New COST Action proposals 201πν

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New COST Action proposals
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Action BM1201

Development Origins of Chronic Lung Disease

Objectives

The main objective of the Action is to create a European-wide multidisciplinary network of researchers for synergistic translational research on developmental origins of CLDs with the ultimate goal to develop novel concepts for the primary prevention and/or treatment.

Abstract

Chronic Lung Diseases (CLD) are a major cause of death in the Western world but curative therapies do not exist. Recent studies indicate that the risk to develop CLD is modified by early exposures during critical developmental windows. This concept opens unique opportunities for the pre- or early postnatal modification of later disease risks, but the underlying molecular mechanisms are largely unexplored. To close this gap, a highly cross-disciplinary approach involving scientists from basic and clinical research is required. Several European institutions study early origins of CLD with adequate national funding, but these efforts are not integrated and lack a comprehensive platform for synergistic collaboration. This COST Action will allow the creation of a coordinated and highly translational research program. This will bring forward a novel understanding of CLD pathogenesis and build the prerequisites for the successful development of early interventions and/or innovative therapies.

Keywords: Early development, chronic lung disease, exposure, epigenetics/ genetic, transgenerational transmission.

Working Groups

WG1 Infant lung development
WG2 Lung Morphogenesis
WG3 Developmental pathways and disease
WG4 Transgenerational animal models

Non-COST participation: USA
**Action BM1202**

**European Network on Microvesicles and Exosomes in Health and Disease (ME-HAD)**

**Objectives**

The aim of this Action is to foster a multidisciplinary approach to research on ME, accelerating progress on the levels of basic science and technology, physiology, pathology and translational research, with the ultimate goal of exploiting ME for clinical application, achievable only through co-ordinated efforts and valorisation thus recruiting interest and funding from industry.

**Abstract**

Microvesicles and Exosomes (ME) have attracted much recent interest because of their potential functions, use as disease biomarkers and possible therapeutic exploitation. Due to their enormous relevance, through nationally-funded projects throughout Europe, this relatively new field of research is quickly expanding. There are, however, many associated issues that need to be addressed to ensure optimal research performance and collation and cross-interpretation of data. These issues range from the need to derive a consensus on fundamental guidelines/nomenclature and optimal techniques for vesicle isolation and analysis, to more advanced issues such as collating emerging data and expertise towards better understanding, and thus exploiting, the physiological and pathological roles of ME. There is also urgency to identify gaps in ME knowledge and how best collaborative research can address these questions. This COST Action will, therefore, create a network of European experts, fostering a multidisciplinary approach to enhance both basic understanding and translational potential of ME. To achieve this, this Action will bring together a critical, yet currently fragmented, mass of academic, clinical and industry expertise from COST and non-COST countries in a field where Europe plays a leadership role, while developing a forum for free-exchange of concepts and training of young European researchers.

**Working Groups**

WG1  Guidelines for nomenclature and analysis
WG2  Physiological importance of ME
WG3  Pathological importance of ME
WG4  Diagnostic & therapeutic potential of ME

**Non-COST participation:** USA and Australia

**Keywords:** Exosomes; microvesicles; cell-to-cell communication; translational research; intersectoral training.
Action BM1203

EU-ROS

Objectives

The main aim of the Action is to form a multi-disciplinary network of European scientists working synergistically on the fundamental biology of oxygen and reactive oxygen species. Currently separated by different disciplines, various researchers will join forces to achieve world-class breakthroughs in the understanding of the fine balance between health-promoting and disease-triggering effects of reactive oxygen species.

Abstract

Life requires oxygen. This runs the risk that, when oxygen leaks out from normal metabolism, reactive oxygen species (ROS) are formed, which – when too high – trigger disease. With the idea to overcome this, antioxidants are heavily marketed, yet without proof of their effectiveness. Rather, worrying evidence suggests adverse effects. This paradox is due to the fact that ROS are not only ‘bad’, but – in tightly regulated amounts – also act as essential signalling molecules. Unravelling the fine balance between ROS acting as a friend or a foe is fundamental to understand aerobic life. To advance this important area of biology and medicine, highly synergistic approaches combining diverse and scattered disciplines are needed. For this, COST provides an ideal framework. EU-ROS will bring together multi-disciplinary experts to enhance the competitiveness of European research. By applying fundamentally new approaches it will generate advanced knowledge and translate this into novel applications ranging from medicine to crop science. With its dynamic structure, EU-ROS will attract further experts and particularly support capacity building of the future European research leaders and talented women. Collectively, EU-ROS will overcome the fragmentation of European R&D on oxygen/ROS research while its translational components will contribute to European societies’ economic growth and wellbeing.

Working Groups

WG1 Sources of ROS
WG2 Molecular mechanisms and targets of ROS
WG3 Compounds interfering with detrimental ROS generation and the damage caused by ROS
WG4 Biomarkers of redox status
WG5 Imaging of redox status
WG6 Technology transfer

Non-COST Participation: Russian Federation

Keywords: Antioxidants, chronic diseases, crop science, individual therapy and diagnosis, oxidative/reductive stress.
Action BM1204

An Integrated European Platform for Pancreas Cancer Research: From Basic Science to Clinical and Public Health Interventions for a Rare Disease.

Objectives
The main objective of the Action is to capitalise on emerging scientific and technological developments to: (1) Identify new modifiable risk factors, and other environmental, genetic and epigenetic risk factors for PDAC and pave the road for the development of risk prediction algorithms; (2) Dissect the molecular complexity of PDAC through omics technology and identify clinically relevant disease subphenotypes; (3) Identify reliable biomarkers of early-stage PDAC; (4) Identify reliable predictive biomarkers in PDAC as well as novel molecular targets for tailored therapies; (5) Identify reliable genetic, epigenetic and tumour-related factors associated with the prognosis for PDAC patients; and (6) Assess the potential of the findings to be translated into public health and clinical settings, emphasizing their impact in high-risk groups.

Abstract
The application of the rapidly evolving -omics technologies to cancer research is a reality and it has demonstrated that large-scale international collaboration is essential to decipher relevant information in the context of massive-scale interrogations. This is even more important for rare and dreadful diseases like pancreas cancer (PDAC). We propose the creation of a unique European platform to facilitate the collaboration of a broad range of European and international PDAC multidisciplinary research groups to integrate knowledge and experience in a multidisciplinary way "from cell to society"; promote the application of uniform study tools and protocols; foster their optimal use by early-stage researchers; enhance the mobility and training of researchers; and permeate the society with the results originated by the Action. This Action will develop novel interdisciplinary tools that will improve our understanding of PDAC and its control by answering questions related to the aetiology, early detection and evidence-based and personalized treatment to enhance primary, secondary, and tertiary prevention, respectively, as well as on health management. The Action brings together a group of young scholars across a range of disciplines in collaboration with more experienced researchers and will allow Europe to actively participate in the international scenario of pancreas cancer research.

Keywords: Pancreas cancer, rare disease, omics data integration, tool harmonization, Early-stage researcher training and mobility, public health and clinical interventions.

Working Groups
WG1 Harmonization of research tools
WG2 Integration of omics data
WG3 Translational research
WG4 PDAC patient management

Interested Countries: 14
Proposer: ES, BE, CZ, DE, EL, FR, IE, IT, NL, PL, RS, SI, SE, UK
Action FA1201

Epigenetics and Periconception Environment – Periconception Environment as an Epigenomic Lever for Optimising Food Production and Health in Livestock

Objectives
The main objective of the Action is to establish a network of European researchers and industries working together in order to define how the periconception environment influences the production of healthy, fertile and productive livestock and which factors provoke epigenetic changes in gametes/embryos.

Abstract
Parental stress before, during and after conception (i.e. the periconception period) induces epigenetic changes in gametes and embryos. Such epigenetic changes may adversely affect the future health, development, productivity and fertility of those offspring. While there is increasing evidence for this in agricultural species, most of this knowledge derives from epidemiological studies in humans and controlled studies in laboratory animals. In this COST Action, time frames and mechanisms during which the gametes and early embryos are susceptible to epigenetic modifications will be determined in livestock in order to optimise their health and productivity. This COST Action will identify stressors and molecules which induce, modulate or remove epigenetic marks on genes that are relevant for different applications in farm animals. Public engagement activities are planned during the COST Action to inform the general public on the importance of the epigenome via the periconception environment in future food production, health and welfare. Research on epigenetic control of development is being performed by different groups in the EU, but efforts need to be coordinated in order to avoid duplication, set targets and guidance for future research and to standardise protocols in this field through a large collaborative EU network. These goals can only be achieved under a COST programme.

Working Groups
WG1 Epigenomic tools
WG2 Periconception environment
WG3 Cross-species epigenetics, gametogenesis and embryogenesis
WG4 Public, peri-conception and epigenome

Non-COST participation: Australia, USA and Argentina

Keywords: Epigenetics, gametogenesis, embryogenesis, environment.
Action FA1202

A European Network for Mitigating Bacterial Colonisation and Persistence on Foods and Food Processing Environments

Objectives
The main objective of the Action is to create a network for mitigating colonisation and persistence of bacteria on foods and processing environments to achieve targeted solutions for the control of associated risks in food industry through a multidisciplinary European network.

Abstract
Persistent bacteria on foods and processing sites are of great concern in food industry causing continuous recontamination and safety problems. Removal of persistent bacteria and biofilms is not only costly but can lead to loss of productivity and environmental issues. Therefore there is a need to combine and re-evaluate the current scientific knowledge on the persistence of bacteria, and to introduce new engineering approaches for controlling pathogens. The objective of this Action is to enable the development/promotion of targeted solutions for controlling risks associated with persistent bacteria and biofilms in the food industry. It involves a multidisciplinary network which will expand our knowledge on colonisation and persistence, and validate/identify appropriate methods for monitoring colonisation patterns. Known and emerging intervention methods will be explored and re-evaluated. The knowledge obtained will be promoted to the relevant food industries and the scientific community.

Keywords: Bacteria, colonisation, persistence, biofilms, intervention.

Working Groups
WG1 Harmonisation/standardisation of tools for the analysis of colonisation patterns
WG2 Mechanisms of bacterial attachment/detachment, survival and biofilm formation on surfaces
WG3 Stress responses vs. resistance development and persistence
WG4 Ways of prevention and intervention

Non-COST participation: Australia, New Zealand and Ukraine
**Action FA1203**

**Sustainable Management of Ambrosia artemisiifolia in Europe (SMARTER)**

**Objectives**
The aim of the Action is to initiate and coordinate long-term management options to reduce ragweed in Europe by establishing an inter-disciplinary consortium that serves as a template for implementing integrated control measures against invasive alien species across Europe.

**Abstract**
Common ragweed (Ambrosia artemisiifolia) is one of the most prominent invasive alien species (IAS) in Europe. Its pollen grains are noxious aeroallergens, it is an important agricultural weed and also occupies large non-crop areas with a range that is likely to accelerate under climate change. As a result, long-term and widely applicable options are required for its sustainable management, as well as the coordination of institutions involved in Ambrosia research and management throughout Europe. SMARTER will establish an interdisciplinary network including experts currently involved in the control of ragweed. Non-COST key-experts, health care professionals, aerobiologists, economists, and atmospheric and agricultural modellers. SMARTER will provide a forum for discussing long-term management and monitoring options and the development of new innovative management solutions, such as a synergy between biological, physical and chemical control measures and vegetation management, and assess their cost-effectiveness in mitigating the effects of IAS. SMARTER will act as a catalyst for long-term research, provide an information platform and develop best practice manuals for the integrated management of ragweed. It will also help to tackle other IAS, benefit all sectors affected by IAS, promote outstanding R&D, innovation in industry and provide support for policy-makers in the European Research Area (ERA).

**Keywords:** Invasive alien species, Common Ragweed, biological control, integrated weed management, economic and environmental management assessment.

**Working Groups**
- WG1 Biological Control
- WG2 Vegetation management
- WG3 Integration of management options
- WG4 Management evaluation

**Non-COST participation:** Armenia, Australia, Canada, China, Georgia, Iran, Russian Federation, Ukraine, USA, European Bodies Participants
Action FA1204

Vegetable Grafting to Improve Yield and Fruit Quality under Biotic and Abiotic Stress Conditions

Objectives
The main objective of the Action is to understand the biological basis of rootstock-mediated improvement of Cucurbits and Solanaceous crops and their compatibility by combining already existing scientific information generated in several COST and non-COST countries as a basis for development and exploitation of new rootstocks.

Abstract
Due to limited availability of arable land and water resources, the widespread use of fertilizers, and the great market demand for vegetables, cucurbits and solanaceous crops are frequently cultivated under unfavourable soil and environmental conditions. These include soilborne pathogens, salinity, thermal stress, drought, and high concentrations of heavy metals. These harmful conditions are magnified by the changes in climate and environmental conditions and the restrictive policies of agrochemical usage. One way to avoid or reduce loss in production caused by adverse conditions in vegetables would be to graft them onto rootstocks capable of alleviating the effect of external stresses on the shoot. This Action aims to stimulate cutting-edge multidisciplinary collaborations towards identifying and understanding how rootstock-mediated traits can improve vegetable crop yield and quality under adverse biotic and abiotic conditions. Shared knowledge and enhanced scientific and technical collaboration will surely fill knowledge gaps in the area of vegetable grafting. This Action can also stimulate a widespread commercial development and exploitation of this technique in Europe. The knowledge collected will be presented in a book as a final output of this Action. Moreover, all data and information of this Action will be made available to the public through a specific website.

Keywords: Vegetable grafting, rootstock breeding and genetics, rootstock-scion interaction, biotic and abiotic stress resistance, fruit quality.

Working Groups
WG1 Genetic resources and rootstock breeding
WG2 Rootstock-scion interactions and graft compatibility
WG3 Rootstock-mediated resistance to biotic and abiotic stresses
WG4 Rootstock-mediated improvement of fruit quality

Non-COST participation: China, Republic of Korea, Lebanon, USA
Action FA1205

Assessing and improving the quality of aquatic animal gametes to enhance aquatic resources. The need to harmonize and standardize evolving methodologies, and improve transfer from academia to industry.

Objectives

The main objective of the Action is to harmonize and standardize evolving analytical methodologies used in assessing the quality of aquatic gametes, improving their different uses, enhancing aquatic resources and transfer from academia to the industry.

Abstract

During the past six years, three international workshops on fish gametes demonstrated a rapid development of methodologies that encompass extensive opportunities for promising use in basic reproductive biology, genetic research, biotechnology and aquaculture practice. All of these can have far-reaching consequences on conservation of endangered species, assessment of anthropogenic and climatic impacts on aquatic species and application in aquaculture, as well as in fisheries management. In particular, it has been recognized that there are many highly diverging details in the practical application of these new methods used by most scientists and laboratories, which can cause highly variable if not contradicting results, even using the same species. There is an urgent need towards a universal scale to assess both the precise state of sexual maturation (for secure broodstock use) and related life history traits (gamete quality assessment, incubation of eggs) in teleost fish and other commercially important invertebrates used in either bioassays or aquaculture. The aim of the proposed AQUAGAMETE COST Action is to reach a consensus on protocols and guidelines (using internationally defined terminology, units of measurement and format of reporting) that permit the use of results in relational databanks for sound and common application in aquaculture research and commerce.

Working Groups

WG1 Techniques for evaluation of gametes quality
WG2 Gametes storage and preservation
WG3 Basic and applied research on gametes biochemistry and physiology, including omics
WG4 Organization of training courses and coordinate meetings and two next International Workshops on Biology of Fish Gametes

Non-COST participants: Brazil, Japan, Singapore, South Africa

Keywords: Aquatic species gametes, Aquaculture, Endangered species, Biotechnology, Cryopreservation.
Action FP1201

Forest Land Ownership Changes in Europe: Significance for Management and Policy (FACESMAP)

Objectives
The main objective of the Action is to provide European scale insights into the differentiated and changing forest ownership patterns, to scrutinize their consequences and to explore new approaches for policy and forest management.

Abstract
Forest ownership is changing across Europe. In some areas a growing number of so-called “new” forest owners hold only small parcels, have no agricultural or forestry knowledge and no capacities or interest to manage their forests, while in others new community and private owners are bringing fresh interest and new objectives to woodland management. This diversity and change creates implementation problems for forest-related policies including biodiversity conservation, timber and renewable energy supply, climate change mitigation, or recreation. The objectives of the Action are:

1. To analyse attitudes and constraints of different forest owner types in Europe and the ongoing changes (outputs: literature survey, meta-analyses and maps).
2. To explore innovative management approaches for new forest owner types (outputs: case studies, critical assessment).
3. To study effective policy instruments with a comparative analysis approach (outputs: literature survey, case studies, policy analyses).
4. To draw conclusions and recommendations for forest-related policies, forest management practice, further education and future research.

The interdisciplinary work will be done in close cooperation with relevant public and private stakeholders. A COST Action is suited for the strongly needed but still lacking comprehensive European overview and analyses.

Keywords: Forest ownership structure, private forest owners motives, forest-related policies, new sustainable forest management models.

Working Groups
WG1 Forest ownership types and motives
WG2 New forest management approaches
WG3 Forest owner related policies

Interested Countries: 24
AT, BA, BG, CZ, DE, DK, EE, ES, FI, FR, HR, HU, IT, LT, LV, MK, NO, PT, RO, RS, SI, SK, SE, UK
Action FP1202

Strengthening Conservation: A key Issue for Adaptation of Marginal/Peripheral Populations (MaP-FGR) of Forest Tree to Climate Change in Europe

Objectives
The main objective of the Action is to generate relevant knowledge on the role and use of the genetic resources of marginal/peripheral populations (MaP FGR) to adapt forests to global change using a multidisciplinary approach. The Action will train researchers and establish active and efficient networking/exchanges.

Abstract
Marginal/peripheral (MaP) forest populations are at the edges of species ranges and contain an original genetic diversity due to unsuitable conditions for survival. Studying adaptive processes in MaP populations is crucial and of mutual interest for European and non-European countries for understanding the future of forest ecosystems. Developing conservation and management strategies for Forest Genetic Resources (FGR) of MaP populations is needed to adapt European forests to Global Change. Because of their millennia-long history of adaptation to environmental changes, FGR in southern Europe may prove invaluable for adapting the European forestry sector. However, southern MaP populations are not only threatened by ongoing climate change but also by other disturbances arising from human activities. Southern Europe represents an ideal model where the effects of climate change on FGR will be stronger and more rapid than in the rest of Europe. This COST Action, with its broad research spectrum and partnership, addresses the conservation and management of MaP FGR by: (i) compiling information on climate change impacts on MaP populations, (ii) making information available for preparing national and pan-European forest plans and strategies for adaptation and mitigation, (iii) developing criteria for monitoring and conserving FGR, (iv) sharing results with forest managers.

