results of COST Actions", and is composed of the following four steps:

- Assessment of proposals for new Actions
- Monitoring of Actions in progress: an "Annual Progress Report" is presented by the MC Chair of each Action annually in a meeting with the relevant DC
- Evaluation of completed Actions
- Dissemination of results.

7. COST Funding

The funds provided by COST are obtained from the European RTD Framework Programmes. The support to COST Actions is less than about 1% of the total value of the research carried out in the Actions. During the 7th Framework Programme (FP7), with funding of around 30 million EUR per year, more than 30.000 European scientists are involved in COST networking, with their projects representing a total value exceeding 2 billion EUR per year.
COST funding covers the coordination costs associated with organising and attending meetings, workshops and conferences; short-term scientific missions; and publications and other dissemination activities. The research activities themselves (staff, infrastructure etc.) are supported through national funds and not by COST.

8. COST Results

The scientific importance and relevance of COST results is testified by the thousands of scientific papers published in the most important scientific journals and by the many doctoral degrees obtained by students working in COST Actions. COST results have also contributed to European competitiveness through many contributions to normative and standardisation bodies, the Small Enterprises originating in Europe from COST activities at the frontiers of modern technology, and the many examples of transfer of results to the European industry.
The societal importance of COST results concerning issues arising from pressing societal needs has also to be underlined. The contribution of COST to the ERA is also particularly important; COST is in many instances a precursor of research projects and activities in the Framework Programmes.

9. COST contributes to reduce fragmentation of national research efforts in the ERA

The mission of COST is to be a flexible, fast, effective and efficient tool to network and coordinate nationally funded research activities at project level (Actions), bringing motivated scientists together under light strategic guidance and letting them work out their ideas. This is particularly important to contribute to reduce fragmentation of national research efforts in Europe where about 85% of the investments in research are done at a national level and only 15% is managed at the European level.

10. COST contributes to increase cooperation on a world basis

One of the key features of COST is its openness towards the rest of the world on the basis of mutual benefit. Institutions from non-COST countries can join individual COST Actions on a case- by- case basis, once the mutual benefit has been ascertained, without the need for any formal arrangements at government or agency level. With such easy accessibility and light and fast procedures, COST has thus always been a "bridge" for the scientific communities both of the European neighbouring countries and the world. More than 230 Institutions from non-COST countries are currently participating in COST Actions.

In general, researchers from institutions in non-COST countries do not receive economic support from COST. However, COST has established a particular strategy to encourage participation in COST Actions by researchers from the "near-neighbouring countries" * : Up to two researchers from an institution in these countries may be reimbursed for attendance at the meetings of any COST Action, and are eligible to be supported to participate in other activities decided at the level of individual Actions.

* The Balkan and Eastern European countries (Albania, Armenia, Azerbaijan, Belarus, Georgia, Moldova, Russia, Ukraine) and the Mediterranean and north African countries (Algeria, Egypt, Libya, Lebanon, Morocco, Syria, Tunisia, Jordan and the Palestinian Authority).
In July 2007 two reciprocal schemes entered into force to facilitate participation by researchers from Australia and New Zealand in COST Actions. Drawing on dedicated funds from their respective governments, these support the travel and subsistence costs of researchers from Australia and New Zealand who participate in COST Actions. Within ten months of the launch of these schemes participation from these two countries had more than tripled. In 2009, similar arrangements were concluded with South Africa. India, Morocco and Argentina are currently also looking at the possibility of similar arrangements.

11. COST IN FP7

In December 2006 the EU Council decided to allocate to COST up to 250 million Euro for the duration of the EU 7th Framework Programme (2007-2013). This increase of about 80% in financial support to COST compared to the 6th Framework Programme is an acknowledgment of the excellence of COST, and a reward of paramount importance for the entire COST community. In particular it is a recognition of the participants in the COST Actions, the real "raison d'être" of COST and, in general, for the entire European scientific community, with their overwhelming response to the COST Open Call confirming the vitality of the COST framework.
COST will continue to contribute to the development of the ERA while maintaining its principal values, adapting its structures and therefore contributing to the development of Europe's competitiveness on the world scale.

THE FUTURE OF COST

COST Vision 2020 is framed by the Strategic 2020 Vision for the European Research Area (ERA). There are several modes of cooperation and instruments to fulfil the mission of ERA. One of them is COST - "European Cooperation in the field of Scientific and Technical Research" - with long and unique experience in the coordination of nationally funded research activities.

COST activities have been continuously developed in response to the needs of the European scientific community and the COST member states, whilst however maintaining its principal values and characteristics. A series of reforms has influenced and changed the whole COST system. Its structure now encourages more multidisciplinarity. The COST Actions have become more objective driven. Open calls have been included. Scientific quality control has been reinforced. Dissemination of results has been diversified. Global participation in COST Actions has increased significantly and early stage researchers have gained a stronger role. These and further adaptations will continue to adjust COST to a changing environment and demonstrate COST's dynamism and ability to adapt to the changing needs of international cooperation.

In Europe's balanced multitude of different systems for the support of research, education and innovation, COST continues to play a very distinct role and to complement other actors in the ERA, providing openness and equality of access to activities in a unique way. There continues to be a strong demand for coordination of bottom-up research activities, and the basic principles of COST – flexibility and openness – are widely recognised. Therefore the level of COST's activities has been maintained and those activities broadened. COST's Vision of its place in the European Research Area in 2020 is:

- COST continues to be a flexible, fast, effective and efficient tool to network and coordinate nationally funded research activities at project level, bringing motivated scientists together under light strategic guidance and letting them work out their ideas, thus contributing to overcome the fragmentation of research in the ERA. A significant share of the European scientific community is involved, directly or indirectly, in COST activities.

- COST responds to future needs; it acts as an exploratorium for ideas and addresses emerging and unforeseen developments. It addresses ambitious goals and more complex questions and has enhanced its precursor role. COST Actions are objective-driven and often multidisciplinary. Their objectives are clearly defined and information arising from COST Actions provides well-structured evidence-based input for policy making and they contribute to Europe's competitiveness and socio-economic development. Whilst maintaining its bottom-up character, COST is open to support longer-term planning processes in the development of new COST Actions.

- COST acts as a catalyst for long-term networking and in particular supports early career scientists and newly established research groups, strengthening their future participation in European and other international research initiatives.

- COST provides a framework for pre-normative cooperation leading to international norms and standards.

- COST is an inclusive and flexible international framework for the benefit of the European scientific community. COST has a worldwide geographical coverage which will be further extended in a pragmatic way by continuing to involve non-member countries in its Actions and through a more structured series of collaborative arrangements.

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Issued by the COST Office

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FOREWORD

Dear members of the COST community,

My Presidency of the COST Committee of Senior Officials which covered the entire period from the latest COST Ministerial Conference in Dubrovnik in 2003 to the COST Ministerial Conference in Spain in 2010 will end on 21 June 2010 and I wish to say good bye to all of you.

It is certainly very satisfactory to note how COST has improved since 2003. Somebody called this six year period the "renaissance" of COST. From 180 COST Actions in 2003 to the more than 280 Actions of today. From the 70 Institutions from non-COST countries participating in COST Actions to the more than 350 Institutions in 2010. From a contribution to COST of 50-80 M€ for the four years of FP6 to the contribution of 210-250 M€ for the seven years of FP7. From 2003 when somebody wanted to give "an honourable funeral " to COST to the present situation in which nobody could dispute that COST is one of the most effective instrument of the European Research Area. From the strong criticism of the "speaking notes" of a representative of the European Commission in 2003 to the "chorus of praises" for COST – as it was reported in the press - during the COST exhibition in the European Parliament in 2006 with Commissioner Potocnick and Professor Buzek or during my presentation of COST to the EU Research Working Party in 2009.

For all this, my deep gratitude to all CSO members, to the members and Chairs of the COST Domain Committees and to the participants in COST Actions, the real "raison d'être" of COST. My gratitude to Professor Klaus Gretschmann, Director General of the General Secretariat of the EU Council, for his constant support and to the members of the COST Secretariat for their always loyal, competent and efficient support. My gratitude to the members of the COST Office and in particular to its Director and to the representatives of the European Commission.

"If COST did not exist it would be necessary to invent it". This was the result of a survey in the European scientific community. COST was certainly extremely important for my scientific career and I understand that this is true for all the young scientists of the COST community. If COST will continue to receive the same high number of proposals for new COST Actions and if the same high number of Institutions of non-COST countries will continue to participate in COST Actions then COST should not have any problem for its future. An extremely efficient mechanism under the direct control of the COST Member States to contribute to decrease the fragmentation of investments in research in Europe coordinating bottom-up initiatives and to open the European Research Area to a global collaboration.

"Parting is such a sweet sorrow". This beautiful oxymoron that Shakespeare used for Romeo and Juliet and that combines contradictory ideas of pleasure and pain reflects well my state of mind. "Sorrow" since this concludes my "first" forty years of association with COST. I started in 1970 as Chair of two consecutive COST Actions, then as Chair of the COST Scientific Committee Telecommunications and Information Science and finally as President of the COST Committee of Senior Officials. "Sweet" since I am sure that my successor and you all will keep up the outstanding traditions of COST. My best wishes to the new COST CSO President Ms Angeles Rodriguez Pena and my heartiest congratulations to her: for the first time after 40 years the COST President will be a woman!

Professor Dr Ing Francesco Fedi
President COST Committee of Senior Officials

"Errare humanum est, sed perseverare diabolicum". COST made its first fatal mistake when I was elected President of the COST CSO in 2004 and persisted when confirmed me as President of the COST CSO in 2007. Now that finally after 40 years COST will acquire its legal status with the COST Office Association - a non profit making Association under the Belgian law - COST made its third fatal mistake electing me as President of its General Assembly and of its Administrative Board.

Consequently this is not really a farewell but simply a good bye since it appears that COST will not get rid of me completely.

Best wishes to all of you, keep up the good work and….long life to COST!

Yours sincerely,

Professor Dr Ing Francesco Fedi

Professor Francesco Fedi was elected President of the COST Committee of Senior Officials (CSO) in 2004 and re-elected for another three-year term in 2007. His COST CSO Presidency ends on 21 June 2010. On 8 June 2010 he was elected President of the General Assembly and of the Administrative Board of the COST Office Association.

Highlights from the Actions

Action MP0601 - Short Wavelength Laboratory Sources and IE0601 - Wood Science for Conservation of Cultural Heritage

The Materials, Physics and Nanosciences Actions MP0601 Short Wavelength Laboratory Sources and IE0601 Wood Science for Conservation of Cultural Heritage (WoodCultHer) partnered for the organisation of "New Lights on ancient materials" a COST training school focused on synchrotron and advanced photon-based analysis of ancient materials for archaeology, heritage conservation, paleontology and past-environment studies. The training school was held from 27 May to 2 June 2010 at the French national Synchrotron facility SOLEIL in the context of the setting-up of IPANEMA, the historical and ancient materials research platform at the synchrotron facility. http://www.synchrotron-soleil.fr/Recherche/ProgrammesTransversaux/MateriauxAnciens/Formations/NewLights2010 and was additionally supported by CHARISMA, the FP7 integrated initiative on the use of European research infrastructures for Cultural heritage.

110 young scientists applied from 25 countries. From these applications, 34 were selected from 13 countries, including participants from the US, China and Mexico. The school focused on Advanced X-ray studies and related sample preparation of sediments, wood, bones, clays, and ceramic materials, namely for archaeology, paleontology and paleo-environments.

Courses were given by world-class experts from analytical laboratories, research institutions in ancient materials, and from SOLEIL and other synchrotron facilities. The programme of the school consisted in theoretical courses on synchrotron and advanced soft / hard X-ray characterisation techniques, courses on sample preparation and state-of-the-art interventions on recent works on ancient materials.

This programme was complemented with hands-on experiments on sample preparation equipment (ultramicrotomy, focused ion beam) and almost a full day spent on real conditions at four synchrotron beamlines, studying real samples. During the week, groups of participants prepared short talks that were presented on the last day of the training course to test their new competencies. On top of the courses and experiments, a social programme included the visit of the Musée des Antiquités nationales in Saint-Germain-en-Laye.

Based on an anonymous survey, the school was highly appreciated by the participants who underlined the interest of the hands-on synchrotron experiment and the extended overview on analytical capabilities for their research.

Action 861 - European network for pig genomics

The Food and Agriculture Action 861, also known as PigNet, had as a main objective to increase the knowledge of the organisation, expression and regulation of the genes involved in pig development, health, reproduction, and product quality. A genomics approach, which is systematic and global, offers an opportunity to improve overall pig husbandry by understanding the genetic variation of economically important traits and also to develop models for unraveling the genetic complexity of human diseases. It will lead to insights in agriculture, medicine, conservation and evolution.

The COST Action organized three conferences which had a broad scope from fundamental genomics through physiology and reproduction to social concerns, breeding applications and human medicine. During the conferences different aspects of genomics were considered and discussed - structure, function, bioinformatics. Some topics were overlapping between the conferences, i.e. advances in traits analyses, reproduction, health, product quality, the impact of the pig genome sequence, comparative genomics, the use of the pig as a model in human medicine, improvement of the dialogue between genomics research and society. The conferences also included specific sessions for commercial presentations of several companies.

The Final Conference of the Action was co-organized with the Swine Genome Sequencing Consortium at Hixton, Cambridge in November 2009, and it was a celebration of the completion and publication of the first draft of the pig genome sequencing. Members of this COST Action contributed significantly to the pig genome sequencing. In addition the Action in collaboration with other networks have through QTL mapping identified candidate genes for economically important traits and generate porcine SNP chips, such as NRSP-8-immune chip. Moreover, the Action

has contributed to the establishment of several public internet platforms with tools for porcine genome analysis.

The generated knowledge will undoubtedly help to improve pig selection and breeding practices and subsequently meet the requirements of both breeders and consumers. Genetic improvement of pigs can lead to better meat quality and safety, traceability as well as animal health and welfare. These can be expressed in terms of breeding objectives: growth and development, infection and immunity, and reproduction. It will also assist in efforts to preserve the global heritage of rare, endangered and wild pigs, and it will provide an insight on the genetic effects of domestication since native wild animals exist.

Moreover, and very importantly, the pig genome is of similar size, complexity and genetic information as the human genome; there is a high degree of sequence conservation between the orthologous genes and high degree of map synteny between the two species. All these together make the pig an important model for human health; the release of the sequence data will provide a tool to the research community to better understand human diseases and particularly complex traits such as obesity and cardiovascular disease.

Action A33 - Cross-Linguistically Robust Stages of Children's Linguistic Performances

The Individuals, Societies, Cultures and Health Action A33 set out with the practical goal of helping European children with language impairments. One important way to help such children is to diagnose cases of language-specific impairment and normal non-verbal intelligence. Children with language-specific problems require a different kind of support from children with more general cognitive impairments. Specifically, the Action proposed to provide recommendations for a design of an unbiased, trans-European language assessment tool.

To accomplish the goal, the Action coordinated a comparative investigation of child language across the more than 25 participating languages. Initial meetings were used to pin down areas of investigation and specific experimental items what could be translated and could be expected to be equally difficult for children across all the participating languages. Simultaneously researchers had to find additional resources to conduct the experimental investigations required for the Action goals. The main result of the Action are a set of unique experiments and results that compare the linguistic performance of children speaking such different languages as Basque and Finnish, Hebrew and Portuguese. A set of high-profile publications presenting these results and the methods developed in the action are appearing in 2010 and 2011. Because the study conducted by the Action is the first of its kind world-wide, international interest is expected to be high. On the basis of the results, the targeted recommendations can be made for language assessment across the European languages.

The Action was successful in at least four other ways:

1) At least 10 associated new projects were launched with funding from either national or European agencies. 2) Of the more than 80 STSMs funded by the Action, already three led to publications in international journals. 3) The two Training Schools and also many of the STSMs transferred much of the expert knowledge of the Action members to the next generation of researchers across Europe. 4) And finally, the Action led to the recognition of specific language impairment in at least two European countries where the concept had not been recognized in the past. In this way, the COST Action already helped a number of European children receive the support they need.

Action E53 - Quality Control for Wood and Wood Products

The Forests, their Products and Services Action E53 aimed to improve existing and develop novel methods and techniques for fast, accurate quality assessment and control in processing associated with wood and timber. Particular attention was paid to a) scanning round wood and logs, scanning sawn timber, process control supported by marking timber pieces, implementation, running and evaluation of scanning systems, b) determination of moisture content and distortion and c) assessment of strength, stiffness and visual appearance of timber and wood products.

To accomplish this objective the Action coordinated activities involving researchers and industrial participants from the twenty-four participating countries, resulting in the successful exchange of current scientific results and industrial needs. One of the most important outcomes was identifying and addressing the need for information on ways of improving quality properties important to end-users. The Action generated qualitative and quantitative knowledge about demands and expectations that end-users in European countries impose on various timber products, in order to identify quality parameters of future importance and thereby enable important developments in assessment and control techniques.

By using an e-questionnaire in the vast majority of the countries involved in the Action scientists, and the producers and users of timber products, are better aware of the regional differences and perception of quality parameters. Improved quality control systems will help to increase the competitiveness of the wood sector and that European wood industry will provide wood products that are well adapted to end-user requirements. The Action generated three key industry-focussed publications to optimise dissemination of the Action's outcomes to end users, thereby maximising the economic benefits of the Action; these publications dealt with drying quality, distortion and discoloration – three major issues faced by the wood processing industry.

Other important successes of the Action include:

- The participation in the Action's activities of all major grading machine producers, industry providing information about industrial needs for the further development of scanning systems for different applications and of many Early Stage Researchers;
- Research funding of approximately 5 million EUR secured by Action participants during the Action's life
- An overview of the state of the art related to measurement systems used in the 25 European countries.

Action 729 - Assessing and Managing Nitrogen Fluxes in the Atmosphere-Biosphere System in Europe

In Europe, atmospheric deposition of reactive nitrogen species is one of the major threats to ecosystems. Increased deposition has led to soil acidification, eutrophication, nutrient imbalances, losses of biodiversity, altered forest growth and soil water pollution. Following the atmospheric deposition of nitrogen compounds to terrestrial and aquatic ecosystems, reactive nitrogen accumulates and can lead to a cascade of effects. Quantifying the nitrogen cascade was one of the most challenging environmental issues at the start of the Earth System Science and Environmental Management Action 729, as well as synthesizing the knowledge available, but widely dispersed between different disciplines and environmental compartments, and between scientists, policy analysts and regulators.

The main objective of the Action was to advance the understanding and quantification of atmosphere-biosphere nitrogen fluxes in Europe in relation to the main economic sectors. The Action built a scientific basis for strategies to reduce the environmental impacts of nitrogen.

The success of the Action resides in the importance and the diversity of the results obtained at both scientific and policy levels. Examples include the scientific work on ammonia sources, sinks and effects in relation to ecosystems and biodiversity, and the integrated assessment. This work led to the establishment of the Task Force on Reactive Nitrogen under the UNECE Convention of Long-Range Transport of Air Pollution that held its first meeting in 2008. The advanced science on ammonia resulted in many publications a.o. three high level publications, two in Nature Geosciences and one in Science. A major product of the Action is the European Nitrogen Assessment that will be finalised in close cooperation with the ESF NinE project and the 7th Framework Integrated Project NitroEurope. The publication is foreseen early 2011.

One of the major dissemination products of the Action is the Nitrogen Visualisation tool. The tool was developed for the 4th International Nitrogen Conference and was cosponsored by the Dutch ministry of the Environment and Spatial Planning. The tool consists of two parts: one is the animation where during 20 minutes the nitrogen issues are explained using simple animations. The second part is the cockpit where the user can chose among different options in order to change the 2030 A2 scenario in such a way that the world is sustainable and economically healthy. This is done by addressing eight major drivers in the nitrogen issue and monitoring the effects of changes in these drivers on the environment, economy and society. The nitrogen visualisation tool was used at many occasions in the discussion with policy makers to involve them in the nitrogen issues.

In addition, the network was consulted to advise the US Environmental Protecting Agency Scientific Advisory Board. Action 729 also co-organised a Nitrogen Side Event "Options for including nitrogen management in Climate Policy Development" at the COP 15 to the United Nations Framework Convention on Climate Change, Copenhagen, 7 December 2009.

CMST Annual Progress Conference

The Chemistry and Molecular Sciences & Technologies Annual Progress Conference occurred on June 3-5 2010 at the Mediterranean Beach Hotel in Limassol, Cyprus. The meeting was jointly organized by COST CMST, the CMST DC Member from Cyprus Prof. Efstathiou and the Cyprus CNC Ms. Constantina Makri, representing the Research Promotion Foundation. With lectures of 30 minutes for 27 Actions represented as well as representatives from ESF-EUROCORE the schedule was tight. However, the very relaxing atmosphere by the beach as well as the fantastic weather helped everyone to cope with the busy schedule.

The different MC Chairs presented outstanding results in many different fields (from biomass transformation to atomic physics), and the Domain Committee agreed that this was the Best Ever Meeting they experienced with CMST. "The level of science presented was at the level of an excellent international conference" commented Prof. Schinzer, DC Chair from CMST. Especially the number of interactions between the industry and the Actions is growing fast (more than 25 industrial partners are now involved in CMST) as well as the number of publications in highest impact factor journals (an average of 20 joint publications per year per Action) and patents (an average of 20 applications per year for the Domain). Again, thank you to the organizers as well as all the participants for this outstanding event.

COMPLETED ACTIONS

Biomedicine and Molecular Biosciences

Action B24 – Laboratory animal science and welfare

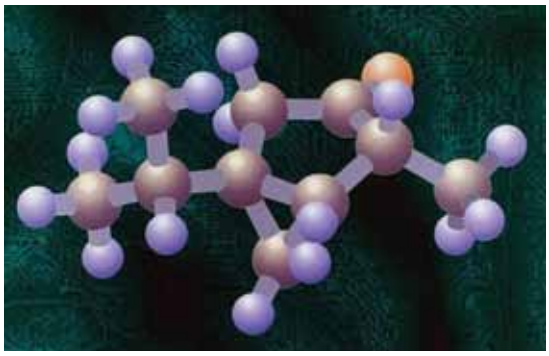
The main objective of the Action was to increase knowledge necessary for both ethically sustainable and scientifically valid use of laboratory animals in research. These objectives reflect cost-benefit thinking, where costs should be minimised, and benefits maximised. Animal experiments are used in basic science but also in applied research. The best practises in animal care were identified leading to improved knowledge on laboratory animal science and the use of animals in basic and applied biomedical research. The COST Action B24 was composed of scientists coming from different fields like Veterinary Medicine, Human Medicine and Natural Sciences (Biology, Biochemistry) as well as institutions specialized in animal research covering wide spectrum of expertise. The main outcome of the Action is the "COST Manual of Laboratory Animal Care and Use". This manual provides valuable information on Laboratory Animal Science and the performance of animal experiments being the state-of-the-art in the field of Laboratory Animal Science and Welfare. The conversion of these consolidated findings and recommendations developed during the Action into scientific practice is of major importance in various fields related to experimental biomedical research. Through meetings, short term scientific missions and training schools Action B24 provided multiple opportunities for training of young researchers in dealing with experimental design and statistical methods in biomedical experimentations contributing to the overall knowledge transfer in this field.

Duration: 2004 - 2009

Chair: Prof. Timo NEVALAINEN (FI)

Parties: Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Lithuania, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom

Action B25 – Physiologically based Pharmaco-Toxicokinetics and Dynamics



The Action was successful in facilitating the exchange of knowledge and expertise between those involved in drug development and therapeutic use and those with an interest in the risk assessment of chemicals. This enabled generic, physiological approaches to be developed and disseminated. The Action has also been successful in promoting the development of integrated approaches to the assessment of kinetics and dynamics, based on physiological principles. Substantial progress has been made in those specific areas which formed an important focus of the Action, such as prediction the of absorption of drugs and other chemicals from the gastrointestinal tract, the importance of active site concentrations in physiological modelling, for example in the CNS, and their estimation or prediction, and in vitro approaches to parameter estimation for physiological models. In addition, the Action has made important contributions in the simulation of kinetics and dynamics, including disease outcome, in specific patient populations, such as children, and those with cancer, and on progress in individualising patient therapy on the basis of physiological models. A key activity of the Action has been the identification of data gaps and research needs, and some of these have formed the basis of successful competitive research grant applications by members of the MC and their colleagues. The Action has been successful in collaborating with a number of other groups with related interests, such as the WHO International Programme on Chemical Safety and the European Centre for the Validation of Alternative Methods. This has enabled the development of internationally accepted frameworks for physiologically-based modelling and of harmonised approaches to study design, model validation and data interpretation.

Duration: 2005 - 2009

Chair: Prof. Alan BOOBIS (UK)

Parties: Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Malta, Netherlands, Norway, Portugal, Romania, Serbia, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom

Non-COST country participation: Canada, JRC

Action B27 – Electrical Neuronal oscillations and Cognition (ENOC)

The main objective of the COST Action B27 was to increase the knowledge of the electric neuronal oscillations correlated to memory and attention as the basis for neuronal regulation aimed at enhancing the human performance and health. To achieve its objective, the Action adopted interdisciplinary approach and tacked the following areas: (i) theoretical analysis of the phase-and generalized synchronization of the brain signals with the aim of enhancing the practical signal analysis and better understanding the physics of synchronization; (ii) clinical research of neuronal processes related to diagnosis and treatment of cognitive functions, with particular reference to neuro-feedback and its efficiency; (iii) experimental analysis of the correlation between the complex cognitive functions and the temporal and spatial characteristics of frequency-specific oscillations.

One of the main achievements of the Action was an increased scientific knowledge of neuronal processes related to diagnosis and treatment of cognitive disorders, with particular reference to neuro-feedback and its efficiency. Moreover, the Action performed scientific validation of neuro-feedback as a viable, alternative, and/or complement to traditional behavioural and stimulant based approaches in dealing with impairment of cognitive performances in children and adult professionals concerned with diagnosis and treatment. In addition the Action generated results that improved the overall knowledge related to memory, attention, executive functions and multi-stable perception. Also, progress has been made in the research on motor function, sleep/circadian rhythms and brain-computer interactions (including neurofeedback).

Duration: 2005 - 2009

Chair: Prof. Jordan POP-JORDANOV (MK)

Parties: Austria, Bulgaria, Croatia, Denmark, Estonia, Former Yugoslav Republic of Macedonia, France, Germany, Ireland, Israel, Italy, Lithuania, Norway, Poland, Serbia, Slovenia, Spain, Switzerland, Turkey, United Kingdom

Non-COST country participation: Canada, Cuba, Japan, New Zealand, Russia, Tunisia, United States

Chemistry and Molecular Sciences & Technologies

Action D31 – Organising Non-Covalent Chemical Systems with Selected Functions

The evaluators and the DC rapporteur acknowledge the excellent management of the Action.

The COST Executive should congratulate all partners in this Action. I believe this to be one of the most successful and productive Actions.

Although formal collaborations between the WGs were not a part of the Action, it is clear that these exist and may be the basis of future Actions or FP7 initiatives. The key role of the characterisation groups in many of the WGs also provided a coherency to the Action.

The impact of the Action is seen in the wide-ranging scientific achievements presented in the final report and in the summary presented in the previous section. Almost all of the WGs have made fundamental and important contributions to their area of activity and in many cases this has been achieved by the partnering of research groups who had not previously worked together. Some of these partnerships look as if they will lead to longer term collaborations and to daughter activities both within the COST framework and FP7 activities.

Duration: 2004 - 2009

Chair: Prof. Mike WARD (UK)

Parties: Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Israel, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Action D32 – Chemistry in High-Energy Microenvironments (CHEM)

This was a very successful and active Action with the potential for significant impact in a range of industrial applications. If further patents can be granted from this work it will have even more impact.

One theme that ran through several of the WG reports at the meeting in Krakow was that of the potential impact of ultrasound and microwaves in environmental applications. This was often in the area of degradation of organic pollutants in water, but also in improved synthetic procedures in which shorter times, less solvent and less toxic reagents could be used. A future Action covering this type of research could have considerable impact and could

include work to look at energy efficiency and the nature of the products produced on the decomposition of pollutants. Two other areas of work that research from Action D32 could prompt future Actions are those of applications in biological areas and in the general field of materials chemistry. It is likely that some of the groups from this Action working with specialists in the biological or materials areas could form strong future Actions.

Duration: 2004 - 2009

Chair: Prof. David WALTON (UK)

Parties: Austria, Belgium, Bulgaria, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Lithuania, Netherlands, Poland, Portugal, Slovakia, Spain, Switzerland, Turkey, United Kingdom

Non-COST country participation: Australia, Japan

Action D33 – Nanoscale Electrochemical and Bio-processes (Corrosion) at Solid-aqueous Interfaces of Industrial Materials

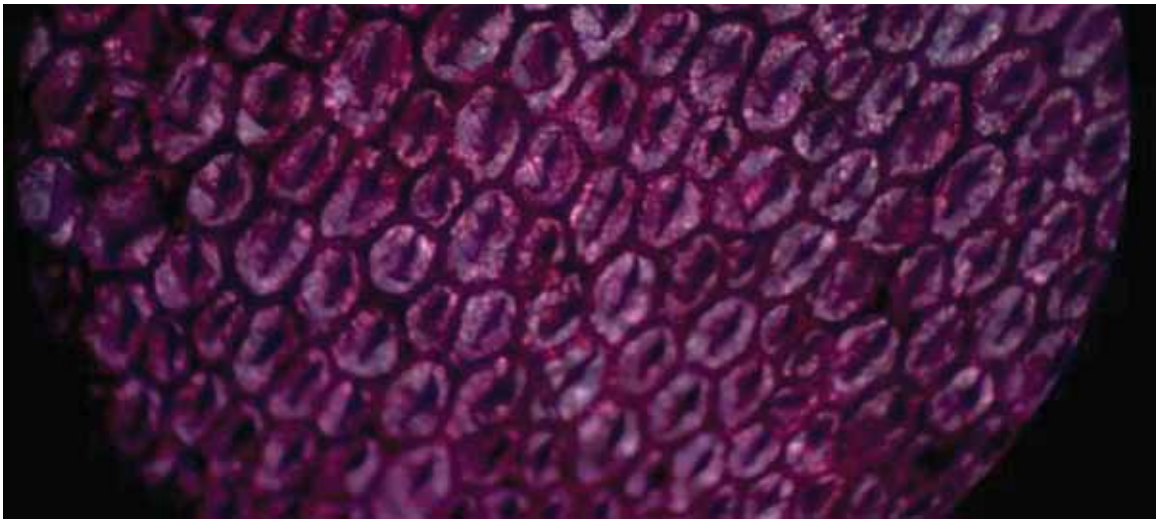
The important achievements were also presented in the reports elaborated by the expert evaluators. The most important achievement is the high interdisciplinary. The conclusion results presented in Cluj-Napoca represent a very nice example of cooperation and integration of scientists with expertise in material science, solid characterization, electrochemistry, biology and microbiology, organic, inorganic, analytic chemistry and biochemistry, and at the end engineering.

As the expert evaluators indicated in their individual reports, all the objectives of this action have been finally fulfilled. As a result of the cooperative research in the three WGs they have been developed a bench of methods (electrochemical, optical, spectroscopic, diffraction, etc) and methodologies for analyzing chemical and biologic processes at interfaces. Methods and methodologies to investigate the microbial activity have been developed as well. These techniques have been used by the researchers involved in the action to manipulate surfaces and to characterize altered surfaces.

Duration: 2005 - 2009

Chair: Prof. Wolfgang SAND (DE)

Parties: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, Lithuania, Netherlands, Romania, Spain, Switzerland, United Kingdom



Earth System Science and Environmental Management

Action 636 - Xenobiotics in the Urban Water Cycle

Xenobiotics are of rising concern in the urban water cycle in addition to conventional problems such as supply of potable water, flooding prevention, and sanitation. There are more than 100,000 xenobiotics on the market in the European Union. Xenobiotics cover many different compounds including inorganic elements (heavy metals and metalloids), organic compounds (pesticides, surfactants, preservatives, solvents, fragrances, flavours), pharmaceuticals as well as endocrine disrupters. Approximately 70,000 of them may be potentially hazardous for humans or ecosystems.

There are numerous sources of xenobiotics in urban water systems: chemical pollution in rainfall-runoff and wastewater resulting from atmospheric washout, erosion of building materials, traffic emissions, pesticides application, industrial production, and use of household chemicals, personal care products and pharmaceuticals. Use of rainwater and reuse of wastewater for industrial as well as domestic non-potable purposes further increase the exposure to xenobiotics, but the conventional urban water cycle management approaches are not designed to deal with these pollutants.

Innovative approaches were therefore needed to understand, in an integrated manner, the sources, flow paths, fate (transport, treatment, natural attenuation) and to prevent xenobiotics from being discharged into surface waters where they may impact on the chemical water quality and ecological status of receiving waters as already acknowledged by the European Water Framework Directive.

The main objective of the Action was to assess the role of xenobiotics in the urban water cycle and to set up strategies for minimizing their impact on humans and ecosystems from a multidisciplinary viewpoint. This successful Action of 31 Parties was structured in 4 Working Groups (WGs) that met systematically twice a year. The Action supported a large number of Short-Term Scientific Missions and organised four annual plenary events. The final conference was attended by 200 participants among which a large number of representatives from chemical industries.

In order to determine the most critical problems related to xenobiotics in the urban water cycle, the Action identified gaps in knowledge, then opened existing pools of knowledge, exchanged them and compiled them in several publications (4 special issues, 2 textbooks, 2 book chapters, 2 webpages and participation in a lot of conferences); finally, the Action developed and offered methodological tools which will be helpful worldwide for future research. Among others, the Action compiled data and tools used in European research on xenobiotics in the urban water cycle, and made them available in databases for researchers.

Action 636 also performed an “Interlaboratory Exercise on Steroid Estrogens in Aqueous Samples”. This exercise demonstrated the high level of competence of the participating testing laboratories from different countries to perform analysis of steroid estrogens from water samples and the suitability of the analytical methods/techniques used for such kind of analysis. The results were compiled in a scientific publication.

Duration: 2005 - 2009

Chair: Prof. Anna LEDIN (DK)

Parties: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

Action 725 - Establishing a European Phenological Data Platform for Climatological Applications

Phenology is the study of periodic plant and animal life cycle events and how these are influenced by seasonal and interannual variations in climate. The science of phenology is considered to have its origins in Europe which has a long tradition of phenological networks dating back to 1750. These networks evolved at different times and in different locations which resulted in the emergence of a diverse range of methodologies for recording of observations. This non-standardized approach presented difficulties for comparative data analysis at a pan-European level and therefore the use of changes in phenology as an indicator of the impact of global climate change on the European environment was a challenging task.

Phenological phases reflect among other things the environmental characteristics of the climate in the region where they occur. Consequently, long series of phenological observations may be used as proxies to detect climate variability or climate change. The main objective of

Action 725 was to establish a European reference data set of phenological observations that can be used for climatological purposes, especially climate monitoring, and detection of changes.

Action 725 inventoried phenological data and metadata in their participating countries. They developed guidelines for data selection, observations and archiving, and set up the database. In parallel, Action 725 demonstrated effectively the value of phenological applications for climate impact research.

The Action showed successfully the importance of phenology in the public and scientific community. It released an impressive list of publications and triggered new national and international programs/projects.

One of the main outcomes of Action 725 is the recommendation by WMO to the National Meteorological Services to use the COST 725 standard guidelines to organise phenological observations. COST 725 succeeded in building a European common database (www.zamg.ac.at/cost725) of phenological records that will be hosted and further developed in the PEP725 (Pan-European Phenology data base) 5-year project financed by EUMETNET. In addition, Action 725 was solicited by the Group on Earth Observation (GEO) to be the leaders of the sub task Number US-09-03d on Global Phenology Data. Finally, the most significant output from Action 725 is the acknowledgement of their findings by IPCC in their 4th Assessment Report.

Action 725 collaborated also with other COST Actions as ES0603 "Assessment of Production, Release, Distribution and Health Impact of Allergenic Pollen in Europe (EUPOL)" and Action 734 "Impacts of Climate Change and Variability on European Agriculture: CLIVAGRI".

Duration: 2004 - 2009

Chair: Dr. Elisabeth KOCH (AT)

Parties: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Action 726 - Long term changes and climatology of UV radiation over Europe

The ultraviolet (UV) radiation reaching the ground is only a small portion of the radiation we receive from the sun. Nevertheless, enhanced UV has a wide variety of adverse effects on humans and the environment (i.e., terrestrial and marine ecosystems). Since UV solar radiation plays an important role in many processes in the biosphere, including impact on humans, and may be very harmful if UV exposure exceeds "safe" limits, the knowledge of biologically effective UV radiation doses and their geographical distribution and climatology in Europe are crucial parameters for public health organisations. From the perspective of public health risk assessment, reliable and continuous measurements of UV radiation and studies on factors responsible for the UV variations over different time scales (ranging from minutes up to decades) are necessary.

Establishing the climatology and long-term changes of UV irradiance and of selected biologically effective UV radiation doses over Europe, using the reconstructed time series, was the challenging task and the goal of this COST Action.

Action 726 produced European climatic maps of UV and assessed the long term UV changes. Input data for modelling the UV irradiances relied on European climatologies for ozone, aerosol optical depth, cloud modification factors and UV albedo. This need of basic parameters generated a close cooperation between the working groups with strong interactive discussions resulting in a lot of publications.

The national and WMO World Radiation Data Centre data sets were made available for the Action. The Action supported the creation of the European UV Calibration Center in Davos under the auspices of the Global Atmosphere Watch Programme of WMO to harmonize UV measurements in Europe. Further to this, the Action implemented a UV Quality Assurance programme and formulated uniform broadband filter radiometer equation. The Action organised successfully three filter and broadband radiometers comparison campaigns between

2005 and 2007. Knowledge on the biological effective UV radiation and on weighting spectral irradiance with action spectra was enhanced. At least 16 action spectra were prepared for modelling and made available to other related research fields like Biometeorolgy, Photobiology, Photochemistry, etc.

The Action also organised a Training School to introduce young researchers and advanced students to UV radiation and its biological effectiveness. The participants were trained to act as potential national contact persons for biologically effective UV radiation. The activity of Action's network was made visible in the numerous published papers and reports, including the Final Report with the e-atlas and the booklet for broader audience "UV radiation and life".

Duration: 2004 - 2009

Chair: Dr. Zenobia LITYNSKA (PL)

Parties: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom

Non-COST country participation: Russia, Joint Research Center

Action 727 - Measuring and Forecasting Atmospheric Icing on Structures

Icing refers to the process of ice or snow growth on a structure exposed to the atmospheric changing conditions. The potential for icing of structures is an important design parameter in many sectors, e.g., building industry, maritime and aviation activities, and it has recently become a relevant issue also in activities related to wind energy production. Furthermore, human activities are increasingly extending to cold climate regions affected by icing problems.

The main objective of Action 727 was to develop the understanding of atmospheric icing, with a special focus on in-cloud icing, wet snow and freezing rain events in the atmospheric boundary layer and their distribution over Europe. The associated challenge was to improve the European potential to observe, monitor and forecast them.

Phase 1 of the Action was dedicated to gathering available information for a comprehensive state-of-the-art report representing what the participants consider as a summary of today's available knowledge. Phase 2 of the Action focused on in-situ measurements of atmospheric icing with selected reference icing sensors at 6 stations operated in Europe and to the modelling of selected icing events with a new adaptation of the WRF model developed by Norway. Test stations have been installed and/or developed in Switzerland (Guetsch) and Finland (Luosto), Sweden (Sveg), Germany (Zinnwald), United Kingdom (Deadwater Fell) and Czech Republic (Studnice). First attempts of model simulations have been performed and validated with the local measurements for icing events for all stations with very promising results.

In addition to meteorological measurements aspects, the Action developed cooperation with the wind energy production sector (ice accretion on wind turbines) and the transport of electricity (power lines collapses). The Final Workshop of the Action was organized in collaboration with the 13th International Workshop on Atmospheric Icing on Structures, IWAIS Conference, in Andermatt, Switzerland, 8-11 September 2009.

The results of Action's networking activities were disseminated through a long list of published papers, proceedings and reports.

Duration: 2004 - 2009

Chair: Dr. Alain HEIMO (CH)

Parties: Austria, Bulgaria, Czech Republic, Finland, Germany, Hungary, Iceland, Norway, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom

Non-COST country participation: Japan

Action 728 - Enhancing Meso-Scale Meteorological Modelling Capabilities for Air Pollution and Dispersion Applications

Over the past few years there has been a growing need to simulate meteorological fields for complex situations at finer spatial resolutions. This has been partly stimulated by scientific and technological advances (for example, in dynamics, computational methods and facilities) and partly by policy pressures requiring more detailed assessment of air pollution on urban to regional scales. At these meso-scales the simulated phenomena are driven by both local scale influences (e.g. orography, urban area) as well as synoptic scale processes (e.g. cyclones). Complex meso-scale atmospheric flow conditions of interest include, for example, land-sea or lake-breeze interactions and their combination with upslope winds and flow over complex terrain (e.g., the regional recirculations in the Western Mediterranean Basin in summer, or the effects of road traffic through the Alps). All of these involve urban/rural transitions. These locally forced features interact with synoptic scale processes, such as fronts and convection. Consequently, these are a challenge for both weather predictions and for simulating regional pollution transport. These aspects require a close coupling between weather forecasting and air quality.

The main objective of the Action was to develop advanced conceptual and computational frameworks to enhance significantly European capabilities in meso-scale meteorological modelling for air pollution and dispersion applications. Significant progress was made in finalising case studies targeting specific key model applications which demonstrate the strengths and weakness of current models. The results of the case study analysis were directly

used by all Working Groups.

Action 728 had significant impact on the European scale and internationally through the participation of members of the US Environmental Protection Agency and the US National Oceanic and Atmospheric Administration. In particular, Action members were involved with the Air Quality Modelling International Initiative (AQMEII) and Forum for Model Evaluation (FAIRMODE). The Action established active collaboration with a number of international organisations, projects and networks. Collaboration with WMO was particularly successful and resulted in several joint reports. Over the last phase the results of the Action were synthesised into a book on meso-scale modelling for air pollution applications. In addition, internal cooperation within Action 728 led to the successful submission of the MEGAPOLI project (EC FP7).

Duration: 2004 - 2009

Chair: Prof. Ranjeet SOKHI (UK)

Parties: Austria, Belgium, Bulgaria, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, Turkey, United Kingdom

Non-COST country participation: Russia, World Meteorological Organisation

Action 730 - Towards a Universal Thermal Climate Index UTCI for Assessing the Thermal Environment of the Human Being

The unprecedented heat wave in Europe in August 2003 which cost 25.000 to 35.000 heat related extra deaths made the vulnerability of the population evident. Daily predictions of the thermal conditions can help to warn people when there is a danger of unusual conditions, but the effect of the weather on people is caused by more than just the air temperature. Humidity and wind speed as well as the intensity of the radiation of the sun all influence how we respond to the outdoor environment. One of the fundamental issues in human biometeorology is the assessment and forecast of the thermal environment in a sound, effective and practical way. This is due to the need for human beings to balance their heat budget to a state very close to his/her thermal environment in order to optimise his/her comfort, performance and health.

The main objective of Action 730 was to develop a Universal Thermal Climate Index (UTCI), and make it easily available. Such a physiologically relevant assessment model of the thermal environment was aimed at significantly enhancing applications related to human health and well-being and at improving prediction of likely effects of the weather in terms of the complete energy balance of the body. This multi-disciplinary approach needed expertise in thermal physiology, thermo-physiological modeling, meteorological

data (e.g. weather forecast, urban climate), scientific program developing, and in the various application fields.

Following extensive validation of accessible models of human thermoregulation, the advanced multi-node 'Fiala' model was adopted for this study. This model was coupled with a state-of-the-art clothing model considering the behavioural adaptation of clothing insulation by the general urban population to actual environmental temperature. The UTCI was developed conceptually as an Equivalent Temperature (ET). For any combination of air temperature, wind, radiation, and humidity, UTCI is defined as the air temperature in the reference condition which would elicit the same dynamic response of the physiological model. A 10 points stress assessment scale from "extreme heat stress" to "extreme cold stress" was defined.

Potential applications were identified in the fields of public weather services, public health systems, urban planning, tourism & recreation and climate impact research. It is recommended to run the UTCI model for the fundamental application in Numerical Weather Predictions and climate assessments operationally in Regional Specialised Meteorological Centres or Regional Climate Centres, respectively.

Extensive dissemination of the project results took place in short term scientific missions of young researchers; in presentations at several conferences and in a training school for young scientists. The final outcome was

presented in a symposium with WMO. WMO offered to publish the outcome of COST Action 730 as a WMO Guideline which assures the perception of UTCI as a suitable standard on an international level.

Duration: 2005 - 2009

Chair: Prof. Gerd JENDRITZKY (DE)

Parties: Austria, Bulgaria, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Israel, Italy, Poland, Portugal, Romania, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Non-COST country participation: Australia, New Zealand

Action 732 - Quality Assurance and Improvement of Micro-scale Meteorological Models

The Framework Directive on Air Quality Assessment and Management together with its 'daughter' directives is a key element of present-day European environmental legislation. It addresses air quality within conurbations and near to major sources. It is the first time that a European directive explicitly requires the use of models as tools for the execution of air quality policy. Though the directive does not require the harmonisation of models across Europe, the performance, representativeness and accuracy of results should be based on quality assured models that can be inter-compared across national borders in order to ensure sound, equitable and effective protection and/or mitigation measures.

Micro-scale meteorological models have begun to play an important and often dominant role in environmental assessment and urban climate studies that are undertaken to investigate and to quantify the effects of human activity on air quality and the local climate. Their increasing use, however, is paralleled by a growing awareness that the majority of these models have never been the subject of rigorous evaluation. Consequently there was a lack of confidence in the modelled results.

The reason that most of the models lack quality assurance is mainly caused by the lack of a generally accepted quality assurance procedure for such models, and the lack of data sets that are quality checked and generally accepted as a standard for model validation purposes. The main objective of Action 732 was to improve and assure the quality of micro-scale meteorological models that are applied for predicting flow and transport processes in urban or industrial environments.

A careful comprehensive model evaluation took place. Most of the important aspects of the data and the models have been considered and discussed. A common procedure of carrying out model performance evaluation has been developed in meetings and workshop. Focus was laid on models mostly applied in Europe, which is important for their application in regulatory purpose.

One of the important recommendations from Action 732 is to use 'exploratory data analysis' as one of the elements in model validation. It was shown that such exploratory analysis is crucial to reveal shortcomings of data sets, model setups and models.

A good mix of experimentalists, modellers and evaluation specialists, which was also an achievement of Action 732, formed the basis of a scientifically sound result: tested guidelines and protocols for the use of micro-scale atmospheric flow models. The success of Action 732 may even increase when policy makers, engineers and other end-users will start to use the guidelines and procedures that were thoroughly set up, tested, and published by the participants of Action 732.

Duration: 2005 - 2009

Chair: Prof. Michael SCHATZMANN (DE)

Parties: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Netherlands, Poland, Portugal, Romania, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom

Non-COST country participation: World Meteorological Organisation

Food and Agriculture

Action 858 - Viticulture: Biotic and abiotic stress - Grapevine Defence Mechanism and Grape Development

The main objective of the Action was to increase our knowledge of the biological phenomena involved in the grapevine responses to environment (climate and soil conditions) during the key stages of grape ripening, to defence against fungal diseases and to resistance to environmental stresses. To achieve this goal, the members of the network, whose expertise ranged from agronomy, plant physiology, biochemistry, molecular biology, genetics and grapevine breeding, searched for correlations between the ecophysiological conditions and gene expression.

The Action had a major breakthrough; a consortium of labs who were members of COST 858 pioneered in the sequencing of the grape genome (about 30,000 genes). This outstanding result was preceded and followed by remarkable progresses made in the design and use of microarray facilities, as well as by continuous improvements in genetic maps, also made by members of COST 858. Bioinformatic tools allowing an easier use of microarray data were transferred from model species to grapevine, and used and shared by COST 858 members.

Through genetic mapping, genome regions controlling traits like the synthesis of some aroma precursors, tolerance to water stress or resistance to major fungal diseases (powdey and downy mildew) were identified. Major genes involved in these processes were characterized (e.g. several aquaporins for water stress tolerance). In addition, the biochemical and molecular basis of berry ripening was also investigated in detail, via the use of natural mutants and the development of several transcriptomic approaches including analysis of expressed sequence tags, microarrays and high throughput RNA sequencing, yielding some original clues like the possible involvement of reactive oxygen species and of ethylene in the control of ripening and in the response to biotic and abiotic stress.

Moreover, many of the genes encoding for transporters and enzymes potentially involved in the accumulation and synthesis of the compounds building up berry quality were also identified. Natural mutants were also exploited to identify important molecular players controlling either flesh development or skin color.

The network also had an impact on vineyard management. Several innovative vineyard management techniques (partial root drying, alert systems indicating the appropriate time and amount of spray to deliver, biodynamics) were experimented on a small scale during COST 858. Several of these techniques turned out to be promising in regards to water saving or to reduction of phytochemical use. Their efficiency though should be tested at a larger scale. In the same way, several vineyard techniques (changes in row orientation, pruning and defoliation practices) were also tested to avoid excessive sugar accumulation in the berries as a result of the climatic change.

The Action generated considerable information on berry growth and vine response to environment. The gathered information has led and can still lead to the design of new predictive tools and viticultural practices more friendly to the environment, and to the production of better and safer wines. Dissemination of the gathered scientific knowledge to the wider community was achieved through the numerous publication generated by the Action including a book entitled « Methodologies and results in grapevine research ». The Action was undoubtedly successful.

Duration: 2003 - 2009
Chair: Prof. Serge DELROT (FR)
Parties: Austria, Bulgaria, Cyprus, Czech Republic, France, Germany, Greece, Hungary, Israel, Italy, Luxembourg, Poland, Portugal, Serbia, Slovenia, Spain, Sweden, Switzerland
Non-COST country participation: Australia, New Zealand

Action 859: Phytotechnologies to promote sustainable land use management and improve food chain safety

The main objective of the Action was multifaceted; the network aimed at improving the understanding and subsequently controlling the mechanisms involved in the uptake, translocation, metabolism and storage of pollutants and essential nutrients in plants, hence reducing the transfer of contaminants to food crops. These subsequently would enable improvement of food quality and nutritive value, and at the same time would provide efficient, ecological and economical solutions for sustainable land use management.

The objectives of the Action were achieved through the formation of four Working Groups which had strong links and interactions between them. The Working Groups were focusing on plant uptake/exclusion and translocation of nutrients and contaminants, on exploiting “genomics, proteomics and metabolomics” approaches in phytotechnologies, on improving nutritional quality and safety of food crops and on integration and application of phytotechnologies.

During the 5 years of its existence the network, involving more than 200 researchers, demonstrated in which way plants can specifically accumulate or exclude essential elements, toxic metals and organic pollutants and how different factors (either at molecular level, at plant level, or at field level) may control the bioavailability of metals

and xenobiotics in the rhizosphere, their uptake by roots, their translocation to and detoxification/storage in the above-ground parts of the plant.

As a result, the Action made scientifically sound recommendations for using green and environmental compatible biotechnologies for restoration of sites contaminated with toxic metals and organic pollutants in order to prevent further degradation of the environment and to rehabilitate former industrial sites.

In addition, the Action showed that crops with a reduced capacity to accumulate toxic metals and organic pollutants in edible parts are valuable to improve food safety. Moreover, crop plants with an enhanced capacity to accumulate essential minerals (e.g. Fe, Zn) in edible parts can help to improve human health through balanced nutrition.

The Action had 29 COST countries and 8 Non-COST countries participating. This in relation to the number of participants to workshops and conferences and the volume of research outputs published in peer reviewed journals suggest that the Action had a significant effect on the mobilization of scientific capacity and has strengthen scientific collaborations and exchanges. A result of this is the funding of a new Action 'Mineral-improved crop production for healthy food and feed'.

Duration: 2004 - 2009

Chair: Dr Jean-Paul SCHWITZGUEBEL (CH)

Parties: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

Non-COST country participation: Algeria, Australia, India, Japan, Russian Federation, Ukraine, United States, Vietnam

Action 861 - European network for pig genomics

The main objective of the Action was to increase the knowledge of the organisation, expression and regulation of the genes involved in pig development, health, reproduction and product quality.

The generated knowledge helps to improve pig selection and breeding practices and subsequently meet the requirements of both breeders and consumers. Genetic improvement of pigs can lead to better meat quality and safety, traceability as well as animal health and welfare. These can be expressed in terms of breeding objectives: growth and development, infection and immunity, and reproduction.

In addition, the accumulated knowledge is useful in terms of biomedicine since pig is a valuable experimental model.

The Action during the last 5 years undertook a genomic approach, which was systematic and global, without a priori hypothesis, and which delivered large amounts of data. The Action organized three Conferences with more than 150 participants, and a number of Working Groups joint meetings and workshops on specific technical and methodological issues. The Action was interdisciplinary; this was particularly evident during a workshop on 'Pig as model for human medicine and toxicological studies', where the most recent research on comparative physiology and pathology was presented.

The number of papers published by members of the COST Action clearly demonstrates the close scientific interactions and collaborations. The sharing and exchange of samples, technology, data, and equipments between groups has been a major opportunity and a tool that contributed to the research activities developed by the different members of the COST Action; the members of the network were more than 600 scientists. In addition, many of the activities

within the Action have been closely linked to activities within other EU projects, hence promoting and enlarging at a European and world-wide level the coordination of research on pig genetics.

The Action in collaboration with the other networks achieved the following objectives:

1) Functional genomics: QTL mapping and identification of candidate genes for economically important traits, such as muscle properties and body composition, and generation of porcine SNP chips, such as NRSP-8-immune chip.
2) Data analysis and integration: EST and SNP databases were created and made publicly available at NCBI and at different COST member state research institutes web sites.
3) Pig genome sequencing: members of this COST Action contributed significantly in the publication of the pig genome sequencing which was presented and discussed at the Final Conference of the Action. An additional outcome was the establishment of several public domain internet platforms with tools for porcine genome analysis aiming to bridge the gap between basic research and practical solutions for industry e.g. safer animal products, animal welfare.

The Action was scientifically excellent and during its lifetime a number of research funds have been raised by its members at national and international level.

Duration: 2004 - 2009

Chair: Prof. Bertram BRENIG (DE)

Parties: Belgium, Czech Republic, Denmark, France, Germany, Greece, Hungary, Italy, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Switzerland, United Kingdom

Action 924: Enhancement and Preservation of Quality and Health Promoting Components in Fresh Fruits and Vegetables

The main objective of COST action 924 was to enhance and preserve fruit quality, safety and the amount of nutritional and functional components in fresh fruits and vegetables in from orchard to consumer with special attention to organic growing. This objective can be achieved through the improvement of quality and uniformity of fruit quality at harvest, the evaluation of the effect of integrated postharvest systems on biochemical and physical processes, by further adaptation of postharvest systems, improvement of the management of postharvest chains to provide healthier, safer and more nutritious fruit and vegetables of the required overall quality and evaluation of new strategies (including definition and measuring technology) to assess quality, safety and value of fruit and vegetables.

The Action involved more than 200 scientists from 22 countries of different expertise, involving agronomists, plant protectionists, specialists in post-harvest pathology, packing and storage, food science and technology, food analysis and health “from orchard to consumer”. Through collaborative work a number of objectives were achieved with the most important being the following ones:

1) Recommendations for increasing self-life and safety of foods,
2) Guidelines for improving UV disinfection in post-harvest,
3) Novel approaches for biological control,
4) Alternatives for reducing the use of synthetic post-harvest fungicides (biological control agents, natural biocides and induction of fruit defence mechanisms),
5) New protocols for inhibiting fungal growth and contamination by mycotoxin,
6) New information on the role of food antioxidants in food quality and health,
7) Methods for non-destructively determination of health promoting compounds,
8) New concepts of modelling in the agro-food chain. Moreover the Action opened a scientific debate about ‘organic growing’, pinpointed how important the tools called “omics” are for a fast progress and better understanding of post-harvest biology and technology and demonstrated how important is the synergy between scientists with different backgrounds to achieve high quality knowledge in the field of the Action.

The Action has generated more than fifty publications and more than thirty-five scientists were benefited from the COST tool, Short-Term-Scientific-Missions, suggesting a good level of transfer of knowledge and technology among research groups. In addition, most partners of the consortium had active collaborations with the European fruit and vegetable industry, suggesting that transfer of results was also a priority of the Action; this is also supported by the fact that publications in trade press and extension services of the partners were made. Participation of some members to funded national and EU projects resulted in further (or new) co-operations between several partners.

Duration: 2004 - 2009

Chair: Prof. Bart NICOLAI (BE)

Parties: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Finland, France, Germany, Greece, Hungary, Israel, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Switzerland, Turkey, United Kingdom

Action 927: Thermally processed foods - possible health implications

Processing is essential for producing foods which are microbiologically safe, have increased nutritional quality

and reduced levels of potentially toxic compounds. In many food items, such as baked or roasted products, thermal treatment is indispensable for determining the specific nutritional and sensory properties, in particular texture, flavour and colour. Thermal treatment may induce the formation of health-promoting components, such as antioxidants and antimicrobial agents, which have not been studied in detail so far. Processing may also lead to the formation of heat-induced contaminants, such as mutagenic heterocyclic amines and acrylamide, particularly in fried potatoes. The main objective of the Action was the production of healthier heat-treated foods and to improve knowledge of the beneficial and detrimental properties of newly formed compounds.

Action 927 involved scientists from a broad range of disciplines. It served as a meeting place for researchers from the general areas of food and biomedical sciences, including the disciplines of analytical chemistry, food processing, nutrition and toxicology, food-related diseases (diabetes and atherosclerosis), gerontology, epidemiology, and others. The overall effect was to build bridges between laboratories and disciplines and to foster interdisciplinary research on food nutrition and toxicology. The inter-disciplinary nature of the Action was one of its strong points.

The Action had various activities with probably the most innovative one being the Ring-Test. This involved comparative analysis of a wide range of compounds and food products at various laboratories by different techniques. Despite various limitations identified, this effort was the first of its kind in the EU and provided a base for development of more sophisticated studies, which may lead to development of standards and standardized analytical methods. In addition a number of activities have been undertaken which despite the fact that can not be described as completed, they all provide a strong base or starting point for addressing important issues in food nutrition and toxicity. These include activities focused on food processing strategies to minimize formation of hazardous compounds in foods, including acrylamide and on assaying the nutritional and toxic effects of food products in animal and cellular systems. For instance, data demonstrating the role of lipid oxidation on the formation of potentially harmful Maillard Reaction products such as acrylamide were presented by the members of the network. Moreover, data concerning the bioavailability of individual advanced glycation end-products (AGEs) were also presented, establishing that some AGEs are bio-available to some degree, but almost completely excreted in urine. Some others cross-linked AGEs are not well digested and are largely excreted in faeces. A new generation of anti-glycating enzyme seems to be a very promising tool to be used in the near future and some pharmaceutical companies demonstrated their interest particularly for the prevention and control of the protein glycation. In addition, the nutritional effect (healthy or toxic) of neoformed compounds was assayed in a number of in vitro and animal system and interesting studies were also performed on the on gut microflora. Indication on the healthy properties of some compounds, particularly pronyl-lysine and N-methyl piridinium was demonstrated.

The Action also worked towards the development of reliable databases for assessing overall intake of these compounds.

Numerous interactions evolved from this Action through STSMs (close to sixty STSMs in total were performed), workshops (ten) and collaborative research, as indicated by the large number of co-authored publications among Action members. These publications brought important issues to the attention of academic and industrial scientists across the world.

Regarding dissemination, the members of the Action established contacts with EFSA, the International Maillard Reaction Society (IMARS, the Network of MONIQA dealing with the cereal world and industry.

Members of COST 927 were involved in an FP6 funded project, a Collective research project and a project in the framework of CAPACITIES program.

The Action activities and research collaboration which involved research labs from 29 COST Parties certainly improved our knowledge of the beneficial and detrimental properties of newly formed compound and the production of healthier heat-treated foods.

Duration: 2004 - 2009

Chair: Prof. Vincenzo FOGLIANO (IT)

Parties: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

Non-COST country participation: Australia

Forests, their Products and Services

Action E47 - European Network for Forest Vegetation Management: Towards Environmental Sustainability

The main aim of COST Action E47 entitled 'European Network for Forest Vegetation Management: Towards environmental sustainability' was to try to gradually reduce dependence on herbicides in Europe's forests by sharing best practice and encouraging collaboration across the European Union.

The members of the action recognised that in the long term this can only be achieved through identifying alternatives that are based on sound forest management principles, recognising society's need for the sustainable production of a wide variety of forest resources, and employing methods that are environmentally sound, socially acceptable, and economically viable.

To this aim Action E47:

(1) Succeeded in building a network of collaborating scientists across the EU, and also with external countries facing similar problems and with advanced knowledge in this field, such as Canada and New Zealand.

(2) It examined best practice and shared current scientific advances across the European union and elsewhere publishing a book on 'Forest Vegetation Management in Europe' which summarised this best practice, scientific advances, work in progress, on a country by country basis.

(3) It identified gaps in current knowledge requiring further research and barriers to adoption of best practice.

(4) The members made proposals for future collaborative research between EU partners including the preparation of an FP7 proposal.

(5) Two International conferences enabled the presentation and dissemination of important results of the relevant scientific work carried out by members of COST Action E47 during the lifetime of the Action. These conferences also brought together international experts in the field from outside Europe including USA and South Africa.

(6) In the lifetime of the Action 2 Brochures were prepared and disseminated along with an Action Conference Poster and four Short Term Scientific Missions (STSMs) were undertaken.

In brief COST Action E47 succeeded in bringing together, researchers, scientists and practitioners along with their scientific teams from 19 different countries who are all involved in working to solve forest vegetation management problems. It did this in a cohesive and collaborative way

which will enable the members and those influenced by the action to go forward with confidence into the 21st century with a better understanding of the challenges ahead.

Duration: 2005 - 2009
Chair: Dr Nick MCCARTHY (IE)
Parties: Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Lithuania, Norway, Romania, Serbia, Slovak Republic, Spain, Sweden, United Kingdom

Action E48 - Limits of Paper Recycling

The main objective of COST Action E48 "Limits of Paper Recycling" was to collect facts, data and experiences and thereby to develop scenarios to support an ecologically and economically optimised utilisation of recovered paper in Europe. A further objective was to suggest strategies to safeguard the future availability of recovered paper as a raw material for the European paper industry. Some of the results obtained are summarised below.

In 2007 the average collection rate in CEPI countries was 66%, corresponding to an annual amount of 58 million tons of collected paper. This corresponded to c. 2/3 of the fibre raw material used by the paper industry in these countries. If all European countries would reach the current maximum collection rate of the best ones (c. 74%), an additional amount of some 10 million tons/year of recovered paper could be made available in Europe. The potential for a further increase of recovered paper collection is biggest in the southern and south-eastern parts of Europe.

As some paper products are not recoverable the maximum achievable collection rate in any country is estimated to be c. 81% of the consumption. Some countries are already rather close to this level.

Collection and sorting systems are quite different in different parts of Europe. Surprisingly enough, neither the type nor the composition of the collection systems seem to have a significant influence on collection rates. Well functioning systems are, however, instrumental for a good result. Collection strategies should thus be locally adapted taking into account the local features of the society and the structure of the paper industry.

The environmental awareness of the consumers and the society was identified as one significant driving force for paper collection. This could be improved by further information and education of the public and, in some cases, by rewarding of the consumers. Improving household collection is in most cases the best way to increase the overall collection rate.

The quality of recovered paper is highly dependent on the collection and sorting systems used. From a quality point of view used paper should not be mixed with other waste, separate collection of paper is definitely to be preferred.

The awareness of the printing and converting industries of problems related to the recycling of paper is not always sufficient. Therefore continuous discussions between these and the recycling industries are required. The recyclability should be made an important criterion for the design of new paper products.

More selective and more energy efficient de-inking and separation technologies need to be developed. Also the techniques for upgrading and regenerating the properties of recycled fibres need to be further improved.

From an overall strategic point of view it is important that the paper industry maintains control of the recovered paper supply chain. Thereby it can influence the development of appropriate collection systems and fight the competition from the energy producing industry – an issue which currently seems to be largely underestimated by the paper industry.

In general terms it seems that the availability of recovered paper will not be the factor limiting the utilization of recovered paper in Europe. Availability of certain higher grades might, however, become a bottleneck. Some discrepancies between local availability and utilization possibilities of recovered paper may be expected in some parts of Europe. Furthermore, sustainable paper production requires a good balance between virgin and recovered fibre supply.

The Actions´ findings will be compiled in the form of a book with the title The Future of Paper Recycling in Europe. This will be published in early 2010.

Duration: 2005 – 2009

Chair: Jan-Erik LEVLIN (FI)

Parties: Bulgaria, Croatia, Czech Republic, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Netherlands, Poland, Romania, Slovenia, Spain, Sweden, United Kingdom

Action E49 - Processes and Performance of Wood-based Panels

COST Action E49's theme was wood-based panels (WBP), e.g. particleboard, OSB, plywood, fibreboards including MDF. Laminated Veneer Lumber (LVL) was also included because it is manufactured as a panel (like a thick large piece of plywood) even if it is rarely used in panel form. Wood-plastic composites (WPC) were excluded from the scope of the Action as they are usually not manufactured nor used as panel products.