Keywords: Forest Genetic Resources, Adaptation to global change, Marginal/peripheral Populations, Genetic Erosion, Conservation.

Working Groups
WG1 Gathering of already available data and compilation of ecological, genetic and global change information
WG2 Evaluation and analysis of WG1 information
WG3 Mainstreaming genetic diversity into sustainable forest management in the context of global change, considering both conservation and use of FGR
WG4 Coordination of all networking, databases management, training and communication activities

Non-COST participation: Algeria, Lebanon, Morocco, Syrian Arab Republic, Tunisia
Action CM1201

Biomimetic Radical Chemistry

Objectives
The main objective of the Action is to implement biomimetic chemical models for understanding free radical biological events. Focus is on: enzymatic activities, DNA damage, membrane stress and bio-inspired synthetic strategies.

Abstract
Knowledge of chemical reactivity is essential for understanding at a molecular level the mechanistic steps that drive processes in life sciences. This COST Action aims to enhance the role of chemistry as a central discipline for understanding free radical biological events. This goal will be achieved through the implementation of biomimetic chemical models. Four Working Groups will focus on: enzymatic activities via free radical species; the formation and fate of free radicals involving nucleic acids; membrane lipids in stress and ageing; and synthetic methodologies inspired by natural free radical processes. The research groups participating in the Action will create an interdisciplinary framework, in which a younger generation of investigators can broaden their expertise by studying the diversity of free radical interactions in biological systems for metabolic, synthetic and catalytic activities through biomimetic models.

Keywords: Free radical chemical reactivity of biological systems, mechanisms of ageing and biomarkers development, reactive oxygen species and biological damages, antioxidants and repair mechanisms, chemical synthesis and catalysis.

Working Groups
WG1 Radical Enzymes
WG2 Models of DNA Damage and Consequences
WG3 Membrane Stress, Signalling and Defences
WG4 Bio-Inspired Synthetic Strategies

Interested Countries: 20
Proposer: IT
AT, BG, CH, CZ, DE, DK, EL, ES, FR, HR, HU, IL, LT, NL, PL, PT, SE, TR, UK
Action CM1202

Supramolecular Photocatalytic Water Splitting (PERSPECT-H2O)

Objectives
The main objective of the Action is to develop a fundamental understanding of the function determining light-induced elementary reactions in supramolecular photocatalytic water splitting and to realize novel supramolecular photocatalysts for water splitting.

Abstract
PERSPECT-H2O will enable spectroscopy/theory guided design of supramolecular photocatalysts for water splitting, and hence the generation of molecular hydrogen as a renewable fuel. The network will integrate leading European groups and national research centres, focusing on a central theme of contemporary research in homogeneous photocatalysis and integration of supramolecular photocatalysts towards the construction of functional materials. The Action combines synthetic chemistry, photophysics and photochemistry, electrochemistry, and theory aiming at (i) a detailed molecular mechanistic understanding of photoinduced reaction steps in supramolecular photocatalytic water splitting, and (ii) development of functional systems. The envisioned approach identifies relations between molecular and electronic structure, photoinduced structural and electronic dynamics, catalytic efficiency, and the stability of long-lived intermediates and catalytically active species. Finally it yields functional photocatalytic materials based on earth-abundant elements and prototypes of supramolecular photocatalytic water-splitting systems.

Keywords: Artificial photosynthesis, solar fuels and water splitting (renewable hydrogen), supramolecular photocatalyst design, time-resolved spectroscopy and spectroelectrochemistry, theoretical chemistry.

Working Groups
WG1 Synthesis and photocatalysis
WG2 Device integration
WG3 Photoinduced dynamics
WG4 Structural intermediates and catalytically active species
Action CM1203

PoCheMoN: Polyoxometalate Chemistry for Molecular Nanoscience

Objectives
The main objective of the Action is to grow European polyoxometalate (POM) research and create a platform for coordination and cooperation that will accelerate advances in fundamental POM chemistry and world-leading POM-based Molecular Nanoscience.

Abstract
Polyoxometalates (POMs) are molecular metal oxides with dimensions in the nanometer range. Their uniquely versatile properties provide the basis for advances in catalysis, alternative energy sources, magnetic, electronic and photonic devices and medicine that are crucial to European science and technology. However, the global pre-eminence of European POM research is currently jeopardized by a rapid growth in activity in China, India and Pacific Rim states, where POM chemistry is recognized as critically important. The main objective of PoCheMoN is to accelerate POM-based Molecular Nanoscience by creating a coherent network for world-leading education and research in POM chemistry. This first overarching COST Action in this area will consolidate the European POM community and promote strategic and efficient POM research through collaboration, thereby creating a readily accessible knowledge base for the rapid uptake of POM chemistry into Molecular Nanoscience and generating breakthrough technologies through links with aligned disciplines and companies. Coordinated mobility will engender new research collaborations, training exchanges and rapid dissemination of results, thereby protecting key skills, growing the skill-base of early-stage researchers and enhancing research output to ensure that Europe benefits from sector leadership into the future in the face of strong competition from the rapidly expanding far-east effort.

Keywords: Polyoxometalate synthesis, structure and properties, nanoscale functional materials, directed assembly, computational studies, surface science.

Working Groups
WG1 POM chemistry and characterisation
WG2 POM-based materials and modified surfaces
WG3 Physical characterization and theoretical modelling
WG4 Applications of POM-based molecular nanoscience

Non-COST participation: Australia, Russian Federation
Action ES1201

NETLAKE – NETworking LAKE observations in Europe

Objectives
The main objective of the Action is to build a network of sites and individuals that will support the development and deployment of sensor-based systems in lakes and reservoirs and promote the use of these systems to address both current and future water quality issues. These issues include those highlighted by the Water Framework Directive (WFD) and the sustainable maintenance of aquatic biodiversity as addressed in Natura 2000.

Abstract

Lakes represent important resources within Europe, providing drinking water, hydroelectric power, flood control, recreation and fisheries. Developments in sensor technology now allow high-resolution monitoring of lakes and reservoirs from in-situ platforms, with the data provided to local end-users by web-based technology. The information acquired by these systems is currently reviewed on a site-by-site basis, but an even greater potential lies in the integration of data from many sites into a European network. Barriers to the development of such a network include, for example, a lack of information on the number of sites currently monitored, and the need for standardisation in data collection, processing and quality control. The over-arching objective of NETLAKE is to establish a network of scientists, technologists, managers and stakeholders focused on the development and application of cutting-edge sensor technology for the protection of European lakes and reservoirs. Deliverables will include a meta-database of instrumented sites, case studies on management-relevant topics, data analysis tools, and a citizen science programme to involve local communities in the protection of water resources. The key deliverable, however, will be the establishment of the NETLAKE network itself, bridging communication gaps between researchers, policy makers and managers, and between scientists and local communities.

Keywords: Lakes, sensor technology, instrumented platforms, resource management, citizen science.

Working Groups

WG1 Development of meta-database and standard operating procedures
WG2 Data analysis and modelling tools
WG3 Development of a citizen science initiative on instrumented lake sites.
WG4 Informing policy and management using lake sensor data
WG5 Dissemination of NETLAKE outputs

Non-COST participation: Australia, New Zealand, USA

Interested Countries: 15

Proposer: IE
CH, DE, DK, EE, ES, FI, FR, HU, IL, IT, NL, PL, SE, UK

Earth System Science and Environmental Management (ESSEM)
Action ES1202

Conceiving Wastewater Treatment in 2020. Energetic, environmental and economic challenges (Water_2020)

Objectives
The main objective of the Action is to face innovation in wastewater treatment from a holistic point of view, in which technological, environmental, energetic, economic and social factors are included.

Abstract
This Action brings together leading professionals working on complementary areas of wastewater treatment (WWT) at Research Institutions, Industries and Water Agencies. The Action will tackle current challenges of WWT, which apart from generating high quality water and sludge, must incorporate issues as resource recovery, energy, odours, greenhouse gases, emerging contaminants, economical efficiency and social acceptance. Thus, the conception of sustainable wastewater treatment plants by 2020 (Water_2020) has to be based on a holistic approach, in which a plant-wide (i.e. including all the inputs and outputs), multi-disciplinary (i.e. with technical, environmental, social and economical considerations) and flexible (i.e. depending on the geographical and socio-economic situation) perspective is included. Research in the water sector is quite fragmented, with scientist working on specific disciplines, and innovation in many countries is hindered due to lack of initiative or confidence. COST Action offers the perfect framework to overcome these barriers by creating a network in which excellent water professionals from different stakeholders and disciplines will cooperate and exchange knowledge. Annual workshops, semi-annual meetings, training schools, a discussion platform and Short Term Scientific Missions will be used as instruments for reaching this effective network. The main deliverables that will be obtained include a book produced by reputable publishers with clear guidance for Water_2020, as well as a Decision Support System for the selection of the best alternatives for each specific economic, legal and social requirement. This COST Action will allow setting up a strong European network, including Early-Stage Researchers (ESR), whose results will be disseminated to the scientific community, water industry, policy makers and society, as the issues implies environmental (water and air pollution), economic (reduce operational costs through resource recovery and energetic self-sufficiency) and social (safer water) concerns.

Keywords: Flexibility, holistic approach, innovation, sustainability, wastewater treatment.

Working Groups
WG1 Energetic self-sufficiency
WG2 Resource recovery
WG3 Minimising environmental and economic impacts
WG4 Process integration (DSS, control, modelling, optimisation)

Interested Countries: 17
Proposer: ES
BE, CH, CZ, DE, DK,
EL, FR, IT, LT, NL,
PL, PT, RO, SE, TR, UK
Action ES1203

Enhancing the Resilience Capacity of SENSitive mountain FORest ecosystems under environmental change (SEnSFoR)

Objectives
The main objective of the Action is to enhance sustainable governance of sensitive treeline ecosystems and related ecosystem services, and to build the capacity of local and regional actors to cope with future climate and land-use changes using fresh approaches to knowledge integration.

Abstract
Treeline ecosystems are important indicators of environmental change because they are heavily impacted by environmental drivers, in particular by changes in climate and land-use, resulting in land abandonment and reforestation of formerly treeless areas. With a focus on treeline ecosystems, this Action aims at integrating scientific methods and results related to biodiversity conservation and sustainable use of natural resources under climate and land-use change. The Action will investigate the drivers and extent of contemporary and future environmental changes in European mountain forests, develop methods for estimating their resilience and define consequences for society. This knowledge provides the scientific basis necessary for developing and adjusting management strategies together with local and regional stakeholders as well as policy recommendations for national and European policy makers. Applying the DPSIR (Drivers, Pressures, State, Impact, Response) framework, the joint actions of the SEnSFoR network will contribute to the development of strategies for preserving ecosystem services and biodiversity conservation in sensitive mountain areas in Europe.

Keywords: Treeline ecosystems, climate change, land-use, resilience, DPSIR framework.

Working Groups
WG1 Analysing the present state and changes in ecosystem structures and functions with particular focus on identifying the DPSIR factors in each case study region.
WG2 Creating a holistic set of indicators for the vulnerability and resilience of coupled socio-ecological systems on the basis of DPSIR framework analysis.
WG3 Organising stakeholder workshops between network participants and outside user groups in order to integrate different kinds of knowledge into management plans which serve policy development in practice, and to create scenarios and use them as ways to integrate various knowledge.
WG4 Providing a logical framework according to which outputs, such as deliverables and peer-reviewed publications, can be structured. The knowledge collected through the first three Working Groups (WG1–3) will be disseminated through different methods, i.e., knowledge exchange, training courses, publications and reports.
Action ES1204

Loss of the Night Network (LoNNe)

Objectives
The main objective of the Action is to facilitate the transfer of existing knowledge between the fragmented national research projects studying the multifaceted aspects of artificial light at night, thereby stimulating future transdisciplinary research; furthermore it will initiate dialogue regarding light pollution with the whole range of concerned and involved stakeholders, in particular the general public.

Abstract
LoNNe aims to improve knowledge of the multiple effects of increasing artificial illumination worldwide. Innovations in technology and policy are urgently required to address the impact of artificial lighting on the natural environment, biodiversity, ecosystems, human health and society, and to identify potential corrective measures. Until now, the overwhelming focus for improvements in illumination technology has been with regard to energy and luminous efficiency. Existing research associated with the impact of artificial lighting on various aspects of our environment and lives is fragmented, and generally at best at a regional or national level. The current potential for networking to enhance mobility between different actors from science, health care, public authorities and industry is limited. LoNNe aims at a cooperation of these players in order to cross-fertilize skills, and to create standard operating procedures. The COST Action will be open to any field of research, with the explicit goals of influencing the development path of modern lighting technology, and creating guidelines for lighting concepts that are ecologically, socially, and economically sustainable.

Keywords: Artificial lighting, light pollution, sustainability, environment, human health.

Working Groups
WG1 Creating a platform and appropriate sub-networks concerning the significance of artificial lighting
WG2 Assembling existing data concerning artificial lighting and light pollution
WG3 Quantifying the economic value of nights with near-natural light conditions
WG4 Dissemination of research results to raise awareness of the consequences of light pollution
Action MP1201

Nanoscale Superconductivity: Novel Functionalities through Optimized Confinement of Condensate and Fields (NanoSC-COST)

Objectives
The main objective of the Action is to streamline science and technology in the field of superconductivity and to contribute to the development of novel applications of nanostructured superconductors beneficial to European industry and society.

Abstract
The world has just celebrated the 100 years of discovery of superconductivity by Kamerlingh Onnes. Superconducting materials are of special interest in the XXI century since they provide new energy saving solutions for electricity grids, transport, metrology, information/communication technologies, and healthcare. This COST Action will coordinate and strengthen scientific and technological collaboration in the field of superconductivity in Europe through a variety of organizational tools, assuring leadership in this field. It will cover fundamental issues as well as explore possible novel applications important for European industries. This Action will also contribute to innovation-based growth in the field of superconductivity aimed at overcoming the existing bottlenecks for widespread industrial applications of nanostructured superconducting materials. The key novel approach here is to exploit recent spectacular progress in design and fabrication of nanostructured superconductors, in order to develop and implement such flux and condensate confinement patterns, which not only substantially improve the superconducting critical parameters, but also lead to novel functionalities of these nanopatterned materials. Due to the advanced dedicated modern technologies needed to produce nanostructured superconductors, international and interdisciplinary collaboration is essential for a successful implementation of the objectives for the NanoSC-COST Action.

Working Groups
WG1 Design and fabrication of new superconducting nanostructures
WG2 Characterisation
WG3 Modeling tools
WG4 SME’s/Industry relations - demonstrator devices
WG5 Coordination, dissemination & teaching-actions

Non-COST participation: Australia, Brazil, Japan

Keywords: Superconductivity, Nanostructuring, Vortex matter, Superconductor/Ferromagnet Hybrids, Josephson junctions and qubits.

Materials, Physics and Nanosciences (MPNS)
Action MP1202


Objectives
The main objective of the Action is to develop a European interdisciplinary platform for scientific added value and improvement of industrial applications of hybrid organic-inorganic materials via a detailed understanding of the properties and dynamics of the multiscale interfaces in such materials.

Abstract

Hybrid organic-inorganic (HOI) materials synthesized using soft inorganic chemistry allow a combination of organic and inorganic units at molecular/nanoscale level, thereby opening access to a wide spectrum of multifunctionality not possible with traditional concepts of materials science. These innovative materials will have major impacts in many application domains (optics, electronics, mechanics, protective coatings). The nanostructure, degree of organization and properties of such materials do not only depend on the chemical nature and the synergies between their nano-units, but also strongly rely on the interface they share. As a consequence, this research network will carry out detailed investigations of design, control, and dynamics of HOI interfaces. Key actions for this COST Action are: a) interfaces improved characterization methods, b) innovative computational approaches, simulation of interaction processes, c) in situ studies of the dynamic aspects of the interface formation, d) role of interfaces for process optimisation and devices. This COST Action research programme perfectly fits with the technological requirements for hybrid materials identified by European industry defined by the European Technology Platform SusChem. The COST Action will contribute to enhance the position of European industry R&D, through creation of patents and industry collaborations.

Keywords: Hybrid organic-inorganic materials, Characterization, Simulation & Dynamics of Interfaces, Functionalization

Working Groups

WG1 New routes for synthesis, structuring and characterisation of hybrid interfaces
WG2 Computer modelling of hybrid interfaces
WG3 In Situ study of dynamics of hybrid interface formation
WG4 Process optimisation, devices and applications (in interaction with WG 1,2,3)
Action MP1203

Advanced X-Ray Spatial and Temporal Metrology

Objectives
The main objective of the Action is to combine different communities from European and International laboratories and X-ray facilities and industry to make significant scientific and technical progress in spatial and temporal X-ray metrology.

Abstract
Soft 0.03-1 keV and hard X-rays 1-100 keV are one of the best tools for probing matter from the macroscopic to the atomic scale thanks to their penetrating power, spectral selectivity and ability to achieve single atom image. Apart from scientific applications, X-rays are everywhere in our daily life, from medicine, security, food safety, environment and cultural heritage. Ultra-intense X-ray free-electron lasers, plasma-based soft X-ray lasers and attosecond high harmonics have strongly changed the X-ray paradigm. Demands on optics and beam metrology are outstripping the conventional X-ray metrology pulsed by synchrotron, EUV lithography and solar telescopes. This COST Action will bring together and consolidate a huge infrastructural and facility rich consortium. New synergies between the different groups will induce strong and fast progress in X-ray metrology. Firms and standardization laboratories are well involved. This Action will improve public and private researchers career at all stages, by increasing mobility and exchange. Five working groups will be set: “X-ray spatial metrology of optics”, “Spatial and temporal metrology of X-ray sources”, “X-ray coherent and incoherent imaging diagnostics”, “Damage on X-ray optics”, “High brightness and coherent X-ray sources for advanced spatial and temporal metrology”.

Working Groups
WG1 X-ray spatial metrology of optics
WG2 Spatial and temporal metrology of X-ray sources
WG3 X-ray coherent and incoherent imaging diagnostics
WG4 Damage on X-ray optics
WG5 High brightness and coherent X-ray sources for advanced spatial and temporal metrology
WG6 Dissemination

Non-COST participation: China, Japan, USA

Keywords: Attosecond or ultra-intense X-rays coherent imaging damage spatial and temporal metrology technology transfer.
Action MP1204

TERA-MIR Radiation: Materials, Generation, Detection and Applications

Objectives
The main objective of this Action is to advance novel materials, concepts and devices for the generation and detection of THz and Mid Infrared radiation and to beneficially exploit their common aspects within a synergetic approach.