The research of E49 was divided amongst three Working Groups:

- WG1 Process optimisation and innovation, was concerned with the manufacturing of different panel products
- WG2 Fundamentals and modelling, grouped together those with an interest in modelling and simulation of both the manufacturing process and the behaviour of products in use. Therefore, this WG provided a link between WG1 and WG3
- WG3 Performance in use and new products, focused on how best to evaluate products.

E49 devoted considerable effort to including researchers employed by companies in addition to academics since the majority of research on WBP is applied rather than fundamental in nature and so it must address industry's needs, which are most easily revealed by interaction between industry and academics. A major achievement of E49 was to demonstrate to industry what might be possible in the future and to provide a link to researchers who might be able to help them realise these possibilities in the future. Whereas for the academics, giving them a link to industry helped to ensure that their research is applicable by the WBP sector and that future projects include industrial partners.

As an example, Heiko Thoemen, Leader of WG2, created an innovative database that presents research topics in a dynamic list. The list is dynamic because the priority order of the list can change from day to day depending on votes received for each topic. A new vote has a higher weighting than an old vote. In other words, a topic that received many votes in the previous year may not be at the top of the list now because other topics have more recent votes compared to the "old" topic. A second database was also created that contains information about institutes and companies that conduct research on WBP and their WBP projects.

In addition, E49 organised: 5 full conferences each with proceedings; 2 workshops; 3 Training Schools (with half the participants coming from industry). It also published two state of the art reports: Performance in Use and New Products of Wood-Based Composites and Wood-Based Panels: An Introduction for Specialists. Electronic copies of the proceedings, presentations and various reports are available at www.COSTE49.org. E49 also awarded eight STSMs to early stage researchers resulting in the

generation of new knowledge. Information gathered by researchers during E49 events has also influenced many national research programmes and new professional relationships have developed between participants of E49 as a result of meetings during conferences or through a STSM. The sharing of knowledge and experience in E49 has been, and will continue to be, of benefit the WBP sector as whole.

Duration: 2005 - 2009
Chair: Dr Mark Anthony IRLE (FR)
Parties: Austria, Belgium, Bulgaria, Denmark, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Latvia, Norway, Poland, Portugal, Romania, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

Action E50 - Cell wall macromolecules and reaction wood (CEMARE)

Reaction wood takes the form of compression wood in softwoods and tension wood in hardwoods. It is vital to the tree in that it without it the genetically determined orientation of branches and main stems could not be maintained under gravitational forces and physical environmental stresses such as wind. At the most fundamental level the arrangement of the main structural elements in the cell wall; cellulose microfibrils, lignin and hemicelluloses is modified in reaction wood to enable the cells to better

withstand compressive (compression wood) or tensile (tension wood) forces. While this has enabled trees to become the world's tallest living organisms, it has serious consequences for the timber user as the presence of reaction wood makes the timber unusable in applications requiring dimensional stability and strength. Clearly its importance to the successful growth of the tree means that we cannot expect to eliminate reaction wood by selective breeding or genetic modification. Understanding how it works may help to assess how far its presence might be reduced without affecting trees adversely, while applications might be sought in which reaction wood is advantageous to the user rather than otherwise.

Therefore, this Action brought together experts from 17 countries within the EC and eight non-EC countries: Australia, Brazil, Canada, China, Japan, New Zealand, Russia, and the USA, dealing with aspects of wood and fibre science ranging from the molecular structure of the fibre and tracheid wall, to the physical and mechanical properties of timber. Four working groups were established; Biosynthesis and Structure of Cellulose and Polysaccharides, Biosynthesis and Modification of Lignin, Formation and Induction of Reaction Wood, and Relating Wood and Fibre Properties to Structure and Formation. With regard to the biosynthesis of cellulose, the application of antibody techniques and spinning disc microscopy proved particularly fruitful in enabling visualisation of the cellulose synthase complexes being guided by microtubules in laying down cellulose microfibrils. As a change in the orientation of cellulose microfibrils is a key factor in changing the mechanical properties of the fibre wall, this information is invaluable in beginning to understand how the orientation is controlled. The effect of wood modification (high temperature drying, UV-treatment, micro-wave treatment, precursor impregnation) on lignin structure and the properties of solid wood and wood fibres was investigated. New techniques such as the fast transform infra-red technique (FTIR) and antibody labelling were developed for lignin analyses and the new FTIR technique enabled determination of the amount of lignin in a wood sample without any extraction. It has also been established that it is possible to detect molecular deformation of cellulose in wood using FTIR together with mechanical straining while a new method was developed for moisture content determination by NMR. Work with antibodies against lignin substructures gave new information on the structure of the cell wall layers and their development. The role of cell-wall maturation and lignification in the process of growth stress generation was also investigated. Work on structure-function relationships in plant cell walls provided new and fundamental information about the mechanical role of xyloglucan and new results on cellulose fibril aggregation in spruce cell wall. Hemicelluloses are increasingly being recognized as having a mechanical role in the fibre wall. Importantly, it was found that climate change is unlikely to affect cell wall structure in northern coniferous trees.

Duration: 2005 - 2009

Chair: Prof. J.R. BARNETT (UK)

Parties: Austria, Belgium, Denmark, Finland, France, Germany, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Slovenia, Sweden, Switzerland, Turkey, United Kingdom

Non-COST country participation: Australia, New Zealand

Individuals, Societies, Cultures and Health

Action A28 - Human Rights, Peace and Security in EU Foreign Policy

The main objective of COST Action A28 was to increase and deepen knowledge on the functioning of national and international instruments devised to pursue human rights, and peace and security objectives in order to recommend modifications of the foreign policy of the European Union.

The Action focused on the following instruments: peace keeping/enforcement; international criminal tribunals; development cooperation; preventive mechanisms, including the UN High Commissioner for Human Rights (UNHCHR) and the High Commissioner on National Minorities of the OSCE. For analysing the functioning of each of these instruments four Working Groups were established.

In February 2009 the Action's Final Conference took place at Utrecht University, the Netherlands. The event could attract a number of outstanding international experts and practitioners.

Very intense interaction between Action participants and experts from the field including representatives of possible end users has taken place throughout the Action's activities. Especially WG 1 "Peacekeeping and –enforcement in order to protect human rights" and WG 4 "UN High Commissioner for human rights have been very successful in building strong contacts with representatives of relevant international organizations. WG1 was able to tie to its work the Personnel Representative of the Secretary General / High Representative for Human Rights of the Council of the European Union, including other officials from the Council's Secretariat and the European Commission. WG4 had strong contacts with the Office of the UN High Commissioner for Human Rights and the Office for the High Commissioner on National Minorities of the OSCE. Moreover, some participants of the WG are practitioners in the field themselves, such as Martin Scheinin (UN Special Rapporteur on Human Rights and Counter-Terrorism), Manfred Nowak (UN Rapporteur on Torture) and Cees Flinterman (member of the UN Treaty Committee on the Elimination of Discrimination against Women).

Duration: 2004 - 2009

Chair: Prof. Cees FLINTERMAN (NL)

Parties: Austria, Belgium, Bulgaria, Cyprus, Denmark, Finland, Germany, Iceland, Ireland, Netherlands, Norway, Portugal, Romania, Serbia, Spain, Sweden, United Kingdom

Action A30 - East of West: Setting a New Central and Eastern European Media Research Agenda

The COST A30 Action "East of West: Setting a New Central and Eastern European Media Research Agenda", coordinated by the Center for Media and Communication Studies at Central European University, brought together approximately 70 distinguished media and communications media researchers from 27 countries in Western and Eastern Europe. The Action has also built a European social science network of research centers, higher education programs and departments with a focus on emerging problems of Central and Eastern European media in a comparative perspective.

The main objective of the Action was to increase the knowledge concerning media production, media reception and use, and the political implications of the transformation of the media landscape in the Eastern and Central European context.

Action participants developed novel conceptual frameworks of analysis and worked on empirical projects concerning specific media problems facing the region. Furthermore, the Action created synergy among similar research efforts that had been conducted both at the national level and in the wider European context. By involving both leading scholars West and East and a new generation of young Central and Eastern European researchers, organizing academic conferences, workshops and innovative research collaboration as well as initiating policy dialogue, the Action

successfully developed and promoted a cutting-edge media research agenda at the European level.

Four Working Groups were established throughout the duration of the Action (Comparative research methods & New media developments; Democratic theory and democratic performance of the media; Media regulation and policy; Textual analysis and media use), these were necessarily inter-disciplinary in nature, connecting media and communication theory, media law, political science and sociology.

The Action has published six books and a journal theme issue and organised numerous international workshops and conferences. The project culminated in the highly successful three-day final conference "Beyond East & West – Two Decades of Media Transformation after the Fall of Communism".

Duration: 2005 - 2009

Chair: Dr Miklos SUKOSD (HU)

Parties: Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Spain, Sweden, United Kingdom

Non-COST country participation: Moldova, Ukraine

Action A34 - Gender and Well-Being: Interactions between Work, Family and Public Policies

The main objective of this Action was to provide new insights into fundamental questions regarding the sustainability of living conditions in the EU and into its systems of provision and distribution of the necessary resources. In doing so, it aimed to contribute to the ongoing debate about the need for welfare reform in Europe today, through discussing relevant methodologies and concepts, comparing practices of living and the perceptions of the quality of life, and assessing social indicators and measures of the contribution to well-being by women in the family, the market and the state.

The Action's activities have been coordinated by 7 WGs which organised 6 symposia over the 4 years duration of the project. In these symposia, researchers and social policy makers of all countries involved in the network were brought together to discuss the policy dimensions of the research carried out by the Action members. Joint sessions and debates with feminist association were used to test the Action's social policy oriented proposals and progress reports. In addition, thanks to the participation of many network members in equality institutions as advisors to policy implementation, the results of the symposia are entering public policies in a very significant way, namely through the elaborating of gender budgets, counsel and elaboration of equality and well-being indicators, and fiscal policy and employment policy.

The Action had a special policy for supporting Early-stage Researchers who were able to benefit from several dedicated activities, such as 2 Training Schools.

Duration: 2005 - 2009

Chair: Dr Cristina BORDERIAS (ES)

Parties: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Malta, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, United Kingdom

Action A35 - Programme for the Study of European Rural Societies (PROGRESSORE)

The main object of this Action has been to examine the changes undergone by contemporary European rural societies in the light of their historical experience. This aim is highly relevant to the rural and agricultural world today. By launching this Action, its members assumed that the present day problems of the countryside could never be really understood without taking into account what happened before and could better be by the observation of past experiences. Although the peasantry has almost disappeared in a large part of Western Europe the future of the surviving farms, their size, and the way they are worked, remains a big challenge, while in Eastern Europe very extensive changes in the distribution of property have taken place over the course of the twentieth century. This means that the researchers gathered in the network have had to produce historical studies on the countries involved in the Action, to make historical comparisons between these countries and then to gather experts to analyse the present and future of the European countryside.

Over the 4 years, the Action organised 12 workshops and a final conference. The final conference was set up as an interdisciplinary event, gathering not only historians, but also economists, geographers, sociologists, anthropologists and other disciplines – thus, setting an example of best practice in the humanities.

Summarising the Actions most important findings, it can be said that, though property rights have long been thought to be a crucial factor for agricultural growth, it seems that incomplete property rights were not a hindrance when farmers had some guarantees. Within a specific social context where the holders of the various property rights had a clear long-term interest in sustainable development, even marginal areas could sustain a healthy social agro-system, while the loss of economic vitality or the emergence of absentee landlords could have clear negative effects. The Action showed that European farmers over the centuries have responded well to economic incentives and that the involvement of rural populations and communities in different kinds of markets (agricultural commodities, labour, land, capital) has influenced the management of rural land in Europe.

Duration: 2005 - 2009

Chair: Prof. Gérard BÉAUR (FR)

Parties: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom

Action A36 - Tributary Empires Compared: Romans, Mughals and Ottomans in the pre-industrial world from antiquity till the transition to modernity

The main objective of the Action was to produce a better understanding of classical tributary empires and the problems relating to segmented, loosely integrated and partly overlapping forms of power and authority, through the establishment of a European network for the comparative study of the Roman, Ottoman, Mughal and related empires.

By organising 10 conferences/working group meetings, attracting a large number of scholars from a wide range of backgrounds, the network established itself as an important interdisciplinary forum of comparative research and pioneered new ways of working together. The main result of this was to generate a permanent and enduring dialogue between students of the 3 above mentioned empires that previously had had no tradition of systematically learning from each other, even though they were confronted with very similar questions and research agendas. By engaging a vast number of scholars from these and related fields over a significant amount of time, the network has made a significant effort to put comparative study of classical empires on a more permanent basis. The fruits of these labours were harvested at the final conference where the action was able to present a series of papers written in collaboration between members with different disciplinary backgrounds.

This dialogue generate by this COST Action came to fruition at a number of levels. A considerable number of graduate students were attracted to the agenda and were helped advance their research through exchange activities and a training school. The meetings themselves spawned a number of book projects which in combination will mark a significant advance in our understanding of the functioning of classical tributary empires. Bang & Bayly (eds.), Empires in Contention (in press) represents the first systematic effort to compare, and through this develop, the basic models of tributary empires available. Duindam, Kunt & Artan (eds.), Royal courts in dynastic states and empires (in press) demonstrate the value of comparing imperial courts across the big East-West divide, Bang & Kolodziejczyk (eds.), Universal Empire (forthcoming), represents the first attempt to chart the notion of imperial universalism across cultures while Salmeri & Forsén (eds.), The Provinces Strike Back (2008) was a novel attempt to compare the changing experience of imperial rule in a number of Mediterranean societies.

Duration: 2005 - 2009

Chair: Dr Peter Fibinger BANG (DK)

Parties: Austria, Cyprus, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Poland, Romania, Sweden, Turkey, United Kingdom

Information and Communication Technologies

Action 294 - Towards the Maturation of IT Usability Evaluation (MAUSE)

COST 294 had three main goals: To deepen understanding about the inherent strengths and weaknesses of individual UEMs; To identify reliable and valid methods for comparing different UEMs in terms of their effectiveness, efficiency and scope of applicability; To develop effective strategies for extracting useful information from the results of UEMs in order to improve the systems tested.

The Action was structured in four Working Groups: Critical Review and Analysis of Individual; Comparing UEMs: Strategies and Implementation; Refining and Validating Classification Schemes for Usability Problems; Review on Computational and Definitional Approaches in Usability Evaluation. A Special Interest Group on User Experience was also set up.

Working Groups focused on their well-defined tasks, resulting in insightful discussions and further stimulations that brought the related research topics forward. Results obtained during the Action's lifetime include: detailed descriptions of a broad range of UEMs; a scientifically sound analytic framework for reviewing computational UEMs; the transfer of results to the Usability Professional Association (UPA) and their publication in scientific journals; some empirical studies (including comparing UEMs with systematic methodological approaches and analysing the quality attributes with sophisticated repertory grid techniques).

In particular, COST 294 initiated an important discussion on the epistemological foundations of Usability Evaluation. This discussion has been of crucial importance to the whole field of applied computer science, since it is characterized by a multitude of different, typically unrelated or even contradictory, research paradigms. An impressive set of high-level international publications resulted from this scientific debate.

COST 294 has networked a wide set of actors in the Human Computer Interaction (HCI) and usability engineering domains, including the industry and standardization bodies. The Action organized a number of scientific events – workshops and special interest group sessions – which were well received and yielded some interesting results, contributing to the advancement of the usability research and practice.

COST 294's success in community building is testified by the fact that a large, new COST-ICT follow-up Action was approved in 2009 (IC0904)

Duration: 2005 - 2009

Chair: Dr Effie LAI-CHONG LAW (CH)

Parties: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Poland, Romania, Serbia, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Action 295 - Dynamic Communications Networks: Foundations and Algorithms (DYNAMO)

The main objective of Action COST 295 was to provide foundations, models, algorithms, and general tools for dynamic communication networks. These new decision-support tools were to favour the study and the efficient design of applications for networks of decentralised interacting and evolving entities, experiencing possibly severe modifications of their environments.

In particular, DYNAMO focused around the following main aspects:

(1) Characterization of common properties shared by large-scale dynamic complex networks (and their communication aspects) arising from the interaction of basic entities, including Internet, sensor, cellular and ad-hoc networks, and social networks (e.g., the WWW, peer-to-peer, etc.);

(2) Design of new dynamic network models (and general communication schemes), optimized with respect to the new measures resulting from the above, while improving other system characteristics (reliability, communication delays, etc.);

(3) Construction of distributed protocol (in the standard setting, or combined with the use of mobile agents) capable of extracting and processing local and global network information;

(4) Production of basic practical algorithms (for routing, control, searching, etc.) to be used in the development of network-based applications

(5) Validation of the results using data extracted from real self-organizing dynamic networks, by the use of reproducible simulations and benchmarks.

COST 295 organized its work around four Working Groups: Small Worlds; Wireless Networks: Sensor, dust, and ad-hoc networks; Peer-to-Peer Networks; Emerging Algorithmic Technologies.

Publications and software developed by Action members mainly relate to points (1) to (4). Collaboration within the Action resulted in about 120 co-authored papers, five of which received paper awards (such as "Best paper" or "Century paper") at a variety of international scientific events. The Action also funded a large number of Short-Term Scientific Missions as well as two Training Schools, which involved about 100 PhD students.

In conclusion, COST 295 stimulated a fruitful synergy between theoretical and applied research by integrating two separate scientific communities: that of Network Engineering and that of Theoretical Computer Science.

Duration: 2005 - 2009

Chair: Dr Pierre FRAIGNIAUD (FR)

Parties: Belgium, Cyprus, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Israel, Italy, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Non-COST country participation: Canada

Action 296 - Mitigation of Ionospheric Effects on Radio Systems (MIERS)

The main objective of the Action was to develop an increased knowledge of the effects imposed by the ionosphere on practical radio systems, in order to facilitate the development and implementation of techniques to mitigate the deleterious effects of the ionosphere on such system.

The Action was organized in three Working Groups: Ionospheric monitoring and modelling; Advanced terrestrial systems; Space based systems. Action participants represented a very large proportion of European scientists involved in radio systems and ionospheric studies.

COST 296 was successful in increasing knowledge of ionospheric effects on terrestrial and satellite radio communication and satellite navigation systems. The Action also achieved results on efficient terrestrial HF over-the-horizon communications, such as MIMO techniques and effective spectrum management. Many models were developed during the Action's lifetime for various applications: ionospheric electron density; characteristic frequencies; maximum electron density; ionospheric scintillations. Some of the models are more of the climatic long-scale type, some others are for shorter scales and even for prediction and forecasting. Special attention was paid also to the ingestion of measured data into climatic models for a more accurate short-scale representation.

The study of the ionosphere carried out in the framework of this Action brought about increased interest in, and increased usage of, critical applications affected by the ionosphere, such as governmental, commercial and mass-market Global Navigation Satellite System applications; high availability satellite communications at UHF and VHF; HF terrestrial communications (e.g. over the Poles, where satellite communication systems are not available). Interest in the development of a Space Situational Awareness system was also aroused.

It is important to note that the study of ionospheric effects on radio systems and the mitigation of these effects have become particularly important nowadays, due to wide use of satellite navigation and the need to optimise positioning accuracy.

The success of COST 296 is given by the fact that the Action provided the right forum to create European and international synergies that gave birth to the development of products, services and data in the area of ionospheric effects on communications and navigation systems.

COST 296 developed both software and hardware tools for the measurement and mitigation of ionospheric effects. A dedicated group of scientists has been working together effectively, producing an impressive number of high-quality scientific publications.

The Action has been an excellent example of the "COST spirit" and fits well in the long tradition of successful wave propagation studies carried out by COST Actions.

Duration: 2005 - 2009

Chair: Prof. Alain BOURDILLON (FR)

Parties: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Finland, France, Germany, Greece, Hungary, Italy, Poland, Portugal, Romania, Slovenia, Spain, Turkey, United Kingdom

Non-COST country participation: Canada, China, China, Malaysia, Republic of Korea, Russian Federation, Russian Federation, United States

Action 297 - High Altitude Platforms for Communications and Other Services

The main objective of the Action was to increase knowledge and understanding of the use of High Altitude Platforms (HAPs) for delivery of communications and other services, by exploring, researching, and developing new methods, analyses, techniques, and strategies for developers, service providers, system integrators and regulators.

In particular, COST 297 aimed at:

(1) increasing knowledge on communication applications of HAPs;

(2) using the COST framework to co-ordinate with other Actions having relevant expertise;

(3) highlighting opportunities and business models for services from HAPs, identifying key features and benefits, as well as cost comparators;

(4) encouraging, coordinating, and promoting knowledge and understanding of HAP vehicles themselves;

(5) increasing awareness on the challenges, constraints, operating parameters and construction of HAPs;

(6) identifying shared concerns and requirements of those working with HAPs and their applications, in particular to develop common requirements from a regulatory point of view and to share and develop ideas, methodology, and good practice concerning trials of HAPs and their applications.

The Action was organized in three Working Groups: Radio Communications; Optical HAP Communications; Platforms, and non-communications applications.

COST 297 achieved all of its objectives by spurring an interdisciplinary scientific production in the domain of HAPs and by giving rise to a lasting 'HAP community'. Significant breakthroughs were achieved in terms of propagation models in HAPs, characterization of optical communication links to/from HAPs, investigation and analysis of quantum cryptography from HAPs, as well as in integration of HAPs with new emerging Cognitive Radio techniques. COST 297 engaged in activities bearing a high socio-economic impact, namely on issues relating to radio spectrum management for HAPs; on detailed exploration of airship design issues; on the use of HAPs for disaster management and on the development of business models for use of HAPs.

The Action's Working Groups proved very active and they generated important technical results.

Finally, in terms of the wider international dimension, COST 297 has made valuable links with leading HAP-related activities in Japan, Russia, South Korea and the United States of America.

Duration: 2005 - 2009

Chair: Mr Tim TOZER (UK)

Parties: Austria, Belgium, Cyprus, Czech Republic, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Poland, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Non-COST country participation: Japan, Russian Federation, United States

Materials, Physics and Nanosciences

Action 533 - Materials for Improved Wear Resistance of Total Artificial Joints

The main scope of this Action was to investigate the biotribology of bearing materials in artificial hip and knee joints, the mechanisms of lubrication and wear, the methods of in vitro simulation and testing, and the resulting biocompatibility and biological reactions to the wear products in order to contribute to the standardising of in vitro simulation and testing. Three major initiatives were undertaken, including a pan-European study of highly cross-linked polyethylene for hip joints, a round robin tribo-corrosion testing of metallic bearing materials for metal-on-metal hip joints, and fundamental studies of lubrication mechanism in natural synovial joints and intervention, including tissue engineering approach. The outcome from the studies within the Action has provided timely guidelines for pre-clinical evaluation of these treatment options, and knowledge for the regulatory and standards bodies. This should have economic benefits to health services as well as clinical benefits to patients. Furthermore, significant networking within Europe as well as with other countries outside, such as China, USA, Japan, Australia and Israel, has been established. A number of early stage researchers (particularly female researchers) have been trained and developed throughout the Action. All these will contribute to the establishment of a centre of excellence in Biotribology in Europe.

All the objectives have been largely met within the scope of the Action and the constraints. The strength of this Action

is demonstrated through networking, training of early stage researchers/female researchers and participation from researchers from outside COST countries (China, USA, Japan, Australia). This has established Europe as the centre of excellence in Biotribology. A future strategy to continue the activities within this Action has also been established, including establishing a Biotribology Society, bilateral/multi-lateral exchange visits, continuing Biotribology Workshops and applying for a new following-on Action.

One of the main strengths of this Action is the interdisciplinary networking. This has led to two major initiatives, a pan-European study of cross-linked polyethylene (6 countries/laboratories) and a Round Robin test (11 in total) on tribo-corrosion of metallic bearing surfaces for artificial hip joints. The outcome from these initiatives has provided significant socio-economic benefits to the use of these alternative bearings for hip replacements, through high impact peer reviewed journal/book publications and contributions to standards.

The European dimension was very good as the Action by the end included 19 countries. More than 50 participants were regularly and actively involved in the Action. The participation from early stage and female researchers was particularly encouraging and this was achieved largely through STMS (5/9) and Training School (72). Participation from outside EU was also excellent, including China, Japan, Australia and USA. Most of the workshops in the Action were organised in conjunction with major EU/world international conferences such as World Congress of Biomaterials and Biomechanics and this was found to be particularly effective to increase the visibility of the Action. Presentations from a selected number of workshops were published in peer reviewed international journals (special issues). Collaborations with other actions and organisation in EU were also strong, including COST 537. The Action helped and facilitated a number of participants to secure national and EU research funding.

Duration: 2004 - 2009

Chair: Prof. Zhongmin JIN (UK)

Parties: Austria, Belgium, Czech Republic, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Switzerland, United Kingdom

Non-COST country participation: China

Action 536 - Alloy development for Critical Components of Environmental friendly Power planT (ACCEPT)

The Action aimed to develop highly efficient steam power plants with low emissions of harmful agents through alloy development for critical components in the steam cycle. The thermal efficiency of steam power plants is to a large extent limited by working temperatures and pressures in the steam cycle, which are defined by creep, fatigue and corrosion/oxidation properties of available materials. Over the last three decades newly developed steel alloys have enabled increases in steam conditions from subcritical 180 bar/540°C to ultra supercritical 300 bar/600°C corresponding to ca. 30% reduction in specific CO2 emissions. Steel development could enable a further increase to 325 bar/650°C corresponding to another 10% reduction. With large expected growth in coal power this could have strong effect on medium term global CO2 emissions.

The Action united 70 participating projects from universities and industry in 15 countries, representing all major players in the materials sector of the European power industry and embracing all development steps from innovative alloy development to validation of large component integrity.

The Action aimed to develop, quantify and introduce improved materials of the 9 to 12%Cr class with improved high temperature strength for the manufacture of critical components required for the fabrication of advanced steam power plants. Especially, materials were to be introduced for heavy forgings (such as steam turbine rotors), castings (such as casings for turbines and valves) and thick walled pipes (such as for headers and steam pipes). The process of introduction entailed the following steps: 1) Alloy design on the basis of computer-aided phase stability predictions validated by investigations of model alloys, 2) Production and investigations of promising novel alloys to evaluate their fitness for the application and 3) Manufacture of larger melts to verify the scale-up to sizes appropriate for full industrial exploitation. Specific requirements were for: I) A high creep strength at the maximum temperature of up to 650°C (typically 100 MPa at a duration of 100,000 hours) II) Resistance to steam oxidation such that no unacceptable growth or spalling of oxide particles occurs within 100,000

hours (alternatively low cost coatings should be qualified and introduced, with which oxidation of high temperature components can be prevented). The main achievements of the Action were:

- Observed microstructure instabilities in 11-12%Cr steels are explained by Z-phase precipitation, which dissolves fine VN nitrides. Model development enables control of this harmful process by limitation of the Cr content. A new possibility to use the Z-phase for strengthening of 12%Cr steels has been identified.
- Improved understanding of effects of B and N on long-term creep properties formed the basis of a series of new strong 9%Cr alloys with improved creep and weld strength. The 9%Cr alloys will be surface coated with newly developed coatings for high temperature applications above 620°C.
- Long-term validation tests in a shared effort on full-scale components of new alloys and weld metals for castings (CB2) and forgings (FB2) from previous Actions (522) form the basis of 25 power plants now under construction with record steam conditions of 300 bar and 600-620°C.
- 254 delegates from 22 countries attended the 8th Liège Conference on "Materials for Advanced Power Systems on September 19-21, 2006
- 32 early-stage researchers (10 female) attended a Training School on Lanzarote on October 24-26, 2008

All in all the Action proceeded as planned: New alloys and components were produced and tested. Significant progress in understanding of strengthening and oxidation mechanisms of the steels was achieved, which provide the necessary back-up for further optimizations of the steels.

New ideas for alloy development based on 9%Cr steels with optimizations of Boron and Nitrogen and 12%Cr steels strengthened by Z-phase precipitates were conceived as a result of the Action, and may well reach the goal of 650°C steam temperature. Surface coatings for the 9%Cr steels are under development.

Duration: 2004 - 2009

Chair: Mr John HALD (DK)

Parties: Austria, Belgium, Czech Republic, Denmark, Finland, Germany, Hungary, Italy, Netherlands, Poland, Slovakia, Spain, Sweden, Switzerland, United Kingdom

Action 539 - Electroceramics from Nanopowders Produced by Innovative Methods (ELENA)

The Action covered a broad research area related to nanostructured materials, electroceramics, films, innovative synthesis methods and characterization. The Action had ambitious goals to improve the physical and electronic properties of advanced electroceramics and films produced by chemical, physical and mechanical synthesis techniques focusing on the polymeric precursors, sol-gel, spray pyrolysis, microemulsion, ultrasonic, freeze drying and mechanochemical methods.

The main objective of this Action was to elaborate on synthesis and characterisation of nanostructure powders (WG1), processing and characterisation of electroceramics and thick films (WG2) and functional characterisation of electroceramic materials and films (WG3). The integrative research was focused to: (i) Nanopowder metrology (ii) Assessment of the different synthesis methods for their applicability to the production of nanosized powders, nanotubes, nanoribbons, nanowires for electroceramic applications, (iii) Confinement and interface-related effects in electroceramics, (iv) Inhomogeneous materials, core-shell and graded structures in electroceramics, (v) Local studies of electrical properties, (vi) Macroscopic electrical characterization and (vii) Modelling and size effects in nanostructure ceramics and films.

The results of the Action clearly indicate the potential of nanotechnology for radical innovation in electroceramics and in general ceramic sector and the particular advantages of innovative methods (solid-state and wet chemical) in that respect recognizing a space for new scientific discoveries in the field of new production methods and technologies. By soft chemistry methods (sol-gel, gel combustion, precipitation, polymeric precursor), vapor phase methods (CVS, CVD, spray-drying, spray pyrolysis) and mechanochemical methods at least have been synthesised 20 different nanosized powders or compositions powders. In general, since the beginning of the Action, the assessment of synthesis methods, powders characterisation and understanding and awareness of the relationship between powder properties and method of synthesis were much improved. Concerning the former issue, Action successfully managed to develop 10 protocols on nanopowder metrology, standardization of methods for nanopowders characterization, training programmes in powder characterization and nanometrology and comparative economic and powder quality assessment. Moreover, the outcome of the Action was the synthesis and characterization of 1-dimesnional nanostructures (nanorods, nanowires, nanotubes, nanobelts) and testing of scaling effects in systems with low dimensionality. Knowledge related to inhomogeneous materials, core-shell and graded ferroelectric and piezoelectric structures in electroceramics, modeling and size effects in nanostructure electroceramics and films, local studies of electrical properties related to domains in ferroelectric nanostructures, dielectric mapping in particles of nanopowders, dielectric and piezoelectric mapping in nanostructured electroceramics and films is strongly promoted.

The important outcome of the Action was the strengthening of a European community connecting different scientific discipline and research teams and building the networks to become much easier the knowledge transfer. The Action gathered 28 countries with the numerous experts groups involved in research activities with ~150 scientists from ~60 institutions, gathered the most comprehensive knowledge base in Europe concerning application of various

innovative methods for producing nanopowders. Moreover, the Action gathered new ideas and challenges in the field of nanostructure electroceramics.

The activities of the Action (meetings, workshops, training school, impressive number of STSMs) have led to a much higher awareness of the complementary competences available in fields such as physics, material science, chemistry, electronic and technological engineering, nanotechnology and specific characterization techniques. In addition, an impressive number of publications in journals with high impact factor resulted, five thematic Proceedings from Workshops, 2 thematic special issues of the international journal Processing and Application of Ceramics (one as the Final Publication) makes the Action attractive for a broad audience as well.

Duration: 2005 - 2009

Chair: Prof. Biljana STOJANOVIC (RS)

Parties: Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Greece, Hungary, Israel, Italy, Lithuania, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Non-COST participation: Azerbaijan, Brazil, Japan, Republic of Moldova, Russian Federation, Ukraine

Action P16 - Emergent Behaviour in Correlated Matter (ECOM)

The main objective of this Action was to provide an essential contribution to knowledge and development in the various fields of strongly correlated electron systems via a concerted European effort. Basic research in this area was considered to require the co-operation of a large number of scientists from various fields like solid state physics, material chemistry, theory or computational material science.