Abstract
The main objective of this Action is to advance novel materials, concepts and device designs for generating and detecting THz (0.3 THz to 10 THz) and Mid Infrared (10 THz to 100 THz) radiation using semiconductor, superconductor, metamaterials and lasers and to beneficially exploit their common aspects within a synergetic approach. The Action will use the unique networking and capacity-building capabilities provided by the COST framework to unify these two spectral domains from their common aspects of sources, detectors, materials and applications. The key instruments of the Action will be meetings of the Working Groups, Round Robin activities, Short Term Scientific Missions (STSMs) and annual Workshops. The Action will create a platform to investigate interdisciplinary topics in Physics, Electrical Engineering and Technology, Applied Chemistry, Materials Sciences and Biology and Radio Astronomy. In this sense THz and MIR are considered jointly, the driving force for both regimes being applications. The main emphasis will be on new fundamental material properties, concepts and device designs that are likely to open the way to new products or to the exploitation of new technologies in the fields of sensing, healthcare, biology, and industrial applications. End users are: research centres, academic, well-established and start-up companies and hospitals.

Working Groups
WG1 Intersubband materials and devices with applications to fingerprint spectroscopy
WG2 Metamaterials, photonic crystals and new functionalities
WG3 Nonlinearities and interaction of radiation with matter including biomaterials
WG4 Generation and Detection based on Nitrides and Bismides

Non-COST participation: Brazil, Canada, Russian Federation, USA

Keywords: Midinfrared, Terahertz, Sources, Detectors, Materials
Action MP1205

Advances in Optofluidics: Integration of Optical Control and Photonics with Microfluidics

Objectives
The objective of this COST Action is to establish long-term collaboration between laboratories working in the fields of micro- and opto-fluidics, optical tweezers, nanoscience and photonics, bio- and soft-materials, focusing on lab-on-a-chip systems.

Abstract
The goal is to increase the knowledge in basic physics and biology from the micro- down to the nano-scale, and to develop the future generation of lab-on-a-chip devices for portable and inexpensive, but accurate and reliable equipment for: (i) diagnostics; (ii) detection, identification and manipulation of biomolecules and nanomaterials; (iii) biomedical and environmental microsensing, (iv) advanced imaging, (v) energy generation. The scientific innovation concerns advanced concepts of optofluidics and new generation of optofluidic devices integrating photonics as well as optical control. Indeed, their technologically relevant research threads are of significant interest for the academic community and industrial R&D. In order to capitalize on recent achievements and go forward, a platform as a COST Action, promoting interdisciplinary activities, is a relevant tool to exchange expertise and to explore new opportunities coming from each specific insights and knowledge.

Keywords: Optofluidics, photonics, optical nano-scale, micro-sensing.

Working Groups
WG1 Integrated microfluidic photonics
WG2 Optical control in microfluidics
WG3 Materials (soft, bio and nano) and technologies for optofluidics devices

Non-COST participation: Australia, Mexico, USA

Materials, Physics and Nanosciences (MPNS)
**Action IS1201**

**Disaster Bioethics: Addressing Ethical Issues Triggered by Disasters**

**Objectives**
The main aim of the Action is to improve ethical decision-making for disasters by gathering knowledge of the ethical dilemmas encountered in disaster settings and by developing training materials and resources for tackling these dilemmas that will assist policy-makers, humanitarian organisations, healthcare professionals, and researchers.

**Abstract**
Disasters overwhelm local and often national capacity to respond effectively. Significant imbalances result between needs and available resources. Disasters have become more frequent and more costly, trends predicted to continue. As a result, disaster risk reduction and management are important priorities for national, European and global agencies. Ethical decisions must be made throughout disaster planning and in responses. High levels statements stress the importance of disaster ethics to put people first in disasters. Yet few resources are available for disaster ethics decision-making. Policy makers, humanitarian agencies and individual responders seek ethical guidance and training materials to better address the challenging and distressful ethical dilemmas in disasters. Evidence-based knowledge is required to promote high-quality ethical decision-making. This Action aims to improve ethical decision-making for disasters by gathering knowledge of the ethical dilemmas and issues, carefully examining them, and developing training materials and published resources to address disaster ethics. These outputs will assist policy-makers, humanitarian organisations, healthcare professionals, researchers and the public. The Action will benefit European citizens, organisations and States who already provide extensive resources for disaster relief. Thereby, the Action will benefit those affected by disasters which disproportionately impact lower income countries and the more vulnerable within those regions.

**Keywords:** Disaster ethics, bioethics, humanitarian ethics, emergency, public policy.

**Working Groups**
- WG1 Healthcare ethics
- WG2 Bioethics, culture and moral theory
- WG3 Research ethics
- WG4 Ethics and governance

**Non-COST participants:** Canada, USA, South Africa, Institutions in International Organisations.
Action IS1202

Dynamics of Virtual Work

Objectives
The main objective of the Action is to bring coherence to the emerging field of the study of virtual work by bringing together scholars from different backgrounds to consolidate existing knowledge, develop theory and map an interdisciplinary research landscape in which early stage researchers can develop and thrive. It further aims to distil knowledge in the field in such a way that policy stakeholders can use it to develop effective strategies to harness the power of ICTs to generate new employment and economic development in Europe and provide the European workforce with the skills to enter these new jobs and participate in the innovation processes associated with the development of a world-leading European knowledge-based economy.

Abstract
ICTs have had a major impact on the content and location of work. Digitisation of information has transformed labour processes whilst telecommunications have enabled jobs to be relocated globally. But ICTs have also enabled the creation of entirely new types of ‘digital’ or ‘virtual’ labour, both paid and unpaid, shifting the borderline between ‘play’ and ‘work’ and creating new types of unpaid labour connected with consumption and co-creation of services. This affects private life as well as transforming the nature of work. Because of the gender division of labour, this affects women and men differently. The changing geography of virtual work and the emergence of new value-generating virtual activities have major implications for economic development, skills and innovation policies. However these are poorly understood because they have been studied in a highly fragmentary way by isolated researchers. This Action will distil knowledge to enable policymakers to separate facts from hype and develop effective strategies to generate new employment and economic development in Europe. It will bring together experts in the fields of communications, innovation, management, digital media, creative industries, technology, employment, economics, sociology, geography, gender studies and cultural studies to consolidate theory, map this emerging field, support early stage researchers and develop new research agendas.

Keywords: virtual, work, digital labour, value, creativity

Working Groups
WG1 New geographies and the New Spatial Division of Virtual Labour
WG2 Creativity, Skills, Knowledge and New Occupational Identities
WG3 Innovation and the Emergence of New Forms of Value Creation and New Economic Activities
WG4 Policy Implications, Including Economic Development, Employment and Innovation Policy

Non-COST participation: Australia, Brazil, Canada, China, India, USA, Institutions in European Bodies

Interested Countries: 22
Proposer: UK
AT, BE, BG, CY, DE, DK, EE, EL, ES, FI, HU, IE, IL, IT, NL, PT, RO, RS, SI, SE, TR
**Action IS1203**

**In Search of Transcultural Memory in Europe (ISTME)**

**Objectives**
The main objective of the Action is to investigate how memories of the twentieth century work as a transcultural dynamic in Europe today by comparing a selection of case studies of transmission and reception of such memories across Europe’s cultural and political borders.

**Abstract**
This Action aims to go beyond the nationally oriented memory studies that tend to reify the bond between culture, nation and memory. Instead it will investigate the transcultural dynamics of memory in Europe today. Studying how memories of the troubled twentieth century are transmitted and received across Europe, the Action will explore the tension between attempts to create a common European memory, or a unitary memory ethics, on the one hand and numerous memory conflicts stemming from Europe’s fragmentation into countless memory communities on the other. Drawing on recent theoretical insights that point to the importance of memory migration, mediation and new media the Action seeks to develop new methods for studying and comparing effects of memory transmission over cultural borders. The Action aims to develop European memory studies theoretically and methodologically by focusing on transculturality, agency and reception - and to contribute to finding ways of accommodating memory conflicts.

**Keywords:** Memory conflicts; transcultural memory; migration; reception; Europe.

**Working Groups**
- WG1 Politics of memory
- WG2 Memory in mass communication
- WG3 Memory and migration

**Non-COST participation:** Russian Federation, Ukraine, USA

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**Interested Countries: 20**
Proposer: SE
AT, CZ, DE, DK, EE, ES, FI, FR, HR, HU, LT, NL, NO, PL, RO, RS, SI, SK, TR, UK
Action IS1204

Tourism, Wellbeing and Ecosystem Services (TObeWELL)

Objectives
The aim of the Action is to explore, challenge and develop the interdisciplinary potentials of research in the fields of tourism, recreation, wellbeing, health and ecosystem services, as well as build bridges and promote knowledge transfer between the research, practitioner and policy-making communities, both across these knowledge areas and different European regions and contexts.

Abstract
This project is based on bringing together principles of ecosystem services (ES), which focus on life support systems, with more non-material services such as culture, health and wellbeing through tourism. It aims to link research on wellbeing provided by ecosystems and their use via tourism, leisure and recreation activities. The underpinning issue of this proposal is to produce new and collaborative research on how and in what way can tourism be a catalyst for improving human health and wellbeing, by using in a symbiotic and sustainable way natural resources and services provided by ecosystems, as well as exploring the challenges of (e)valuation of such services. This will be achieved by creating a collaborative European network of research centres based around four key working groups, namely (a) theoretical relationships between tourism, wellbeing and ES; (b) empirical and methodological research challenges and approaches; (c) interrelations between ageing, wellbeing and ES; and (d) policy frameworks’ analysis and research-informed policy making.

Keywords: Nature-based tourism and recreation, Health and Wellbeing, Ecosystem Services, Natural and Human Capital, Interdisciplinary research.

Working Groups
WG1 Relationships between tourism, wellbeing and ecosystem services: theoretical aspects, impacts and interdependences.
WG2 Empirical and methodological research issues and approaches for tourism, wellbeing and ecosystem services.
WG3 Ageing, wellbeing and Ecosystem services
WG4 Towards research – informed policy making on Tourism, Wellbeing and Ecosystem Services.
Action IS1205

Social Psychological Dynamics of Historical Representations in the Enlarged European Union

Objectives
The main objective of the Action is to advance scientific knowledge about the role played by lay representations of history in processes of ethnic, national, and European identities construction and intergroup conflicts by combining expertise in social psychology and in history, moving towards a unified theoretical framework and a set of guidelines applicable in Europe.

Abstract
Social representations of history are vital to form a group’s identity. They have a wide social and political impact as they provide some of the cultural contents that accompany identity changes following societal transformations. In Europe, these representations are fragmented between nations or ethnic groups. They elicit group-based emotions that influence behaviours and may lead to intergroup conflicts or reconciliation. The aim of the COST Action is to advance knowledge on the role played by social representations of history in processes of ethnic, national, and European identities construction and intergroup conflicts. It will coordinate research on 1) the psychological antecedents of lay representations of history; 2) their content and structure; 3) their transmission through history textbooks and other media; and 4) their social psychological effects in shaping attitudes. The Action will stimulate scientific cooperation among social psychologists and historians sharing an interest for history education from a wide range of countries. This will be done through four Working groups, two international conferences, Short-Term Scientific Missions, a summer school and a dedicated website. The Action will have an impact in both scientific and public domains through academic and public dissemination.

Keywords: Social representations of history, social identity, intergroup conflict, group-based emotions, history education

Working Groups
WG1 The role of social cognitive processes in shaping lay representations of history
WG2 Lay representations of history in Europe: Conceptions of nationhood and identities.
WG3 Social-psychological implications of the narrative transmission of history
WG4 The role of lay representations of history and group-based emotions in conflict and reconciliation processes.

Non-COST participation: Argentina and New Zealand

Individuals, Societies, Cultures and Health (ISCH) 32
Action IC1201

**BETTY: Behavioural Types for Reliable Large-Scale Software Systems**

**Objectives**
The aim of the Action is to use behavioural type theory as a basis for improved programming languages and tools for the implementation of reliable large-scale distributed software systems.

**Abstract**

Modern society is increasingly dependent on large-scale software systems that are distributed, collaborative and communication-centred. Correctness and reliability of such systems depend on compatibility between components and services that are newly developed or may already exist. The consequences of failure are severe, including security breaches and unavailability of essential services. Current software development technology is not well suited to producing these large-scale systems, because of the lack of high-level structuring abstractions for complex communication behaviour. This Action will use behavioural type theory as the basis for new foundations, programming languages, and software development methods for communication-intensive distributed systems. Behavioural type theory encompasses concepts such as interfaces, communication protocols, contracts, and choreography. As a unifying structural principle it will transform the theory and practice of distributed software development. The significance of behavioural types has been recognised world-wide during the last five years. European researchers are internationally leading. There is an urgent need for European co-ordination to avoid duplication of effort, facilitate interactions among research groups, and ensure that the field proceeds efficiently from academic research to industrial practice. This Action will provide the co-ordination layer and leverage the efforts of European researchers, to increase the competitiveness of the European software industry.

**Working Groups**

- WG1 Foundations
- WG2 Security
- WG3 Languages
- WG4 Tools & Applications

**Keywords:** Distributed software infrastructure, software development methodology, foundations of programming languages, service-oriented computing, behavioural types.
Action IC1202

TACLe: Timing Analysis on Code-Level

Objectives
The main objective of the Action is to develop industrial strength code-level timing analysis techniques for future generation embedded systems.

Abstract

Embedded systems increasingly permeate our daily lives. Many of those systems are business- or safety-critical, with strict timing requirements. Code-level timing analysis (used to analyse software running on some given hardware w.r.t. its timing properties) is an indispensable technique for ascertaining whether or not these requirements are met. However, recent developments in hardware, especially multi-core processors, and in software organisation render analysis increasingly more difficult, thus challenging the evolution of timing analysis techniques. New principles for building "timing-composable" embedded systems are needed in order to make timing analysis tractable in the future. This requires improved contacts within the timing analysis community, as well as with related communities dealing with other forms of analysis such as model-checking and type-inference, and with computer architectures and compilers. The goal of this COST Action is to gather these forces in order to develop industrial-strength code-level timing analysis techniques for future-generation embedded systems.

Working Groups
WG1 Timing models for multi-cores and timing composability
WG2 Tooling aspects
WG3 Early-stage timing analysis
WG4 Resources other than time

Keywords: Real-time systems, WCET analysis, code generation, time-predictable computer architecture, safety-critical embedded systems.
Action IC1203

ENERGIC (European Network Exploring Research into Geospatial Information Crowdsourcing): Software and Methodologies for Harnessing Geographic Information from the Crowd

Objectives
The main objectives of the Action are: develop data mining software and methodologies to exploit a wide range of volunteered geographic information (VGI); define quality assessment criteria; establish an open and updatable repository of VGI analysis, integration tools, methods and case studies; develop VGI methods for understanding the local aspects of VGI datasets and their use.

Abstract
New and unprecedented sources of geographic information have recently become available in the form of user-generated Web content. The integration and application of these sources, often termed volunteered geographic information (VGI), offers multidisciplinary scientists an unprecedented opportunity to conduct research on a variety of topics at multiple spatial and temporal scales. Since applications generating VGI are not often designed specifically for data production or analytical purposes, the Action aims at the following to fill this gap, recognizing the potential value of these sources to the EU in citizen-based decision-making by: 1) define VGI sources, share and develop data retrieval software, assess VGI quality, 2) define standardization criteria for interoperability with other datasets, 3) identify applications and transfer these applications to business implementation (market analysis, risk management, advertising, etc.). The Action targets fundamental scientific and technological advances by establishing a European network of excellence on GeoWeb technologies. VGI is particularly relevant as it provides information of citizens’ preferences and concerns and is an alternative source of knowledge in a context where governments are putting fewer resources in data collection.

Working Groups
WG1 Common Data Mining Software and Methodologies
WG2 Quality Assessment Criteria
WG3 Repository of VGI Analysis, Integration Tools and Methods
WG4 Cultural and Contextual Analysis Methods

Non-COST participation: New Zealand, USA

Keywords: User-generated geographic information, Geographic Crowdsourcing, Volunteered Geographic Information, data retrieval, semantic interoperability.
Action IC1204

Trustworthy Manufacturing and Utilization of Secure Devices

Objectives
The main objective of the Action is to identify new design and manufacturing flows for the production of secure integrated circuits by creating a strong network between several centres of expertise on hardware security at European level.

Abstract

Hardware security is becoming increasingly important for many embedded systems applications ranging from small RFID tag to satellites orbiting the earth. Its relevance is expected to increase in the upcoming decades as secure applications such as public services, communication, control and healthcare will keep growing. The vulnerability of hardware devices that implement cryptography functions (including smart cards) has become the Achilles’s heel in the last decade. Therefore, the industry is recognizing the significance of hardware security to combat semiconductor device counterfeiting, theft of service and tampering. This COST Action aims at creating a European network of competence and experts on all aspects of hardware security including design, manufacturing, testing, reliability, validation and utilization. The network will play a key role in developing solutions responding to the hardware security challenges, hence strengthening the position of Europe in the field.

Keywords: Trustfulness of Secure Device Manufacturing, Test and Security of Secure ICs, Fault Attacks, Hardware Trojans, Reconfigurable Devices for Security.

Working Groups

WG1 Manufacturing test of secure devices
WG2 Trustworthy manufacturing of secure devices
WG3 Fault attack detection and protection
WG4 Reconfigurable devices for secure functions
WG5 Validation, Evaluation, and Fault Injection
Action IC1205

Computational Social Choice

Objectives

The main objective of the Action is to coordinate European research in Computational Social Choice and to address the fundamental challenges in the design of methods for collective decision making raised by recent advances in information technology.

Abstract

The COST Action on Computational Social Choice will address the fundamental new challenges in the design and analysis of methods for collective decision making raised by recent technological advances in areas such as social networks, electronic commerce, webpage ranking, and e-governance. Computational Social Choice is a novel and innovative research trend that is now gathering substantial momentum, especially in the European research arena. It combines methods from Computer Science with insights from Economic Theory. The Action will provide a much needed framework for coordinating research efforts in this important new field at the European level. The scientific programme will focus on four thematic areas: (1) voting and elections, (2) fair division, (3) information merging, and (4) matching mechanisms. In organisational terms, the Action will particularly emphasise the close involvement of Early-Stage Researchers.

Working Groups

WG1 Voting and Elections
WG2 Fair Division
WG3 Information Merging
WG4 Matching Mechanisms

Keywords: Computational Social Choice; Economics and Computer Science; Artificial Intelligence; Multiagent Systems; Collective Decision Making.

Non-COST participation: Australia, New Zealand, Russian Federation, Singapore, USA, South Africa
Action TU1201

Urban Allotment Gardens in European Cities – Future, Challenges and Lessons

Objectives
The aim of this Action is to better comprehend and manage the relevance of AG in political, social, ecological and urban design aspects within the urban context of European cities. This will be achieved by creating an interdisciplinary network to foster the multi-dimensional aspects of knowledge about AG and by the identification of practices supportive for the management of AG within urban planning processes.