Research on materials with strongly correlated electrons has become one of the vital topics in condensed matter physics. This fact relates to the discovery of unexpected features and phases of metals and Mott-insulators. Among others, quantum phase transitions and related quantum critical phenomena are of particular importance. Quantum critical fluctuations can lead to strong renormalization of normal metal properties as well as to novel exotic phases emerging from these strongly fluctuating environments. The most prominent example of such emerging phases is superconductivity (SC), behaving sharply different from standard BCS-type (Bardeen-Cooper-Schrieffer) SC. In order to tackle the rich field of physics associated with highly correlated electron systems, this Action was organized in 4 work groups and the problem of superconductivity without inversion symmetry was dealt with a special task force meeting.

Working Group1, "Novel Materials" intended to prepare and characterize materials not yet known in literature on a basis of isostructural, isomorphous and/or isoelectronic systems

of promising starting materials. Besides the poly- or single crystalline state of the bulk material, special emphasize was directed to other material parameters such as the influence of the dimensionality of the system, the structure - ranging from the nanocrystalline scale to large single domains or dynamic inhomogeneities, with the objective to relate such macroscopic material parameters with the microscopic properties of correlated metals as well as their tuning via external parameters such as substitution, magnetic fields, hydrostatic pressure or hydrogenation.

Working Group 2, "Experimental Techniques" was inaugurated in order to carry out experiments with outstanding accuracy and resolution. The study of ground state properties requires extreme conditions, i.e., temperatures near to absolute zero, high hydrostatic pressure and high magnetic fields. Steady development of appropriate measurement procedures is an on going task, carried out by groups involved in the Action. Special emphasize was paid to microscopic methods evidenced e.g., by a special workshop devoted to neutron elastic and inelastic scattering processes, or to developments in scanning tunnel microscopy, allowing the study of physics on local nanometer scales.

Working group 3, "Theory and modelling" targeted theoretical studies on quantum phase transitions and phenomena related with it. The physics of correlated electrons provides a basis for the study of novel emerging phase near to quantum phase transitions. The richness of respective phase diagrams established in this field evidenced in many cases interplay (co-existence or competition) between superconductivity and other ordered phases, like magnetism. Ab initio methods and perturbative theories have been used to model experimental results on a very sophisticated level.

Working group 4, "Applications" dealt with the fact that electron-electron correlations strongly impact spin, charge and energy transport in the various states of solids. Such materials are thus of a great scientific and technological importance, and specific attention was committed to thermoelectric properties and their applications. Two large-scale workshops focused on this issue and subsequent research projects on national levels were initiated.

Overall, the Action has prepared and supported 22 workshops/conferences/schools either as organizer or co-organizer, has funded about 50 STSM, resulting in about 215 internationally published papers with acknowledgements to COST P16, making this Action internationally visible. Beyond doubt, the Action assisted keeping the European community in the field of highly correlated electron systems on a competitive international level.

Duration: 2005 - 2009

Chair: Prof. Ernst BAUER (AT)

Parties: Austria, Belgium, Croatia, Czech Republic, Estonia, France, Germany, Greece, Hungary, Italy, Netherlands, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Switzerland, United Kingdom

Non-COST country participation: Republic of Korea, Russian Federation, United States

Action P17 - Electromagnetic processing of Materials (EPM)

The main objective of this Action was to increase knowledge about the behaviour of electromagnetic fields to control, process and manipulate liquid and solid metals, semiconductors, electrolytes, ferrofluids, and plasmas with the aim of producing new or improve the quality of existing materials. The emphasis of the Action was on two aspects: the physics of electromagnetic processing of materials (EPM), i.e. on the study of the underlying effects of the electromagnetic field on the matter, and on materials science.

The Action was split into four 'vertical' and two 'horizontal' working groups. The vertical groups focused on the action of the electromagnetic fields on liquid metals and semiconductors (WG-V1), ferrofluids (WG-V2), solids and plasmas (WG-V3), and electrolytes (WG-H4). Two integrating, horizontal working groups were on fundamentals of EPM (WG-H1) and on measurement techniques (WG-H2).

Since the start of the Action, results of major importance have been obtained in all the areas of research covered by the Action. These include progress in modelling of magnetohydrodynamic turbulence, research on ferrofluids, groundbreaking discoveries in the field of measurement techniques, and aluminium smelting to name a few examples. The results clearly indicate high potential for the use of the electromagnetic fields in the development of innovative, new technologies.

Groundbreaking achievements involve the development of two measurement techniques to determine the flow rate of an electrically conducting fluid in a contactless way. These are the so-called Lorentz force velocimetry and the AC induction flowmeter. In the field of fundamentals of EPM the most important discoveries are the bypass transition in the Hartmann flow, new type of instabilities of jets in the rectangular duct, and transition to three-dimensionality in the quasi-two-dimensional magnetohydrodynamic flow.

Significant advances have been made in aluminium smelting, melting in induction cold crucible, induction levitation melting, steel production, melting in specially designed induction crucibles, crystal growth for microelectronics, use of adapted (tailored) magnetic fields, increasingly multi-frequency fields, induction skull melting of low conductive materials like oxides and glasses, electrowetting, etc. The results of this Action and of a previous related Action P6 "Magnetofluiddynamics" have been published in an edited book "Magnetohydrodynamics: historical evolution and trends", eds. S. Molokov, R. Moreau and H.K. Moffatt, Springer, 2007, which has been sponsored by COST.

Highlights of the Action have been four training schools, on magnetohydrodynamic turbulence, on magnetoelectrolysis, on plasma science and technology, and on magnetosciences during which about 100 young researchers have been trained. The Action also organized many conferences and workshops, three Summer Research Programs, and many STSMs.

Besides scientific achievements the main outcomes of the Action have been establishing working European networking structure and strengthening European leadership in the field of EPM.

Duration: 2005 - 2009

Chair: Prof. Sergei MOLOKOV (UK)

Parties: Belgium, Cyprus, Czech Republic, Finland, France, Germany, Greece, Ireland, Israel, Italy, Latvia, Lithuania, Netherlands, Poland, Romania, Slovakia, Spain, Turkey, United Kingdom

Non-COST country participation: Algeria, Australia, Russian Federation

Action P18 - The Physics of Lightning Flash and its Effects

The main objective of this Action was to increase the knowledge of the physics of the lightning discharge and of its effects on natural and man-made systems. This included

(a) Understand and model the different physical processes in the lightning channel.

(b) Understand and model the lightning attachment to objects.

(c) Measurement of characteristics of lightning flashes in Europe and an establishment of a data bank on the lightning parameters, including a databank on

the characteristics of the electromagnetic radiation of lightning from extremely low frequency (ELF) to gamma rays.

(d) Develop models for the inverse source problem in lightning that is, inferring the characteristics of the processes in the lightning channel from remote measurements of the electromagnetic waves associated with lightning.

(e) Understand the mechanism of the production of the trace gas species in the atmosphere by the hot plasma channel and corona in lightning discharge.

(f) Understand the connection between the particular characteristics of lightning flashes and the associated observation of luminous events in the mesosphere and the lower ionosphere.

To achieve the above objectives, the activities were organized into 5 working groups: WG1 on measurement of properties of various types of lightning discharge, WG2 on phenomenology and modelling of the processes in the lightning flash, WG3 on physics and models for the lightning attachment to objects, WG4 on inverse source problems in lightning, and WG5 on mesospheric transient luminous events associated with lightning. The Action had participation from 21 COST countries and 8 non-COST institutions. The Action provided a common platform for scientists in diverse fields such as physics, meteorology, space physics, engineering, chemistry, but all studying lightning.

Four symposiums in Vienna, 4 workshops in different cities and one training school in Kiten, Bulgaria were conducted to present and discuss the research methodology and results. To provide research training to Ph.D. students and young researchers 27 STSMs were performed. These STSMs also helped to increase the collaboration between the lightning research groups within Europe. A dedicated journal called Journal of Lightning Research was started with WG3 leader Prof. Vernon Cooray as Editor and several COST member scientists as Associate Editors. A lightning safety brochure for general public was produced as one of the activity of the Action. This was translated into several other European and non-European languages. Joint experiments between several groups were conducted at the instrumented tower on mount Gaisberg in Austria and this facility became a training place for Early Stage Researchers in lightning observation and measurement techniques. Within working group WG3, the so-called non-conventional lightning protection technologies, including ESE, were analyzed by expert scientists in the field of lightning and lightning protection. The study confirmed that from a theoretical point of view, the ESE concept is based on inconsistent scientific hypotheses and that the early initiation of leaders from ESE terminals observed in the laboratory cannot take place under natural outdoor conditions during thunderstorms.

Duration: 2005 - 2009

Chair: Prof. Rajeev THOTTAPPILLIL (SE)

Parties: Austria, Belgium, Bulgaria, Cyprus, Denmark, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Hungary, Israel, Italy, Netherlands, Poland, Portugal, Serbia, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Non-COST country participation: Canada, Japan, Ukraine, United States

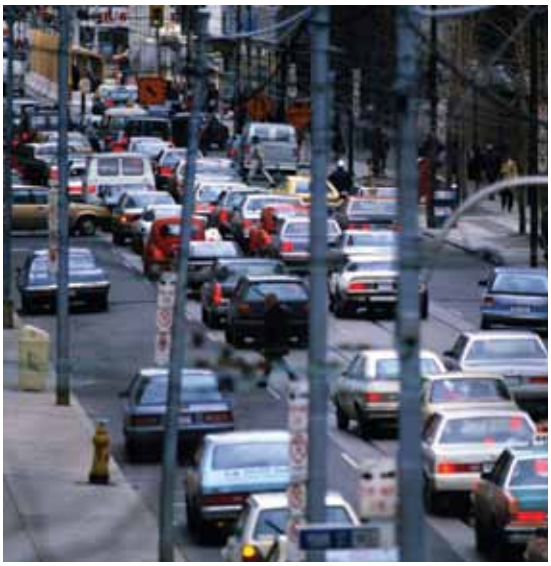
Transport and Urban Development

Action 357 - Accident Prevention Options with Motorcycle Helmets

Powered two-wheelers (PTW), such as mopeds and motorcycles, are over-represented in traffic fatalities, accounting for 18% of all European traffic fatalities. Even more disturbing is that PTW are the only mode of transport for which the annual European fatalities are consistently increasing. One of the most effective protection products for PTW riders is the motorcycle helmet. Although understanding and optimizing motorcycle helmets' impact protection has been covered by numerous studies, very little is known about how the motorcycle helmet affects its wearer's riding behaviour, or the behaviour of other traffic participants. Therefore, the objective of the COST Action 357 was to increase knowledge on how motorcycle helmets and their design could be improved in aspects other than impact protection to prevent the avoidance of accidents. The Action addressed this objective from two directions - motorcyclists and other road users. The Action focused on: i) Providing better understanding of the physical and physiological effects of wearing a motorcycle helmet; ii) Providing better understanding of the links between these physical and physiological effects and their impact on the cognitive abilities relevant to the PTW rider; iii) Providing better understanding of how the PTW-rider-helmet systems affect cognitive faculty of other road users perception of PTW riders; and iv) Providing knowledge of how motorcycle helmets should be improved to reduce their negative impact on physiological and cognitive parameters for the rider as well as other traffic participants.

Physical and physiological effect of the helmet on a PTW rider

A study established that the useful-visual-field reduces with age and with increasing PTW speed. At the same time a survey of helmets in use found no difference between the field-of-view provided by helmets involved in accident cases and controls. This suggests that the simple field-of-view parameter might not play a large role in PTW traffic safety. The same study found that the status of light transmission of helmet visors is not different between PTW riders involved in an accident, compared to controls. One study has assessed perception thresholds for transmission changes of visors. This information is useful in designing effective visors with different transmission states which are perceptually different from one to another, and in assessing whether a used visor's transmission has changed from its "as new" condition by a perceptible amount. Other work found that motorcycle helmets are excellent thermal insulators causing relatively warm microclimates around the head, which are unfavourable for thermal comfort;



while their ventilation systems are mostly ineffective in providing a perceivable effect on the rider's temperature perception. Carbon dioxide levels can reach at least 2% which rapidly drops with the presence of airflow around the helmet. Although only occurring at stand-still these elevated carbon dioxide levels are relevant since they have been shown to negatively affect cognitive performance. Finally, noise was evaluated on the shell of the helmet as well as in the ear, providing initial understanding of the underlying mechanisms responsible for noise experienced by PTW riders. This understanding will allow better noise reduction methods in helmet design.

Cognitive effects

A test battery was developed for the cognitive assessment of wearing a motorcycle helmet. It was established that, under well controlled laboratory conditions, wearing a motorcycle helmet causes a subtle cognitive impairment when compared to not wearing any headgear. Numerous studies have focused on the ability of other road users to spot approaching PTW riders. Brighter coloured helmets are associated with a reduced accident risk relative to less brightly coloured helmets. A pattern of many different colours as perceived by another road user (referred to as a high spatial frequency) is also considered to play an important role in "looked-but-failed-to-see" accidents, or in misinterpretations the speed of an approaching PTW. A survey was developed to evaluate attitudes of automobile drivers towards PTW riders. It appeared that automobile drivers have little empathy for the safety needs of PTW riders. Additional results indicated that the empathy of automobile drivers toward PTW riders can be improved through demonstrating the vulnerability of PTWs in traffic, such as through video-clips. Such training could lead to a better appraisal of PTW riders by automobile drivers. Finally, besides the cognitive test battery and the attitudes survey, riding simulators have been developed allowing future studies to be conducted under more realistic, but still well-controlled, laboratory conditions.

During the lifetime of the COST Action 357, the members

produced over 25 peer-reviewed publications, two books, a multitude of conference contributions, the organization of a new conference for vulnerable road users (VRU), and two Ph.D. theses. Many of these scientific contributions advanced the world-wide state-of-the-art, and several projects are still underway. In this timely Action long-lasting European interdisciplinary collaborations were formed among psychologists, physiologists, and engineers. Young researchers were greatly supported, producing a total of 13 peer-reviewed accepted publications of which a young researcher was the first author, with an additional 12 manuscript currently under review, and 24 oral presentations at relevant international conferences. The multidisciplinary approach focussing on both separate and linked physical and physiological effects and their impact on cognition as initiated by this Action should be continued, and new optimized motorcycle helmet concepts should be developed. In such future work helmet manufacturers should play a more active role. The multidisciplinary approach should ensure that one parameter will not be optimized at the cost of another; and especially that the mechanical impact protection characteristics should not be reduced from their current level. Finally, many aspects of the work carried out in this Action are relevant for other types of protective headgear, especially bicycle helmets, for which the structure of the COST Action will serve as an example.

Duration: 2005 - 2009

Chair: Dr Paul BRUHWILER (CH)

Parties: Belgium, Bulgaria, France, Germany, Greece, Ireland, Israel, Italy, Norway, Poland, Portugal, Spain, Switzerland, Turkey, United Kingdom

Action C20 - Urban Knowledge Arena – Developing a European Arena for Cross-Boundary Co-operation in Production of Knowledge and Know-how on Complex Urban Problems

Roughly 80% of the EU's inhabitants live in urban communities. The main economic activities of nations are located in cities. Moreover, most cultural production and consumption are urban. In addition, many cities consider attractive environment, carbon free energy production, clean water and air, low levels of crime, efficient public transport, affordable and good housing, public services (including educational systems) and leisure facilities as important elements to enhance their competitiveness. Thus, a single scientific field cannot offer appropriate solutions for the complex issues urban professionals and decision-makers face. In recent years there has been much talk of interaction, the holistic view and integral thinking, but this has seldom been matched by action. Society appears to lack supportive structures for the co-production, co-management and co-use of knowledge which is needed to find innovative solutions for cities.

The objective of the COST Action C20 was to investigate the emerging field of integrated knowledge, experience and know-how, which is needed in today's highly complex and delicate urban development and regeneration processes, and which is summarised by the term Urban Knowledge. The Action identified and examined theories, methods and tools for cross-boundary and trans-disciplinary knowledge production, management and communication. Furthermore, the Action introduced the concept of Urban Knowledge

Arena (UKA), i.e. a platform/forum/arena, which can give knowledge support in an urban development activity, and simultaneously contribute to the production of new knowledge and learning. The group also explored how innovation occurs in urban development processes, and how it can exploit all aspects of Urban Knowledge to achieve it.

Since international state-of-the-art as such on urban knowledge and urban knowledge arenas was lacking, a lot of effort in the initial phase of the Action was devoted to moving this position forward in relation to the conceptual and theoretical understanding of urban knowledge and the notion of urban knowledge arenas. Urban knowledge can be viewed as an attempt to point to the value of combining different perspectives (i.e. practice and theory) with different approaches and disciplines. This approach accepts that knowledge is also produced outside university departments and other research institutions. In particular, it recognises the importance of non-institutionalised forms of knowledge and the need to be open to changes at 'street level' as well as the existence of 'tacit' knowledge. Knowledge, therefore, should be conceived as a social product, which implies that someone (or some process) decides what is and what is not acceptable as "knowledge", under which circumstances knowledge is produced and who are the producers of knowledge. Urban knowledge cannot be isolated from the conditions of its production and concepts must be related to specific circumstances in order to make sense of them. Here urban knowledge is action-oriented, multidisciplinary and contextually defined. It is about bringing practical improvements for cities and their citizens.

The Action focused then on the complexity of an urban project, and the necessity in urban knowledge to rely upon a large diversity of expertise and experts. The group developed a more collective and creative approach: The Urban Knowledge Arena, which can be described as a group of free actors - typically including a mix from government, industry, academia and the citizenry - sharing a common project related to urban knowledge management. It is actually a collective action based on partnership and specific relations between the actors, working in a specific way on the development of innovative knowledge related to a specific place and time, usually addressing an issue of immediate urban concern. Examples show that successful UKAs often are informal (i.e. not institutionalized), temporary phenomena; an ad hoc initiative most often organized from 'below', with geographically defined boundaries and not necessarily leading to a final decision. The knowledge output from a UKA process is thus twofold; highlighting and managing the specific local knowledge and producing new generic urban knowledge which can contribute to the comprehensive field of urban knowledge.

The Action finally studied fifteen innovative urban projects and processes in the participating countries, meaning either whole projects which were innovative in their entirety, or parts of projects which effectively demonstrated innovation. The urban development 'industry' spans an infinitely large number of disciplines, each of which is both pursuing a policy of developing innovation within its domain, while continuously collaborating with other disciplines to generate cross discipline innovation. Working on large, multi-disciplinary projects, stimulates innovation in product, technological systems, management systems, political systems, with new knowledge being produced constantly, much of which is fed back in the form of 'best practice'. It should be acknowledged, however that the mere achievement of innovation cannot always be taken as good or successful. Innovation can take the form of an incremental evolution, a gradual improvement, or structural change in a product or a process. As a general rule, incremental innovations aim to maintain existing systems, disguising their inability to resolve new problems. As for structural innovations, they raise the questions of economic adjustment and social acceptance. As societies enter a period of transition their leaders face the challenge of difficult choices as they envisage innovation options. The duty to anticipate, demands that we pursue research and the implementation of solutions which are intermediate and reversible, able to rapidly produce more enlightened answers.

The Action has also organized a sequence of workshops with thematic focus on different urban issues, illustrated by local urban projects/processes, with the objective to investigate the role of urban knowledge and UKA in urban development. Complementary to this, a series of theoretical and conceptual seminars were held. In order to encourage the involvement of younger researchers and professionals in the Action, a C20 Junior Network (JN) was established. Ten junior experts from height countries participated as full members of the Action. Following an initiative by the COST Office, C20 has established a liaison group between C20 and COST Cultural Heritage, under the title C20 Urban Built Heritage. The group has organized a number of workshops dedicated to the role of built heritage in city development.

Duration: 2005 - 2009

Chair: Mr Henrik NOLMARK (SE)

Parties: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Hungary, Israel, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom

Action C21 - Towntology – Urban Ontologies for an Improved Communication in Urban Civil Engineering Projects

The main objective of the COST C21 Action was to increase the knowledge and promote the use of ontologies in the domain of urban development projects, in the view of facilitating the communications between information systems, stakeholders and UCE specialists at a European level.

Ontologies were understood in the course of the Action as a set of concepts with their associated definitions and an elicitation of the nature of relations holding between them, shared by a community. Such an elementary definition deliberately encompasses formal ontologies, as those developed for software and database interoperability, but also a diverse set of explicit and implicit conceptualisations framing communications and exchanges between practioners.

Adopting a common and stable ontology is all but neutral especially in a domain like urban development whose boundaries and specific content is, by nature, subject to controversies as it crosses different scientific disciplines (architecture, law, engineering, social sciences etc.). Furthermore the rapid pace of change of our cities over the last decades and the challenges raised by these transformations induced the questioning of existing conceptual systems and stimulated the elaboration of new ones, centred around emerging issues such as urban sustainability, local innovation or urban sprawl containment. Transforming these emerging conceptual systems into valid ontologies basically requires that the definition of concepts and the identification of relations holding between them is somehow stabilized. More importantly it must be shared by some community of users who agree on those definitions and relations.

The Action C21 progressively rephrased its initial objective around three basic questions. How can ontologies support urban interoperability at all levels? How can urban ontologies be popularise and sources can be used? How can ontologies be used in the urban domain? The Action thereby assumed that there exist ontologies in the urban domain even though these may stay at a pre-formalisation stage and the group further assumed that urban practice is inherently based on conceptualisations even though these may be implicit.

Once adopted by the group, these two basic assumptions facilitated the organisation of a repository of ontologies adapted to the urban domain. This repository was organised along a common format considering three aspects: i) nature of the ontology (formal, informal, language etc.), ii) purpose and use, iii) development over time (author, modifications, possible decay). This helped the group to identify a diverse set of ontologies ranging from normalisation standards used for the classification of construction activities (ISO 12006) to thesauri used by urban knowledge bases like EUKN (European Urban Knowledge Network) or Urbamet in France.

This repository, progressively built up by all members of the Action, served as a basis for the work of the three Working Groups. These could either view the ontologies gathered in the repository as a way to integrate different systems, may these be technical or human ones, as a source for the development of new ontologies, by the combination of different sources, or as a way to access the way ontologies were constructed and mobilised by urban practioners. All these efforts culminated in the edition of a book dedicated to the design and use on ontologies in the domain of urban development.

Quite strikingly it appears that there are a lot of initiatives in this field (JRC-Joint Research Center, NCGIA-National Center for Geographic Information Agency, HEREIN-European Heritage Network…). Many applications of ontologies in the urban and territorial domain are presently related to the development of intelligent web services, a phenomenon which could not be expected at the time when the Action was designed. Though it has to be admitted that most urban experts are still not aware of using ontologies in their daily practice even when they are using one. This obviously hinders prospective thinking and collective debate about potentialities and limitations of current urban ontologies. The Action further demonstrated that extracting ontologies from existing sources, as for instance urban thesauri, territorial databases and the like, is certainly a way to bring added value to existing knowledge bases and to make people more aware to ontologies underlying their action.

Duration: 2005 - 2009

Chair: Prof. Jacques TELLER (BE)

Parties: Belgium, Finland, France, Greece, Italy, Norway, Romania, Spain, Switzerland, United Kingdom

Action C22 - Urban Flood Management

The main objective of the COST Action C22 was to increase knowledge required for prevention and mitigation of potential flood impacts to urban areas by exchanging experiences, developing integrated approaches, and by promoting the diffusion of best practices in Urban Flood Management. Three phases were completed: (I) Inventory, (II) Analysis and Integration (III) Dissemination & Consolidation.

The Action lead to some major conclusions. First of all, new strategies of damage reduction are necessary to take account of the residual flood risk where new developments are planned in at-risk areas. Secondly, flood proofing can be accomplished by five defence or accommodation strategies, using elevated configuration, dry proofing or wet proofing the building, construction of permanent or mobile water barriers, and using floating or amphibious solutions. Thirdly, there is a lack of communication of adequate information on flood risk to those at risk and the responsible authorities. This must be undertaken at both regional and local levels. Moreover, non structural responses are under utilized partly because the professionals like to stick to what they know and the institutional and regulatory frameworks support this ‘technology entrapment’ approach. In addition, the group stressed the need of a national policy to regulate encroachment into natural river channels and flood risk areas at local level. It also noticed that poorer groups are frequently largely ignored when infrastructure is being planned to alleviate vulnerabilities from flooding, as the

cost-benefits accruing to their alleviation do not reach the pre-defined thresholds necessary to trigger investments. Finally, there is a mismatch between governance system, often characterized by fragmented organizational and institutional structures and compartmentalized and sectorized decision-making processes, and flood system, characterized by complex interactions in time and space.

The consortium recommended several priority actions to increase adaptiveness. Firstly, a there is a need for a long-term planning involving all parties with flood risk and spatial planning responsibilities, including the financial sector. Secondly,

Communicating with, engagement of and capacity building in all sectors associated with flood risk management, including public authorities, developers, architects and builders are crucial and necessary. Thirdly, changing flood risk requires clearer definition of roles amongst stakeholders in respect of the different forms of flooding and the continuum from forecasting, through control measures to flood fighting and recovery. In addition, innovative approaches recognizing and accepting the risks involved must be supported at national, regional and local levels through policy actions and demonstration projects. More attention to non-structural measures is also necessary to improve resilience. The support for this approach depends on the understanding of the context at both institutional and community levels. Finally, social transformation should be initiated to move from unsustainable and undesired trajectories, to one where the capacity for sustainable flood management is strengthened. This requires preparing the system for change, seizing a window of opportunity and linking organizations and institutions across scales.

The COST Action stressed in conclusion the need to improve the dissemination of research and development to both policy makers and practitioners, and feedback from these levels into research and development programmes through a formal structure that encourages and promotes innovation. The group also insisted on reducing 'implementation gap' by integrating at planning stages and engaging with the main stakeholders which are able to implement plans and responses over differing spatial areas, from the river catchment scale to the local planning level and street level.

All final outputs of the Action are summarized in a Textbook on Urban Flood management. The subject is approached from an international perspective and many recognized experts have contributed to the book. Various case studies, exercises, expert advises and literature recommendations are included to support the theory and illustrations. This book is intended for urban flood management education of hydrology, geography, civil and environmental engineering and management students at university level. Moreover, professionals will find this book useful as a reference.

Establishment Flood Resilience Network (FRN) and Flood Resilience Centre (FRC)

C22 members established a new knowledge based network (supported by a website) named the Flood Resilient Network (FRN). The primary objective of FRN is to support and foster information flow between PhD students world-wide working on (Urban) Flood Resilience.

At the WWF5 in Istanbul COST C22 launched the idea of a Flood Resilience Centre (FRC). Knowledge and demonstration centres and networks will play a key role in advancing the knowledge, understanding and application of science in urban flood risk management. ICHARM, the UNESCO Centre of Excellence in risk of water related disasters, is already fulfilling this role in flood risk management strategies at different levels ranging from local to global. Along similar lines COST C22 pledged for the establishment of an international Flood Resilience Centre to demonstrate and share innovations in management and technology required developing adequate responses that enhance resilience. Based on the commitments received at WWF5 COST C22 is currently undertaking several actions to get this off the ground.

Duration: 2005 - 2009

Chair: Prof. Chris ZEVENBERGEN (NL)

Parties: Cyprus, Czech Republic, France, Germany, Greece, Hungary, Luxembourg, Netherlands, Norway, Poland, Serbia, Slovenia, Spain, United Kingdom

Action C23 - Strategies for a Low Carbon Built Environment

The COST Action C23 was the first concerted attempt to examine reducing carbon dioxide emissions in the built environment across Europe linking new design and refurbishment of buildings and cities. It provided a unique platform for the development of a cross-disciplinary approach to researching the built environment carbon agenda.

The C23 Action investigated how nineteen EU member states were active in reducing carbon dioxide emission levels in the built environment, not only in line with buildings meeting the requirements of the Energy Performance of Buildings Directive (EPBD), but also taking standards beyond that and looking at how national and regional planning initiatives are being developed to reduce the energy use of urban areas. A collection of case studies were compiled that illustrate the development and implementation of low carbon strategies at urban and building scales, including both newly constructed and refurbished buildings, focussing on the design process, performance and costs.

The results at an urban scale included a return to the compact city principles, with a shift from private to public transport, increased use of bicycles, new planning legislation against urban sprawl, and developments along public transport routes, together with an increased demand for urban living. There were examples of new public transport systems replacing car use. At an infra-structure level, there were large scale energy supply initiatives. Whereas planning policy in the past has in general not focused on energy and carbon dioxide emissions, there

was an indication of change in some countries.

At a building scale the Action has identified a number of issues in relation to the implementation of the Energy Performance of Buildings Directive, including, a wide variation in the way it has been implemented, differences in calculation procedures and variations in the design of Energy Performance Certificates. Few member states were able to meet the demanding timetable for implementation, with many countries experiencing problems in developing the knowledge, skills and supply chains needed to deliver low carbon buildings. Much of the focus to date has been on the design of new buildings, whereas it is the existing building stock, at an individual building and urban scale, where the main effort needs to be applied. Refurbishment of existing buildings showed carbon dioxide emission reductions of 60 to 90% with payback periods as low as 9 years. For new buildings, examples of 'zero carbon' autonomous buildings were identified and others with emission reductions of 75% achieved over current standards with typical increased costs of between 0 to 6%.

At city scale, in order to achieve the long term carbon dioxide emission reductions urban transportation must be designed in harmony with building development, and renewable energy supply and storage mechanisms must be applied to the urban built environment.

The Action has shown that large reductions in carbon dioxide emissions are possible and affordable, and examples of good practice exist. However, the rate of uptake is slow, and not necessarily because the technology is difficult or the costs are high. It is more about changing the mindset of planners, designers and the building construction industry, so that innovation and new ideas are accepted by what is generally considered to be a risk adverse industry. From a social and economic perspective the green economy has been identified as an area where development and wealth creation without environmental harm can be achieved. There is a need not only to understand the process of planning and design for sustainability, but also to understand the everyday practices of people's lives that buildings form part of, and for the built environment to encourage a broad range of sustainable lifestyles for individuals, communities and organisations.

The main results of the Action have been published in a book titled The European Carbon Atlas, which is intended to be used as a guide on how a low carbon approach to the built environment can be progressed.

A major outcome of the Action has been the recognition of socio-economic dimensions to the problems of reducing carbon emissions in the built environment. So, while there is a continuing need for technical and scientific research on construction and systems, there is an urgent need to integrate proposed technical solutions with existing economies and social reality in different settings and at different scales. The approach adopted in this Action (to present the findings by geographical location) underlines the importance of context in developing and applying low carbon technologies. For example, in Wales, technologies identified during the Action are being researched and developed further within new projects—such as the Low Carbon Research Institute (LCRI)—leading to the creation of new jobs as part of a shift towards the 'green' economy .

Duration: 2005 - 2009

Chair: Prof. Phillip John JONES (UK)

Parties: Austria, Belgium, Cyprus, Denmark, Finland, Germany, Greece, Italy, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Serbia, Slovenia, Spain, Switzerland, United Kingdom

APPROVED ACTIONS*

Biomedicine and Molecular Biosciences

Action BM0901 - European systems genetics network for the study of complex genetic human diseases using mouse genetic reference populations (SYSGENET)

The main objective of the Action is to contribute to the discovery of gene networks that are involved in the development of complex genetic diseases in human. The main benefit of establishing SYSGENET will be at the scientific level. SYSGENET will allow researchers in different European countries to devise common research programmes and infrastructures which will give them access to various GRP resources from different European laboratories and to future GRP resources world-wide. The results from these research activities will provide the basis for a better understanding of human diseases and allow the development of new strategies for their prevention and therapy. In addition, SYSGENET will create a data sharing pan-European platform where the results of multiple phenotypic studies can be combined and new associations between phenotypes, gene networks and genotypes can be identified, allowing entering into the new area of systems genetics.

Working Groups

WG1: Genetic reference populations (GRP) resources

WG2: Phenotyping and genotyping

WG3: Bioinformatics

WG4: International outreach

WG5: Training and mobility

Chair: Prof. Klaus SCHUGHART (DE)

Parties: Austria, Denmark, Estonia, Finland, France, Germany, Greece, Israel, Italy, Luxembourg, Netherlands, Poland, Spain, Switzerland, United Kingdom

Action BM0902 - Network of experts in the diagnosis of myeloproliferative disorders (MPD)

The main objective of the Action is to facilitate and improve the accuracy of the diagnosis of MPD and related diseases in European countries. Philadelphia-negative myeloproliferative disorders (MPD) and related

diseases are chronic blood diseases which had known little improvement in diagnosis and treatment for decades. In 2005 the discovery in Europe of the V617F mutation of JAK2 in MPD has renewed interest in these diseases. Since 2005, other mutations have been discovered in MPD and related diseases. New diagnosis tools will be designed and novel drugs will soon be tested. The objective of this COST Action, which regroups the main leaders in the field of MPD research, diagnosis and patient care, is to establish a European Network of experts in MPD and related diseases, MPD-EuroNet. This Action will formalize collaboration between European MPD experts in order to facilitate, optimize and standardize diagnosis and care for MPD patients in Europe. The network will centralize the diagnostic investigation of rare forms of MPD and related diseases.