Abstract
The main objective of the Action is to create a research platform on which Allotment Gardens (AG) and their relevance for sustainable urban development in Europe will be comprehended and managed, and also their impacts from social, ecological and urban design perspectives will be studied. During the last 20 years, there can be seen both, a revival of interest in AG by urban residents especially in large cities and a simultaneous competition from other kinds of land use. The multi-character and partly contradictory nature of the AG makes it a relevant issue to be studied within different European urban contexts. Through selected case studies and in-depth research (into the areas of policy and urban development, sociology, ecology, urban design), the initiative will showcase the state-of-the-art, challenges and opportunities. The relevance and potential of AG for urban development so far has not been studied from a European perspective. The Action will contribute to a better understanding of framing conditions for policy measurements in different European countries through different outputs such as the development of a Comparative Rating System.

Keywords: Sustainable urban development, allotment garden, land use, socio-ecological benefits, urban well-being.

Working Groups
WG1 Policy and Urban Development
WG2 Sociology
WG3 Ecology
WG4 Urban Design

Interested Countries: 11
Proposer: DE
AT, BE, CH, EE, ES,
IT, LV, PL, PT, UK
**Action TU1202**

**Impact of Climate Change on Engineered Slopes for Infrastructure**

**Objectives**

The main objective of the Action is to: a) Review and compare case studies, methods of numerical simulation, monitoring systems, and risk analysis systems for climate impacts on engineered infrastructure slopes; b) Explore methods to communicate slope stability risk to stakeholders/asset owners.

**Abstract**

There is an urgent need to assess the risks posed by climate change on our already ageing infrastructure and to plan adaptations that both increase safety and reduce the cost of repairs. Engineered slopes (cuttings, embankments, flood defences) are a critical component of this infrastructure. Many of these slopes are now exhibiting excess deformation, which are threatening the serviceability of the infrastructure and dwellings nearby and causing delays and subsequent economic loss to European industry and the general public, while posing a safety hazard. The aim of the proposed COST Action is to build a coalition of researchers equipped to address the challenges of engineered slope infrastructure resilience and adaptation to climate change. This group will develop collective understanding, share techniques, facilities and data, and work jointly in disseminating results across the EU and to asset owners. Ultimately, the COST Action will enable infrastructure asset owners to make evidence based investment and adaptation decisions to improve resilience and safety.

**Keywords:** Slope stability, infrastructure, resilience, climate change, adaptation.

**Working Groups**

WG1  Numerical modelling capabilities
WG2  Slopes monitoring data knowledge exchange
WG3  Climate – vegetation – soil interactions
WG4  Hazard/risk:

**Interested Countries : 12**

- CH, EL, FR, IE, IT,
- NL, PL, PT, RS, SE, SI

Transport and Urban Development (TUD)
Action TU1203

Crime Prevention Through Urban Design and Planning

Objectives
The goal of the Action is to develop an advancement and innovation of knowledge and practices in Environmental Crime Prevention, in order to avoid the construction of projects that are not sustainable in terms of safety, affecting the life of present and future generations.

Abstract
The objective of this Cost Action is to contribute to structuring existing knowledge and develop innovative approaches on how to build more secure and safe cities. Studies have proved that there is a correlation between the structure and organization of urban space and crime: new criminological theory supports this point of view. The Justice and Home Affairs Council of the EU has underlined that crime prevention through design is a successful and effective strategy for crime prevention and needs to be supported. Despite this, new projects are being implemented all over Europe without considering safety criteria, creating urban areas where crime and fear of crime make life difficult. The Action will develop new knowledge and innovative approaches putting together theoretical thinking and practical experience. Thus the scientific program forecasts to work simultaneously on one hand on the innovative approaches deriving from research and experts, on the other hand on the know-how acquired through best practical experience of participating countries. This will be done through lectures, seminars, focused Working Groups as well as a workshop. Dissemination of awareness is an important aspect for working in the field of CP-UDP and the Action devotes quite an effort on this issue. Central to this Action is the training of young people, for this purpose a Junior network as well as specific training are forecasted. N.B. The term crime, according to the most recent definitions, covers a wide range: proper crime, anti-social behaviours, conflicts, fear of crime and other harmful behaviours.

Keywords: Urban sustainability, crime prevention, urban planning and design, public spaces, CPTED.

Working Groups (may change functionality as per requirements of each of 4 phases)
WG1 Terminology and Bibliography
WG2 CEN Technical Report, Handbook and Presentation
WG3 Preparation of Phase 2
**Action TD1201 (MPNS, ICT, CMST, ISCH)**

**COSCH – Colour and Space in Cultural Heritage**

**Objectives**
The main objective of the Action is to realize an interdisciplinary cooperation, on a concerted European level, to prepare a novel, reliable, independent and global knowledge base facilitating the use of today’s and future optical measuring techniques for the documentation of European heritage.

**Abstract**

True, precise and complete documentation of artefacts is essential for conservation and preservation of our cultural heritage (CH). By ensuring access to the best possible documentation of artefacts this Action is contributing to the enhanced understanding of material CH and helps its long-term preservation. Europe is responsible for ensuring that his heritage is passed on to future generations. Documentation of CH involves researchers, scientists and professionals from multiple disciplines and industries. There is a need to promote research, development and application of non-contact optical measurement techniques (spectral and spatial) – adapted to the needs of heritage documentation – on a concerted European level, in order to protect, preserve, analyse understand, model, virtually reproduce, document and publish important CH in Europe and beyond. Research in this field typically relies on nationally-funded projects with little interaction between stakeholders. This Action will provide a stimulating framework for articulating and clarifying problems, sharing solutions and skills, standardising methodologies and protocols, encouraging a common understanding, widening applications and dissemination. The Action will foster open standards for state-of-the-art documentation of CH. It will simplify the usage of high-resolution optical techniques in CH and define good practice and stimulate research.

**Working Groups**

- **WG1** Spectral object documentation
- **WG2** Spatial object documentation
- **WG3** Algorithms and procedures
- **WG4** Analysis and restoration of CH surfaces and objects
- **WG5** Visualisation of CH objects and its dissemination

**Non-COST participation:** Morocco

**Keywords:** Cultural Heritage documentation, optical technologies, 3D scanning, multispectral imaging, colour.

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**Trans-Domain Proposals**

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Trans-Domain Proposals

Action TD1202 (ICT, ESSEM, ISCH)

Mapping and the Citizen Sensor

Objectives
The aim of the Action is to enhance the role of citizen sensing in mapping. The Action seeks to increase the value of volunteered data provided by citizen sensors for mapping applications, with a particular focus on map production and map evaluation. The core aim of the Action is to enhance the value of citizen sensors in mapping applications.

Abstract

Accurate and timely maps are a fundamental resource but their production in a changing world is a major scientific and practical grand challenge. Remote sensing provides images for mapping at unparalleled rates but the ground reference data needed in map production and evaluation are difficult to acquire. The rise of citizen sensors (e.g. volunteers contributing information from remote devices) provides immense potential to radically change mapping. The quality of citizen sensor data, however, is highly variable and activity is uncoordinated. A major internationally recognised mapping challenge is how to deal with the vast amounts of image data and large bank of uncoordinated citizen sensors in a way to allow accurate mapping. This Action will evaluate the utility of citizen sensors in mapping, debate means to encourage standardisation, coordination of activity and identify how mapping can proceed with imperfect data. It will produce protocols for the collection and use of volunteered data, encouraging good practices while not constraining volunteers. The work is highly inter-disciplinary, at the interface of several COST Domains (ISCH, ICT, TUD, ESSEM, FA and FPS ), and benefits from expertise distributed across Europe. The Action provides a means to foster advances mainly via networking of typically disparate groups for broad benefit.

Keywords: Mapping, volunteers, geographical information.

Working Groups
WG1 Acquiring and managing
WG2 Understanding and influencing contributors
WG3 Map production
WG4 Map validation activities

Non-COST participation: Canada, India, Malaysia, Russian Federation, Taiwan, USA, European Commission

Participants

Interested Countries: 15
Proposer: UK
AT, BE, CH, DE, EL, ES, FR, IE, IS, IT, NL, NO, PT, SK
**Action TD1203** *(FA, CMST)*

**Food Waste Valorisation for Sustainable Chemicals, Materials and Fuels (EUBis)**

**Objectives**
The main objective of the Action is to provide an integrated alternative renewable source of carbon for the production of industrially relevant bio-derived chemicals, fuels and material via the exploration of novel and advanced routes for food supply chain waste valorisation.

**Abstract**
Food supply chain waste (FSCW) creates huge environmental, economic and social problems. There is now a growing recognition that the twin problems of waste management and resource depletion can be solved together through the utilisation of waste as a resource, using green and sustainable technologies. The EUBis Action represents a timely opportunity to develop novel strategies for the valorisation of FSCW to new, sustainable and functional feedstocks. The symbiotic organisation of a COST Action will greatly benefit EU research in this field, and will focus on key areas to provide cohesive direction on the valorisation of FSCW within a multidisciplinary and multinational collaborative network. The overall aim of EUBis is to bring about a critical mass of researchers and stakeholders to harness the potential of FSCW as an alternative carbon source to produce commercially viable chemical commodities. The EUBis Action will bring together skills and expertise that cross scientific borders, covering biology, chemistry, biotechnology and food science and technology as well as experts in environmental and economic assessment. EUBis will interconnect different technology hubs across Europe, overcome technological barriers, go beyond current waste exploitation/management approaches, and bridge gaps between academic disciplines as well as between academia and industry.

**Keywords**: Food supply chain waste, valorisation, sustainability, bio-derived chemicals, alternative carbon source

**Working Groups**

- **WG1**: Pre-treatment and extraction
- **WG2**: Bio-processing
- **WG3**: Chemical processing
- **WG4**: Technical and Sustainability Assessment/ Policy Analysis

Trans-Domain Proposals
Action TD1204 *(MPNS, BMBS, CMST)*

Modelling Nanomaterial Toxicity (MODENA)

**Objectives**

The main objective of the Action is to produce Quantitative Nanostructure-Toxicity Relationships (QNTR) models for nanomaterials, through the coordination of inter-disciplinary collaborations of different stakeholder parties.

**Abstract**

Nanotechnology produces engineered nanomaterials (ENM) having new or enhanced physico-chemical properties in comparison to their micron-sized counterparts. Some of these properties, like the high surface area to volume ratio, make them potentially dangerous to humans as shown by research in NANOTOXICOLOGY. To promote the development of a new generation of ENM that are SAFE-by-DESIGN, an understanding of the relationship between the ENM STRUCTURE and the biological ACTIVITY is needed. In this context, Quantitative Nanostructure-Toxicity Relationships (QNTR) computational modelling technique is an effective alternative to experimental testing since it enables the prediction of (eco)-toxicological effects based on ENM structure only. The construction of QNTR model requires the integration of expertise of nanomaterial scientists, (eco)-toxicologists, and modellers from academia, regulatory agencies and industry. Therefore, a network for trans-disciplinary cooperation is needed. Thus, this COST Action (MODENA – Modelling Nanomaterial Toxicity) will promote and realise through the coordination of these inter-disciplinary collaborations of different parties with the ultimate aim of producing QNTR models for ENM. The important benefits from MODENA include: (i) the development of a new generation of SAFE-by-DESIGN ENM; (ii) the effective reduction of animal testing and (iii) The creation of transparent, validated and rigorous QNTR tools for regulatory purposes in the field of nanotoxicology according to OECD principles.

**Working Groups**

WG1 Synthesis and Characterisation of ENM
WG2 Toxicity of ENM
WG3 QNTR modelling and Database

**Non-COST participation:** Australia
Participation of Non-COST countries

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(OC-2019-01)

18th CSO Meeting
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Action BM1205

European Network for Skin Cancer Detection using Laser Imaging

Objectives

The main objective of this Action is to coordinate efforts and enhance interaction of researchers, as well as to promote development and application of early, accurate diagnosis of skin cancer known to be the key determinant of patient outcome.

Abstract

The Action will provide an interdisciplinary framework to enhance interaction activities within the field of optical biosensing, between world-class academic groups, labs and system integrators from the industry. It will exploit novel laser sources and innovative feedback interferometry in specific biomedical applications. Recent developments in the design of solid-state laser sources at near-infrared, mid-infrared and terahertz frequencies, coupled with novel self-mixing approaches to signal detection and the integration of these into imaging platforms, provide a way forward in the design of the next generation of detection systems. Specifically, we propose extending the non-invasive interrogation of skin tissue into these frequencies. The Action will exchange knowledge, explore and compare technology platforms and perform clinical validation and evaluation of new devices which will permit detection of both the changes in skin lesions and disordered blood flow patterns and tissue perfusion typical of malignancy. The COST scheme is an ultimate choice for this network as it will bring together COST- countries academia, industry and clinical end-users which would be virtually impossible through any other European funding mechanism.

Keywords: Early cancer diagnosis, Medical imaging of Skin Cancer, Infrared and Terahertz imaging, Optical feedback Interferometry, Laser Self-Mixing sensors.

Working Groups

WG1 VCSEL array perfusion imaging
WG2 Tissue characterization at mid infrared frequencies using Quantum Cascade Lasers (QCLs)
WG3 Tissue characterisation at terahertz frequencies using THz QCLs SMI
WG4 Validation and evaluation of combined sensing modalities

Non-COST participation: Australia

Interested Countries: 13
Proposer: UK
Belgium, CH, DE, DK, ES, FI, FR, IE, IT, NL, RS, SE
Action BM1206

Cooperation Studies on Inherited Susceptibility to Colorectal Cancer

Objectives

The main objective of this Action is to comprehensively understand the impact of inherited susceptibility in CRC for profiling individual disease risk and performing early screening and treatment monitoring. By doing so, new molecular biomarkers will be implemented and validated for personalized CRC medicine.

Abstract

Colorectal cancer (CRC) is one of the most frequent neoplasms worldwide and an important cause of morbidity in the developed world. It is necessary to identify individuals with a medium-high CRC risk in order to develop adequate preventive measures. The identification of inherited genetic factors involved in CRC susceptibility can help to profile individual disease risk and may enable early screening and treatment monitoring. Participants interested in networking in this Action include 19 research groups actively working on CRC genetics with high success and with access to more than 50,000 CRC cases and 50,000 controls through cohorts in 11 countries. This Action will permit the articulation of the cooperation between these research groups in Europe in order to comprehensively understand the impact of inherited susceptibility to CRC and to describe the genetic landscape of this disease, providing a highly innovative and unconditional tool for personalized CRC medicine with a future application in early screening and treatment monitoring for this disease.

Working Groups

WG1 Genetic Association Studies
WG2 Functional Genomics
WG3 Next Generation Sequencing
WG4 Statistical Modelling

Non-COST participation: USA

Keywords: Colorectal cancer, genetic susceptibility, risk profiling, treatment monitoring, genotype-phenotype correlation.
Action BM1207

Networking Towards Clinical Application of Antisense-Mediated Exon Skipping

Objectives

The aim of the Action is to accelerate the clinical development of antisense-mediated exon skipping for rare diseases, with a focus on Duchenne muscular dystrophy.

Abstract

This COST Action aims to advance the development of antisense-mediated exon skipping for rare diseases, focusing on Duchenne muscular dystrophy for which this approach is currently assessed in phase 3 clinical trials. Several challenges hamper its development to wide clinical application: 1) There is no standardized protocol for important biological outcome measures, such as dystrophin restoration. 2) The approach is mutation specific; development for patient subgroups is challenging as most mutations are rare. 3) Fragmentation: several European groups work on preclinical optimization. 4) There is therapeutic misconception amongst patients and unrealistic expectations. This COST Action will address the described issues through: 1) meetings and training to standardize outcome measures, 2) meetings with regulatory authorities to discuss alternatives to develop this approach for small patients groups, 3) networking workshops where unpublished data are shared confidentially between Parties to foster synergistic work and avoid duplication, 4) training of young scientists in unbiased and clear communication to patients. Networking is crucial for research in the orphan disease field and this model is applicable to other rare diseases for which exon skipping is currently in preclinical development. Groups involved are anticipated to join the Action when their research moves towards the clinical trial phase.

Keywords: Personalized medicine, rare diseases, Duchenne muscular dystrophy, antisense oligonucleotide-mediated exon skipping, therapeutic misconception.

Working Groups

WG1 Biochemical Outcome Measurements
WG2 Regulatory Models
WG3 Meeting on Antisense Therapeutics
WG4 Stakeholder Communication

Non-COST participation: USA
Action BM1208

European Network for Human Congenital Imprinting Disorders

Objectives

The main objective of the Action is to achieve progress in our understanding of IDs necessitates the co-ordinated efforts of specialist clinicians: general paediatricians and paediatric endocrinologists; molecular geneticists; as well as basic scientists, epidemiologists, bio-informaticians and the experience of patient groups. The aim of this COST Action is the creation of a pan-European interdisciplinary network to promote ID research from molecular studies to treatment; improve the standard of clinical and molecular diagnosis for IDs across Europe; and educate the public and professionals about the disorders. Altogether, the ID Action will join forces and complement studies to reduce health care costs and increase the life quality of patients.

Abstract

Imprinting disorders (IDs) are a group of rare congenital diseases affecting growth, development and metabolism with a lifelong impact on patients’ quality of life. Despite their common underlying (epi)genetic aetiologies, IDs are usually studied separately by small groups working in isolation, and the basic pathogenesis and long term clinical consequences of IDs remain largely unknown. Efforts to elucidate the aetiology of IDs are currently fragmented across Europe and standardisation of diagnostic and clinical management is lacking. This COST Action will, for the first time, draw together researchers of all eight known human IDs in an interdisciplinary pan-European Network for Human Congenital IDs, working to advance understanding of the pathophysiology with the major aim of translating this knowledge to improvement of diagnostic and clinical management for the benefit of the patients and their families. The Action will harmonise a common ID classification system, develop guidelines for treatment through consensus, create standard operation procedures (SOPs) for diagnosis based on best current practice, coordinate databases held in different countries to make them compatible and useful as a springboard for collective research initiatives, identify new imprinting disorders through collaborative effort, educate researchers and stimulate translational exchange. The ID network will join forces and complement studies to reduce health care costs and increase the life quality of patients.

Keywords: Congenital imprinting disorders, clinical assessment, biobanking, epigenetic mechanisms, best practice guidelines.

Working Groups

WG1 European clinical integration – standardisation and harmonisation of clinical phenotyping and medical management.
WG2 Molecular Biology
WG3 Molecular Diagnostics
WG4 Capacity building
WG5 Dissemination

Interested Countries: 11
Proposer: DE
BE, DK, EE, ES, FR, IT, NL, PL, SE, UK
Action BM1209

Regenerative Sphincter Therapy (ReST)

Objectives

Our aim is the establishment of a unique international interdisciplinary research network in cell-based therapy dedicated to developing standards for a novel cell-based Regenerative Sphincter Therapy (ReST) for treatment of a malfunctioning sphincter muscle. Defining standardized methods at the end of an international multi-centre study for approval by the EMA for all partnering countries is envisaged.

Abstract

Urinary incontinence is a major health burden. For many patients stress urinary incontinence is associated with progressive degeneration of the muscular tissue. During this process muscle cells die. Novel cell-based therapy for regeneration and improvement of the sphincter muscle can tackle the etiology of incontinence rather than the consequences. Unfortunately, different laboratories use different cell-based sphincter approaches. This COST Action, Regenerative Sphincter Therapy (ReST), will endorse a strong interdisciplinary collaboration in academic, clinical, and medical technology. The major aim of this COST Action is to assemble an International Board of Experts in order to harmonize cell-based patient therapy methods that would lead to a global multi-centre study for approval by the European Medicines Agency (EMA). COST will allow us to interact with other networks across various disciplines to promote pan-European teaching and investigation. COST will contribute not only to the quality of life of patients affected, but in the long run will serve to control high costs caused by incontinence by providing knowledge on efficacy and information on effective methods of application of the various regenerative sphincter therapies.

Keywords: Urinary incontinence, stress urinary incontinence, cell-based therapy, coordination of multi-centre studies.

Working Groups

WG1 Academic
WG2 Technical
WG3 Clinical
WG4 Surgical
WG5 Communication
Action FA1206

Strigolactones: Biological Roles and Applications

Objectives

The aim of this COST Action is the creation of a multidisciplinary network of experts, of basic and applied sciences, who can share expertise and developmental knowledge about the multifaceted biological role of Strigolactones. The coordination of the research activities is aimed at the exploitation of SLs in the development of new agro-technologies.

Abstract

Strigolactones (SLs) are newly discovered phytohormones that contribute to define plant morphology, also in response to environmental conditions, and to the dialogue with organisms in the rhizosphere. As a consequence, SLs have become a cutting-edge topic in plant biology and agronomy, having a great potential in modern agriculture. However, little is known about how they act, their biosynthesis and signaling pathways. Because of their both endogenous and exogenous role as signaling molecules, SLs are well placed to mediate both adaptive changes in the plant architecture and beneficial rhizosphere interactions. Even though SLs are a prime interest for many laboratories across disciplines, there are no official networks, either in Europe or in the rest of the world, on this subject. The outcome of an EU network on this subject would be sustaining and would promote the EU leadership in SLs-related sciences, the coordination of SLs research activities and a transfer of knowledge which may lead to the development of targeted and sustainable agro-technologies. The aim of this proposal is the creation of such multidisciplinary network of experts, of both basic and applied sciences, who can share expertise through the flexibility of the COST framework.

Keywords: Strigolactones, crop improvement, arbuscular mycorrhizal fungi, plant hormones, pest management.

Working Groups

WG1 SLs as Plant hormones
WG2 SLs as signals for parasitic plants
WG3 Role of SLs in the soil biota
WG4 Biochemistry of SLs/design and synthesis of analogues

Non-COST participation: Australia, Japan and USA
Towards Control of Avian Coronaviruses: Strategies for Vaccination, Diagnosis and Surveillance

Objectives

The aim of this COST Action is to define and develop an internationally standardized nomenclature and standardized, fast and accurate detection technologies and methods for typing and subtyping of Avian Coronaviruses as well as a general classification of AvCoV, taking into account the genetic, immunological, clinical and epidemiological aspects.

Abstract

For several decades, poultry production worldwide has been struggling with severe diseases and huge economic losses caused by Avian Coronavirus (AvCoV) infections. Control of the disease is hampered by the variations within this virus family. As a result of its variability, the nomenclature as well as detection methods and classification of the virus strains are not consistent. Constant surveillance of flocks and vaccination programmes against these viruses are the major tools for control of AvCoV. This COST Action aims to increase knowledge on diseases caused by Avian Coronaviruses. The main objective is to promote exchange of knowledge and technology in the field of diagnosis, molecular virology, serology, immunology, vaccination, pathogenesis and epidemiology in relation to these viruses. A COST network is considered the most appropriate way to stimulate cooperation between researchers to facilitate regulation, standardization and harmonization of diagnostic methods, nomenclature, classification and surveillance in Europe.

Keywords: Avian Coronaviruses, diagnosis, protectotype, surveillance, poultry.

Working Groups

WG1 Molecular Virology
WG2 Serology and Immunology
WG3 Clinic and Pathology
WG4 Epidemiology
WG5 Conceptualizing an infrastructure for collaborative research

Non-COST participation: Australia, Brazil, India, Japan, USA

Interested Countries: 10
Proposer: DE
ES, FR, HU, IT, NL,
NO, PL, SE, UK

Food and Agriculture (FA)
Action FA1208

Pathogen-Informed Strategies for Sustainable Broad-Spectrum Crop Resistance

Objectives

The main objective of the Action is to develop innovative pathogen-informed strategies to obtain sustainable and broad spectrum resistant varieties of cereal and solanaceous crops.

Abstract

Restrictions on the use of pesticides mean that there is a need for new, sustainable pest control methods. Exploiting natural plant disease resistance is highly attractive, as it reduces the dependency on pesticides. However, the use of crop resistance is bound by two factors: the limited number of resistance sources against important diseases in major crops and the frequent breakdown of resistance due to rapid evolution of pathogens. Both issues can now be addressed by innovative and powerful approaches developed on the basis of recent and unprecedented progress in research on plants and their pathogens fostered by the revolution in next generation sequencing and the investigation of pathogen effector proteins. The challenge is to implement these novel pathogen-informed strategies for the generation of sustainable broad-spectrum crop resistance. Hence, this COST Action aims to create a European network of scientists and breeders for the translation of breakthroughs in plant-pathogen interaction research into effective breeding strategies for durable disease resistance in cereal and solanaceous crops which are of primary importance for European agriculture.

Keywords: Sustainable agriculture, plant diseases, crop protection, crop improvement, durable plant resistance.

Working Groups

WG1 Understanding the contribution of pathogen effectors to virulence
WG2 Host processes and proteins targeted by central pathogen effectors
WG3 Evolutionary constraints on pathogen effectors and emergence of new pathotypes
WG4 Plant immune receptors and allelic variants of host targets for sustainable and broad-spectrum resistance breeding
Action FP1203

European Non-Wood Forest Products (NWFPS) Network

Objectives

The aim of the Action is to build a multidisciplinary European-wide network of NWFP researchers and managers, who will review current knowledge, highlight existing innovation, share information, identify research topics, seek research synergies and generally increase European knowledge about NWFP ecology, modelling, management and economics.

Abstract

Non-wood forest products (NWFPs) have important commercial, environmental, social and recreational roles in many European forests. They also have a relevant place in the multifunctional sustainable forest management (MSFM) paradigm, being the main source of income from forests in several regions. Although the importance of NWFPs is recognised and accepted, forest research remains mainly focussed on timber production. Consequently knowledge about European NWFPs is comparatively scarce, as is research on their ecology, management and economics, required to optimize sustainable simultaneous production of different products from forests. It is proposed that a multidisciplinary European network on NWFPs will help to bridge these gaps. In this context, the main goal of the Action is to build a broad multidisciplinary network of European NWFPs researchers and managers, to review the current state of the art, highlight existing innovation, share information and experience, identify research topics, seek research synergies and by increasing the European-wide theoretical and practical understanding of NWFPs, promote their sustainable management.

Keywords: Non-wood forest products, NWFP, multi-purpose forestry, Sustainable forest management, European NWFPs.

Working Groups

WG1 Mushrooms and Truffles
WG2 Tree Products
WG3 Understory Plants
WG4 Animal Origin

Non-COST participants: Australia, Chile, Georgia, Morocco, New Zealand, Tunisia, Ukraine, USA
Action FP1204

Green Infrastructure Approach: Linking Environmental with Social Aspects in Studying and Managing Urban Forests

Objectives

The aim of the Action is to increase the understanding of the role of UF in the context of GI in terms of ecosystem services provision. This ambitious goal will be achieved by bringing together a community of forest scientists with a multidisciplinary profile, ranging from ecology, ecophysiology, modeling, genetics, arboriculture, wood production, social sciences, landscape architecture, and urban planning, and who therefore have the capabilities to be able to study the relationships between UF and environmental and social ecosystem services.

Abstract

Green Infrastructure (GI) has recently gained prominence as a planning tool at regional and local levels. GI provides a range of ecosystem services, and new initiatives can build on state-of-the-art research and on delivery mechanisms such as urban forestry (UF). However, greater attention is needed on integrating the environmental and social benefits produced, particularly in the context of climate change adaptation and mitigation. The COST Action aims to: 1) increase the understanding of the role of UF in the context of GI from a scientific and a socio-economic perspective, in terms of the ecosystem services provided to people and to the urban environment; 2) to identify priorities and challenges for future research in the field; 3) to provide indicators and/or thresholds to be included by policy makers in local, national or international regulations about GI and UF; 4) to develop guidelines for GI planners and managers on how to implement GI approaches with an emphasis on linking the environmental and social services of UF. Undertaking a COST Action on this topic is crucial because of the diversity of GI and UF approaches at European level and because of the need to create a structured interaction among scientists, citizens, policy makers and managers.

Keywords: Green Infrastructure, Urban forestry, ecosystem services, climate change, governance.

Working Groups

WG1 Environmental services of GI and UF and implications of climate change
WG2 Social/cultural services of GI and UF
WG3 Governance of UF in a GI approach
WG4 Integrating and disseminating to stakeholders (Task-Force for dissemination)

Non-COST participants: Armenia, Algeria, USA

Interested Countries : 22
Proposer : IT
AT, BE, BG, CZ, DE,
DK, EE, EL, ES, FI,
FR, HR, HU, IT, MT, NL,
NO, PL, SE, SI, TR,
UK
Action FP1205

Innovative Applications of Regenerated Wood Cellulose Fibres

Objectives

The main objective of the Action is to improve the knowledge on the processing and use of cellulosic fibres derived from wood sources in a wide range of emerging innovative markets. This Action will help in the understanding of products such as nanocellulose, cellulose whiskers, cellulose gels and films and regenerated textile fibres from wood-based resources. In order to achieve this, this Action aims to bring together fibre technologists, chemists, analytical scientists, wood scientists and polymer scientists from academia and industry to increase the potential of these materials. Thus, 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 cellulosic fibres from wood through the provision of a networking and information portal.

Abstract

Demand for high performance products is increasing globally, as is the demand for more environmentally responsible sourcing. The combination of these facts places significant strain on traditional material supplies and processing. Fibre demand and nanocellulose are two such area of increasing demand, where diversification of fibre supplies is necessary to provide the demands and allow use of land for agricultural food purposes and biorefinery / biofuel supply. One area where fibre supply is increasing in supply is through the wood industry. This is through greater forest reserves under sustainable forestry practices, especially across Europe. However, it is necessary to think “outside the box” on how this resource can be put to optimum value (i.e. in areas in addition to construction, pulp & paper and bioenergy). This Action aims to develop the sustainable emerging technologies in the areas of textile fibre production, cellulosic fibres, and the various forms of nanocellulose derived solely from wood. This advancement needs to be undertaken within a COST framework not only to provide a means of information sharing, but to educate and train scientists in new areas of development. Through a programme of collaboration and knowledge exchange and training, this Action will develop a pan-European leap in capabilities, product and processes. This will lead to an improvement in the environmental credentials of advanced cellulose-based materials, strengthening R&D and innovative material production across Europe.

Keywords: Wood, Cellulose fibres, Nanocellulose, Production, Properties.

Working Groups

WG1 Fabric and textile manufacture
WG2 Science and uses of nanocellulose
WG3 Cellulose foams and films

Interested Countries: 8

Proposer: SE
AT, FI, FR, NL, RO, SI, UK
Action FP1206

European Mixed Forests. Integrating scientific knowledge in sustainable forest management (EuMIXFOR)

Objectives

The aim of the Action is to establish a lasting European research network on mixed forests, which can contribute to the increase of knowledge, the sustainability of management, and the future expansion, conservation and improvement of mixed forests on the basis of science, innovation and rural development in Europe.

Abstract

Structure, dynamics and functioning of admixtures of tree species is a research topic of increasing relevance across Europe. The reason is that it is frequently suggested that mixed forests present (i) more resistance and resilience to human or non-human disturbances, (ii) higher biodiversity levels (iii) higher carbon storage capacity and thus higher potential for mitigation strategies, (iv) better adaptation strategies to global change, and (v) higher productivity and support for ecosystem services. To date, these features have been studied separately for different mixtures of species, management practices and specific growing conditions. Consequently, the knowledge gained is local and a common and lasting European perspective on mixed forest sustainable management has yet to be developed. EuMIXFOR aims at creating a European research network on mixed forests, which can contribute to the increase of knowledge of adaptive forestry, the sustainability of management and the conservation and improvement of mixed forests to support rural development. The accomplishment of the objectives and the development and innovation activities involved in this Action will result in the definition of silvicultural recommendations that will help decision makers to promote the social, economic and environmental functions of European mixed forests.

Working Groups

WG1 Mixed forests dynamics and functioning
WG2 Adaptive management of mixed forests
WG3 Mixed forests extension and innovation network

Non-COST participation: Argentina, Canada, Costa Rica, Algeria, Tunisia, USA

Keywords: Mixed-forests, sustainable forest management, science-based knowledge, networking.
Action FP1207

Orchestrating forest-related policy analysis in Europe (ORCHESTRA)

Objectives

The Action aims to support the coherence of forest-related policy targets and the efficiency of policy measures by considering together the many policies influencing forestry at EU and MS levels, and by bringing together policy makers, quantitative modellers, economists, sociologists and policy scientists to develop the use of models for integrated policy analysis and support.

Abstract

When preparing forest-related policies, the multilevel and multi-stakeholder governance make it challenging to foresee their economic, social and environmental impacts. To coordinate and streamline the development and implementation of forest-related policy targets and measures at different levels and sectors, new means for policy analyses should be developed. Based on the recent advances in sociology, policy science, economics, and quantitative modelling this COST Action aims: i) to analyse how different forest-related targets have been and could be implemented at supranational, national and sub-national level; ii) to enhance the use of models for integrated policy analysis; and iii) to develop new methodologies and related good practices for the orchestration of policy modelling and analyses. The COST framework will facilitate multinational, transdisciplinary collaboration between sociologists, policy scientists, economists and modellers as well as active interaction with various stakeholders. Especially in the context of Europe 2020, post-2013 Rural Development Policy and other relevant policies, the Action will support the coherence of policy targets and efficiency of policy measures. The generated new knowledge can be used by European policy and decision makers to adjust forest-related policies and their implementation to the requirements of multilevel and multi-stakeholder governance.

Keywords: Forest-related policies, multilevel and multi-stakeholder governance, policy support, policy modelling, integrated policy analysis.

Working Groups

WG1 Forest-related policy targets and measures
WG2 Forestry modelling for integrated policy analysis
WG3 Orchestration of forest-related modelling and policy analyses

Non-COST participation: Institutions in International Organisations
Action CM1204

XUV/X-Ray Light and Fast Ions for Ultrafast Chemistry (XLIC)

Objectives

The main objective of this Action is to explore and control the complex chemical dynamics of molecules interacting with XUV and X-ray radiation or highly energetic ions. The knowledge obtained by combining experts in advanced theoretical tools and in cutting-edge experiments will provide the necessary guidelines for the design of new experiments in large European facilities as synchrotrons, XFEL or ion accelerators. The Action aims at keeping Europe’s science at the forefront of this emerging field, by forming and attracting young scientists to use these new techniques of high potential for industrial applications.

Abstract

The use of novel light sources and fast ions is opening new avenues in the study of chemical reactivity. XUV/X-ray pulses with attosecond duration permit to "visualize" the movement of electrons inside a molecule and a much better control of chemical reactions. X-ray Free Electron Lasers, synchrotrons or collision with fast ions can be used to generate molecules in highly excited and highly charged states that present new and unexpected reactivity. The study of molecules under these extreme intensities and time resolution conditions requires new theoretical models that can serve as guidance for experiments. The scientific objective of the Action is to understand, monitor and control the complex ultrafast electronic and nuclear dynamics that occur in medium-sized and large molecules, to develop new control strategies of reactions and to develop a new generation of ultrafast spectroscopies combining attosecond temporal and sub-Angstrom spatial resolutions. This is an interdisciplinary field in which European groups are very active but work separately. COST is thus the perfect framework to enhance exchange of knowledge, bringing together leading experts in generating, manipulating and modeling these new phenomena. The collaboration between groups will reinforce the European leadership in XUV/X-ray-, attosecond-, synchrotron- and ion-based research in chemistry.

Keywords: Attochemistry, Ultrafast spectroscopies, Time dependent quantum chemistry, Control of chemical reactions, Molecular excitation ionization and dissociation.

Working Groups

WG1 Ultrafast electron dynamics in molecules
WG2 Reactivity of highly excited and highly charged molecules
WG3 Control of chemical reactivity
Action CM1205

Catalytic Routines for Small Molecule Activation (CARISMA)

Objectives

The aim of the Action is to attain a fundamental understanding of the catalytic principles involved in the transition metal-catalyzed activation of small molecules through concerted research activities in silico and in vitro, using an integral approach to catalysis that includes homogeneous, heterogeneous, and mechanistic aspects.

Abstract

CARISMA will set the stage for an unprecedented Action where the most advanced computational and experimental minds will meet to foster synergies with one priority mission: disruptive catalysis. The Action will provide new processes for the selective and sustainable transformation of small and pervasive molecules like H2O, CO2, NH3 into high-value chemical feedstocks and energy resources. CARISMA will promote new collaborations, lab-knowledge exchange, frontier training, and a virtual open-space to enable a strongly iterative advancement of theory and experiment, with input from experts in computational chemistry, spectroscopy, kinetics, catalysis, synthesis and materials science. Such interactions will spur the discovery of innovative catalytic processes and of advanced theory. Methods and concepts emerging from CARISMA will significantly shorten demands of time and resources for catalyst optimization, and will result in tailor-made systems with broad implications for fundamental and industrial areas.

Working Groups

WG1 Catalyst design and synthesis
WG2 Experimental mechanistic analysis
WG3 Theoretical methods

Keywords: Catalytic activation of small molecules, rapid evolution of catalysts, harnessing abundant feedstocks for energy and synthesis, understanding of reaction mechanisms, identification of intermediates.
Action CM1206

EXIL – EXchange on Ionic Liquids

Objectives

The aim of the Action is to focus research activities on ionic liquids (ILs) across Europe, and to explore their full potential in the context of chemistry, materials science and engineering with emphasis on the critical evaluation in the field of green chemistry and exploration of their potential as novel, advanced, smart materials.