Working Groups

WG1: Molecular diagnosis of Jak2 mutated MPD

WG2: Molecular diagnosis of thrombocythemia and primary myelofibroses

WG3: Molecular diagnosis of congenital erythrocytosis

WG4: Scientific cooperation and communication

Chair: Dr Sylvie HERMOUET (FR)

Parties: Denmark, Former Yugoslav Republic of Macedonia, France, Germany, Italy, Netherlands, Portugal, Slovakia, Spain, Sweden, United Kingdom

*** Descriptions as provided by the Action**

Action BM0903 - Skin Barrier and Atopic Diseases (SKINBAD)

The main objective of the Action is to bundle research expertise on atopic eczema (AE) and to identify key genetic and environmental risk factors. Atopic eczema (AE) is an inflammatory skin disorder which is characterized by dry and itchy skin and a cutaneous hyperreactivity to environmental triggers. It affects at least 15% of children and 2-10% of adults and often predates the development of allergic airway diseases. Given its substantial prevalence, which has seen an enormous rise especially in industrialized nations, and the lack of cure, there is a pressing need to better understand its pathophysiology. Recent evidence from molecular genetics underscores the importance of the skin barrier genes in addition to genes promoting abnormal immunological pathways. To reveal the mechanisms by which environmental factors pursue the genetic predisposition into disease manifestation, a multi-disciplinary approach is needed with complementary experimental approaches including both in vivo studies and validated animal and in vitro models. This COST Action will bring together experts engaged in epidemiology, genetics, clinical research and research on skin barrier and immunology.

Working Groups

WG1: Genetics of AE

WG2: Immunology of AE

WG3: Environmental interactions

WG4: In vivo methods

WG5 : Animal and in vivo models for AE

Chair: Dr Sanja KEZIC (NL)

Parties: Austria, Belgium, Bulgaria, Croatia, Denmark, Estonia, France, Germany, Iceland, Ireland, Italy, Netherlands, Poland, Spain, United Kingdom

Action BM0904 - High-density lipoprotein - from biological understanding to clinical exploitation

The main objective of this Action is the formation of a scientific network dedicated to a better understanding of the biology of high-density lipoprotein (HDL), the identification of targets for novel HDL-based therapies and the discovery of biomarkers which can be used for diagnostics, prevention and monitoring of cardiovascular disease risk.

HDL is an attractive target for preventing and curing coronary artery disease (CAD) in view of the inverse association between plasma HDL cholesterol and CAD risk as well as the multiple beneficial, anti-atherogenic properties of HDL. As yet, no effective HDL-tailored therapy of CAD is available. This may be due to the fact that HDLs differ in composition and functionality which necessitates the search for the proper biomarkers to assess and monitor HDL-related CAD risk. This COST Action therefore aims to create a scientific network of leading European investigators working on epidemiology, clinical aspects, genetics, structure, function, metabolism and regulation of HDL in order to foster multidisciplinary and collaborative HDL research. The scientific goals of this Action will be pursued by five working groups. They will obtain, share and discuss novel information on structure, function and regulation of HDL, exchange resources and technology and develop strategies to exploit this knowledge and know-how for diagnostics and therapy of disturbed HDL metabolism and atherosclerosis. The major economic/societal benefits from this Action will be the reduction of CAD-related morbidity and mortality in Europe and the support of the European biomedical industry and economic competitiveness.

Working Groups

WG1: HDL structure

WG2: HDL function

WG3: HDL genetics and regulation

WG4: HDL physiology

WG5: Epidemiological and clinical validation of biomarkers and therapies

Chair: Prof. Dimitris KARDASSIS (GR)

Parties: Austria, Finland, France, Germany, Greece, Italy, Netherlands, Serbia, Spain, Switzerland, United Kingdom

Action BM0905 - European Network for the Study of Gilles de la Tourette Syndrome

Gilles de la Tourette Syndrome (GTS) is an inherited neuropsychiatric disorder with childhood onset. It is marked by multiple motor and vocal tics and high comorbidity rates

with attention deficit hyperactivity disorder and obsessive compulsive disorder. Due to lack of education of medical professionals, educators, and the general public, GTS is underdiagnosed and patients are severely discriminated against. Efforts to elucidate the genetic etiology of GTS are fragmented across Europe and hampered by low statistical power. This COST Action will foster the creation of a pan-European, interdisciplinary scientific network with a goal to promote the study of GTS, improve the standards of care, and educate the public and professionals, combating stigmatisation of affected individuals. Best practice guidelines are going to be set and national projects are going to be unified into a large-scale effort that will uncover the genetic basis of GTS and disentangle the interplay between environment and genetics.

Working Groups

WG1: Standardisation and harmonisation of clinical practices for GTS

WG2: Genetic studies of GTS

WG3: Online database for the study of GTS

WG4: Outreach activities

Chair: Prof. Peristera PASCHOU (GR)

Parties: Austria, Belgium, France, Germany, Greece, Hungary, Israel, Italy, Netherlands, Spain, United Kingdom

Action BM0906 - Regulatory RNAs in bacterial pathogenicity: new targets for alternative therapies

The primary objective of this Action is the pooling of knowledge and coordination at the European level of research in the field of infectious diseases. The understanding of RNA-mediated regulatory networks in pathogenic bacteria requires concerted studies in different organisms including Archaea and yeast. Data from different organisms should be made available and comparable through the usage of compatible techniques and approaches. Finally, strategies used by pathogens to adapt to their hosts are to be deciphered with the aim to identify novel targets for therapeutic intervention.

Bacterial infections continue to be a serious health problem worldwide and research to understand and combat bacterial infections remains indispensible and needs considerable further efforts. Alternative approaches are needed to address this important concern in novel ways. In the past years, a very high number of regulatory RNAs have been discovered. Many of these control bacterial pathogenicity and the adaptation of bacteria to environmental changes and to their hosts. However, these studies have only been performed in a few model organisms and are still in an initial state. It is now urgent to widen the scope of the present research to include all major human pathogens focusing on common mechanisms between pathogens and identifying pathogen-specific targets. This COST Action connects European research groups from different disciplines working on regulatory RNAs in a large number of different human pathogens. The aim of this COST Action is to bring these experts together allowing synergy between the different approaches to a common goal: to increase basic knowledge on the regulation of bacterial pathogenicity on a genomic scale in order to identify novel targets to develop novel therapies. This COST Action will boost a novel fast expanding research area by especially promoting young investigators.

Working Groups

WG1: Identification of ncRNAs and their targets

WG2: Regulatory pathways, mode of action, and structures

WG3: Bioinformatics

WG4: Microbiology and Disease

Chair: Dr. Pascale ROMBY (FR)

Parties: Finland, France, Germany, Greece, Italy, Lithuania, Portugal, Spain, Switzerland, United Kingdom

Action BM0907 - European Network for Translational Immunology Research and Education (ENTIRE): From immunomonitoring to personalized immunotherapy

Immune-mediated inflammatory diseases (IMIDs) are characterized by dysregulation of the immune response, leading to chronic disorders that affect organ integrity and function. The burden of disease and socio-economic impact of IMIDs in the Western world are comparable to those for infectious diseases or malignancies. The major challenge in the field of IMIDs is not only to unravel their pathogenesis, but also to translate the newly available therapeutic options into optimal personalized care. One key step is the rational measurement of the functional immune status in individual patients that provides crucial information relating to staging, treatment choice, monitoring of efficacy, safety and dose adjustment of immunomodulation, as well as biological assessment of remission. The knowledge and technology required to define such an "immunotype" is currently dispersed within centres with expertise in specific pathways or organ-specific diseases. The ENTIRE-Action will harness the multidisciplinary synergy between different European centres in the field of immunology to define, validate, and implement a rational and standardized measurement of the immune function for IMIDs and their treatment. Building on the unique European model of structural integration between fundamental and clinical research, the Action will ultimately promote the translation of new developments into optimal individualized treatment of IMIDs.

Working Groups

WG1: Immune signature in health and disease

WG2: Web-based platform

WG3: Training and education

WG4: Networking and Outreach

Chair: Dr Dominique BAETEN (NL)

Parties: Finland, France, Germany, Italy, Netherlands, Serbia, Spain, United Kingdom

Action TD0901 - Hypoxia sensing, signalling and adaptation

The main objective of the Action is to promote basic research on hypoxia signalling pathways, accelerating scientific progress on the levels of basic science, technology, pharmacology and translational medicine, with the ultimate goal to exploit hypoxia signalling pathways for clinical application. Insufficient tissue oxygenation (hypoxia) occurs in a wide range of physiological and pathological conditions, including high altitude, embryonic development, wound healing, anemia, inflammation, cancer, and ischemic diseases such as infarction and stroke. A detailed understanding of the mechanisms of hypoxia sensing, signaling and adaptation is important to exploit this signaling pathway for therapeutic applications. Towards this goal, the four most pressing problems in hypoxia research have been identified: basic science (function and interaction of the different oxygen sensing systems in our body); technology (detection of oxygen-dependent protein modifications); pharmacology (development of drugs modulating the oxygen signaling pathways); and translational medicine (function of these drugs in living organisms). An interdisciplinary COST Action is considered to be the best way to bundle the already existing, widespread research activities in this field, ultimately accelerating the solution of these problems. The Action will coordinate and strengthen European research on hypoxia signaling pathways and their exploitation for clinical application. Improved knowledge on hypoxia signaling is the basis for new therapies that serve patients' health, and it will be a driving force for new employment opportunities in Europe.

Working Groups

WG1: Basic science

WG2: Technology

WG3: Pharmacology

WG4: Translational Medicine

Chair: Prof. Roland WENGER (CH)

Parties: Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Latvia, Netherlands, Poland, Romania, Serbia, Slovakia, Spain, Switzerland, Turkey, United Kingdom

Chemistry and Molecular Sciences & Technologies

Action CM0901 - Detailed chemical kinetic models for cleaner combustion

The main objective of the Action is to develop cleaner and more efficient combustion processes through the design and implementation of better defined and more accurate detailed chemical kinetic models. The key objective of this Action is to promote at EU level the development of cleaner and more efficient combustion technologies through the implementation of theoretically grounded and more accurate chemical models. This will be achieved by gathering experts from all over Europe and working on the theory and computation of elementary reactions, on detailed kinetic modelling in a variety of combustion environments, on experimental measurements in reactors, rapid compression machines, shock tubes and burners and on the assemblage, as well, of technologically advanced industrial devices. This is motivated by the fact that the current models which have been developed for the combustion of hydrocarbons and oxygenated compounds present in natural gas, kerosene, gasoline, diesel and bio-fuels do a reasonable job in predicting auto-ignition and flame propagation parameters, and the formation of the main regulated pollutants. However their success rate deteriorates sharply in the prediction of the formation of minor products (alkenes, dienes, aromatics, aldehydes) and soot nano-particles, which have a deleterious impact on both the environment and on human health. The launch of this Action would represent, therefore a big step forward in our understanding of this economically valuable, politically and socially desirable and scientifically challenging issue.

Working Groups

WG1: Improvement of detailed combustion models

WG2: Modelling reactions of oxygenated pollutants

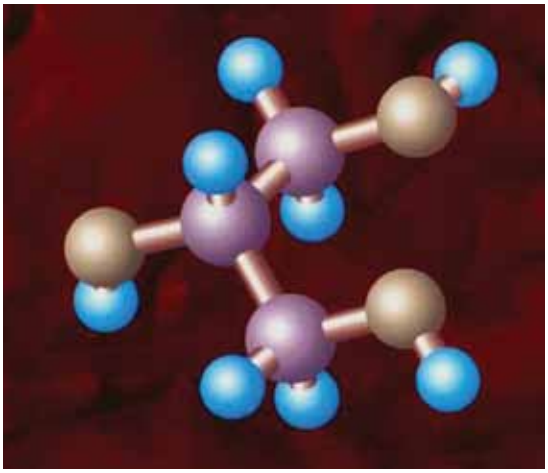
WG3: Modelling formation of polyaromatic compounds and soot

WG4: Mechanism reduction and uncertainty analysis

WG5: Experimental and theoretical determination of thermochemical parameters and rate coefficients for elementary steps

Chair: Dr Frederique BATTIN-LECLERC (FR)

Parties: Austria, Bulgaria, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Poland, Portugal, Romania, Spain, Sweden, Switzerland, United Kingdom



Action CM0902 - Molecular machineries for ion translocation across biomembranes

The main objective of the Action is to improve the understanding of proton and metal ion translocation across bio-membranes and the fate of such chemicals following their uptake by bridging neighbouring scientific fields and fostering applicative outcomes. “Molecular machineries for ion translocation across biomembranes” is a strongly interdisciplinary COST Action aiming at coordinating the research efforts of the participant groups in elucidating mechanistic details of proton and metal transfer processes and in exploring their potential applications in the biosynthesis of new materials and in the environment. The Action is organised in four Working Groups whose coordinated activities will help to generate a more detailed description of how protons and metal cations and oxyanions are translocated across biological membranes, how they interact with their target proteins having crossed the membrane and how these metabolic processes can be controlled and eventually utilised for the biosynthesis of nanostructured inorganic and metal materials and in bioremediation.

Working Groups

WG1: Translocation of protons across biomembranes

WG2: Translocation of metallic ions across the biomembrane and their fate after uptake

WG3: Inorganic and metal nanoparticles

WG4: Biomineralisation, phyto and bioremediation

Chair: Dr Massimo TROTTA (IT)

Parties: Austria, Denmark, France, Germany, Hungary, Ireland, Israel, Italy, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, Turkey, United Kingdom

Action CM0903 - Utilisation of Biomass for Sustainable Fuels & Chemicals (UBIOCHEM)

The main objective of the Action is to generate a synergistic approach for utilisation of biomass for sustainable fuels & chemicals through cooperation between scientists from different member states and different areas and disciplines. This Action is aimed at coordinating scientific innovations within Europe in order to improve existing methods or develop new ones for utilisation of biomass to produce biofuels, platform and specialty chemicals in accordance with the safety and environmental requirements. Special emphasis will be placed on the utilisation of lignocellulose biomass, algae and non-edible crops, which does not compete with food. It will involve the use of green catalytic methodologies (homogeneous, heterogeneous, enzymatic and photocatalysis) and novel reaction media. Moreover, alternative biomass-based products that are safer and have a reduced environmental footprint, (e.g. biodegradable polymers) will be explored. The Action is also linked to extended biorefinery concepts in wood and pulp industry and to greener and more economic energy utilization between plants and communities. Successful results will be a result of the cooperation of both scientists and R&D workers in universities, research institutes and in industry.

Working Groups

WG1: Primary conversion of lignucellulosic feedstocks

WG2: Conversion of Biomass into energy

WG3: Biomass to materials

WG4: Platform chemicals

Chair: Prof. Roger SHELDON (NL)

Parties: Austria, Belgium, Bulgaria, Denmark, Estonia, Finland, France, Germany, Greece, Italy, Latvia, Lithuania, Netherlands, Poland, Romania, Spain, Sweden, Switzerland, Turkey, United Kingdom

Action CM0904 - Network for intermetallic compounds as catalysts for steam reforming of methanol (IMC-SRM)

The main objective of this Action is to establish a dedicated platform and a knowledge-based approach for the development of intermetallic compounds as methanol steam reforming catalysts. The deep understanding of the underlying processes will enable a rational development of catalysts with high economic impact. This Action is generating the fundamentals necessary to develop the next generation of industrial catalysts for clean hydrogen production via one step steam reforming of methanol, a basic building block of many future applications - mobile and stationary - of a hydrogen-based economy, meeting European economic and societal needs.

Due to its huge socio-economic impact, methanol steam reforming is a catalytic application with a high potential and a world wide impact. Methanol is an efficient and easy to handle hydrogen carrier, thus being distinguished for a hydrogen based energy infrastructure. Intermetallic compounds have an enormous potential as catalysts thanks to their electronic and geometric structure. In different scientific groups research on intermetallic compounds or methanol steam reforming is ongoing independently. This COST action aims at connecting these groups and coordinating R&D, developing a knowledge-based scientific approach, Technological Road Maps and initiation of new joint research projects to bridge knowledge gaps, driven by scientific curiosity, as well as by industrial and societal needs. The network delivers, along with the proof of principle, a final Technological Road Map to stable and highly selective catalysts for methanol steam reforming ready for industrial implementation. Development and implementation of this road map will be achieved through dedicated projects with external funding (national and international level).

Working Groups

WG1: Synthesis of single phase intermetallic compounds

WG2: Nanoparticle synthesis, determination of the size distribution

WG3: Quantum chemical description of bonding

WG4: Determination of the intrinsic catalytic properties

WG5: Adsorption properties under UHV and ambient conditions, temperature programmed desorption experiments

WG6: Investigation of the stability in oxidizing and reducing atmospheres

Chair: Dr Marc ARMBRUESTER (DE)

Parties: Austria, Belgium, France, Germany, Greece, Romania, Slovenia, Spain, Switzerland, United Kingdom

Action CM0905 - Organocatalysis (ORCA)

The main objective of this Action is to provide a knowledge platform to advance different kinds of organocatalyzed transformations to broadly applicable methods in academia as well as in industry. The large number of publications and activities in the field of enantioselective catalysis requires a concentration of different developments and efforts of organocatalytic transformations. There is also a need to supply the scientific community with systematic information and data. A welcome stage to this objective is the COST Action. This program will allow interaction between European scientists within this network. The exchange of all available data, ideas and methodologies will give a significant push for further developments in organocatalysis. Beneficiaries of this Action will be researchers of industry and academia as well as young researchers.

Working Groups

WG1: Asymmetric C-C bond formation processes

WG2: Asymmetric oxidation-reduction processes

WG3: Asymmetric α-functionalization of carbonyl compounds

WG4: Organocatalysis in industrial applications

Chair: Dr Rainer MAHRWALD (DE)

Parties: Belgium, Estonia, Finland, France, Germany, Greece, Italy, Latvia, Netherlands, Norway, Portugal, Romania, Spain, Sweden, Switzerland, Turkey, United Kingdom

Action TD0903 - Understanding and manipulating enzymatic and proteomic processes in biomineralization - towards new biomimetic strategies, the creation of tailored nano-scale architectures and environmental monitoring

The main objective of the Action is to promote research on the biomineralisation processes of selected land, freshwater and marine species for both environmental biomonitoring and as a source of new biomimetic strategies and materials. This Action will bring together outstanding expertise in biomineralization research in a Europe-wide network that will promote a comprehensive approach to address emerging challenges in environmental monitoring and bio-nanotechnology. The work will focus on monitoring the embryonic development of selected marine organisms, on biochemical and crystallographic control mechanisms of the mineralization pathways in the embryonal and adult organisms, characterisation of specialised metabolic pathways in marine, freshwater, land and subterranean molluscs and to use these organisms in the biomonitoring of riverine and marine environments. In vivo manipulation of organisms at the biological level to create new inorganic materials will be carried out with the parallel development of strategies for new biomimetic routes to novel materials. The Action will facilitate the coordination, transfer and dissemination of knowledge within Europe to foster world-class biomineralisation research through the integration of diverse, though complementary, disciplines, capacity building, enhanced competitiveness and the development of research cohesion between western and eastern European countries. Scientific knowledge gained under the Action will be integrated in teaching curricula at participating universities around Europe, effectively broadening the scope of training of young scientists and creating a foundation for enhancing Europe's competitiveness in this area.

Working Groups

WG1: Microbiology and Proteomics

WG2: Advanced Analysis and Characterisation

WG3: Environment and Biomonitoring

WG4: Biomimetics and New Materials

Chair: Dr Davorin MEDAKOVIC (HR)

Parties: Bosnia and Herzegovina, Croatia, Denmark, France, Germany, Ireland, Italy, Slovenia, Spain, United Kingdom

Action TD0905 - Epigenetics: Bench to Bedside

The main objective of this Action is to further our understanding on gene regulation processes. It will contribute, besides to the basic science, to the chemical biology of epigenetics. This will lead to a better understanding of developmental and cellular biology and provide information for the development of novel therapeutic agents against diverse human diseases. Epigenetics is the science relating to changes in biological phenotype without an underlying change in the organism's genome. Epigenetic changes are orchestrated by enzymes that modulate chromatin structure by covalently altering DNA or histone proteins. These post-translational modifications are dynamic, and regulate the pattern of gene expression and repression. Progress in understanding these global processes of gene regulation will greatly improve our understanding of developmental and cellular biology, and provide leads for novel therapeutic agents against diverse human diseases. Chemistry has a major role to play in epigenetics by providing analytical techniques, diagnostic and molecular probes but current efforts are uncoordinated and led by individual investigators. The Action will unite synthetic chemists and chemical biologists working in epigenetics, and attract new researchers to the area. The Action will feature a unique cross-disciplinary approach that brings together chemists, biologists, pharmacologists and clinicians. This will enable a focus on both innovative and translational science that targets grand challenges within this area. The Action will feature participation from academia, multinational pharmaceutical companies and small to medium enterprises.

Working Groups

WG1: Analysis and Assays

WG2: Acetylation and Methylation

WG3: Other PTMs (Post-Translational Modifications)

WG4: Prot-Prot and Prot-DNA

Chair: Dr A.GANESAN (UK)

Parties: Belgium, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Poland, Spain, United Kingdom

Earth System Science and Environmental Management

Action ES0901 - European procedures for flood frequency estimation (FloodFreq)

The main objective is to undertake a pan-European comparison and evaluation of methods for flood frequency estimation under the various climatologic and geographic conditions found in Europe, and different levels of data availability. This Action undertakes a pan-European comparison and evaluation of different methods for flood frequency estimation under the various climatologic and geographic conditions found in Europe, and different levels of data availability. A scientific framework for assessing the ability of these methods to predict the impact of environmental change (climate change, land-use and river engineering works) on future flood frequency characteristics (flood occurrence and magnitude) will be developed and tested. The availability of such procedures is crucial for the formulation of robust flood risk management strategies as required by the Directive of the European Parliament on the assessment and management of floods. The outputs from FloodFreq will be disseminated to: academics, professionals involved in operational flood risk management from private and public institutions, and relevant policy makers from national and international regulatory bodies. This Action enables cooperation between researchers involved in nationally funded research projects to, thereby enabling testing of methods free from the constraints of administrative boundaries, and allowing a more efficient use of European flood research funding.

Working Groups

WG1: Compile dataset and inventories of existing data and methods

WG2: Use of statistical methods for flood frequency estimation

WG3: Flood frequency analysis using rainfall-runoff methods

WG4: Flood frequency estimation methods and environmental change

Chair: Dr Thomas KJELDSEN (UK)

Parties: Austria, Bulgaria, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Serbia, Slovakia, Spain, United Kingdom

Action ES0902 - Permafrost and gas hydrate related methane release in the Arctic and impact on climate change - European cooperation for long-term monitoring (PERGAMON)

The main objective is to quantify the methane input from marine and terrestrial sources into the atmosphere in the Arctic region, and ultimately to evaluate the impact of Arctic methane seepage on global climate. The Arctic is a key area in our anthropogenically-warming world as massive releases of methane currently locked up in permafrost and gas hydrates, both on land and in marine sediments, could increase atmospheric concentrations of this greenhouse gas much faster than predicted. The vast Arctic continental shelf, wetlands and Tundra might become major emitters of methane in the future. At present, there are a handful of unconnected projects involving research on methane seepage in this area. The exchange of information about these ongoing and also planned activities with respect to gas hydrate destabilization and permafrost thawing is minimal within the EU and almost non-existent at an international level. The aim of this Action is to promote networking between the disparate groups within the EU, and to develop coherent links between the terrestrial and marine communities, with the ultimate goal of establishing a long-term monitoring project led by members of the EU, but also involving experts from Russia, the US and Canada. In order to achieve these objectives, work-visits, workshops, electronic-newsletters, sessions at conferences, data compilation and joint field campaigns are planned together with lobbying on EU and national levels to promote research on this important topic.

Working Groups

WG1: Methane formation, transport and accumulation (free gas and gas hydrate) in terrestrial and marine sediments and permafrost

WG2: Biogeochemical processes in the shallow sub-seafloor and at the sediment-water interface, and effectiveness of methane transport through the water column (ocean and lakes) and assessment of methane fluxes into the atmosphere

WG3: Methane fluxes from the terrestrial environment (wetlands, tundra, Arctic lakes), and remote and land-based atmospheric methane monitoring

WG4: Data compilation, integration and organization of data distribution among the scientific community

Chair: Dr Jens GREINERT (NL)

Parties: Belgium, Denmark, Finland, France, Germany, Greece, Israel, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom

Action ES0903 - Spectral sampling tools for vegetation Biophysical Parameters and Flux measurements in Europe

The main objective of the Action is to develop common protocols and new instruments within a larger European network for optical measurements, bringing together scientists and industries in order to increase the reliability, value and cost-efficiency of the existing spectral observations within the European flux network. The Action will focus entirely on the optical sampling strategies, which can be considered a fundamental tool in monitoring Biophysical Parameters (BP) and which act as a “bridge” between the flux tower and the remote sensing community. Flux towers remain a primary tool for understanding ecosystem carbon fluxes within the FLUXNET and CarboEurope IP networks. In the last years, important EU initiatives have been started (such as EUFAR, IMECC, ICOS and COST Action ES0804) to coordinate a common dataset for characterizing the carbon balance of Europe. The objectives are also to standardise ground spectroradiometric measurements, to analyse the limits and opportunities of the current tools, to introduce a new low cost sensor to continuously monitor BP, and to facilitate interdisciplinary science collaborations between the optical sampling, remote sensing and flux tower scientific communities. Dissemination and coordination will be fundamental in this Action. Development of common measurement methodologies, data management systems, and metadata protocols will make a significant contribution to the European research community.

Working Groups

WG1: Network: state of the art of the optical sampling networks, protocol definition

WG2: Intercomparison: Instrument characterisation, standardisation, intercalibration and measurement protocol issues

WG3: New instruments: new instruments development

WG4: Upscaling: scaling Biophysical Parameters (BP) and fluxes from the ecosystem at upper levels

Chair: Dr Loris VESCOVO (IT)

Parties: Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Norway, Poland, Spain, Sweden, Turkey, United Kingdom

Action ES0904 - European Gliding Observatories Network (EGO)

The main objective of this Action is the coordination of ongoing research using gliders, and the conception of future research, to operate fleets of autonomous underwater gliders in order to provide cost-effective methods for the discovery and monitoring of the ocean at global, regional and coastal scales with benefit to both basic oceanographic research and operational applications for marine activities. Underwater gliders are intelligent and affordable platforms useful for long term multi parameter marine observations. They play an important role for present and planned marine observation networks. Deployed in swarms, they provide near real-time high spatial and temporal resolution data that will efficiently fill the gaps left by existing in-situ observation networks based on other marine platforms such as the profilers in the ARGO network. This will be beneficial for both academic oceanographic research and especially operational oceanography systems on which a large number of marine activities now rely. However, the deployment of swarms of gliders requires highly skilled operators and a sophisticated level of cooperation. The objective of the “European Gliding Observatories” Action is to build cooperation at the technological, scientific and organizational levels for a European capacity for sustained observations of the oceans with gliders.

Working Groups

WG1: Support for glider deployments and data dissemination

WG2: Glider vehicle, sensors, and “gliderports” infrastructures

WG3: Piloting gliders and artificial intelligence

WG4: Networks, links with the other observing systems and OSSEs

WG5: High resolution 4D oceanic measurements by gliders and process studies

Chair: Dr Pierre TESTOR (FR)

Parties: Cyprus, Finland, France, Germany, Italy, Norway, United Kingdom

Action ES0905 - Basic Concepts for Convection Parameterization in Weather Forecast and Climate Models

The main objective of the Action is to provide clear theoretical guidance on convection parameterizations for climate and numerical weather prediction models. Both global and regional atmospheric models are concerned. The Action achieves this objective by creating a core theoretical group to address the fundamental issues of convection parameterization. Modellers and theoreticians join together under this framework. The Action proposes a clear pathway for more coherent and effective parameterizations by integrating existing operational schemes and new theoretical ideas. Proposed alternative approaches intend to replace conventional tuning-based approaches. The Action complements extensive inter-comparison based validations performed by operational modellers.

The Action responds particularly to urgent needs which have arisen from increasing the resolutions of forecast models. In these new-generation models, not only the traditional approximations break down, but associated physical processes become increasingly complex. Thus, the parameterization must be extensively re-formulated with more sophisticated physics under new constraints. The Action contributes to reduce uncertainties in weather forecasts and climate projection by overcoming the often weak physical basis of the current parameterizations. Particular benefits will be in prediction of highly unusual extreme weather events, such as local heavy precipitation, tropical cyclone trajectories etc. The IPCC will be a particular international agent that will benefit from the present Action.

Working Groups

WG1: Mass-Flux Parameterization

WG2: Non Mass-Flux Parameterizations

WG3: High-Resolution Limit

WG4: Physics and Observations

Chair: Dr Jun-Ichi YANO (FR)

Parties: Austria, Belgium, Croatia, Finland, Germany, Hungary, Italy, Netherlands, Poland, Romania, Spain, Sweden, United Kingdom

Action ES0906 - Seagrass productivity: from genes to ecosystem management

The main objective of this Action is to provide the scientific basis for estimating and preserving the goods and services arising from the productivity of European seagrass ecosystems under anthropogenic pressure.

Seagrass ecosystems rank with coral reefs and tropical rainforests in their many ecosystem services, yet are

drastically declining worldwide as a consequence of both anthropogenic and natural pressures including habitat fragmentation, eutrophication, poor water clarity and climate change stressors. In spite of this, the level of awareness is low and management ineffective. Seagrass research is fragmented and there is little integration between researchers and coastal zone managers.

The Action aim is to form a European-wide research coordination network that integrates expertise in physiological ecology, ecological genomics and conservation-resource management. Uniquely, scientists and managers will work together to close the pure/applied research gap and to develop comprehensive best practices for integrated seagrass habitat management. This is a much talked-about approach that has not been implemented. The European capacities for seagrass research will be integrated to carry out six tasks: establish continuous, in-situ measurement devices for seagrass productivity, establish a modelling and monitoring tool based on seagrass light requirements, understand seagrass responses to global changes, assess seagrass genetic adaptative variation at photosynthetic related loci, evaluate the effectiveness of existing and new seagrass-health ecological indicators and provide guidelines to improve the conservation and management of seagrass dominated ecosystems.

Working Groups

WG1: Ecophysiology: Drivers of seagrass plant productivity: vulnerability and resilience to anthropogenic driven change

WG2: Genetics: Develop functional genetic and genomic tools to understand seagrass photosynthetic responses to environmental stressors

WG3: Scientists-Managers Interface

WG4: Innovative approaches to seagrass monitoring and management in Europe

Chair: Prof. Rui SANTOS (PT)

Parties: Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom

Action ES0907 - INTegrating Ice core, MArine and TErrestrial records - 60,000 to 8000 years ago (INTIMATE)

The main objective of this Action is to develop common protocols and methods within a larger network to reconstruct abrupt and extreme climate change across the full range of European environments (ice, marine and terrestrial) within the period 60,000 to 8000 years ago, bringing together scientists in order to better understand the impact and mechanisms of change, and thereby reducing the uncertainty of future prediction.

The main aim of this Action is to develop common protocols and methods to reconstruct abrupt and extreme climate change across the full range of European environments (ice, marine and terrestrial) over the period 60,000 to 8000 years ago, to better understand the mechanisms and impact of change, and thereby reduce the uncertainty of future prediction. Past climate and environmental data provide critical tests of global and regional climate models. While there are a small number of high profile records, such as the Greenland ice cores, which are critical for informing on the dynamic nature of past climate change, it is at the scale of Europe and the North Atlantic that abrupt climate variability needs to be fully explored. It is crucial that independent records of abrupt climate change across Europe are generated and robustly compared to test for leads/lags in the climate system and the interaction between different climate forcing mechanisms. Doing so will critically underpin our ability to model future climate change and ecosystem response. The main objectives of this Action are to standardize methodologies across Europe; incorporate reconstructions within climate models; and facilitate interdisciplinary science collaborations, including early-stage and established scientists, to build European research capacity.