Abstract

The objective of this Action is to coordinate European research activities and knowledge exchange on ionic liquids (ILs, low melting salts, many of them liquid at room temperature and below) and to explore their full potential in the context of fundamental and applied chemistry, materials science and engineering. The COST Action will provide a coordinated forum for; an efficient intra- and interdisciplinary knowledge and expertise exchange, networking and dissemination of information and results, training and initiating collaborations, harmonizing research activities, establishing an open public database and supplying the scientific community with systematic high quality information on ILs and their applications. The Action aims to combat misinformation as well as contradicting data and reports. EXIL will facilitate technology transfer from university to industry, enhance the supply routes of trained researchers from universities to industry, and structure the European science base. Transferring ILs from the laboratory workbench to true beneficial applications is the long-term goal of EXIL - the European exchange network on Ionic Liquids. An IL-COST action will lead to an improvement of everyday life through new and improved technologies and materials, not to mention cleaner and safer production techniques and will thus contribute to strengthening European research and economy.

Keywords: Synthetic Inorganic and Organic Chemistry, Physical and Computational Chemistry, Materials Science, Engineering.

Working Groups

WG1 Design and synthesis of ionic liquids with specific functions
WG2 Fundamental chemical and physical properties of ionic liquids
WG3 Application of ILs in Synthesis
WG4 Long term prospects and scale-up challenges
Action CM1207

GLISTEN: GPCR-Ligand Interactions, Structures and Transmembrane Signalling: a European Research Network

Objectives

The aim of the Action is to create a pan-European multidisciplinary network of researchers investigating all aspects of G protein-coupled receptor signalling with the goal to gain in-depth and general understanding of GPCR mechanisms and to use this knowledge to identify and design chemical modulators of GPCR-mediated signalling. The individual research groups will contribute biophysical, chemical, computational and pharmacological methods and focus on four areas, namely GPCR dynamics, biased signalling, GPCR-lipid/protein interactions, and the discovery and design of GPCR ligands.

Abstract

G protein-coupled receptors (GPCRs) are the largest family of proteins involved in signal transduction across membranes and one of the most important pharmaceutical drug target classes. In the past five years, an unprecedented number of X-ray structures of GPCRs have been solved, affording us first peeks at the molecular details of their function. Based on these and forthcoming structures, this COST Action will bring together experts in a wide range of complementary methods to unravel details of the activation mechanism, ligand binding, and the effect of the membrane and other interaction partners on GPCRs. The information exchange that will be made possible by the COST Action will lead to innovative insights into mechanistic details of GPCR function. This will in turn give rise to novel effector molecules to be used as lead structures for drug development, offering valuable new opportunities for European pharmaceutical research and industry.

Keywords: G protein-coupled receptor, biased signalling, activation mechanism, drug discovery, GPCR-membrane interactions.

Working Groups

WG1 Dynamics
WG2 Biased Signalling
WG3 GPCR Lipid/Protein Interactions
WG4 Discovery & Design of GPCR Ligands
Action ES1205

The Transfer of Engineered Nanomaterials from Wastewater Treatment & Stormwater to Rivers

Objectives

The aim of this COST Action is the creation and maintenance of a pan-European inter- and transdisciplinary network in order to provide new insights into the role of urban water systems in controlling the release of ENMs to the aquatic environment. Enter will significantly improve the transparency of scientific research to the non-scientific community. Furthermore, potential sinks for Engineered NanoMaterials within urban wastewater systems will be evaluated thus providing new perspectives in terms of their lifecycle stages.

Abstract

Concerning the transfer of Engineered Nanomaterials from wastewater Treatment & stormwatEr to Rivers (ENTER) the following issues require clarification: (i) which and (ii) what amounts of Engineered NanoMaterials (ENMs) are released, (iii) how persistent are they and (iv) to what extent do they cause in situ toxicity? Reasons for knowledge gaps are a lack of suitable analytical methods, insufficient databases on usage and release, and the absence of comprehensive monitoring networks. ENTER will help to advance scientific knowledge on release and fate of ENMs in the urban water cycle and to communicate expert knowledge in an appropriate manner to the non-scientific community. ENTER will break down barriers between scientific and public pressure groups by an intensified scientific exchange via, e.g., the position papers. The ENTER products are needed to improve the decision-making process by supporting end users such as politicians, the EU and national public servants. ENTER will clearly aid in advancing the understanding on the transport and transformation processes of ENMs released to the urban wastewater systems and to understand the transfer of ENMs to the aquatic environment. This Action will improve the collaboration between scientists and the public by striking a new path towards an efficient knowledge exchange.

Keywords: Engineered nanomaterials, wastewater treatment plants, stormwater, surface water, urban water cycle.

Working Groups

WG1 Fate and transport of ENMs in urban water cycle
WG2 The analytical toolbox: ways to detect, differentiate and quantify ENMs in the aquatic environment
WG3 From toxicity studies to regulation

Non-COST participation: USA
Action ES1206

**Advanced Global Navigation Satellite Systems Tropospheric Products for Monitoring Severe Weather Events and Climate (GNSS4SWEC)**

**Objectives**
The aim of the Action is to enhance existing and develop new, ground-based multi-Global Navigation Satellite Systems tropospheric products, to assess their usefulness in forecasting of severe weather and climate monitoring, and to improve GNSS real-time positioning accuracy through enhanced atmospheric modelling. A main focus is to strengthen and intensify this inter-disciplinary collaboration on a European level and to encourage cross-border cooperation.

**Abstract**
Global Navigation Satellite Systems (GNSS) have revolutionised positioning, navigation, and timing, becoming a common part of our everyday life. Aside from these well-known civilian and commercial applications, GNSS is now an established atmospheric observing system which can accurately sense water vapour, the most abundant greenhouse gas, accounting for 60-70% of atmospheric warming. Severe weather forecasting is challenging, in part due to the high temporal and spatial variation of atmospheric water vapour. Water vapour is under-sampled in the current meteorological and climate observing systems - obtaining and exploiting more high-quality humidity observations is essential to weather forecasting and climate monitoring. This Action will address new and improved capabilities from concurrent developments in both the GNSS and meteorological communities. For the first time, the synergy of the three GNSS systems (GPS, GLONASS and Galileo) will be used to develop new, advanced tropospheric products, exploiting the full potential of multi-GNSS water vapour estimates on a wide range of temporal and spatial scales, from real-time monitoring and forecasting of severe weather, to climate research. In addition the action will promote the use of meteorological data in GNSS positioning, navigation, and timing services. The Action will stimulate knowledge transfer and data sharing throughout Europe.

**Keywords:** Global Navigation Satellite Systems (GNSS), ground-based atmospheric sounding of water vapour, monitoring and forecasting of severe weather, climate change trends and variability, global warming.

**Working Groups**
- **WG1 Advanced GNSS processing**
- **WG2 Use of GNSS tropospheric products for monitoring severe weather**
- **WG3 Use of GNSS tropospheric products for climate monitoring**

**Non-COST participation:** Australia, Canada, Hong Kong, Tunisia, USA
Action ES1207

A European Brewer Network - EUBREWNET

Objectives

The aim of the Action is to establish a coherent network of European Brewer Spectrophotometer monitoring stations in order to harmonise operations and develop approaches, practices and protocols to achieve consistency in quality control, quality assurance and coordinated operations.

Abstract

This COST Action will coordinate Brewer Spectrophotometer measurements of ozone, spectral UV and aerosol optical depth (AOD) in the UV within Europe, and unite the ozone, UV and AOD communities, through a formally managed European Brewer Network capable of delivering a consistent, spatially homogeneous European data resource, significant for the World Meteorological Organisation (WMO), the World Ozone and UV Data Centre (WOUDC), the International Ozone Commission (IO3C), the Intergovernmental Panel on Climate Change (IPCC), Global Monitoring for Environment and Security (GMES) and the ozone trend assessment panels. Around 50 Brewer Spectrophotometers are deployed in Europe, independently funded by national agencies, each duplicating effort to achieve separately best practice and accuracy. A COST Action is the ideal mechanism to remove this disparity, establish knowledge exchange and training, and open up a route to links with international agencies and other networks globally.

Keywords: Ozone, ultraviolet, aerosol, Brewer spectrophotometer, irradiance, optical depth, stratospheric, depletion, real time, monitoring, atmospheric, radiation, network, satellite validation

Working Groups

WG1 Instrument characterisation and calibration
WG2 Algorithm developments
WG3 Network governance and data management
WG4 Users, public outreach and applications

Non-COST participation: Canada, Institutions in International Organisations
Action MP1206

Electrospun Nano-Fibres for Bio Inspired Composite Materials and Innovative Industrial Applications

Objectives

The aim of the Action is to form a European multidisciplinary knowledge platform on electrospinning of nanofibres to facilitate their rapid development and applications. In particular, this platform will help to promote cooperation between researchers from different scientific disciplines, efficiently exchanging ideas and strategies in order to lead developments in science, technology and innovative applications of electrospun nanofibres and materials derived therefrom.

Abstract

Electrospinning, an electro-hydrodynamic process is a versatile and promising platform technology for the production of electrospun nanofibrous materials consisting of diverse polymers and polymer composites. This platform process can provide bio- or oil based polymer nanofibrous materials for the fabrication of innovative biomedical devices and for the fabrication of new technical applications. By forming an interdisciplinary knowledge platform the COST Action will strengthen the European R&TD on electrospun nanofibrous materials and nanofibrous composites and will generate fast progress in the state of the art. The COST Action will cover scientific breakthroughs and innovations in the electrospinning process itself, nanofibrous materials and nanofibrous composite advancements and the post treatment processing of electrospun materials. Applications in the biomedical and technical fields as well as health, societal and environmental issues are considered.

Working Groups

WG1 Electrospinning processes of nanofibres
WG2 New electrospun nanofibrous materials
WG3 Biomedical applications of electrospun nanofibrous materials
WG4 Technical applications of electrospun nanofibrous materials
WG5 Health/environment/societal aspects of electrospinning of nanofibres

Non-COST participation: Australia, Canada, China, Japan, New Zealand, Puerto Rico, Singapore

Keywords: Electrospinning, polymer nanofibres, bio-inspired materials, nanofibrous composite materials, health and environmental impact.
Action MP1207

Enhanced X-Ray Tomographic Reconstruction: Experiment, Modeling, and Algorithms

Objectives

The main objective of the Action is to establish an active, interdisciplinary research network that bridges the gap between the experimental X-ray tomography community and the mathematical image reconstruction community, which will enable the development of next generation X-ray tomography techniques and algorithms for absorption, phase, diffraction, and fluorescence contrast imaging.

Abstract

The aim of this Action is to establish an active, interdisciplinary research network that bridges the gap between the experimental X-ray tomography community and the mathematical image reconstruction community. While the advanced X-ray imaging community (i.e. synchrotron imaging, advanced lab setups) and the image reconstruction community have each made strong progress in various research projects within Europe, further advances require the combination of efforts and ideas from both fields. A joint network must be established including both communities, where experiences, ideas and computational tools can be exchanged and cross-fertilization can take place in a concerted effort. The goal is to develop the next generation of X-ray tomography techniques and algorithms for absorption, phase, diffraction, and fluorescence contrast imaging. As a result, both the spatial and temporal resolution of advanced X-ray imaging will be strongly increased, facilitating high-tech research and industrial applications in a wide range of fields (materials science, life sciences, biomedical sciences, etc.).

Keywords: X-ray tomography, image reconstruction, scientific computing.

Working Groups

WG1 Software and data exchange
WG2 Quantitative modeling
WG3 Algorithm development
WG - TI1 Absorption contrast and phase contrast tomography
WG - TI2 Diffraction contrast tomography
WG - TI3 Fluorescence contrast

Interested Countries : 15
Proposer: NL
BE, CH, DE, DK, EL,
ES, FR, HU, IL, IT,
MK, PL, SE, UK

Materials, Physics and Nanosciences (MPNS)
**Action MP1208**

**Developing the Physics and the Scientific Community for Internal Confinement Fusion at the time of NIF Ignition**

**Objectives**

Develop the physics and the scientific community for Inertial Confinement Fusion at the time of NIF ignition, via networking activities.

**Abstract**

The present Action aims at directly contributing to develop a scientific community in Europe working in Inertial Confinement Fusion and High Energy Density Physics. This will be complementary and synergic to several initiatives going on in Europe at the moment, in particular the construction of the lasers Megajoule and PETAL in France (LMJ/PETAL facility), the upgrade of high-energy laser facilities already working, the HiPER and ELI projects. At the same time, the physics related to the development of high-energy laser facilities is very interesting and fascinating in itself, opening new perspectives and new fields of research. The objectives of the present Action address Networking on one side and the Study of relevant physics on the other. In particular, LMJ/PETAL will be open the European academic community for civilian research in 2015. This will be a unique system in the world (comparable only to NIF in US) and this Action will contribute to the elaboration of the scientific program for such facility over the next 10 years. No other European research program is at the moment directly covering such topics and all mentioned programs are related to "facility development" rather than "community building". Therefore this Action will fill an "empty slot" in a way which is synergic to running programs.

**Keywords:** Inertial Confinement Fusion, High-energy lasers, Laser-produced Plasmas, Diagnostics, Laboratory Astrophysics, Extreme states of matter, Advance Schemes for Ignition, Hydrodynamics.

**Working Groups**

- **WG1** Study of fast ignition and fast electron transport
- **WG2** Study of the shock ignition Approach to ICF
- **WG3** Study of Plasma and Laser Diagnostics
- **WG4** Complementary aspects: Secondary sources of particles and radiation
- **WG5** Complementary aspects: Astrophysics in the laboratory

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Materials, Physics and Nanosciences (MPNS)
**Action MP1209**

**Thermodynamics in the Quantum Regime**

**Objectives**

The main objective of the Action is to establish the scientific foundations for thermodynamic technologies in the quantum regime.

**Abstract**

Modern technologies, which now miniaturise to the nanoscale and into the quantum regime, have the potential to revolutionise many upcoming socio-economic challenges. Historically, thermodynamics has been highly successful, enabling the development of technologies that changed our lives, ranging from fridges to jet planes. While these applications involve macroscopic systems, described accurately by the laws of classical physics, little is known about the applicability of standard notions of thermodynamics in the quantum regime. The aim of the Action is to establish and develop the scientific basis that underpins future thermodynamic technologies at the nanoscale. Central to this is the understanding of fundamental thermodynamic processes for small ensembles, particularly in the quantum regime, in- and out-of equilibrium. These are topics of the emerging cross-over field, “Quantum Thermodynamics”, which is overwhelmingly pioneered by researchers currently located in Europe, many at an early stage in their careers. However, this research across Europe is fragmented and needs large-scale coordination to pave the way for swift progress. This Action is designed to bring researchers from different backgrounds together, foster interdisciplinary exchange and coordinate domestically funded European research to create an internationally leading knowledge base in this emerging and technologically important field.

**Keywords:** Equilibration and emergence of the canonical state, Heat, work and entropy in quantum dynamical processes, Thermodynamic experiments in the quantum regime, Quantum engines, Information theory - thermodynamics link.

**Working Groups**

WG1 Equilibrium & thermalisation, emergence of canonical states  
WG2 Thermodynamic and information theoretic relations for general quantum systems  
WG3 Implementations: from classical to quantum thermodynamic experiments

**Non-COST participation:** Argentina, Japan, Singapore

**Interested Countries:** 13  
**Proposer:** UK  
AT, BE, CH, DE, ES, FI, FR, IL, IT, LU, PL, SK

Materials, Physics and Nanosciences (MPNS)
**Action MP1210**

**The String Theory Universe**

**Objectives**

The main objective of the Action is to exploit complementary expertise of different research groups in Europe to enhance the understanding of String Theory and its applications to Particle Physics, Condensed Matter, Cosmology and Quantum Gravity.

**Abstract**

Although String Theory has been around for more than forty years, it has never been so important for physical reality as it is now, due to its novel outstanding applications to different areas of Physics and Mathematics. While the Large Hadron Collider (LHC) narrows down the experimental limits on supersymmetric particles and satellite missions such as The Wilkinson Microwave Anisotropy Probe (WMAP) and Planck probe the very early Universe, this Action aims at creating a strong European Network focused on fundamental, forefront research exploring the role played by String Theory in Particle Physics, Cosmology and Condensed Matter Physics. The large majority of European world experts in String Theory will be involved in this Action. This will ensure a top quality research output, achieved through an intense exchange of expertise, intra-European collaboration and co-organization of scientific activities. The Action will ensure fair gender representation and simultaneously adopt specific measures for promoting the involvement of women scientists at all levels. Moreover, it will foster the active participation of junior excellent scientists. The outcome of the Action is expected to have a positive impact on both science and society at a European level, in line with the strategic priorities of COST.

**Working Groups**

WG1  Gauge/Gravity duality  
WG2  String phenomenology  
WG3  Cosmology and Quantum Gravity  
WG4  Promote cross-activities and exchange of knowledge  
WG5  Gender issues and outreach activities

**Non-COST participation: South Africa**

**Interested Countries: 15**

Proposer: IT  
BE, BG, CH, DE, DK,  
EL, ES, FR, HU, IL,  
NL, PT, SE, UK

**Keywords:** String Theory, Gauge/Gravity Correspondence, String Phenomenology, String Cosmology, Black Holes.
**Action IS1206**

**Femicide Across Europe**

**Objectives**

The aim of the Action is to establish the first-ever European coalition of experts on femicide in order to advance scientific knowledge, collate data and launch a European Observatory, while suggesting guidelines and interventions to policy-makers and practitioners on femicide in order to improve women's lives and safety in Europe. Expected scientific deliverables of the Action include: scientific workshops promoting awareness of femicide; joint papers, research books, and proceedings of conferences; a web forum for researchers, practitioners and members of the public; a regular newsletter; summer school for students and early-stage researchers; a European Observatory.

**Abstract**

Femicide is a leading cause of premature death for women globally, distinct from homicide and other forms of gender violence. Femicide research is abundant in the United States. In Europe, agencies have funded initiatives on gender and violence but not specifically on femicide. Research is in its infancy and uncoordinated. It requires an interdisciplinary approach, focusing on victim and perpetrator, upon cultural (e.g. “honour killings”) and psychological causes, and on societal issues. The Action will establish the first pan-European coalition on femicide with researchers who are already studying the phenomenon nationally, in order to advance research clarity, agree on definitions, improve the efficacy of policies for femicide prevention, and publish guidelines for the use of national policy-makers. Different forms of publications will emerge from the Action, such as articles, books, newsletters and an Action internet site for the use of researchers, practitioners and policy-makers. Workshops will be held annually, adding advocates and researchers each year, and an Action Conference will be held to attract stakeholders until the Action will organise a pan-European conference to launch the idea of a European Observatory on femicide.