Working Groups

WG1: Dating and Chronological Modelling

WG2: Quantification of Past Climate

WG3: Modelling Mechanisms of Past Change

WG4: Climate Impacts

Chair: Prof. Chris TURNEY (UK)

Parties: France, Germany, Greece, Netherlands, Norway, Spain, Switzerland, United Kingdom

Food and Agriculture

Action FA0901 - Putting Halophytes to Work - From Genes to Ecosystems

The main objective of the Action is to collate existing knowledge of halophytes from gene function to ecosystems that will impact on conservation and management of saline environments and agricultural productions. The growing human population presents a huge challenge to world agriculture. As more than 40% of the Earth is arid or semi-arid and most of the planet's water is saline, we advocate the sustainable use of these under-exploited resources for human benefit. Halophytes have evolved in saline habitats and are an untapped source of food, fibre and bioenergy. Deepening our understanding of halophytes and saline ecosystems will help combat salinisation, soil erosion, loss of biodiversity and bioproductivity. Our goal is to create an interdisciplinary group of scientists to bridge gaps between disciplines by jointly exploring the biodiversity of halophytes, re-evaluating their uses as crops, including bioenergy, as sources of salt-resistance genes and for use in the restoration and rehabilitation of salinized or contaminated land. The Action will tackle the problems of salt-affected agricultural land and support the timely development of a saline agriculture using brackish water as a replacement or a supplement for diminishing freshwater.

Working Groups

WG1: Ecology, ecosystem analysis, rhizosphere dynamics and plant responses to pedo-climatic conditions.

WG2: Proteomics, genetics, bioinformatics and metabolomics of halophytes; i.e. the molecular biology of halophytes.

WG3: Modelling water, soils and salt balance, plant development and succession and elaborating principles for a sustainable saline agriculture.

WG4: Halophyte utilization - agronomic, restorative and economic aspects.

Chair: Prof. Timothy FLOWERS (UK)

Parties: Belgium, Bulgaria, Cyprus, Denmark, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Israel, Italy, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom

Action FA0902 - Understanding and combating porcine reproductive and respiratory syndrome in Europe

The main objective of the Action is to improve knowledge on porcine reproductive and respiratory syndrome (PRRS) in Europe in order to identify effective strategies to combat it. Twenty years after its emergence, porcine reproductive and respiratory syndrome (PRRS) is still having major impacts on pig health and welfare. The etiologic agent is the PRRS virus. PRRS remains a challenge to the sustainability of pig production, especially with the emergence of new highly pathogenic PRRSV strains. To date, European PRRS research programs have been fragmented. The objectives of the Action are to generate specific outcomes such as the identification of key challenges and propose potential solutions to problems to increase progress and facilitate the use of new technologies in animal health. With a specific emphasise on genetics and genomics this Action will improve understanding of, and hence better control, of PRRS. The strategies derived from this Action will benefit animal health, producers, public health and allied organizations that have a stake in animal agriculture systems. The recommendations will be widely disseminated and serve as a roadmap for training and future initiatives.

Working Groups

WG1: Epidemio-Surveillance Transmission and Economic Impacts

WG2: Immunopathogenesis

WG3: Vaccine Development

WG4: Diagnostic Toolkit

Chair: Dr Tahar AIT-ALI (UK)

Parties: Austria, Belgium, Croatia, Denmark, France, Germany, Greece, Italy, Netherlands, Poland, Romania, Serbia, Slovenia, Spain, United Kingdom

Action FA0903 - Harnessing plant reproduction for crop improvement

The main objective of the Action is to understand the mechanisms of sexual/apomictic plant reproduction and to facilitate the use of this increased knowledge in the development of new approaches in biotechnology, agriculture and food industry through improved crops. Although most desirable crop traits are polygenic, no plant breeding tools exist, which allow the efficient fixation of multigenic traits over successive generations. Among several reproductive system-related strategies for fixation of desirable agronomic traits, one of the best choices is apomixis (i.e. clonal seed production) that would enable the instantaneous fixation of the complete genome of the best plants. For instance, apomixis technology would allow the fixation of heterosis in F1 hybrids. Moreover, when coupled with male-sterility systems, apomictic reproduction (with no need for male contribution) could help in addressing issues related to transgene escape from GM crops to organic or conventional crops, and thereby allow for better coexistence systems in Europe. The overall goal of the Action is to allow for a synergy of inter-related European and international expertise to better understand the mechanisms of sexual/apomictic plant reproduction and to facilitate the application of this increased knowledge in the development of new approaches for agriculture and food industry to increase productivity.

Working Groups

WG1: Female gametophyte development and embryogenesis in plants.

WG2: Male gametophyte development and pollen viability in plants.

WG3: Apomixis technology development.

Chair: Prof. Emidio ALBERTINI (IT)

Parties: Austria, Belgium, Czech Republic, Denmark, France, Germany, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Serbia, Slovakia, Spain, Switzerland, United Kingdom

Action FA0904 - Eco-sustainable food packaging based on polymer nanomaterials

The main objective of this Action is to constitute an international scientific and technology network on issues related to eco-sustainable Polymer Nanocomposites Food Packaging for the preservation, conservation and distribution of high quality and safe food.

The Action will constitute an international scientific and technology network on issues related to Eco-sustainable Polymer Nanomaterials for Food Packaging (PNFP), for the preservation, conservation and distribution of high quality and safe food. The Action aims at exploiting the potentiality of polymer nanotechnology in the area of food packaging treating in a complete way the demanding needs of the users, such as health, environment, taste, cost and the specific requirements of the food industry. The envisioned direction is to look at the complete life cycle of the PNFP by the combined efforts of leading research and industrial groups. The Action will identify the barriers (in research and technology, safety, standardisation, trained workforce and technology transfer) that prevent a complete successful development of PNFP and will indicate the strategies to proceed further.

Working Groups

WG1: Development of new safe PNFP

WG2: Development of new processing technologies including modelling and simulation

WG3: Development of new strategies to identify any critical interaction of PNFP with food

WG4: Ethics, Standardization, Science- society dialog

Chair: Dr Clara SILVESTRE (IT)

Parties: Austria, Belgium, Bulgaria, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Ireland, Israel, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Spain, Sweden, Switzerland, United Kingdom

Action FA0905 - Mineral-improved crop production for healthy food and feed

The main objective of this Action is to identify bottlenecks limiting the content of bioavailable minerals (Fe, Zn, Mg, Se) in the consumable crop parts and to provide solutions for an approximately 3-fold increase in bioavailable food/feed mineral content but at the same time limit the entry of bioavailable Cd and As in food/feed to safe standards so as to consequently improve and protect human and animal health.

Global food systems are failing to provide adequate quantities of essential nutrients and other factors needed for good health, productivity and well-being of people. Improving content especially of Fe, Zn, Mg and Se will improve the nutritional value of crop-derived food or feed, potentially enhancing human and animal health. At the same time, the content of toxic minerals, Cd and As, and anti-nutritional compounds limiting mineral bioavailability, needs to be reduced to improve food safety. In this COST Action several bottlenecks in the food/feed production chain limiting mineral status will be addressed by employing agronomic, genomic, biotechnological, and innovative food processing techniques in an interdisciplinary and integrated approach. Four working groups will focus on soil mineral bioavailability; plant biology; food/feed processing; and food/feed mineral bioavailability related to human/animal health.

Working Groups

WG1: Soil- Plant Interactions and Physiology (rhizosphere, bioavailability, agronomy, mineral fertilizers, use of nano-particles)

WG2: Biological features in the relationship between plants and minerals

WG3: Plant product processing

WG4: Human/animal nutrition (bioavailability, pro/anti-nutrients)

Chair: Prof. Bal Ram SINGH (NO)

Parties: Austria, Belgium, Bulgaria, France, Germany, Hungary, Israel, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Action FA0906 - UV-B radiation: A specific regulator of plant growth and food quality in a changing climate (UV4growth)

The main objective of this Action is to bring together, coordinate, and enhance the performance of nationally-funded research activities by forming a coherent, interdisciplinary research & training network that will develop an integrated vision on the regulatory role of UV-B in plant growth and development at cell, organism and ecosystem level.

Significant new understanding of UV-B mediated processes in plants has been gained during the last decade. Rather than being a damaging agent, it is now recognised that UV-B radiation is a specific regulator of gene expression, metabolite profiles, and responses to climate change parameters. This COST-Action will generate knowledge on the fundamentals of plant growth, food quality, and plant-environment interactions by integrating nationally and internationally funded research on UV-B mediated regulation of molecular, physiological, metabolic and ecological processes. The aim of this Action is to develop an integrated vision of the role of UV-B in plant growth across a range of organisational levels and natural and agricultural systems.

Working Groups

WG1: Nuclear regulation by UV-B radiation

WG2: UV-B-induced metabolic changes

WG3: Organismal responses to UV-B radiation

WG4: UV-B and climate change

Chair: Dr Marcel JANSEN (IE)

Parties: Austria, Belgium, Estonia, Finland, France, Germany, Hungary, Ireland, Israel, Italy, Lithuania, Netherlands, Norway, Poland, Serbia, Slovenia, Spain, Sweden, United Kingdom

Action FA0907 - Yeast flavour production - New biocatalysts and novel molecular mechanisms acronym (BIOFLAVOUR)

The main objective of this Action is to mainstream and catalyze transnational research into the flavour, through coordination of research activities in genomics, functional genomics, biodiversity, metabolic engineering, and bioprocessing engineering. The immediate scientific and technological benefit will be to build the foundation for the development of biotechnological and eco-efficient production of natural flavour compounds that will eliminate potential risks for consumer's health and the environment.

Flavours and Fragrances (F&F) are highly important quality components in food, beverages, cosmetics, detergents and pharmaceutical products. Nowadays, most F&F molecules are produced by chemical synthesis or by extraction from plants. The need for environmentally friendly processes and the consumer's preference for natural products encourage research and development in the biotechnological production of F&F. This calls for a strong investment in capacity building through molecular, genetic and metabolic studies of the microbial flavour synthesis, which is at the moment relatively scarce. This COST Action will build a unique European Yeast Flavour Network addressing fundamental research in natural bioflavour production through an innovative systems biology approach.

Working Groups

WG1: Dipping into Biodiversity and Screening for New Biocatalysts

WG2: A Systems Biology approach for Functional Analysis of existing or novel Microbial Flavour Pathways

WG3: Engineering Strategies of Flavour Metabolic Pathways

WG4: Addressing novel Tailored Bioprocesses and Biocontrol methods for Natural Flavour Bioproduction

Chair: Dr Gustavo M. DE BILLERBECK (FR)

Parties: Belgium, France, Germany, Italy, Poland, Serbia, Slovakia, Spain, United Kingdom

Forests, their Products and Services

Action FP0901 - Analytical Techniques for Biorefineries

With the rapidly growing international trade in plants and ongoing impacts of climate change, activities of plant pathogens Trees, annual and perennial plants, recycled fibres, and lignocellulosic side streams from forest and agroindustry are renewable resources for the development of natural materials, biochemicals, and bioenergy. The chemical complexity of plant materials, the feed material of Biorefineries, renders the analyses of the feed constituents, processes, and valorised products challenging. The main objective of the Action is to develop new and evaluate existing analytical methods related to forest-based and agroindustrial Biorefineries. Thus, the Action covers the analytical methods for the Biorefinery feed material and for processed biochemicals, biomaterials, and process residues. Especially analytical pretreatments will be evaluated. Critical steps are the representativeness of the sampling and samples, the extraction, fractionation,

and sample storage methods applied. New methods will be applied and evaluated for their relevance. Other emphasised areas will be development of analytical on-line applications, hyphenated techniques, and applying statistical multicomponent analyses to sort out the relevant data from the main data stream. The European forest-based, bioenergy-based and agroindustrial industries will benefit

from the Action in receiving relevant information on their developments of sustainable and environmentally benign solutions for novel utilisation of renewable resources. The development of analytical tools will lead to cost effective and sustainable processes and products.

Working Groups

WG1: Biorefinery feed material sampling and characterisation

WG2: Characterisation of processed biochemicals and biomaterials

WG3: Characterisation and fate of process residues

Chair: Prof. Stefan WILLFOR (FI)

Parties: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

Action FP0902 - Development and harmonisation of new operational research and assessment procedures for sustainable forest biomass supply

The main objective is to harmonise forest energy terminology and methodologies of forest operations research and biomass availability calculations thereby building the scientific capacity within forest energy research and supporting the technology transfer of the forest biomass procurement chain and sustainable forest management. At present the use of forest biomass for energy is an increasingly important topic particularly in light of the debate on climate change. Forest biomass offers the largest potential as a renewable fuel. In order to ensure the reliable and sustainable supply of forest fuel new technological solutions to procure forest biomass are needed. By harmonising research methodologies in forest biomass operations research it is anticipated that more solid conclusions can be drawn from research results since the Action enables more comparable repetitions of the same studies across Europe. Furthermore, research results will be more comparable and the generalisation of research results will be improved. The Action will provide an original synthesis of multidisciplinary research efforts and an innovative European wide reference for forest biomass for energy terminology, sampling methods, standard measurements, and research methodologies. This synthesis will promote the increase in the use of forest biomass for energy as laid out in the EU strategies. Through the possibilities of the networking concept, the most suitable research methods can be identified, harmonised and standardised throughout the EU. The Action contributes to provide a more solid basis for the decision making on national and EU levels on biomass supply.

Working Groups

WG1: Forest biomass terminology and units

WG2: Operations research and measurement methodologies

WG3: Machine cost calculation and data analysis methodologies

WG4: System Analysis and modelling in forest operations

Chair: Mr Dominik ROSER (FI)

Parties: Austria, Bulgaria, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Turkey, United Kingdom

Action FP0903 - Climate Change and Forest Mitigation and Adaptation in a Polluted Environment

The main objective is to increase understanding of state and potential of forest mitigation and adaptation to climate change in a polluted environment, and to reconcile process-oriented research, long-term monitoring and applied modelling at comprehensive forest research sites. Forests are expected to face significant pressures from climate change and air pollution. The COST Strategic Workshop "Forest Ecosystems in a Changing Environment: Identifying Future Monitoring and Research Needs", held in Istanbul in 2008, recommended more integration between approaches and themes in order to assess the risks for European forests. This Action creates a platform of experts from different fields, with the following main objectives:

1) to increase understanding of state and potential of forest mitigation and adaptation to climate change in a polluted environment; and
2) to reconcile process-oriented research, long-term monitoring and applied modelling at comprehensive forest research sites (Supersites III). Present forest monitoring in Europe is carried out at Level I and II plots by the ICP Forests programme on behalf of the Convention on Long-range Transboundary Air Pollution. Supersites of Level III were proposed in Istanbul, with the main aim of integrating soil, plant and atmospheric sciences and monitoring, and providing policy-oriented modelling with scientifically sound indicators of pollution and climate-related risks.

Working Groups

WG1: Availability and evaluation of monitoring data

WG2: Scientific gaps and modelling

WG3: Protocols and supersites

WG4: Training and transfer of results

Chair: Dr Elena PAOLETTI (IT)

Parties: Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Israel, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

Action FP0904 - Thermo-Hydro-Mechanical Wood Behaviour and Processing

The main objective of this Action is to improve the knowledge on wood mechanical and physical behaviour and its chemical degradation during Thermo-Hydro-Mechanical (THM) processing, and its application to wide-ranging wood treatment systems. This Action will help overcome challenges related to the scaling-up of research findings and full industrial production, optimising processing conditions, improving product properties and developing innovative product ranges from the understanding of THM processing.

The polymeric components of wood and its porous structure allow its properties to be modified under the combined effects of temperature, moisture and mechanical action – so-called Thermo-Hydro-Mechanical (THM) treatments. Various types of processing techniques, including high temperature steam with or without an applied mechanical force, can be utilised to enhance wood properties, to produce eco-friendly new materials and to develop new products. During these THM treatments, wood undergoes mechano-chemical transformations, which depend upon the processing parameters and material properties. An investigation of these phenomena requires collaboration between groups from different wood disciplines; however, to date research has been rather fragmented. This COST Action aims to apply promising techniques in the fields of wood mechanics, wood chemistry and material sciences through an interdisciplinary approach to improve knowledge about the chemical degradation and mechanical behaviour of wood during THM processing. This will help overcome the challenges being faced in scaling-up research findings, as well to improving full industrial production, process improvement and the enhancement of product properties and the development of new products.

Working Groups

WG1: Chemical degradation of wood under TH treatment (TH)

WG2: Modelling of THM behaviour of wood (THM)

WG3: New Products by THM (NPTHM)

Chair: Dr Parviz NAVI (CH)

Parties: Austria, Finland, France, Germany, Greece, Italy, Netherlands, Poland, Portugal, Romania, Sweden, Switzerland, United Kingdom

Action FP0905 - Biosafety of forest transgenic trees: improving the scientific basis for safe tree development and implementation of EU policy directives

The main objective of this Action is to evaluate and substantiate the scientific knowledge relevant for genetically modified tree (GMT) biosafety protocols by putting together already existing information generated in various European countries as the basis for future EU policy and regulation for the environmental impact assessment and the safe development and practical use of GMTs.

The potential for unintended consequences of spread of foreign genes (via vertical or horizontal transfer) and of pleiotropic effects following transgene expression may be enhanced in long-lived forest trees. This Action will focus on four key aspects related to the biosafety of GMTs: (a) analyses of the efficiency of existing gene containment strategies to avoid or if not possible to minimize gene flow; (b) facilitate efforts to develop site-specific integration of transgenes in tree genomes to minimize variability of transgene expression and pleiotropic effects, (c) evaluate possible methods to monitor GMTs in the whole production chain, and (d) conduct socio-economic and cost/benefit analyses in relation to the use of GMTs in plantations. This Action combines multidisciplinary knowledge generated with transgenic lines of forest trees (such as, Populus spp., Pinus spp., Eucalyptus spp., Betula spp., Castanea spp., Picea spp., etc.) as well as extensive expertise in correlated topics. The information gained should contribute to strengthen the scientific basis for the execution of the EU policy directives related to transgenic trees intended for cultivation in Europe. The knowledge gained will be summarised in a book as a final output of this Action.

Working Groups

WG1: Biological characterization of GMTs

WG2: Environmental impact assessment and monitoring of GMTs in the whole production chain from plantation to final products

WG3: Socio-economic implications of and recommendations for the use of GMTs

WG4: Management of intranet - internet websites and dissemination

Chair: Dr Cristina VETTORI (IT)

Parties: Austria, Belgium, Bulgaria, Estonia, Finland, France, Germany, Greece, Israel, Italy, Netherlands, Norway, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, United Kingdom

Individuals, Societies, Cultures and Health

Action IS0901 - Women Writers in History - Toward a New Understanding of European Literary Culture

The main objective of the Action is to create a strong collaborative international Research Network and to produce a Road Map outlining future systematic collaborative research in European women's literary history. The historiography of literature needs renewal. In particular women's contribution to European literary practice can and must be accounted for in a much more adequate way than current literary histories do. This COST Action lays the foundations for an innovative European-scale approach to this problem. The neglect of women as cultural agents is indeed an international phenomenon, directly relating to gender inequality in modern societies. International cooperation is needed in order to change things and demonstrate that women's growing presence, since the Middle Ages, prepared the way for their massive entrance into the "literary field" (Bourdieu) during the 20th century. Using recent theoretical insights (Moretti, Hutcheon, Valdés) and new technological means, the Action will prepare avenues for collective research by organizing a strong network of European (and other) researchers. At the end of the Action the network will be ready to carry out a large European research programme that contributes to a more balanced picture of – western and eastern – Europe's cultural heritage).

Working Groups

WG1: Models and Theories

WG2: Tools and Interconnectivity

WG3: Selection and Use of Relevant Sources

WG4: Dissemination and Extension of the Network

Chair: Dr Suzan VAN DIJK (NL)

Parties: Belgium, Denmark, Finland, France, Germany, Ireland, Israel, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Spain, Switzerland, United Kingdom

Action IS0902 - Systemic Risks, Financial Crises and Credit - the roots, dynamics and consequences of the Subprime Crisis

The main objective of the Action is to provide comprehensive documentation and state of the art analysis of the current Subprime Crisis and its consequences. What started as a burst of a speculation bubble in the US real estate market has developed into the most severe financial crisis since the Great Depression. Characteristic of the Subprime Crisis was the tight connection between the American real estate credit market and the structures and processes of global markets. The slicing and dicing of subprime was made possible by modern financial instruments like derivates, modern practices like securitization, and new actors like Credit Rating Agencies who provided first class ratings and thereby suggested what turned out to be false security, and Hedge funds that generated demand. The crisis is therefore as much a crisis of the modern capitalist system as it is of finance. It has led to greater transformation of the American and European financial markets than any planned reform. Discursively, the crisis has challenged core ideas of monetarism and led to a revival of Keynesian monetary and fiscal policies. This interdisciplinary Action critically assesses sources, dynamics and consequences of the global financial crisis. It aims to develop a completely new approach to financial stability, reach a better understanding of financial crises in general, and formulate specific policy goals to make financial markets more secure.

Working Groups

WG1: Systemic Risk, Trust and the Search for Financial Stability in Modern Finance

WG2: Systemic Risk, Credit and Financial Markets

WG3: Systemic Risk, Reform and Regulation

Chair: Dr Oliver KESSLER (DE)

Parties: Austria, Bulgaria, Denmark, Estonia, Former Yugoslav Republic of Macedonia, France, Germany, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Romania, Sweden, Switzerland, United Kingdom

Action IS0903 - Enhancing the role of medicine in the management of European health systems - implications for control, innovation and user voice

The main objective of the Action is to increase empirical, theoretical and policy relevant knowledge about the changing role of medical professionals in the management of healthcare. This Action is rooted in a number of recent trends in healthcare: the growing involvement of doctors in management and changes in medical education, training and career structures. These changes are assumed to be positive, leading to improvements in organization learning and control, innovation and user voice. However the evidence supporting such conclusions remains fragmented. While changes in the relationship between management and medicine have received some attention at national levels, there is less research adopting a rigorous, comparative, interdisciplinary perspective. Focusing on hospital doctors the Action aims to address these limitations to advance theoretical, empirical and policy relevant knowledge. The wider benefit for society will be the identification of promising practices in healthcare management to facilitate policy change at both national and European levels. The Action will also contribute to goals of enhancing the mobility of clinical professionals and the user voice in healthcare.

Working Groups

WG1: Development of Medical Management Roles

WG2: Control

WG3: User Voice

WG4: Innovation

Chair: Prof. Ian KIRKPATRICK (UK)

Parties: Belgium, Denmark, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Israel, Italy, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Action IS0904 - European Architecture beyond Europe: Sharing Research and Knowledge on Dissemination Processes, Historical Data and Material Legacy (19th-20th centuries)

This Action aims to produce a broader understanding of the worldwide spread of European architecture across empires during the 19th and 20th c. by focusing on its vectors, connections, semantics and materiality in a large range of geographic and linguistic contexts engaging both Western and non-Western environments. It posits that the bilateral colonial channel (e.g. French architecture in Algeria or British architecture in India), represented but one aspect of a larger multifaceted history. By combining architectural history with area studies' knowledge, the intention is to map and analyze more complex dissemination patterns and border-crossing relationships. Beyond architecture, the challenge is to contribute to the writing of a global history of modern European culture, including overseas expansions and transnational dynamics in its scope. To that end, this Action proposes joining efforts at the European level in collaboration with non-European researchers. A major outcome will be the development of accurate digital resources on the topic, as a first step towards the building of a research infrastructure.

Working Groups

WG1: Actors and networks of expertise

WG2: The printed media and the construction of a canon

WG3: Documenting transnational architecture

WG4: Conceptualizing an infrastructure for collaborative research

Chair: Prof. Mercedes VOLAIT (FR)

Parties: Austria, Belgium, France, Germany, Greece, Italy, Netherlands, Portugal, Spain, Switzerland, United Kingdom

Action IS0905 - The Emergence of Southern Multinationals and their Impact on Europe

The main objectives of this Action are to develop an enhanced capacity for scholarly analysis of the emergence of Southern Multinationals to establish and test empirically their impact on Europe and its stakeholders; to assess existing EU wide and country policies in relation to this phenomenon and make policy recommendations.

Traditionally Foreign Direct Investment (FDI) has flowed from advanced developed economies into developed

and developing countries. More recently a new trend has emerged in the pattern of FDI. Outward bound FDI from emerging economies has begun to increase significantly and has been growing at a faster pace than FDI from the advanced developed world. The Action seeks to develop and sustain an international research network to study the impact of this new phenomenon for Europe and its stakeholders. The goal of the network is to implement a research agenda that will be of value to all stakeholders and policy makers in Europe as they grapple with this facet of globalisation.

Working Groups

WG1: Description of emerging sources of growth in FDI

WG2: Provision of insight into the drivers of the emerging areas of FDI

WG3: Identification of the opportunities and challenges for Europe from this phenomenon

WG4: Stimulation of ideas around both national and European policy responses

Chair: Prof. Louis BRENNAN (IE)

Parties: Belgium, Germany, Hungary, Ireland, Italy, Netherlands, Norway, Portugal, Romania, Spain, Switzerland, United Kingdom

Action IS0906 - Transforming Audiences, Transforming Societies

The main objective of this Action is to advance state-of-the-art knowledge of the key transformations of European audiences within a changing media and communication environment, identifying their interrelationships with the social, cultural and political areas of European societies.

The Action will coordinate research efforts into the key transformations of European audiences within a changing media and communication environment, identifying their complex interrelationships with the social, cultural and political areas of European societies. The Action will offer a perspective which is different from that of conventional ICT-focused audience research, by (a) bringing together experts who study a wide range of media, 'old' mass media included, to understand how these relate to each other and to everyday life, and (b) paying equal attention to audience-focused issues (especially media interpretations and mediated experiences) and user-focused issues (both adoption and use of technologies). The Action will be of benefit to the scientific and education communities, to media, communication and ICT industries and professionals, to policy-makers and regulatory bodies, and to media-oriented NGOs and citizen initiatives.

Working Groups

WG1: New media genres, media literacy and trust in the media

WG2: Audience interactivity and participation

WG3: The role of media and ICT use for evolving social relationships

WG4: Audience transformation and social integration

Chair: Dr Geoffroy PATRIARCHE (BE)

Parties: Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Cyprus, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Hungary, Ireland, Israel, Italy, Netherlands, Norway, Poland, Portugal, Serbia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

Action IS0907 - Childbirth Cultures, Concerns, and Consequences: Creating a dynamic EU framework for optimal maternity care

The main objective of the Action is to advance scientific knowledge about ways of improving maternity care provision and outcomes for mothers, babies and families across Europe by understanding what works, for who, in what circumstances, and by identifying and learning from the best.

Around 4.7 million European women experience childbirth annually. Optimal maternal and infant health is critical to societal well-being. Survival rates have improved, but there are now concerns about iatrogenic morbidity. There are significant cross-EU differences in maternity care cultures, philosophies, organisation, uptake, and outcomes. This Action will advance scientific knowledge about ways of improving maternity care provision and outcomes by examining what works, for who, in what circumstances, and by identifying and learning from the best. The work will include an examination of first trimester prenatal diagnosis, routine intrapartum interventions for low risk women, and care for migrant women. Bringing all maternity care in Europe up to the standard of the best is the ultimate aim of the Action.

Working Groups

WG1: Organisational systems design

WG2: Outcomes measurement

WG3: Impact on migrant women

WG4: Techniques for identifying the best in complex systems

WG5: Building innovative knowledge transfer

Chair: Prof. Soo DOWNE (UK)

Parties: Belgium, Finland, Germany, Greece, Ireland, Lithuania, Norway, Portugal, Serbia, Sweden, Switzerland, United Kingdom

Action TD0902 - Submerged Prehistoric Archaeology and Landscapes of the Continental Shelf

The main objective of the Action is to promote research on the archaeology, climate and environment of the drowned landscapes of the continental shelf, created during periods of lower sea level, which form a major part of the European cultural heritage. For most of human history on the European continent over the past one million years, sea levels have persisted at levels lower than present by as much as 130m, creating extensive coastal and lowland landscapes attractive to human settlement. Between 16,000 and 6000 years, most of this territory was drowned by rapid sea level rise from -130m, following the last Ice Age, transforming the geographical and environmental context of human development with consequences that persisted into the modern era. This drowned landscape preserves valuable sedimentary archives of long-term environmental and climatic changes, and an increasing number of archaeological remains have been found, documenting human response and adaptation to this rapidly changing environment. With intensification of commercial activity on the seabed and improved research technology, the quantity of evidence is increasing rapidly. So too are the threats of destruction of this cultural heritage. This Action will improve knowledge on the location, preservation conditions, investigation methods, interpretation and management of underwater archaeological, geological and palaeoenvironmental evidence of prehistoric human activity, create a structure for the development of new interdisciplinary and international research collaboration, provide guidance for archaeologists, heritage professionals, scientists, government agencies, commercial organisations, policy makers and a wider public.

Working Groups

WG1: Archaeological Data and Interpretations

WG2: Environmental Data and Reconstructions

WG3: Technology, Technical Resources and Training

WG4: Commercial Collaboration and Outreach

Chair: Prof. Geoffrey BAILEY (UK)

Parties: Belgium, Croatia, Denmark, Estonia, France, Germany, Greece, Ireland, Israel, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Spain, United Kingdom

Action TD0904 - Time In MEntaL activitY: theoretical, behavioral, bioimaging and clinical perspectives (TIMELY)

The main objective of this Action is to advance the understanding of the processes underlying time perception by exploring the relevant multidisciplinary theoretical, behavioural, neurobiological, and clinical perspectives.

Time perception (TP) represents a fundamental issue in cognitive science and neurosciences. However, the cognitive mechanisms and brain areas involved are still underspecified. Uncovering the processes underlying TP will specify its interactions with action, attention, memory, and language and will make crucial contributions to our understanding of longstanding questions on various aspects of time (synchrony, duration, etc.). To investigate TP one has to move away from the single-discipline perspective and profit from the synergy of theoretical and methodological inputs from different disciplines. This Action will develop a scientific network that will establish the first European community on TP and advance our understanding of TP by coordinating efforts on:

a) developing a common-code of communication;

b) advancing the understanding and treatment/ neurorehabilitation of time distortions in neurological and mental disorders or other impairments;

c) developing new behavioral/imaging paradigms;

d) creating new research materials;

e) studying developmental aspects of TP.

Working Groups

WG1: Conceptual analysis and methodology for measuring time perception (TP)

WG2: A developmental view and analysis of individual and cultural factors on TP

WG3: TP of complex, multisensory events.

WG4: TP in mental health, developmental disorders, and neurology.

Chair: Dr Argiro VATAKIS (GR)

Parties: Belgium, Estonia, Finland, France, Germany, Greece, Ireland, Israel, Italy, Netherlands, Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom

Information and Communication Technologies

Action IC0901 - Rich-Model Toolkit - An Infrastructure for Reliable Computer Systems

The main objective is making automated reasoning techniques and tools applicable to a wider range of problems, as well as making them easier to use by researchers, software developers, hardware designers, and information system users and developers. The Action coordinates activities on developing infrastructures for automated reasoning about the new notion of Rich Models of computer systems. Rich Models have the expressive power of a large fragment of formalizable mathematics, enabling specification of software, hardware, embedded, and distributed systems. Rich Models support modeling at a wide range of abstraction levels, from knowledge bases and system architecture, to software source code and detailed hardware design. The Action contributes to the construction of Rich-Model Toolkit, a new unified infrastructure that precisely defines the meaning of Rich Models, introduces standardized representation formats, and incorporates a number of automated reasoning tools. Moreover, the Action develops and deploys new tools for automated reasoning that communicate using these standardized formats. The resulting tools will have a wide range of applicability and improved efficiency, helping system developers construct reliable systems through automated reasoning, analysis, and synthesis.

Working Groups

WG1: Rich Model Language Design and Benchmark Suite

WG2: Decision Procedures for Rich Model Language Fragments

WG3: Analysis of Executable Rich Models

WG4: Synthesis from Rich Model Language Descriptions

Chair: Prof. Viktor KUNCAK (CH)

Parties: Austria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Israel, Italy, Norway, Poland, Romania, Serbia, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Action IC0902 - Cognitive Radio and Networking for Cooperative Coexistence of Heterogeneous Wireless Networks

The main objective of the Action is to integrate the cognitive concept across all layers of communication systems, resulting in the definition of a European platform for cognitive radio and networks. The Action proposes coordinated research in the field of cognitive radio and networks. The cognitive concept applies to coexistence between heterogeneous wireless networks, that share the electromagnetic spectrum for maximum efficiency in resource management. Several efforts are currently in place in European research centers and consortia to introduce cognitive mechanisms at different layers of the communications protocol stack. This Action goes beyond the above trend by integrating the cognitive concept across all layers of system architecture, in view of joint optimization of link adaptation based on spectrum sensing, resource allocation, and selection between multiple networks, including underlay technologies. The cross-layer approach will provide a new perspective in the design of cognitive systems, based on a global optimization process that integrates existing cognitive radio projects, thanks to the merge of a wide-range of expertise, from hardware to applications, provided by over 30 academic and industrial partners. The final result will be the definition of a European platform for cognitive radio and networks. To reach this goal, algorithms and protocols for all layers of the communications stack will be designed, and a set of standard interfaces as well as a common reference language for interaction between cognitive network nodes will be defined.