**Working Groups**

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**Non-COST participation: New Zealand, USA**

**Keywords:** Femicide; honour killings; domestic violence; European Observatory; advocacy.
Action IS1207

Local Public Sector Reforms: An International Comparison

Objectives

The aim of the Action is to bundle and integrate the fragmented European research activities and knowledge bases about public sector reforms on the local level of government for the purpose of enhancing the conceptual foundations as well as the methodological rigour of the field in an innovative way. This will foster policy relevant knowledge and practical insights concerning administrative modernization from a cross-county comparative perspective.

Abstract

In the current comparative research concerning public sector modernization, the local level of government is blatantly absent. Databases on local public sector reforms are fragmented, incomparable, incoherent, nationally scattered and confined in their methodological approach. This Action is intended to remedy those deficits. It will generate coherent data bases for systematic comparison with a view to streamlining analytical approaches and synthesizing research outcomes using methodological triangulation (qualitative/quantitative techniques). The Action will provide a platform for establishing a new set of comparative (descriptive, explanatory, and evaluative) knowledge on local public sector reforms and for integrating the fragmented research activities in this neglected area of investigation. It aims to enhance the scope of the conceptual foundations as well as the methodological rigour of comparative public administration. The Action will prepare the basis for a systematic evaluation of local public sector reforms within a European scale of comparison. Action activities will yield policy relevant knowledge concerning local reform measures from a European perspective, which can then be utilized to improve policy making for future public sector modernization.

Working Groups

WG1  External (Post-) NPM Reforms
WG2  Internal (Post-) NPM Reforms
WG3  Democratic Renewal
WG4  Territorial-Functional Re-Scaling

Keywords: Local Public Sector Reforms, Comparative Public Administration, Local Government, Administrative Modernization, Evaluation of different Public Sector Reforms (managerial, functional/territorial, democratic).
**Action IS1208**

**Collaboration of Aphasia Trialists (CATS)**

**Objectives**

The aim of the Action is to develop, coordinate and align collaborative research activity which seeks to improve the assessment, diagnosis, prognosis and rehabilitation of people with aphasia.

**Abstract**

Aphasia, a language problem due to stroke, affects the understanding and expression of spoken and written language. Communication with families, friends and the wider community may be severely affected. Altered social interaction isolates the person with aphasia and impacts on their emotional wellbeing. Aphasia contributes to poorer functional recovery, mobility, discharge destination and return to employment. With an aging population and improved stroke survival, the societal and economic burden of aphasia will rise. Effective management and rehabilitation of aphasia is vital. Aphasia research faces methodological and infrastructural challenges. Typically it remains language, region and discipline specific limiting the efficiency, strength and broader relevance of any research. This Action aims to establish a network of leading European multidisciplinary aphasia investigators in rehabilitation, social science, linguistics and language research. This collaborative network will enhance knowledge, skills and methodology relating to aphasia research. Consensus activities will facilitate international synergy between members in aphasia assessment and diagnosis. Data sharing activities will support enhanced prognosis and rehabilitation of aphasia. In addition, this Action will foster and coordinate the development of high quality aphasia research activity which will address the needs of people with aphasia and their families, health and social care providers and voluntary groups.

**Working Groups**

- WG1 Action Website
- WG2 Aphasia Assessment
- WG3 Prognosis and Predictors of Recovery
- WG4 Effectiveness of Rehabilitation Processes
- WG5 Societal Impact and Re-Integration

**Non-COST participation:** Australia

**Keywords:** Communication, Aphasia, Language, Stroke, Rehabilitation.

**Interested Countries:** 6

**Proposer:** UK

DE, FI, IT, NL, SE
Action IS1209

Comparing European Prostitution Politics: Understanding Scales and Cultures of Governance (PROSPOL)

Objectives

The aim of the Action is to exchange, enhance and compare knowledge about prostitution policies across Europe. By offering insight into the empirical effects and contexts of various regulatory regimes and techniques, the Action will inform future prostitution research and policy including comparative work between different prostitution policy regimes and their effects.

Abstract

ProsPol will compare and disseminate knowledge about the multiple contexts, features and effects of prostitution policies at the European, national and local levels. Due to the combined pressures of globalisation and changing patterns of migration, trafficking and the commercialisation of sex, prostitution has received unprecedented levels of attention in the last three decades. This has led to a heightened demand for effective models of regulation, for legal harmonization and sharing practice across jurisdictions. Nevertheless, much is contested in this field, with countries adopting varying approaches in light of their own particular political, social and legal cultures. At present there are no efficient strategies to address these complex issues and their comprehensive analysis remain fragmented, with little communication amongst researchers from different countries and between researchers and policy makers. This Action will fulfil the pressing need to exchange knowledge and develop comparative approaches on prostitution policies, their effects and the complex contexts influencing them. It will provide an innovative platform of exchange to enhance understanding of how concepts, policies and practices transfer across national cultures and local contexts, and the implications this has for knowledge exchange and coordination in the field.

Keywords: Prostitution, Policy design and transfer, Gender and sexuality, Migration and trafficking, Informal economy.

Working Groups

WG1  Prostitution Policies and Politics
WG2  Economic Dimensions
WG3  Sex, Money & Society

Interested Countries: 14
Proposer: UK
AT, BE, BG, DE, EE, FI, FR, IT, NL, NO, PT, RO, SE
Action IS1210

Appearance Matters: Tackling the Physical and Psychological Consequences of Dissatisfaction with Appearance

Objectives

The aim of this Action is to increase, co-ordinate and harmonise European research in the field of appearance-related dissatisfaction. The Action will progressively construct a multidisciplinary community of researchers and practitioners which will develop comprehensive resources to support collaborative pan-European research to (a) determine the extent and impacts of appearance-related distress on key areas of living, (b) evaluate the effectiveness of interventions and (c) promote social activism to produce changes in policy and practice.

Abstract

Until recently, societal interest in ‘looks’ has been considered largely benign, however, debilitating levels of appearance dissatisfaction are now normative in resource-rich nations, with extensive and damaging impacts on physical and psychological health. Although there are examples of research and activism in the field in Europe, many researchers work in isolation, diluting the potential impact of their work. Europe currently lacks a harmonised approach to establishing levels of appearance-related distress, the impacts on key areas of living and to the systematic evaluation of interventions currently being implemented within and beyond Europe. This Action will co-ordinate and increase research across Europe, offer support to the high proportion of female and early career researchers in this field and will forge crucial links between researchers, practitioners and policy makers, offering the potential for significant benefits to the millions of Europeans adversely affected by these issues.

Keywords: Appearance dissatisfaction, body image, disfigurement, risks to physical and psychological health.

Working Groups

WG1 Educational settings
WG2 Vocational training settings
WG3 Public health
WG4 Health care settings
WG5 Social and Cultural issues relating to appearance dissatisfaction
Action IS1211

Cancer and Work Network (CANWON)

Objectives

The aim of the Action is to integrate emerging knowledge on cancer and work to achieve insight into the return-to-work process in cancer survivors, work-related costs of cancer survivorship and role of employers; and to develop and evaluate highly innovative interventions which effectively enhance work participation of cancer patients.

Abstract

Each year in Europe, 3.2 million new cancer patients are diagnosed including 1.6 million patients of working age. The number of cancer survivors in Europe is rapidly growing due to improved treatment and ageing population. Many cancer survivors are at risk for unemployment which greatly affects their quality of life and financial situation. Research on cancer and work is therefore of great importance but scattered over Europe and lacking appropriate dissemination. Moreover, interventions supporting employment of cancer survivors are urgently required but scarcely developed. This Action aims to combine European knowledge on: 1) prognostic factors of unemployment in cancer survivors including gender- and country-specific differences; 2) work-related costs of survivorship for both patients and society; 3) the role of employers; and 4) development and evaluation of innovative, interdisciplinary interventions which effectively support employment. Furthermore, it aims at disseminating research knowledge and best practice over Europe. This CANWON Action unites 23 teams from 15 COST countries across different stakeholders and research areas. The expected benefits are rapid exchange of research knowledge, standardised methods and techniques, innovative interventions, future guidelines on cancer and work and the improvement of quality of life of cancer patients.

Keywords: Cancer, work, employment, costs, intervention.

Working Groups

WG1 Prognostic factors of work participation of cancer patients
WG2 Economic burden
WG3 The role of employers in work participation
WG4 Development of innovative interventions to enhance work participation of cancer patients
Action IC1206

De-Identification for Privacy Protection in Multimedia Content

Objectives

The aim of the Action is to facilitate and promote coordinated efforts in automated person de-identification in multimedia content (text, image, audio and video) through the provision of an effective and innovative approach to the integration of relevant European experts, institutions and organisations, as well as non-COST experts (from China and United States).

Abstract

De-identification in multimedia content can be defined as the process of concealing the identities of individuals captured in a given set of data (images, video, audio, text), for the purpose of protecting their privacy. This will provide an effective means for supporting the EU's Data Protection Directive (95/46/EC), which is concerned with the introduction of appropriate measures for the protection of personal data. The fact that a person can be identified by such features as face, voice, silhouette and gait, indicates the de-identification process as an interdisciplinary challenge, involving such scientific areas as image processing, speech analysis, video tracking and biometrics. This Action aims to facilitate coordinated interdisciplinary efforts (related to scientific, legal, ethical and societal aspects) in the introduction of person de-identification and reversible de-identification in multimedia content by networking relevant European experts and organisations.

Keywords: De-Identification, Reversible De-Identification, Biometrics, Privacy Protection, Multimedia.

Working Groups

WG1 De-identification methods for biometric identifiers
WG2 De-identification methods for soft- and non-biometric identifiers
WG3 Applications and added value of de-identified data
WG4 Ethical, bioethical, societal and legal aspects and guidelines for de-identification and reversible de-identification

Non-COST participation: China, USA
Action IC1207


Objectives

The main objectives of the Action are: develop data mining software and methodologies to exploit a wide range of volunteered geographic information (VGI); define quality assessment criteria; establish an open and updatable repository of VGI analysis, integration tools, methods and case studies; develop VGI methods for understanding the local aspects of VGI datasets and their use.

Abstract

The Action, PARSEME, aims at increasing and enhancing the support of the European multilingual heritage from Information and Communication Technologies (ICT). This general aim is addressed through improving linguistic representativeness, precision and computational efficiency of Natural Language Processing (NLP) applications. The Action focuses on the major bottleneck of these applications: Multi-Word Expressions (MWEs), i.e. sequences of words with unpredictable properties such as “to count somebody in” or “to take a haircut”. A breakthrough in their modelling and processing can only result from a coordinated effort of multidisciplinary experts in different languages. COST is the most adequate framework answering this need. Fourteen European languages will be addressed from a cross-theoretical and cross-methodological perspective, necessary for coping with current fragmentation issues. Expected deliverables include enhanced language resources and tools, as well as recommendations of best practices for cutting-edge MWE-aware language models. The Action will lead to a better understanding of the nature of MWEs. It will establish a long-lasting collaboration within a multilingual network of MWE specialists. It will pave the way towards competitive next generation text processing tools which will pay greater attention to language phenomena.

Keywords: Multilingualism, natural language processing, multi-word expressions, idioms, parsing.

Working Groups

WG1 Lexicon/Grammar Interface
WG2 Parsing Techniques for MWEs
WG3 Hybrid Parsing of MWEs
WG4 Annotating MWEs in Treebanks

Non-COST participation: Brazil, USA
Action IC1208  

Integrating Devices and Materials: A Challenge for New Instrumentation in ICT

Objectives
The aim of IDEM COST Action is to increase the scientific understanding and technical knowledge of the emerging field of integrating devices and materials for new instrumentation in ICT by exploring and developing the combination of novel nanostructured materials, preparation methods, techniques and devices. The resulting materials and devices are envisioned as an indispensable part of the future ICT equipments and instrumentation.

Abstract
This Action addresses the critical challenge of providing new devices for Information and Communication Technologies (ICT) applications running from sensors to photonics and optoelectronics. Traditional materials—such as liquid crystals—and devices—such as acoustic resonators—are now showing new and improved functionalities when combined with nanostructured materials. This leads to innovative devices, which broaden the horizon of the applications in many areas, from health (bio- and diagnostic sensors) to optical communications and photonics (reconfigurable optics, displays). Interdisciplinarity and improved use of knowledge are essential for undertaking challenges in the design of new devices derived from new materials. The action will develop new ideas for functional materials and devices in these areas and innovative training curricula for professionals and scientists that encourage an integrated approach to the design and implementation of breaking new devices for photonics, materials engineering (e.g. multiferroic ceramics) and sensor areas.

Keywords: Reconfigurable optics, biosensor, nanostructured liquid crystal, acoustic resonator, nanomultiferroic ceramics.

Working Groups
WG1 LC modification with nanostructures  
WG2 Biosensors and reading electronics  
WG3 New ICT devices based on reconfigurable LCs and unconventional materials  
WG4 Tools for Integration; Tools for Dissemination

Interested Countries: 6
Proposer: ES
BE, IT, PL, SI, UK
Action TU1204

People Friendly Cities in a Data Rich World

Objectives

The main objective is to foster a trans-disciplinary network of key stakeholders to identify new approaches, policies and research priorities for the emerging theme of smart and liveable cities; and so allow people to co-create cities where infrastructure, technology, innovative ICT and data driven solutions are aligned with user needs to promote well being, good health, a sustainable use of resources, within a people-centred form of economic, cultural, and political development.

Abstract

Cities are the future. In 2008, the percentage of people living in urban areas surpassed those living rural communities. These trends are expected to continue; the United Nations estimates that over 70% of the world’s population will be living in towns and cities by 2050. Not surprisingly cities elicit ever greater attention from government, researchers, and industry. Many of the initiatives focus upon the efficient use of resources and carbon reduction in response to climate change such as Europe 2020 and the European Covenant of Mayors’ commitment to energy efficiency. Likewise the “Smart City” concept offers a similar if somewhat broader vision of a more efficient city. The focus upon smarter and more efficient cities is important, but incomplete. It is important that cities be sustainable and pleasant to live within. Against this background, the Action builds on an ESF exploratory workshop on the emerging theme of “smart and liveable cities”. Supported by a European network of candidate cities, the Action co-ordinates a trans-disciplinary network of experts and non-experts that investigate the alignment of the “hardware” and “software” of a city with user needs to promote well being, good health, and a sustainable use of resources, within an evolving people-centred consultation framework for economic, cultural, and political development.

Keywords: Smart and Liveable Cities, Collaborative Urbanism, Trans-disciplinary Network, Digital Data, City Sounding Board.

Working Groups

WG1 Roadmap and Research Strategy
WG2 Knowledge Platform
WG3 Living Laboratory
WG4 Framework for Collaborative Urbanism

Interested Countries : 11
Proposer : IE
BE, DE, DK, FI, IS, IT,
NL, NO, SE, UK

Transport and Urban Development (TUD)
Action TU1205

Building Integration of Solar Thermal Systems (BISTS)

Objectives

The objectives for this Action focus on creating a platform from which a working environment is developed that generates methods to further the integration of STS in buildings. To ensure the success of the Action the following objectives are set.

Abstract

Energy use in buildings represents 40% of the total primary energy used in the EU and therefore developing effective energy alternatives is imperative. Solar thermal systems (STS) will have a main role to play as they contribute directly to the heating and cooling of buildings and the provision of domestic hot water. STS are typically mounted on building roofs with no attempt to incorporate them into the building envelope, creating aesthetic challenges and space availability problems. The proposed Action will foster and accelerate long-term development in STS through critical review, experimentation, simulation and demonstration of viable systems for full incorporation and integration into the traditional building envelope. Viable solutions will also consider economic constraints, resulting in cost effective Building Integrated STS. Additionally, factors like structural integrity, weather impact protection, fire and noise protection will be considered. The most important benefit of this Action is the increased adoption of RES in buildings. Three generic European regions are considered: Southern Mediterranean, Central Continental and Northern Maritime Europe, to fully explore the Pan-European nature of STS integration. The proposed Action consortium presents a critical mass of European knowledge, expertise, resources, skills and R&D in the area of STS, supporting innovation and conceptual thinking.

Working Groups

WG1 Development and characterisation of new BISTS
WG2 Modelling and Simulation
WG3 Investigation of new applications for innovative BISTS
WG4 Dissemination

Non-COST participants: Canada, USA

Keywords: Building integration, Solar thermal systems, Renewable energy, Envelope integrity problems, Cost effective solutions.
Action TU1206

Sub-Urban – A European Network to Improve Understanding and use of the Ground Beneath our Cities

Objectives

The main objective of the Action is to provide a long-needed contribution to greater interaction and networking between experts who develop urban subsurface knowledge and those who can benefit most from it - urban decision-makers, practitioners (private consultants and contractors) and the wider research community by establishing a network to co-ordinate, integrate and accelerate the world-leading research into modelling the subsurface taking place in European institutions, and by developing a Toolbox to enable the knowledge to be widely disseminated and more easily incorporated in urban policy and planning.

Abstract

Increasing urbanisation throughout the world challenges the sustainable development and resilience of cities. Despite this, the importance of the ground beneath cities is under-recognised and often overlooked. The main aim of the Action is to provide a long-needed contribution to greater interaction and networking, and so transform the relationship between experts who develop urban subsurface knowledge and those who can benefit most from it - urban decision makers, practitioners and the wider research community. The Action will establish a network to co-ordinate, integrate and accelerate the world-leading research into modelling the subsurface taking place in European institutions and to develop a Toolbox to enable subsurface knowledge to be widely disseminated.

Keywords: Subsurface, city, 3D/4D modelling, urban sustainability and ecosystem services, geology and groundwater.

Working Groups

WG1 Compile inventories of existing methods, practices and case studies
WG2 Evaluation and integration of techniques
WG3 Preparation of guidelines and a Toolbox
WG4 Dissemination and training

Non-COST participation: Bangladesh, Hong Kong, Russia

Interested Countries: 8
Proposer: UK
DE, DK, FI, IE, NL, NO, SE
Action TU1207

Next Generation Design Guidelines for Composites in Construction

Objectives

The main aim of the Action is to contribute to the development of advanced design guidelines, compatible with European standards. These guidelines will address both new structures reinforced with FRPs, as well as the rehabilitation and strengthening of existing deficient concrete, masonry, steel and timber structures. Key scientific and technological challenges (individuated in part B.2) will be addressed along with the new challenges identified by this Action. Technical reports, databases, scientific publications, training and informative communications will be produced on four main priority areas: Material Development and Characterisation; New Structures; Strengthening Applications; Whole-life-costing and life cycle assessments.