Working Groups

WG1: Definition of mechanisms for intersystem coexistence and cooperation

WG2: Definition of network-wide mechanisms for enabling the cognitive approach

WG3: Definition of cooperation-based cognitive algorithms, that take advantage of information exchange at a local level

WG4: Definition of cognitive algorithms for adaptation and configuration of a single link according to the status of external environment

Chair: Prof. Maria-Gabriella DI BENEDETTO (IT)

Parties: Belgium, Bosnia-Herzegovina, Cyprus, Denmark, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Latvia, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden, Turkey, United Kingdom

Action IC0903 - Knowledge Discovery from Moving Objects (MOVE)

The main objective of the Action is to develop improved methods for knowledge extraction from massive amounts of data regarding moving objects. This Action aims to build a network for collaboration that leads to the improvement of ICT methods for knowledge extraction from massive amounts of data about moving objects. This knowledge is essential to substantiate decision making in public and private sectors. Moving object data typically include trajectories of concrete objects (e.g. humans, vehicles, animals, and goods), as well as trajectories of abstract concepts (e.g. spreading diseases). While movement records are nowadays generated in huge volumes, methods for extracting useful information are still immature, due to fragmentation of research and lack of comprehensiveness from monodisciplinary approaches. Overcoming these limitations calls for COST-like networking. In response to a strong expression of interest from the academic, industrial, and user communities, this Action will empower the development of substantial and widely applicable methods in mobility analysis, focusing on representation and analysis of movement, including spatio-temporal data mining, and visual analytics. Results will be demonstrated through showcases for decision makers. Researchers from various subdomains in computer and geographic information sciences will join domain specialists from a broad range of relevant applications, from courier services and transportation to ecology, and epidemiology, among others. This will make Europe a central stakeholder in an emerging key domain.

Working Groups

WG1: Cross-WG Activities, Showcases, and Evaluation

WG2: Representation of Movement Data and Spatio-temporal Databases

WG3: Analysis of Movement and Spatio-temporal Data Mining

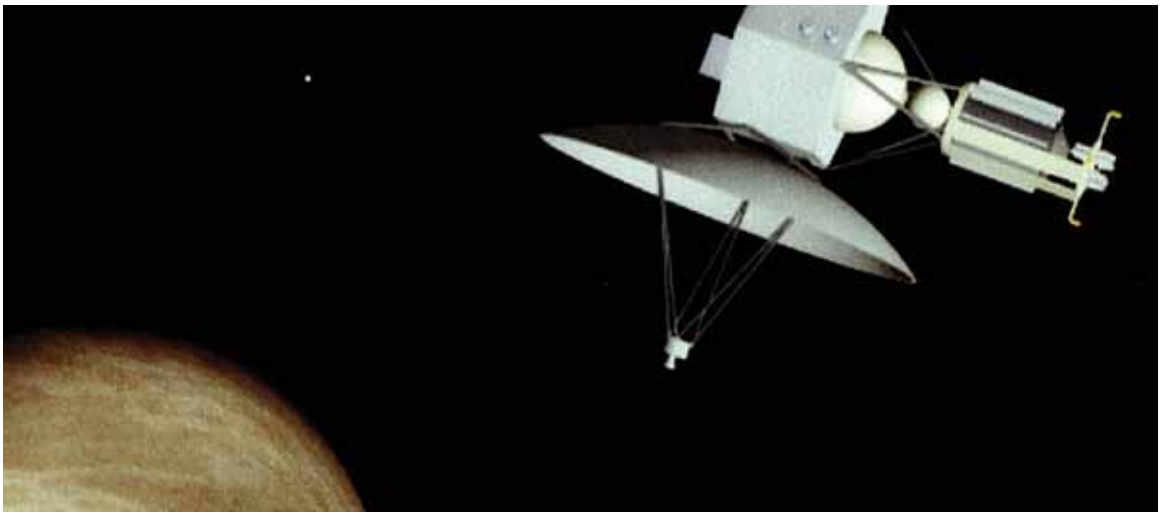
WG4: Visual Analytics for Movement and Cognitive Issues

Chair: Prof. Robert WEIBEL (CH)

Parties: Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Poland, Portugal, Romania, Serbia, Spain, Switzerland, Turkey, United Kingdom

Action IC0904 - Towards the Integration of Transectorial IT Design and Evaluation

The main objective of the Action is to harmonise research and practice on design and evaluation methodologies for computing artefacts, across sectors and disciplines. Third-wave human computer interaction (HCI) is characterised by a diversifying user base and use contexts, new emphasis on user experience and new interaction styles. This implies



a need for informed method choice sensitive to domains, user groups and system objectives. Effective method use requires complex judgments about applicability across applications and genres, with failure implying significant financial and human costs. The adoption of ICT across ages and abilities further increases the need for sound D&E methods, which bring about useful, usable, desirable computing artefacts that improve life quality. Effective cross-sectorial transfer of design and evaluation (D&E) methods is plausible and demonstrable. Relevant research work, however, is fragmented and scattered. The Action aims to provide harmonization and leadership currently lacking in this field by bringing together researchers and D&E professionals. Their broad experience of D&E methods deployed in different sectors and disciplines enables comparison of method applications, assessing transferability of both established and novel approaches. These collaborative activities in Working Groups and open Workshops will facilitate production of a generic D&E method selection and application framework and scientific publications reaching the wider research community. The Action will also provide young interdisciplinary researchers with systematic training and networking opportunities such as STSMs and Training Schools.

Working Groups

WG1: Critical Reviews of D&E Method Potential and Value-Realisation in IT-enhanced Sectors

WG2: Transferability of D&E Methods across IT-enhanced Sectors

WG3: Interplay between Design and Evaluation, Quality Models and Standards

WG4: Integrated D&E Methodological Framework

Chair: Dr Effie Lai-Chong LAW (CH)

Parties: Austria, Belgium, Cyprus, Denmark, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

Action IC0905 - Techno-Economic Regulatory Framework for Radio Spectrum Access for Cognitive Radio/Software Defined Radio (TERRA)

The main objective of this Action is to develop a comprehensive techno-economic regulatory framework of radio spectrum access rules for CR/SDR-based wireless applications, catering for envisaged CR/SDR deployment scenarios and shown to benefit most optimally the development of the wireless industries and consumer interests at large. Furthermore, the Action will provide assistance to European administrations in formulating a European position on radio spectrum access rules for CR/SDR applications.

This Action will establish a multi-disciplinary European forum focused on coordinating techno-economic studies for the development of a harmonised European regulatory framework to facilitate the advancement and broad commercial deployment of Cognitive Radio/Software Defined Radio (CR/SDR) systems. The Action will leverage on results and experiences from national and international research initiatives and early standard-setting activities by recommending sound regulatory policies that would facilitate fastest possible uptake and proliferation of CR/SDR. The need for this Action has been supported by European regulators in the European Conference of Postal and Telecommunications Administrations (CEPT). They stated willingness to use the results of the Action in their work on developing the harmonised European regulatory regime for CR/SDR. Very conveniently, proposals elaborated by the Action could also be used as a part of European contributions to the forthcoming World Radiocommunications Conference in 2012, which has CR/SDR regulatory policy on its agenda.

Working Groups

WG1: CR/SDR deployment scenarios

WG2: CR/SDR co-existence studies

WG3: Economic aspects of CR/SDR regulation

WG4: Impact assessment of CR/SDR regulation

Chair: Dr Arturas MEDEISIS (LT)

Parties: Belgium, Finland, Germany, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Switzerland, United Kingdom

Action IC0906 - Wireless Networking for Moving Objects (WiNeMO)

The main objective of this Action is to advance the state-of-the-art concerning networking aspects of scenarios integrating moving objects of the most varied kinds, ranging from personal use devices to sensors, into the Internet of the Future. In particular, the Action will coordinate the development of new algorithms, techniques, protocols models and tools that will facilitate the integration of moving objects into pervasive and ambient communications.

The Internet of the Future will incorporate a large number of autonomous wireless objects moving with diverse patterns and speeds while communicating via several radio interfaces. Examples of such objects may include humans, cars or unmanned aerial vehicles, with every object acting as a networking device generating, relaying and/or absorbing data. Achieving the Internet of the Future, will require global interoperability amongst objects/devices, not typically common place due to inherent features of today's Internet. To overcome the current shortcomings, a number of research challenges have to be addressed in the area of networking, including protocol engineering, development of applications and services, as well as realistic use-cases. The Action will increase the knowledge and coordinate research efforts of national and international projects in the area of Wireless Networking for Moving Objects (WiNeMO). Its activity will foster wide dissemination of research results, serving as an internationally recognized reference point through capacity building of WiNeMO stakeholders offering appropriate networking opportunities to early-stage researchers. The results will be also demonstrated through joint living labs and show cases for researchers, decision makers and public exhibitions.

Working Groups

WG1: Network architectures

WG2: Protocol engineering, cross-layering and cooperation

WG3: Applications and services

WG4: Testbeds, use-cases, societal and economical aspects

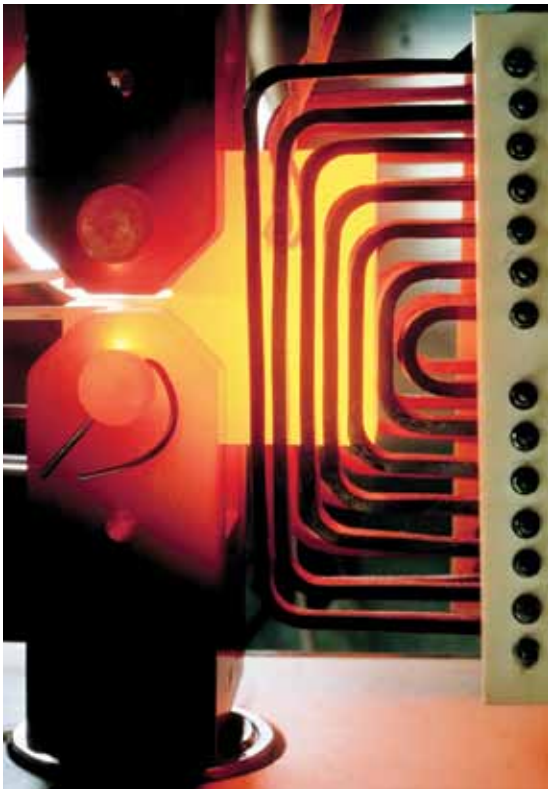
Chair: Prof. Yevgeni KOUCHERYAVY (FI)

Parties: Belgium, Finland, Former Yugoslav Republic of Macedonia, Germany, Greece, Ireland, Italy, Latvia, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom

Materials, Physics and Nanosciences

Action MP0901 - Designing novel materials for nanodevices - from Theory to Practice (NanoTP)

The main objective of the Action is atomic-scale interface design and characterisation. Engineering of surfaces and interfaces of nanostructures remains a central goal of modern solid state physics and chemistry, since atomically controlled interfaces play a key role in the performance of nanodevices. Limitations in characterisation and theoretical modelling tools have been a major obstacle to the development of controllable device interfaces. Technology is now entering a period of convergence between theory and characterisation tools: new electron microscopy tools can provide images and chemical mapping with atomic resolution; developments in near-field optical microscopy probes enable Raman spectroscopy of individual nano-



objects. STXM-NEXAFS has been used to characterise individual nanoobjects. Concurrently, developments within the available computer codes (AIMPRO, siesta/transiesta …) allow routine handling of systems with many 100s of atoms, and latest results show the promise of scaling this down by a factor of 10-100, i.e. into the range of realistic nano-objects. These developments will allow theoretical modelling and experimental characterisation at the same nanometric scale. This Action combines development of these new tools with the expertise needed to exploit them for improved nano-interface control and novel device design. This approach will support the design and integration of novel materials of high technological relevance.

Working Groups

WG1: Engineering of Novel Nanostructures.

WG2: Characterisation of Nanostructures and Nanoscale Junctions

WG3: Integration of Nanostructures in demonstrator Devices

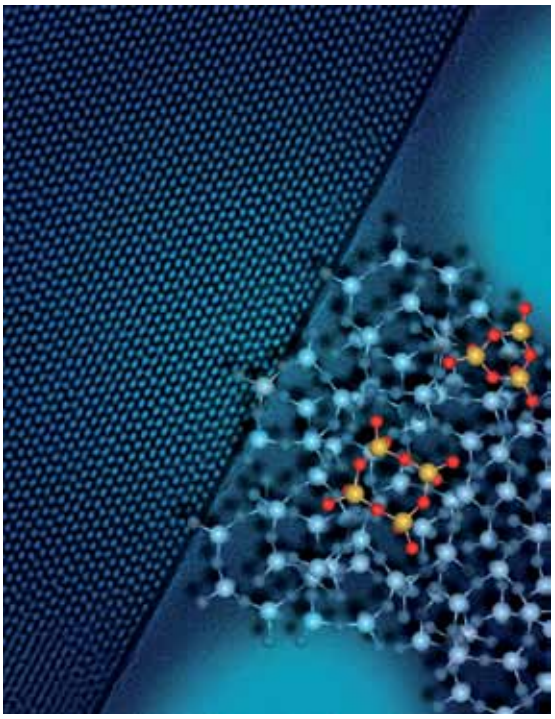
WG4: Theoretical Modelling

Chair: Dr Carla BITTENCOURT (BE)

Parties: Belgium, Bulgaria, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Poland, Portugal, Romania, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

Action MP0902 - Composites of Inorganic Nanotubes and Polymers (COINAPO)

The main objective of the Action is to develop new composite materials from inorganic nanotubes and polymers and to establish appropriate links and transfer of knowledge needed for application and commercialisation of this kind of composite media by European industry. Nanotubes made of inorganic materials are an interesting alternative to carbon nanotubes, showing advantages such as e.g. easy synthetic access, good uniformity and solubility, and predefined electrical conductivity depending on the composition of the starting material. They are therefore very promising candidates as fillers for polymer composites with enhanced thermal, mechanical, and electrical properties. Target applications for this kind of composites are materials for heat management, electrostatic dissipaters, wear protection materials, photovoltaic elements, etc. The proposed Action will link together European scientists working on this rapidly emerging field to create a basis for a highly interdisciplinary research network focused on development and exploration of inorganic nanotube-polymer composites. The Action will generate a fundamental knowledge and create widespread links needed for application and commercialization of this kind of composite media by European industry.



Working Groups

WG1: Fabrication of materials

WG2: Characterization

WG3: Theory

WG4: Engineering

Chair: Prof. Irena DREVENSEK OLENIK (SI)

Parties: Austria, Belgium, Estonia, France, Germany, Greece, Ireland, Israel, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

Action MP0903 - Nanoalloys as advanced materials: from structure to properties and applications (NANOALLOY)

The main objective of this Action is to increase knowledge and understanding in bi- and multi-metallic nanoparticles (nanoalloys) in order to develop combined experimental/computational methodologies for designing nanoparticles with specific structures, properties and functions. NANOALLOY will contribute to the determination of phase diagrams of nanoalloys, to the development of controlled growth/synthesis protocols, and to the determination of catalytic, magnetic and optical properties of the nanoalloys of major interest in applications. The proposed network will establish a common knowledge basis on nanoalloys, reinforcing and rationalizing European research on the subject.

Alloy nanoparticles (also known as nanoalloys) are multicomponent metallic particles in the 1-100 nm diameter

range. Nanoalloys present very complex structures and properties, which crucially depend on their size, composition and chemical ordering, and which can therefore be tailored for specific and industrially relevant applications - as in data storage, optical devices and catalysis. Controlling and tailoring the properties of nanoalloys, and determining their phase diagrams, require the concerted effort of experiment and computer modelling. NANOALLOY brings together European experimental and theory/modelling research groups from universities and other research institutions to develop new methodologies for the growth, synthesis and characterization of nanoalloys, leading to new materials and applications.

Working Groups

WG1: Equilibrium properties and nanoalloy phase diagrams

WG2: Growth/synthesis of nanoalloys

WG3: Applications to catalysis

WG4: Applications to magnetism and optics

Chair: Prof. Riccardo FERRANDO (IT)

Parties: Austria, Belgium, Bulgaria, Finland, France, Germany, Ireland, Israel, Italy, Lithuania, Poland, Romania, Serbia, Slovak Republic, Spain, Turkey, United Kingdom

Action MP0904 - Single- and multiphase ferroics and multiferroics with restricted geometries (SIMUFER)

The main objective of this Action is to organize a multidisciplinary European scientific network of groups experienced in synthesis, advanced characterization and modeling of single-and multi-phase ferroic and multiferroic nanosystems.

The goal of the Action is to build a high level European scientific knowledge platform in the field of single and multiphase nanoscale ferroic and multiferroic oxides with restricted geometries, in which new properties are driven by engineering size, shape and interface-mediated phenomena. Ferroic and multiferroic oxides with various boundary conditions (thin films, free-standing, supported nano-particles/wires/ribbons/islands/toroids, hollow particles, hierarchical structures) and multiphase systems with at least one ferroic or multiferroic component will be produced by innovative synthesis and a top-down approach, investigated by manifold complex tools and theoretically described by multiscale modeling. Active links among European laboratories will be established to increase knowledge beyond the state-of-the art in this research field. Specific tools will be promoted to create a young researchers group with high scientific level and managerial competence, to contribute to the future competitiveness of Europe in this research topic.

Working Groups

WG1: Novel ferroic nanostructures

WG2: Single-phase multiferroics

WG3: Ferroic-based composites

WG4: Early stage researchers group (ESRG)

Chair: Prof. Liliana MITOSERIU (RO)

Parties: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Serbia, Slovak Republic, Slovenia, Spain, Switzerland, United Kingdom

Action MP0905 - Black Holes in a Violent Universe

The main objectives of this Action are (i) to enhance the understanding of the BH-phenomenon and its impact on the evolution of our Universe,(ii) to study the fundamental laws of nature using an multi-disciplinary and multi-dimensional approach of BH research, and (iii) to use BHs as laboratories to test new physical concepts.

Black Hole physics is both fundamental and broad ranging and hence multidisciplinary. The world's first open and flexible network on BH research will counteract the existing fragmentation of this research field. To attack the elementary and far-reaching demands posed by BH-related science, an overarching framework is required. It will connect astronomers from all wavelength regimes (from low energy radio bands up to ultra-high energies such as TeV), working on all mass scales of Black Holes, i.e. from the smallest structures up to the largest masses in the Universe (i.e. Quantum BHs to SMBHs), with physicists and particle physicists as well as theoreticians, observers and software and technology developers. By strengthening Europe's scientific networking capacities in BH research, Europe's leading role in the international competition will be enhanced. The collaboration of scientists and engineers in this Action will also catalyse an increase of European industrial competitiveness to meet the technological challenges of upcoming large-scale facilities (e.g. E-ELT, SKA).

Working Groups

WG1: Quantum Black Holes

WG2: Stellar Black Holes & Pulsars

WG3: The Galactic Centre

WG4: Supermassive Black Holes

Chair: Dr Silke BRITZEN (DE)

Parties: Austria, Belgium, Finland, France, Germany, Greece, Hungary, Italy, Poland, Portugal, Romania, Serbia, Slovenia, Spain, Sweden, United Kingdom

Action TD0906 - Biological adhesives: from biology to biomimetics

The main objective of this Action is to gain new understanding relating to the mode of action of biological adhesives so as to facilitate the development of synthetic counterparts with improved function. These bio-inspired adhesives will provide more elegant solutions to contemporary engineering and biomedical adhesive requirements and will additionally provide a platform for future technological innovation that requires adhesion in hostile conditions as a prerequisite.

Biological adhesives often offer impressive performances and, therewith, the potential to inspire novel, superior industrial adhesives for an increasing variety of high-tech applications. Using an iterative, multidisciplinary biomimetic approach, structures, functions and principles of natural models can be experimentally studied, theoretically analyzed, and prototyped in order to bring innovative bio-inspired adhesives to the market. This COST Action will unite widespread European expertise and activities in the fields of biological and technological adhesives (biology, physics, chemistry, and engineering), streamlining and pooling knowledge, methods and techniques, avoiding duplication of effort, decreasing costs, and accelerating scientific and technological progress in Europe.

Working Groups

WG1: Chemical characterization and synthesis of adhesives

WG2: Structural characterization of natural and synthetic adhesives

WG3: Mechanical testing and theory

WG4: Fabrication of biomimetic adhesives and their evaluation

Chair: Dr Patrick FLAMMANG (BE)

Parties: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Portugal, Switzerland, United Kingdom

Transport and Urban Development

Action TU0901 - Integrating and Harmonizing Sound Insulation Aspects in Sustainable Urban Housing Constructions

The main objective of the Action is to harmonise the descriptors for airborne and impact sound insulation between dwellings and for airborne sound insulation of facades as well as to prepare a European classification scheme with a number of quality classes. In Europe, regulatory requirements concerning acoustic performance of buildings differ widely in performance descriptors and limit values. The diversity (indicators, steps between classes, grade of quietness achieved, etc.) found in the nine existing national schemes and proposals in three more countries is an obstacle for exchange of experience, development and trade. The harmonization of such descriptors and performance levels of sound insulation classes is important to make progress and would be well received by the building industry, governments and research sectors. The Action will stimulate innovation, support sustainability through simplified research and development objectives, reduce trade barriers between Member States and facilitate

marketing. Coordination of research activity, knowledge transfer, psychoacoustic evaluation, collection of data of typical and high performance acoustic solutions is necessary to make progress.

Working Groups

WG1: Common descriptors, classification schemes, legislation, enforcement, harmonization, rating and prediction methods (ISO and EN standards) for all member states in the fields of airborne and impact sound insulation of dwellings.

WG2: Collection and interpretation of research data in the participating countries about the social surveys and psychoacoustic evaluation of neighbour noise: annoyance, impact on health, quality of life, relocation, correlation with acoustic comfort.

WG3: Collection and discussion of construction details and sound insulation data. Prepare a European database with traditional and innovative "robust" solutions for sound insulation of new dwellings and for improvement of existing dwellings.

Chair: Ms Birgit RASMUSSEN (DK)

Parties: Austria, Belgium, Croatia, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Action TU0902 - Integrated assessment technologies to support the sustainable development of urban areas

The main objective of the Action is to develop better representations of the urban systems interactions and dynamics as well as new configurations of urban areas so that they consume fewer resources, emit less pollution, are more resilient to the impacts of climate change and are more sustainable in general. It is widely recognised that urban areas need to curb greenhouse gas emissions, reduce consumption of resources and adapt to be more resilient to climate change impacts – and become more sustainable in general. Whilst many initiatives address aspects of sustainability, this Action is distinct in its focus upon assessment technologies for simulation and integrated assessment of urban areas from a multi-functional point of view at a whole city scale. Models, techniques and tools that are required to enable management of the highly connected technological, human and natural systems that make up cities are now emerging. Meanwhile, planning decisions are being made without sufficient understanding of long term changes, impacts and uncertainties. The implications for sustainability within Europe and internationally are critical. This COST Action will build a new European coalition of researchers equipped to address the intricate challenge of integrated assessment in cities. Whilst cultivating a diversity of multi-disciplinary approaches this coalition will develop collective understanding, share techniques and work jointly in disseminating results. This Action is a timely opportunity and suitable mechanism to take European research on urban integrated assessment from its current infant and rather fragmented state to being a consolidated and internationally leading activity.

Working Groups

WG1: Integrated assessment methods and technologies

WG2: Adaptation, mitigation and climate change feedbacks in cities

WG3: Resource flows and urban ecosystem services in cities

WG4: Strategic urban planning and governance

Chair: Mr Richard DAWSON (UK)

Parties: Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Spain, Switzerland, Turkey, United Kingdom

Action TU0903 - Methods and tools for supporting the use, calibration and validation of traffic simulation models

The main objective of the Action is to develop, implement and promote the use of methods and procedures for supporting the use of traffic simulation models, especially on the topics of model calibration and validation. To this date, the bulk of resources and effort in the field of traffic simulation have focused on "model development", leading to many simulation models being available on the market. These models are extensively used in applications that have great potential impact on the safety, capacity and environmental efficiency of the road system. However the fidelity of results and conclusions drawn from a simulation study, as well as the range of possible applications the tools can reliably be used for, are questionable: the same simulation study carried out by different people, even when using the same tool, is likely to give different results. Thus, the trustworthiness of the results almost entirely depends on the ability of the model users and on their intuition. Moreover, the increasing complexity of models makes appropriate and correct use a difficult task even for experts, requiring very specific calibration and validation methodologies. For these reasons the main objective of this Action is to develop, implement and promote methodologies and procedures to support the use of traffic simulation, especially on the topics of calibration and validation. To this aim the sharing and exchanging of available traffic datasets will also be a key task of the Action.

Working Groups

WG1: Updated review of traffic simulation practice and research

WG2: Highway modelling

WG3: Network modelling

WG4: Synthesis, dissemination and training

Chair: Dr Vincenzo PUNZO (IT)

Parties: Belgium, Finland, France, Germany, Greece, Ireland, Israel, Italy, Latvia, Netherlands, Portugal, Spain, Sweden, Switzerland, United Kingdom

Action TU0904 - Integrated Fire Engineering and Response (IFER)

The main objective of this Action is to break down the barrier preventing the exchange of information and experience between researchers from different disciplines on the one hand and between academia and practitioners (including fire-fighters) on the other hand. Thanks to the exchange of international experience, ideas and state-of-the-art on fire risk concepts and assessment methods, the Action aims at providing concrete applications of the performance-based fire safety design methods to practitioners and at introducing the latest research into standards for fire design.

Fire engineering researchers are specialists working in specific areas, such as fire dynamics, structural fire engineering, active/passive fire protection, environmental protection and human response. Since the background sciences of these disciplines are different at present there is little interaction between researchers. Practitioners, including fire engineers and building/fire control authorities, tend to consider fire safety as a whole, but lack in-depth awareness of recent advances in research. Through encouraging integration of different aspects of fire engineering and response, the Action will enable researchers with different fields of expertise and coming from different countries to understand better the recent advances in research in parallel fields, as well as their limitations, so that they see their own research in context, and identify opportunities in involvement of early-stage researchers and application of the results in national standards. Practitioners, fire fighting authorities and building control authorities will benefit from exposure to advanced research findings, discussion with the research community, and the sharing of best practice and others' experiences. On the other side their input will make researchers aware of real-world constraints, as well as current requirements for new research and for the development of European standards.

Working Groups

WG1: Fire behaviour and life safety

WG2: Structural safety

WG3: Integrated design

Chair: Prof. Frantisek WALD (CZ)

Parties: Austria, Belgium, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Italy, Poland, Portugal, Romania, Slovak Republic, Spain, United Kingdom

Action TU0905 - Structural Glass - Novel design methods and next generation products

The main objective of this Action is to provide a strong contribution to the ongoing development of innovative high performance structural glass products mainly in architectural and solar applications, and to European standards in this field. The Action will identify and share the outcomes of existing fragmented activities within the European research community. In addition, the Action will establish a diverse multi-disciplinary network that will encourage new research and collaborations. Finally, the Action will strengthen the current and future generations of European glass designers by developing a structural glass educational pack for university curricula across Europe.

The STRUCTURAL GLASS Action will result in high impact scientific and engineering advances. In addition, the STRUCTURAL GLASS Action is expected to result in substantial benefits with respect to economics, well-being and the environment. More specifically, the Action will strengthen Europe's leading position in the growing market of architectural glass manufacture, building façades and renewable energy applications by developing European design methods and novel high-performance products. This Action will directly contribute to safer products and risk analysis-based design methods. In doing so, it will reduce glass-related injuries, which generally constitute an unacceptably high proportion of casualties in extreme loading events. Finally, the research themes supported by this COST Action will directly lead to a reduction in embodied energy and will contribute to reducing energy demand in buildings.

Working Groups

WG1: Predicting complex loads on glass structures

WG2: Material characterization and material improvement

WG3: An integrated design approach incorporating risk analysis and post-fracture performance

WG4: Novel glass assemblies

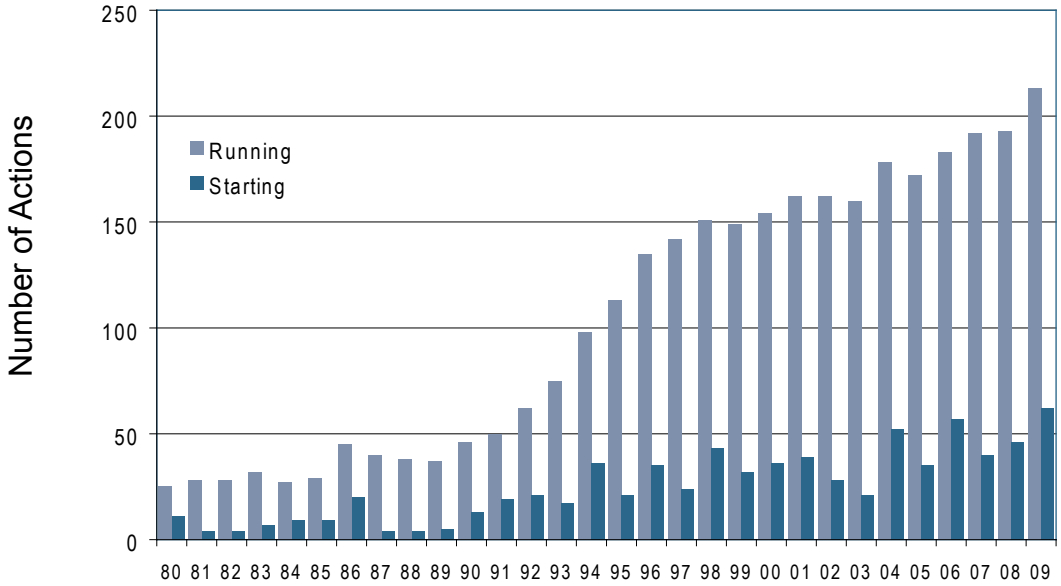
Chair: Dr Jurgen NEUGEBAUER (AT)

Parties: Austria, Belgium, Croatia, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Italy, Lithuania, Netherlands, Portugal, Slovenia, Spain, Switzerland, United Kingdom

STATISTICS

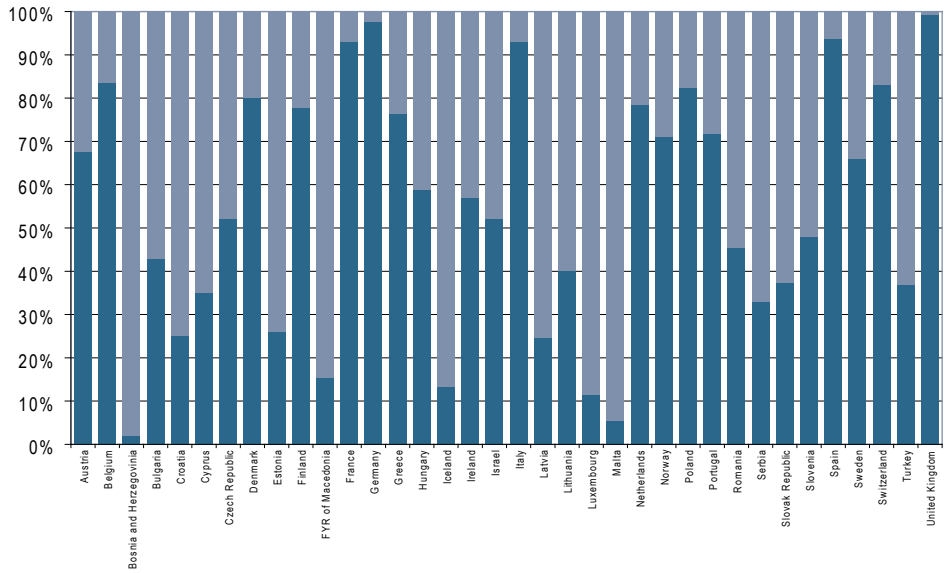
Yearly evolution of the Running and Started COST Actions up to 2009

(Status on 31st December)



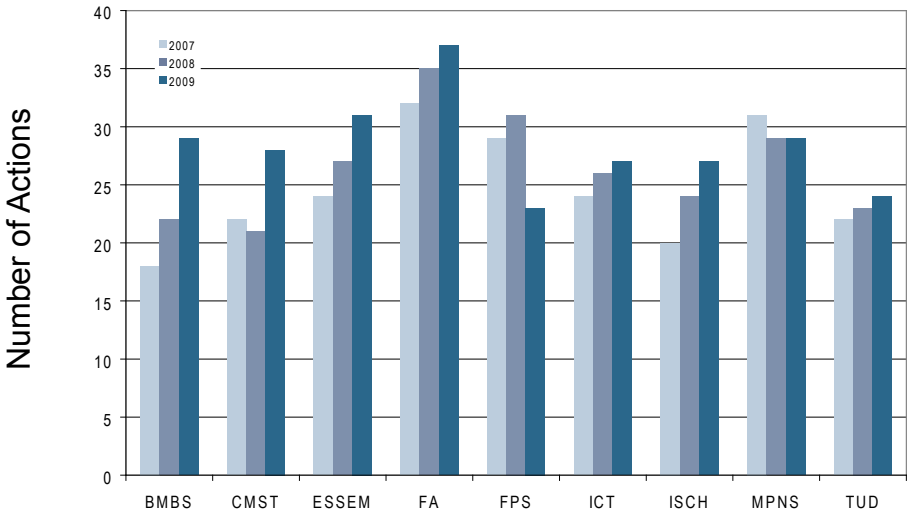
COST country rate of participation 2009

(% of the total number of running Actions)