Abstract

Construction is rapidly becoming the leading outlet for FRP composites. Although the use of composite materials in construction started in the 1980s, civil engineers only recently started gaining confidence in this technology for use in primary structural applications. Despite the considerable technological developments in this field, there are still key scientific and logistical issues that need to be addressed for the widespread acceptance in construction. For example, existing design recommendations are largely based on work carried out more than fifteen years ago on first generation reinforcing products and their conservativeness is hindering the development of innovative and more efficient products and design solutions. This Action aims to: coordinate European research in the field; develop and maintain a critical mass of researchers; offer a link between academia and industry; and develop a new generation of design guidelines based on European Standards. This will facilitate the adoption of European products not only in Europe but also internationally and help Europe stay one step ahead of International competitors.

Working Groups

WG1 Material Development and Characterisation
WG2 New Structures
WG3 Strengthening Applications
WG4 Whole-life-costing and life cycle assessments

Non-COST participation: Australia, Canada, China, Hong Kong, Singapore, USA

Keywords: Composites, Fibre Reinforced Polymers, Strengthening, Design Guidelines, Life Cycle Analysis.
Action TU1208

Civil Engineering Applications of Ground Penetrating Radar

Objectives

The aim of the Action is to exchange and increase scientific-technical knowledge and experience of Ground Penetrating Radar (GPR) techniques in Civil Engineering (CE), whilst simultaneously promoting throughout Europe the effective use of this safe and non-destructive technique in the monitoring of infrastructures and structures. The Action will establish active links between universities, research institutes, companies and end users working in this field, fostering and accelerating its long-term development in Europe.

Abstract

This Action focuses on the exchange of scientific-technical knowledge and experience of Ground Penetrating Radar (GPR) techniques in Civil Engineering (CE). The project will be developed within the frame of a unique approach based on the integrated contribution of University researchers, software developers, geophysics experts, Non-Destructive Testing equipment designers and producers, end users from private companies and public agencies. In this interdisciplinary Action, advantages and limitations of GPR will be highlighted leading to the identification of gaps in knowledge and technology. Protocols and guidelines for EU Standards will be developed, for effective application of GPR in CE. A novel GPR will be designed and realized: a multi-static system, with dedicated software and calibration procedures, able to construct real-time lane 3D high resolution images of investigated areas. Advanced electromagnetc-scattering and data-processing techniques will be developed. The understanding of relationships between geophysical parameters and CE needs will be improved. Freeware software will be released, for inspection and monitoring of structures and infrastructures, buried-object localization, shape reconstruction and estimation of useful parameters. A high level training program will be organized. Mobility of early career researchers will be encouraged. The project has already received the interest of key end users and excellent EU Institutions.

Keywords: Ground Penetrating Radar (GPR), Electromagnetic Direct and Inverse Scattering and Data-Processing, Non-Destructive Testing (NDT), Civil Engineering (CE), Surveying of pavements - bridges - tunnels and buildings - underground utilities and voids.

Working Groups

WG1 Novel GPR instrumentation
WG2 GPR surveying of pavements, bridges, tunnels and buildings; underground utility and void sensing
WG3 EM methods for near-field scattering problems by buried structures; data processing techniques
WG4 Different applications of GPR and other NDT technologies in CE

Non-Cost participation: Australia, USA

Interested Countries : 15
Proposer : IT
AT, BE, CH, CZ, DE,
EL, ES, FI, FR, NL,
PL, PT, TR, UK

Transport and Urban Development (TUD)
**Action TU1209**

**Transport Equity Analysis: Assessment and Integration of Equity Criteria in Transportation Planning (TEA)**

**Objectives**

The aim of the Action is to enhance the role of citizen sensing in mapping. The Action seeks to increase the value of volunteered data provided by citizen sensors for mapping applications, with a particular focus on map production and map evaluation. The core aim of the Action is to enhance the value of citizen sensors in mapping applications.

**Abstract**

Understanding the equity implications of transport policies and investments is becoming increasingly important, as underscored by social movements around the world. This poses a major challenge in the assessment and appraisal of transport projects and policies, in which equity issues are currently hardly addressed. In fact, current evaluation methods in transport do not account for equity issues, and this topic is not dealt with in EU guidebooks for project evaluation. Only Germany, as an exception, considers equity between regions (Länder), but not in terms of accessibility to key life activities within an urban region. This Action proposal contributes to the body of research by bringing together new approaches to incorporate equity consideration in transport project evaluation and decision making. The approaches consist of the measurement of accessibility with the literature on social justice, travel behaviour models and socio-economic impacts analysis in line with mainstream welfare economics.

The three main objectives of this Action proposal are:
1) to establish a methodology to explore the links between transport accessibility and distributional factors;
2) to develop new transport evaluation criteria accounting for accessibility in the social welfare function;
3) to help embed equity assessment into future transport policies and investments.

**Working Groups**

WG1 Management
WG2 Identify equity approaches
WG3 Methods for integrating equity criteria in assessment practices
WG4 Equity issues and challenges in the decision-making process
WG5 Dissemination

**Non-COST participation: Canada**
**Action TD1205 (BMBS, MPNS, CMST)**

**Innovative Methods in Radiotherapy and Radiosurgery Using Synchronisation Radiation**

**Objectives**

The main objective of the Action is to develop and coordinate a multidisciplinary network for developing synchrotron radiotherapy and radiosurgery to treat brain tumours and nervous diseases.

**Abstract**

Radiotherapy is one of the main treatment options for cancer patients. The physical properties of synchrotron-generated X-rays make them ideally suited for the design of new therapeutic approaches to treat both malignant and non-malignant diseases, in particular aggressive brain tumors. Centered around six multidisciplinary work groups, the COST teams will a) prepare for clinical trials in human patients preceded by, b) controlled trials in veterinary patients with spontaneous malignant tumours, c) preclinical studies in small animals, d) dosimetry, e) ethical aspects and patient care. SYRA3 will be an excellent coordination and communication tool for experienced scientists and Early Stage Researchers in the field of innovative radiotherapy & radiosurgery. International institutions and industrial partners are involved to apply standardization methods and for the dissemination/exploitation of results. The networking Action will be carried out by workshops and seminars, Short-Term Scientific Missions, training events, conferences and common joint publications.

**Keywords:** Radiation therapy, microbeam, stereotactic radiosurgery, synchrotron radiation, clinical trials.

**Working Groups**

- **WG1** Radiobiosis
- **WG2** Treatment of brain tumors by MRT
- **WG3** Dosimetry and treatment planning development for small fields and microbeams
- **WG4** Improved drug delivery and dose enhancement
- **WG5** Emerging applications of microbeams
- **WG6** From bench to bedside

**Non-COST participation:** Australia, Canada, USA

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**Interested Countries:** 10

**Proposer:** FR

CH, DE, ES, FI, IT,
NL, NO, SE, UK
Action TD1206 (ISCH, BMBS)

Development and Implementation of European Standards on Prevention of Occupational Skin Diseases (STANDERM)

Objectives

The aim of the Action is to bundle research relevant for prevention of occupational skin diseases (OSD) in the participating countries, including basic sciences (aetiology and individual susceptibility), epidemiological surveillance, translational and applied clinical research. The outcome will be common European standards on evidence-based prevention of OSD and on the complete spectrum of medical and educational management of patients with OSD. This will provide (i) a safer working environment and (ii) easier access to targeted early intervention programmes for all workers in high risk professions throughout Europe. Thereby, both health and quality of life of workers will be improved, and detrimental socio-economic consequences of OSD for the individuals and the society diminished. This will, in turn increase economic competitiveness, particularly of small and medium sized companies where incidence of OSD is highest, and decrease the overall costs related to OSD.

Abstract

In Europe occupational skin diseases (OSD) represent up to 30% of occupational diseases. OSD related costs exceed 5 billion €/year in the EU by loss of productivity and cause extensive suffering for affected workers. Recently, the EU commission defined lacking prevention of OSD a top priority problem. There are isolated efforts in some countries; however, prevention programmes are poorly validated and there is no coordinated action between the stakeholders at national and international levels. Surveillance and diagnostics of OSD are hampered by lack of common monitoring of new allergens in workplaces. The proposed COST-Action comprising 26 countries aims to coordinate activities relevant for OSD prevention, including basic sciences (aetiology and individual susceptibility), epidemiological surveillance, transnational and applied clinical research. This involves regulatory issues (e.g. REACH), development of interdisciplinary workers’ education concepts, identifying individual susceptibility markers enabling tailored prevention and pre-employment counselling. This COST-Action will allow setting up transnational controlled intervention studies in large cohorts in high-risk professions. The outcome will be evidence-based common European standards on OSD prevention and patient management. This will provide a safer working environment and targeted early intervention for workers throughout Europe enhancing economic competitiveness, particularly of small and medium sized companies.

Keywords: Occupational skin diseases, health surveillance, risk assessment, prevention, standards.

Working Groups

WG1 Aetiology and Susceptibility
WG2 Development of Common European Standards
WG3 European Integration Studies
WG4 Surveillance, Risk Assessment and Allergens
WG5 Knowledge and Dissemination

Interested Countries: 26
Proposer: DE
AT, BE, BG, CH, CZ, DK, EE, EL, ES, FI, FR, HR, HU, IT, LT, LV, MK, MT, NL, PL, PT, RO, RS, SE, UK
Action TD1207 *(ICT, ESSEM)*

Mathematical Optimization in the Decision Support Systems for Efficient and Robust Energy Networks

Objectives

The aim of the Action is to coordinate the ongoing efforts of experts of different fields, from academia and industry, in developing innovative tools for quantitative decision making, and applying them to the efficient and robust design and management of energy networks. The use of Decision Support Systems and their use in the energy production and distribution context aims at improving the economic, environmental and social impact of energy management in Europe.

Abstract

Energy Production and Distribution (EP&D) is among the biggest challenges of our time, since energy is a scarce resource whose efficient production and fair distribution is associated with many technical, economic, political and ethical issues like environmental protection and people health. EP&D networks have rapidly increased their size and complexity, e.g. with the introduction and interconnection of markets within the EU. Thus, there is an increasing need of systems supporting the operational, regulatory and design decisions through a highly inter-disciplinary approach, where experts of all the concerned fields contribute to the definition of appropriate mathematical models. This is particularly challenging because these models require the simultaneous use of many different mathematical optimization tools and the verification by experts of the underlying engineering and financial issues. The COST framework is instrumental for this Action to be able to coordinate the inter-disciplinary efforts of scientists and industrial players at the EU level.

Keywords: Energy Networks Optimization and Safety, Infrastructure Optimization, Energy Saving, Mixed Integer Linear and Non-Linear Programming, Mathematical Modeling for Decision Support.

Working Groups

WG1 State of the Art
WG2 Methodology
WG3 Validation
WG4 Software

Non-COST participation: Brazil, China, Japan, Kenya, USA
**Action TD1208 (CMST, BMBS, MPNS)**

**Electrical Discharges with Liquids for Future Applications**

**Objectives**

The overall aim of the Action is the establishment of an internationally leading virtual-centre in Europe concerned with the development of theoretical and experimental knowledge and expertise on discharge plasmas-liquid interactions. This Action's developments will lead to future studies and applications in physics, chemistry, biomedicine and materials engineering.

**Abstract**

Plasmas generated in liquids and gas discharges interacting with liquids are today hot topic greatly interesting plasma physicists and plasma chemists due to the broad field of potential applications. Plasma-liquid systems can produce strongly non-equilibrium environments. Plasma-liquid interactions represent a great opportunity for developing novel chemistries and related technologies. This proposed Action aims bringing together a high level of experimental, simulation and theoretical expertise available around Europe. This Action will support a coordinated effort that will improve our knowledge of basic processes responsible for initiating and sustaining discharges in/on liquids. New applications will be identified with direct benefits to the European industrial sector. Potential technological impact is foreseen in a range of application fields such as water and surface treatment, synthesis of nanoparticles, catalysis, formation of new organic compounds, and biochemistry. The Action will bring together researchers and practitioners from diverse fields including physics, chemistry, materials science, engineering and biology. The Action’s activities exhibit a strongly interdisciplinary character and will represent the basis for future developments. The research platform as well as the new infrastructure, obtained knowledge and experience developed under the Action will form an effective background for the future research and deep international collaboration across all disciplines involved.

**Working Groups**

WG1 Plasmas generated directly in the liquid phase  
WG2 Plasmas interacting with liquids  
WG3 Elementary physical and chemical processes initiated by discharges  
WG4 Interaction of plasma reactive species with materials and surfaces

**Non-COST participation:** Belarus, Japan, Russia, Ukraine, USA

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Keywords: Plasmas in liquids, plasma-liquid interaction, plasma chemistry and modelling, plasma diagnostics, chemical analyses.
**Action TD1209** *(FA, FPS, ESSEM, ICT, ISCH)*

**European Information System for Alien Species**

**Objectives**

The aim of the Action is to facilitate enhanced knowledge gathering and sharing to provide support to a European information system for effective and informed decision-making in relation to IAS. The COST Action will achieve this through inter-related objectives.

**Abstract**

Invasive Alien Species (IAS) threaten biodiversity, society, human-health, well-being and the economy. The economic impact to Europe is estimated 12.5 to 20 billion € (annually). Europe has committed to tackling IAS through Target 5 of the EU Biodiversity Strategy to 2020 which is in line with target 9, COP 10 Decision X/2; an information system is a prerequisite to meet strategy through effective early warning and rapid response for prevention and control of IAS. Initiatives to collate information on IAS have resulted in the development of many databases differing in their geographic, taxonomic and ecological coverage. There are a number of constraints that might limit the effective use of existing databases: data obsolescence, lack of interoperability and uncertainties for long-term sustainability of the various tools. This COST Action will facilitate enhanced knowledge gathering and sharing through a network of experts, providing support to a European IAS information system which will enable effective and informed decision-making in relation to IAS. An overarching priority will be to identify the needs and formats for alien species (AS) information by different user groups and specifically for implementation of EU 2020 Biodiversity Strategy. Correspondingly early warning tools and rapid response protocols will be developed.

**Working Groups**

- WG1 Early Warning and Rapid Response
- WG2 Trends and analyses on pathways and priority species
- WG3 Trends and analyses on impacts of priority species
- WG4 Data standardisation and harmonisation

**Non-COST participation:** New Zealand, USA

**Keywords:** Invasive alien species (IAS), Early Warning and Rapid Response System, European IAS Information Network, EU Biodiversity Strategy, Pathways and Impact.
Action TD1210 *(ISCH, MPNS, ICT)*

Analyzing the Dynamics of Information and knowledge landscapes - KNOWeSCAPE

Objectives

The aim of the Action is the development of interactive knowledge maps for the study and curation of large information spaces and effective navigation through them.

Abstract

There is no escape from the expansion of information, so that structuring and locating meaningful knowledge becomes ever more difficult. This Action will tackle this urgent problem using the unique networking and capacity-building features provided by the COST framework. For the first time, a platform will be created where information professionals, sociologists, physicists, digital humanities scholars and computer scientists collaborate on problems of data mining and data curation in collections. The main objective of this Action is advancing the analysis of large knowledge spaces and systems that organize and order them. The combination of insights from complexity theory and knowledge organization will improve our understanding of the collective, self-organized nature of human knowledge production and will support the development of new principles and methods of data representation, processing, and archiving. To this end, the knowledge organization in web-based information spaces such as Wikipedia as well as collections from libraries, archives, and museums will be studied. This Action aims to create interactive knowledge maps. Their end users could be scientists working between disciplines and seeking mutual understanding; science policy makers designing funding frameworks; cultural heritage institutions aiming at better access to their collections; and students seeking a first orientation in academia.

Working Groups

WG1  Phenomenology of knowledge spaces  
WG2  Theory of knowledge spaces  
WG3  Visual analytics of knowledge spaces – knowledge maps  
WG4  Data curation and navigation based on knowledge maps

Non-COST participation: Ukraine, USA
Participation of Non-COST countries

Life Sciences

Biomedicine and Molecular Biosciences (BMBS)
BM1205 – Australia (AU) .................................................................................................................. 5
BM1206 – USA (US) ............................................................................................................................... 6
BM1207 – USA (US) ............................................................................................................................... 7

Food and Agriculture (FA)
FA1206 – Australia (AU), Japan (JP), USA (US) .................................................................................. 10
FA1207 – Australia (AU), Brazil (BR), India (IN), Japan (JP), USA (US) .................................................. 11

Forests, their Products and Services (FPS)
FP1203 – Australia (AU), Chile (CL), Georgia (GE), Morocco (MA), New Zealand (NZ), Tunisia (TN), Ukraine (UA), USA (US) .............................. 13
FP1204 – Armenia (AM), Algeria (DZ), USA (US) .................................................................................. 14
FP1206 – Argentina (AR), Canada (CA), Costa Rica (CR), Algeria (DZ), Tunisia (TN), USA (US) ....... 16
FP1207 – Institutions in International Organisations (XI) ................................................................... 17

Natural Sciences

Earth System Science and Environmental Management (ESSEM)
ES1205 – USA (US) .............................................................................................................................. 22
ES1206 – Australia (AU), Canada (CA), Hong Kong (HK), Tunisia (TN), USA (US) .......................... 23
ES1207 – Canada (CA), Institutions in International Organisations (XI) ........................................... 24

Materials, Physics and Nanosciences (MPNS)
MP1206 – Australia (AU), Canada (CA), China (CN), Japan (JP), New Zealand (NZ), Puerto Rico (PR), Singapore (SG) ................................. 25
MP1209 – Argentina (AR), Japan (JP), Singapore (SG) ...................................................................... 28
MP1210 – South Africa (ZA) ................................................................................................................... 29

Science in Society

Individuals, Societies, Cultures and Health (ISCH)
IS1206 – New Zealand (NZ), USA (US) .............................................................................................. 30
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Information and Communication Technologies (ICT)
IC1206 – China (CN), USA (US) ............................................................................................................. 36
IC1207 – Brazil (BR), USA (US) ............................................................................................................. 37

Transport and Urban Design (TUD)
TU1205 – Canada (CA), USA (US) ......................................................................................................... 40
TU1206 – Bangladesh (BD), Hong Kong (HK), Russia (RU) .................................................................. 41
TU1207 – Australia (AU), Canada (CA), China (CN), Hong Kong (HK), Singapore (SG), USA (US) .... 42
TU1208 – Australia (AU), USA (US) ....................................................................................................... 43
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Trans-Domain Proposals (TDP)
TD1205 – Australia (AU), Canada (CA), USA (US) ............................................................................. 45
TD1207 – Brazil (BR), China (CN), Japan (JP), Kenya (KE), USA (US) ..................................................... 47
TD1208 – Belarus (BY), Japan (JP), Russia (RU), Ukraine (UA), USA (US) ........................................... 48
TD1209 – New Zealand (NZ), USA (US) ............................................................................................... 49
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