Number of COST Actions by Domain 2007 - 2009

(running any time of the year)

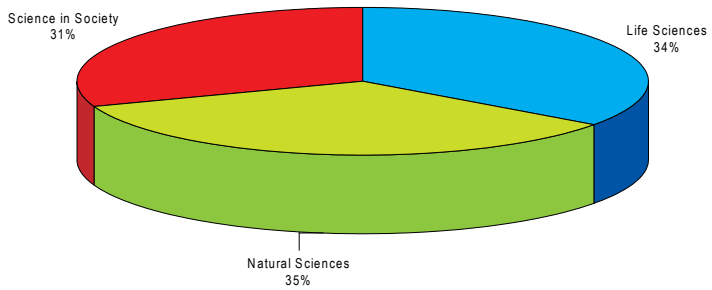


Number of Actions Running any time of the year

YEAR	2007	2008	2009
Biomedicine and Molecular Biosciences (BMBS)	*18*	*22*	*29*
Chemistry and Molecular Sciences & Technologies (CMST)	*22*	*21*	*28*
Earth System Science and Environmental Management (ESSEM)	*24*	*27*	*31*
Food and Agriculture (FA)	*32*	*35*	*37*
Forests, their Products and Services (FPS)	*29*	*31*	*23*
Individuals, Societies, Cultures and Health (ISCH)	*20*	*24*	*27*
Information and Communication Technologies (ICT)	*24*	*26*	*27*
Materials, Physics and Nanosciences (MPNS)	*31*	*29*	*29*
Transport and Urban Development (TUD)	*22*	*23*	*24*
TOTAL	**222**	**238**	**255**

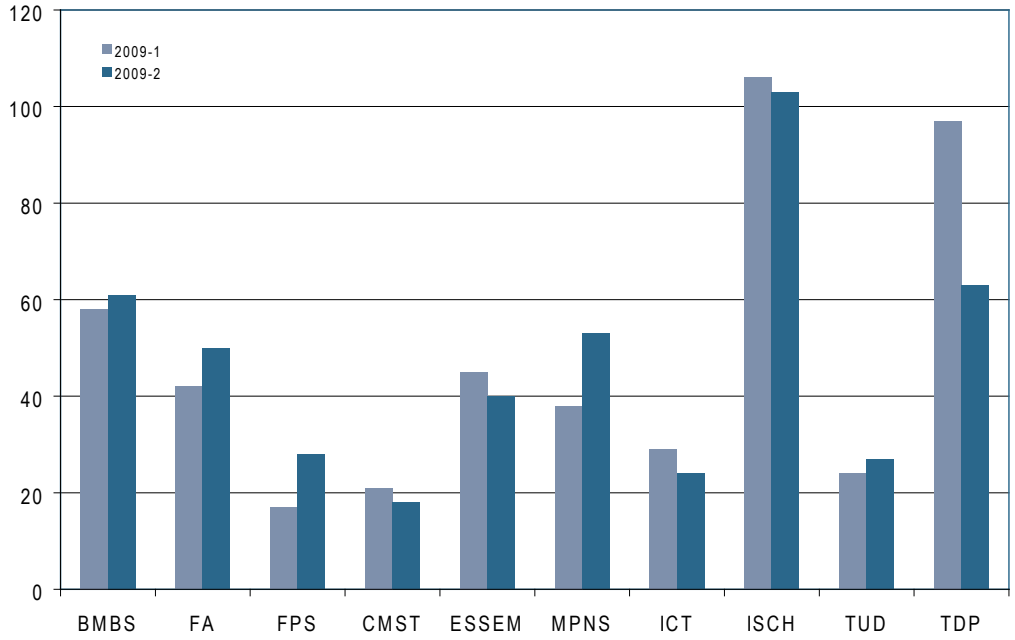
Share of COST Actions by Cluster 2009

(running any time of the year)



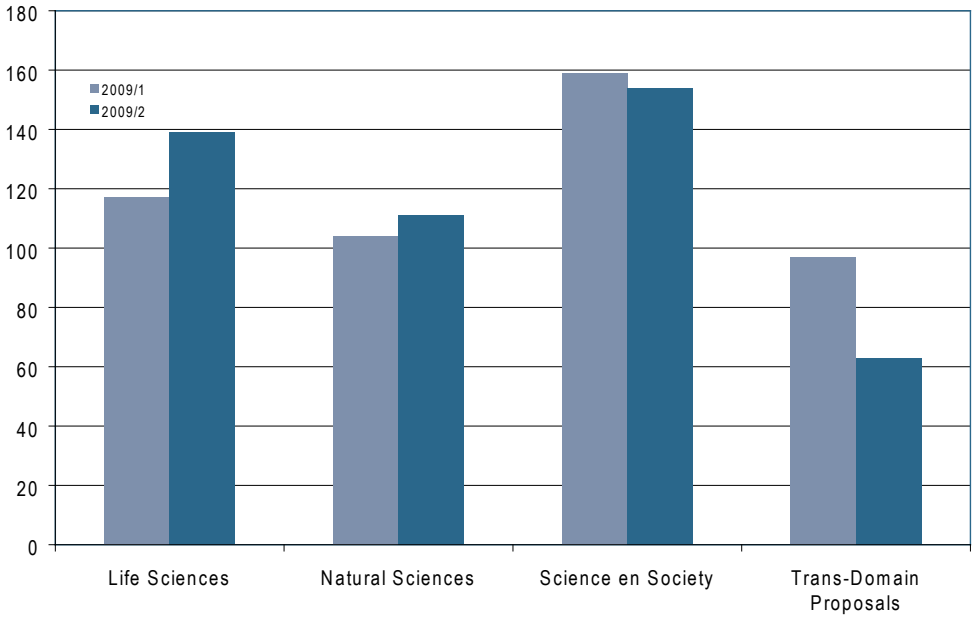
Open Call - number of pre-proposals by Domain

(Collection dates 2009-1 and 2009-2)



Open Call - number of pre-proposals by Cluster

(Collection dates 2009-1 and 2009-2)



Participation of Non-COST Country Institutions

COUNTRY	DOMAIN	ACTION	INSTITUTION
Albania (Total: 1)	MPNS (1)	IE0601	Agricultural University of Tirana
Algeria (Total: 3)	FA (1)	859	Université Badji Mokhtar de Annaba - Faculté des Sciences de l'Ingénieur
	MPNS (1)	P17	Université des Sciences et de la Technology Houari Boumedienne (USTHB) - Faculté de Physique
	TUD (1)	356	Université de Blida
Andorra (Total: 1)	ESSEM (1)	ES0601	Andorran Research Institute
Argentina (Total: 5)	BMBS (1)	BM0806	University of Buenos Aires, School of Pharmacy and Biochemistry
	FA (2)	FA0605	Universidad Nacional de Cordoba (UNC)
		FA0605	Universidad Nacional de San Martín (UNSAM)
	ICT (1)	IC0801	Universidad Nacional Del Sur
	MPNS (1)	MP0801	Universidad de Buenos Aires
Armenia (Total: 2)	ESSEM (1)	ES0803	Yerevan Physics Institute
	MPNS (1)	MP0702	State Engineering University of Armenia, Yerevan
Australia (Total: 63)	BMBS (2)	BM0602	University of Queensland, Diamantina Institute for Cancer, Immunology and Metabolic Medicine
		BM0702	Baker IDI Heart and Diabetes Institute
	CMST (8)	CM0601	School of Chemistry, Physics and Earth Sciences, Flinders University
		CM0801	School of Chemistry, University of Sydney
		D32	Australian Nuclear Science and Technology Organisation (ANSTO)
		D39	The University of Sydney
		D39	The University of Western Australia
		D39	University of Western Sydney
		D41	University of Adelaide
		D43	University of South Australia
	ESSEM (5)	730	Macquarie University
		731	Centre for Australian Weather and Climate Research
		ES0601	Australian Bureau of Meteorology
		ES0701	University of Tasmania
		ES0801	Antarctic Climate and Ecosystems CRC - University of Tasmania
	FA (14)	858	CSIRO Plant Industry
		859	The University of Melbourne, School of Botany
		867	Australian Maritime College - University of Tasmania
		872	Murdoch University WA State Agricultural Biotechnology Centre (SABC)
		872	Wollongong University, Centre for Biomedical Science School of Biological Sciences
		873	University of Tasmania
		927	James Cook University
		928	The University of Queensland
		FA0605	University of Tasmania
		FA0701	Centre for Plants and the Environment, Univeristy of Western Sydney

COUNTRY	DOMAIN	ACTION	INSTITUTION
Australia	FA	FA0701	The University of Queensland
		FA0702	University of Sydney
		FA0801	Department of Fisheries, Western Australia
		FA0805	CSIRO Livestock Industries, F. D. McMaster Laboratory
	FPS (5)	E50	Horticulture and Forestry Science
		E55	University of Technology Sydney - School of Civil and Environ-mental Engi-neering
		FP0702	Royal Melbourne Institute of Technology (RMIT University)
		FP0801	Murdoch University
		FP0803	The University of Western Australia
	ICT (10)	298	Australian National University Canberra ACT
		298	RMIT University
		299	University of Sydney, Australia (School of Physics)
		2101	NICTA Queensland Research Laboratory
		IC0601	Sonic Communications Research Group
		IC0602	NICTA
		IC0603	School of Information Technology and Electrical Engineering University of Queensland
		IC0801	Swinburne University of Technology
		IC0801	University of Technology Sydney
		IC0803	La Trobe University
	ISCH (6)	IS0801	Edith Cowan University
		IS0801	Flinders University
		IS0801	Queensland University of Technology
		IS0801	University of South Australia
		IS0807	Monash University
		IS0807	University of Queensland, Centre for Critical and Cultural Studies
	MPNS (10)	MP0604	Australian National University, Nonlinear Physics Centre
		MP0604	University of Queensland, Centre for Biophotonics and Laser Science
		MP0701	Flinders University
		MP0702	Laser Physics Centre, Research School of Physical Sciences and Engineering, Australian National University
		MP0702	MQPhotonics Research Centre, Macquarie University. Sydney
		MP0801	Australian National University
		MP0804	School of Physics, The University of Sydney
		P15	University of Queensland - Centre for Magnetic Resonance
		P17	University of Newcastle, School of Engineering
		P21	Ian Wark Research Institute - University of South Australia
	TUD (3)	TD0804	Griffith School of Environment, Griffith University
		TD0804	Institute of Transport and Logistics Studies, The University of Sydney
		TU0702	Monash University Melbourne
Azerbaijan (total: 1)	MPNS (1)	539	Baku State University
Belarus (total: 2)	FPS (1)	FP0801	Institute of Plant Protection
	MPNS (1)	MP0702	Institute for Command Engineers, Ministry of Emergencies
Brazil (Total: 3)	ICT (2)	IC0801	Instituto de Informática da Universidade Federal do Rio Grande do Sul
		IC0802	Telecommunications Centre at Catholic University
	MPNS (1)	539	Chemistry Institute of the University of Sao Paulo State

COUNTRY	DOMAIN	ACTION	INSTITUTION
Canada (Total: 25)	BMBS (5)	B25	Health Canada
		B27	University of Quebec
		B28	Canadian Science Centre for Human and Animal Health
		BM0602	The Hospital for Sick Children
		BM0805	Institute for Research in Immunology and Cancer, Université de Montréal
	FA (4)	929	Health Canada (HC) - Food Directorate, Bureau of Microbial Hazards Research Centre
		FA0601	Fisheries and Oceans Canada
		FA0807	Agriculture and Agri-Food
		FA0807	University of Windsor
	FPS (2)	FP0802	IREQ (Hydro-Quebec Research Center)
		FP0902	FP Innovations – Feric Division
	ICT (9)	295	Carleton University
		295	Université du Québec
		295	University of Ottawa
		296	Geomagnetic Laboratory Natural Resources, Ottawa
		2100	Communications Research Centre
		IC0601	McGill University
		IC0603	Royal Military College
		IC0802	Communications Research Centre
		IC0802	McMaster University
	ISCH (1)	IS0804	Department of Linguistics, University of Alberta
	MPNS (4)	MP0702	Optoelectronic Devices Group, National Research Council of Canada
		P18	McMaster University - Department of Engineering Physics
		P18	Ryerson University Toronto - Electrical and Computer Engineering Department
		P18	University of Toronto - Department of Electrical and Computer Engineering
Chile (Total: 1)	FA (1)	FA0807	Universidad de Chile, Facultad de Ciencias Agronómicas
China (Total: 7)	FA (1)	FA0803	Bee Institute of Chinese Academy of Agricultural Sciences
	ICT (4)	296	LEME
		296	Polar Research Institute
		2100	Beijing University of Posts and Telecommunications
		IC0803	State Key Lab. of Millimeter Waves, School of Information Science and Engineering, Southeast University
	ISCH (1)	IS0602	Xi'an Jiaotong University, Silk Road Institute of International Law
	MPNS (1)	533	University of Mining and Technology - Institute of Tribology and Reliability
Colombia (Total: 1)	ICT (1)	2100	Universidad Icesi
Cuba (Total: 1)	BMBS (1)	B27	Institute of Neurology and Neurosurgery, Ciudad de la Habana
Egypt (Total: 5)	CMST (1)	D43	Egyptian Petroleum Research Institute (EPRI)
	FA (3)	872	Agricultural Research Centre (ARC)
		929	National Research Center
		FA0807	Plant Pathology Institute, Department of Virus & Phytoplasma (Molecular biology)
	ICT (1)	2102	Ain Shams University
Georgia (Total: 7)	BMBS (2)	B30	Ilia Chavchavadze State University
		BM0603	Ilia Chavchavadze State University

COUNTRY	DOMAIN	ACTION	INSTITUTION
Georgia	FA (3)	FA0601	Ilia Chavchavadze State University
		FA0604	Institute of Molecular Biology and Biological Physics
		FA0801	Faculty of Life Sciences, Ilia Chavchavadze State University
	ICT (1)	IC0604	Georgian Telemedicine Union
	ISCH (1)	IS0605	Partners for Health NGO / National Information Learning Centre
Hong Kong (Total: 2)	ICT (1)	298	Polytechnic University - Department of Applied Social Sciences
	ISCH (1)	A31	City University of Hong Kong
India (Total: 6)	FA (3)	859	University of Hyderabad
		FA0605	International Centre for Genetic Engineering & Biotechnology (ICGEB)
		FA0807	Sugarcane Research Station
	ICT (2)	IC0604	Wipro Technologies
		IC0802	Indian Institute of Technology Kharag-pur
	MPNS (1)	MP0806	Indian Institute of Science
Japan (Total: 15)	BMBS (1)	B27	The Institute of Physical and Chemical Research, RIKEN
	CMST (1)	D32	Kyushu University - Institute of Materials Chemistry and Engineering & the interdisciplinary Graduate School of Engineering Sciences
	ESSEM (1)	727	Kaganawa Institute of Technology
	FA (2)	859	Hiroshima University - Graduate School of Science
		FA0605	Tohoku University
	FPS (1)	FP0902	Forestry and Forest Products Research Institute
	ICT (3)	297	National Institute of Information and Communications Technology (NICT)
		2100	NICT
		2100	Tokyo Institute of Technology
	MPNS (4)	539	Faculty of Science and Technology, Keio University
		IE0601	RISH
		MP0801	Tokyo Institute of Technology
		P18	Doshisha University - Department of Electrical Engineering
	TUD (2)	C24	Musashi Institute of Technology
		TU0702	The University of Tokyo
Lebanon (Total: 4)	FA (3)	873	American University of Beirut
		FA0807	American University of Beirut, Faculty of Agricultural and Food Sciences
		FA0807	Lebanese Agricultural Research Institute (LARI)
	ICT (1)	IC0806	American University of Beirut
Malaysia (Total: 1)	ICT (1)	296	Department of Electrical, Electronic and Systems Engineering, University Kebangsaan Malaysia
Mauritius (Total: 1)	FA (1)	FA0807	Agricultural Research and Extension Unit (AREU)
Mexico (Total: 1)	ICT (1)	IC0801	Universidad Autónoma Metropolitana
Morocco (Total: 4)	FPS (2)	FP0701	National Forest School of Engineers
		FP0804	National Forest School of Engineers
	MPNS (2)	541	Al Akhawayn University
		MP0702	Université Chaouaib Doukkali
New Zealand (Total: 36)	BMBS (4)	B27	University of Auckland
		BM0601	Van der Veer Institute for Parkinson's and Brain Research
		BM0602	University of Auckland
		BM0806	University of Otago
	ESSEM (3)	730	School of Geography, Geology and Environmental Science, The University of Auckland

COUNTRY	DOMAIN	ACTION	INSTITUTION
New Zealand	ESSEM	734	Lincoln University
		735	National Institute for Water and Atmospheric Research, New Zealand
	FA (13)	858	Lincoln University
		863	The Horticulture and Food Research Institute of New Zealand Limited
		867	Leigh Marine Lab - University of Auckland
		868	Scion
		869	National Institute for Water and Atmospheric Research
		869	New Zealand Pastoral Agricultural Research Institute
		871	Institute for Crop & Food Research
		873	HortResearch Ruakura Research Centre
		873	Landcare Research New Zealand Ltd
		929	Institute of Environmental Science & Research
		FA0603	New Zealand Institute for Plant & Food Research
		FA0702	Invermay Agricultural Centre
		FA0805	Lincoln University
	FPS (11)	E45	University of Waikato
		E50	University of Auckland
		E55	The University of Auckland
		FP0602	SCION
		FP0603	SCION
		FP0701	Scion
		FP0801	SCION
		FP0802	SCION
		FP0802	University of Canterbury
		FP0804	SCION
		FP0902	University of Canterbury
	ICT (1)	IC0701	Victoria University of Wellington
	ISCH (1)	IS0807	Victoria University of Wellington
	MPNS (3)	IE0601	SCION
		MP0701	New Zealand Institute for Crop & Food Research Ltd.
		P19	Auckland University of Technology
Pakistan (Total: 1)	ICT (1)	IC0802	National University of Computer and Emerging Sciences
Palestine (Total: 1)	CMST (1)	D43	Al-Quds University
Republic of Korea (Total: 5)	FA (1)	FA0701	Kyungpook National University
	ICT (1)	296	Radio Research Laboratory
	MPNS (3)	MP0701	INHA University
		MP0702	Gwangju Institute of Science and Technology
		P20	Seoul National University
Republic of Moldova (Total: 5)	FPS (3)	E51	State Agricultural University
		FP0601	State Agricultural University
		FP0603	Forestry and Public Gardens Department, State Agricultural University
	ISCH (1)	A30	Public Association “Our home - Chisinau”
	MPNS (1)	539	Technical University of Moldova
Russian Federation (Total: 46)	BMBS (4)	B27	Institute of Molecular Biology and Biophysics
		B27	Institute of the Human Brain of the Russian Academy of Sciences

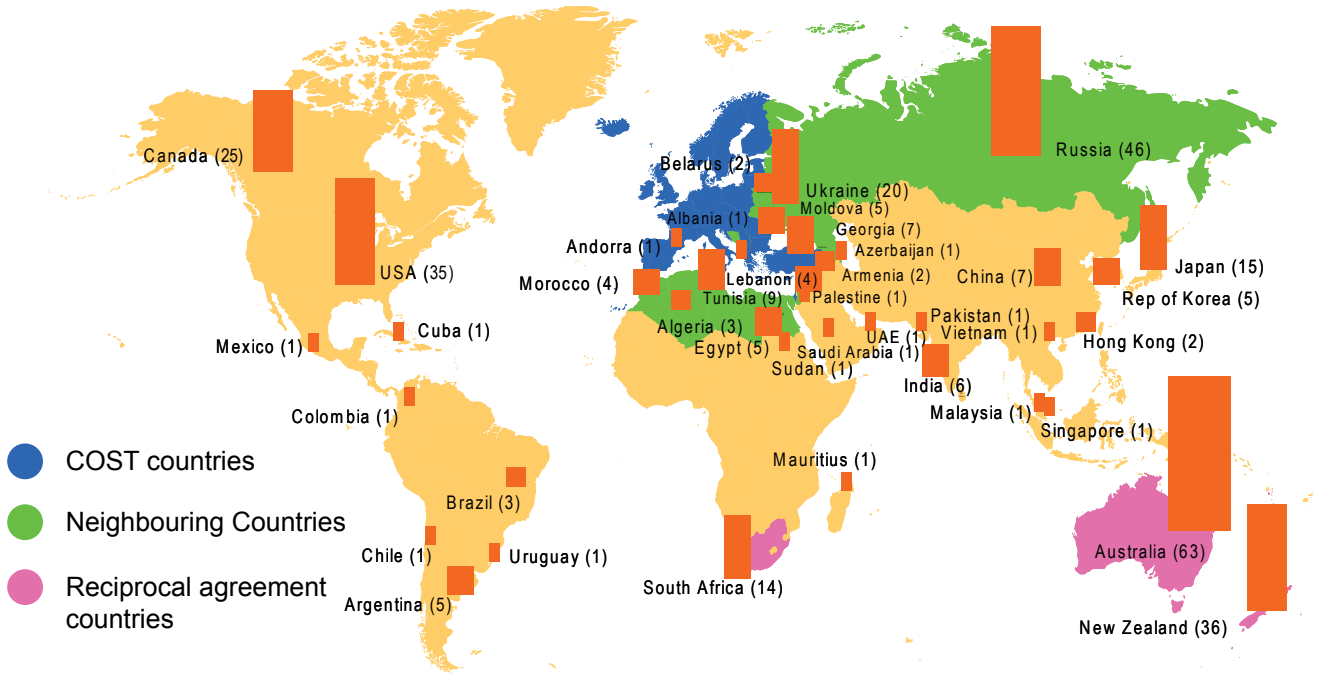
COUNTRY	DOMAIN	ACTION	INSTITUTION
Russian Federation	BMBS	B27	State Research Institute of Physiology
		BM0805	Moscow State University, Faculty of Medicine
	CMST (2)	CM0802	IOPC - Kazan Scientific Center
		D35	Moscow State University, Department of Chemistry
	ESSEM (7)	639	Agrophysical Research Institute
		726	Moscow State University, Faculty of Geography
		ES0602	Voeikov Main Geophysical Observatory
		ES0603	Moscow State University
		ES0803	Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation, Russian Academy of Sciences
		ES0803	ISTP - Siberian Branch of Russian Academy of Sciences
		ES0803	Space Research Institute Russian Academy of Sciences (IKI RAS)
	FA (7)	859	Institute of Physicochem and Biological Problems in Soil Science, RAS, Pushchino
		868	M.V. Lomonosov Moscow State University
		871	N.I. Vavilov Research Institute of Plant Industry VIR
		FA0601	Polar Research Institute of Marine Fisheries and Oceanography
		FA0604	All-Russia Research Institute of Agricultural Biotechnology
		FA0604	Institute of Cytology and Genetics (IC&G)
		FA0701	Institute of Cytology and Genetics
	FPS (5)	FP0703	Saint-Petersburg State Forest Technical Academy
		FP0804	All-Russian Research Institute of Silviculture and Forestry Mechanization (ARISMF)
		FP0804	Institute of Mathematical Problems in Biology of Russian Academy of Sciences
		FP0804	Institute of Physicochemical and Biological Problems in Soil Science of Russian Academy of Sciences
		FP0804	Moscow State Forest University
	ICT (5)	296	IZMIRAN - Russian Academy of Sciences
		296	University of St Petersburg
		297	The Institute for Information Transmission Problems (IITP)
		298	Russian Academy of Sciences (Institute for Socio-Economic Studies of Population)
		IC0703	Institute of Control Sciences
	ISCH (2)	IS0701	State University - Higher School of Economics
		IS0803	Higher School of Economics, St. Petersburg branch
	MPNS (14)	539	Institute of Solid State Chemistry, Siberian Branch Russian Academy of Sciences
		542	ECOND Ltd.
		542	Joint Institute for High Temperatures (IVTAN) - Scientific and Engineering Center for Energy Saving Processes and Equipment
		542	Mendeleyev Russian University for Chemical Technology - MRChTU
		542	Russian Railway Research Institute (VNIIZT)
		MP0602	Institute of metallurgy of Ural
		MP0602	Ural State Pedagogical University, Institute of Metallurgy
		MP0702	Fiber Optics Research Center
		MP0702	International Laser Center, M.V. Lomonosov Moscow State University
		MP0702	Pushkov Institute of Terrestrial Magnetism, Ionosphere and Radiowave Propagation

COUNTRY	DOMAIN	ACTION	INSTITUTION
Russian Federation	MPNS	MP0702	Saratov State University, Department of Physics, Laser Physics Group
		P17	D.V.Efremov Scientific Research Institute of Electrophysical Apparatus
		P17	Institute of Continuum Media Mechanics
		P20	Space Research Institute, Russian Academy of Sciences
Saudi Arabia (Total: 1)	ICT (1)	2102	Computer Engineering Department, College of Computer & Info, King Saud University
Singapore (Total: 1)	ICT (1)	2100	Nanyang Technological University
South Africa (Total: 14)	CMST (2)	CM0701	CSIR Biosciences
		D39	Mintek
	FA (2)	873	Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria
		929	University of Pretoria
	FPS (4)	E54	Forestry and Forest Products Research Centre, CSIR-UKZN
		FP0801	Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria
		FP0804	Department of Forest and Wood Science, Faculty of AgriSciences, Stellenbosch University
		FP0902	Stellenbosch University
	ICT (3)	IC0602	Council for Scientific and Industrial Research (CSIR)
		IC0806	Council for Scientific and Industrial Research
		IC0806	University of Pretoria, Department of Electrical, Electronic and Computer Engineering
	ISCH (2)	IS0602	University of Pretoria, Centre for Human Rights
		IS0804	Stellenbosch University
	MPNS (1)	MP0702	Nanosciences Laboratories, Materials ResearchDepartment, ithemba LABS-National Research Foundation of South Africa
Sudan (Total: 1)	CMST (1)	CM0801	The National Center for Research
Tunisia (Total: 9)	BMBS (1)	B27	Faculté des Sciences de Tunis, Campus Le Belvedere, Tunis
	FA (4)	862	Centre of Biotechnology of Sfax
		871	Faculté des Sciences de Sfax
		FA0605	Centre of Biotechnology of Sfax
		FA0701	Université de Tunis El Manar
	FPS (3)	E45	INRGREF
		FP0701	National Institute for Research on Rural Engineering, Water and Forests (INRGREF)
		FP0801	University of Sousse, Higher Institute of Agronomy of Chott Mariem
	ICT (1)	IC0803	Faculty of Sciences of Tunis
Ukraine (Total: 20)	BMBS (2)	B30	Bogomoletz Institute of Physiology
		B35	Department of Hospital Therapy (Internal Diseases) National Medical University of Lviv
	CMST (1)	D43	Institute of Biocolloid Chemistry (IBCC) - National Academy of Sciences of Ukraine
	FA (3)	859	National Agricultural University - Ukrainian Institute of Agricultural Radiology
		872	Institute of Plant Protection (UAAS)
		FA0604	South Plan Biotechnology Center
	FPS (3)	E52	Ukrainian State University of Forestry and Wood Technology - Faculty of Forestry
		FP0703	National University of Life and Environmental Sciences of Ukraine, Education and Research Institute of Forestry and Landscape Architecture

COUNTRY	DOMAIN	ACTION	INSTITUTION
Ukraine	FPS	FP0804	The Ukrainian Research Institute for Mountain Forestry
	ISCH (2)	A30	Kyiv-Mohyla Academy
		IS0801	Vinnytsia State Pedagogical University
	MPNS (9)	539	Department of Functional Oxide Materials of the Institute for Problems of Materials Science of National Academy of Sciences of Ukraine
		MP0602	Ivan Franko National University
		MP0702	Department of Macromolecular Chemistry, Kiev National Taras Shevchenko University
		MP0702	Kharkiv National University of Radio-Electronics
		MP0702	Usikov Institute of Radio Physics and Electronics
		MP0801	Institute for Condensed Matter
		MP0802	ILTPE (B. Verkin Institute for Low Temperature Physics and Engineering of National Academy of Science of Ukraine)
		P18	Kyiv Polytechnic Institute - Department of High Voltage Engineering and Electrophysics
		P18	Usikov Institute for Radio-Physics and Electronics - Department of Remote Sensing
United Arab Emirates (Total: 1)	ICT (1)	IC0801	The British University in Dubai
United States (Total: 35)	BMBS (6)	B27	Institute for Nonlinear Science, University of California
		B27	New York University School of Medicine
		BM0805	Columbia University, Dept. Biochemistry and Molecular Biophysics
		BM0805	Cornell University, Weill Medical School
		BM0805	Dept of Pathology, Stanford University School of Medicine
		BM0805	University of Michigan
	CMST (1)	D42	The Conservation Center institute of fine arts – New York University
	ESSEM (1)	734	University of Nebraska–Lincoln
	FA (4)	859	Brookhaven National Laboratory
		929	Centers for Disease Control and Prevention (CDC)
		FA0701	School of Natural and Social Sciences, Purchase College, State University of New York
		FA0701	University of California
	FPS (2)	FP0804	US Department of Agriculture, Forest Service
		FP0902	University of California, Davis Biological and Agricultural Engineering
	ICT (5)	296	University of Massachusetts, Lowell
		297	NOAA-CU Center for Environmental Technology (CET)
		2100	Motorola Inc.
			Azimuth System Incorporated
		IC0602	DIMACS
		IC0806	University of Central Florida, Department of Industrial Engineering and Management Systems
	ISCH (4)	A32	Networked Infrastructure for Nineteenth-century Electronic Scholarship
		IS0602	American University, Washington College of Law
		IS0602	George Washington University, Law School
		IS0804	Department of Speech-Language-Hearing Sciences, University of Minnesota
	MPNS (12)	MP0702	Center for Optoelectronics and Optical Communications, University of North Carolina at Charlotte
		MP0804	Lawrence Berkley National Laboratory

COUNTRY	DOMAIN	ACTION	INSTITUTION
United States	MPNS	MP0806	Cornell University, College of Engineering
		MP0806	Michigan Technological University, Department of Physics
		P16	Tallahassee High Field Laboratory
		P18	University of Alaska - Geophysical Institute and Physics Department
		P18	University of Florida - Department of Electrical and Computer Engineering
		P20	Los Alamos National Laboratory
		P20	NASA Glenn Research Center
		P20	University of Maryland Glen L. Martin Institute of Technology, Department of Mechanical Engineering
		P20	University of Southern California
		P20	Worcester Polytechnic Institute
Uruguay (Total: 1)	CMST (1)	CM0801	Institut Pasteur Montevideo
Vietnam (Total: 1)	FA (1)	859	National University of HoChiMinh city - Institute for Environment and Resources

Participation of non-COST country institutions in 2009
(Total: 340 participations from 40 countries in 126 Actions)



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List of abbreviations

Domains

BMBS: Biomedicine and Molecular Biosciences
CMST: Chemistry and Molecular Sciences & Technologies
ESSEM: Earth System Science and Environmental Management
FA: Food and Agriculture
FPS: Forests, their Products and Services
ICT: Information and Communication Technologies
ISCH: Individuals, Societies, Cultures and Health
MPNS: Materials, Physics and Nanosciences
TUD: Transport and Urban Development

Other

CSO: Committee of Senior Officials
ERA: European Research Area
MC: Management Committee
STSM: Short-Term Scientific Mission
TDP: Trans-Domain Proposal
WG: Working Group

COST member states

AT: Austria
BE: Belgium
BA: Bosnia-Herzegovina
BG: Bulgaria
HR: Croatia
CY: Cyprus
CZ: Czech Republic
DK: Denmark
EE: Estonia
MK: F.Y.R.of Macedonia
FI: Finland
FR: France
DE: Germany
GR: Greece
HU: Hungary
IS: Iceland
IE: Ireland
IL: Israel
IT: Italy
LV: Latvia
LT: Lithuania
LU: Luxembourg
MT: Malta
NL: Netherlands
NO: Norway
PL: Poland
PT: Portugal
RS: Republic of Serbia
RO: Romania
SK: Slovakia
SI: Slovenia
ES: Spain
SE: Sweden
CH: Switzerland
TR: Turkey
UK: United Kingdom

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