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List of Action

CA15101 - Comparative Analysis of Conspiracy Theories

OBJECTIVE

The main objective is to generate the thorough comprehension of the history, politics, sociology, rhetoric and psychology of conspiracy theories needed to counter their often harmful effects on democratic values. Conspiracy theories have so far not at all been studied as comprehensively as their manifest importance demands.

SUMMARY

Conspiracy theories play an increasingly visible role in the political life in Europe, not least because the EU itself is often viewed as a vast conspiracy. Although sometimes seen as harmless entertainment, conspiracy theories can contribute to extremism within particular regions, as well as fuelling tensions between nations. They can erode trust in democratic institutions and the media. Despite the increasing prominence of conspiracy theories in the age of the internet, there has been little systematic research on where they come from, how they work and what can be done about them. The aim of this Action is to develop an interdisciplinary and international network to provide a comprehensive understanding of conspiracy theories.
Existing research has tended to concentrate on specific national traditions, and is often confined to the perspective of a single discipline. In contrast this Action will adopt a comparative approach, investigating the causes, manifestations and effects of conspiracy theories in different regions and times, and drawing on insights from history, politics, sociology, anthropology, cultural studies and psychology. The Action will pursue the inquiry in three broad areas: the manifestations and modes of transmission of conspiracy theory in different historical and cultural contexts; the variety of actors and audiences involved in the production and consumption of conspiracy theories; and the psychological and cultural causes and political consequences of belief in conspiracy. Working closely with stakeholders, this Action will build a better understanding of conspiracy theories in order to develop an effective response to them.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Psychology: Social psychology ● Sociology: Anthropology, ethnology, cultural studies ● Political Science: Violence, conflict and conflict resolution ● Media and communications: Media and communications, social aspects of information science and surveillance, socio-cultural communication ● History and Archeology: Modern and contemporary history	● conspiracy theory ● racism ● anti-semitism ● populism ● cultural narratives

NETWORK OF PROPOSERS

Main Proposer: DE
Network of Proposers (31): AT, BE, BG, CH, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IL, IT, LT, MK, NL, NO, PL, PT, RO, RS, SE, SI, SK, TR, UK (ITC: 48%)
Near Neighbour Country: Russian Federation
International Partner Country: Australia, United States
Industrial participation: SME (Hungary)
Gender balance of Proposers: 42% F / 58% M

CA15102 - Solutions for Critical Raw Materials Under Extreme Conditions

OBJECTIVE

The main objective is to focus on the substitution of critical raw materials (CRMs) in high value alloys and metal-matrix composites used under extreme conditions, in Energy, Transportation and Machinery manufacturing industries, and to set up a network of expertise in multi-scale modelling, synthesis, characterization, engineering design and recycling to find viable alternatives to CRMs.

SUMMARY

Difficulties in the access to CRMs are expected to depress industrial sectors vital to Europe. The Action focuses on the substitution of CRMs (like Cr, Co, Nb, W, Y) in high value alloys and metal-matrix composites used under extreme conditions of temperature, loading, friction, wear, corrosion, in Energy, Transportation and Machinery manufacturing industries. The Action aims to set up a network of expertise to define the state of knowledge and gaps in multi-scale modelling, synthesis, characterization, engineering design and recycling, that could find viable alternatives to CRMs and promote the industrial exploitation of substituted materials.
The Action envisions a fully Sustainable Value Chain approach for:

- Machinery manufacturing industry. Alternatives for Co and W in WC/Co cemented carbide wear resistant tool materials (Hard Metals and Cutting Tools)
  Alternatives for chromium- and tungsten-alloyed tool steels
- Energy Industry. Reduction of Cr and Y in high-strength steel alloys
  Alternatives for Cr and other CRMs by hard, wear and corrosion resistant surface coatings
- Transportation Industry

Alternatives for Nb in high-strength low-alloy (HSLA) steel (Automotive)
Alternatives for high-temperature Ni-based superalloys (Aerospace)
A four-year Action oriented to strengthen collaboration between active researchers working in the different areas of investigation involving CRMs, is the most suitable initiative to seed the initial catalytic nucleus of growth for EU excellence in strategic CRMs substitution.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Materials engineering: Sustainable engineering ● Materials engineering: New materials: oxides, alloys, composite, organic-inorganic hybrid ● Materials engineering: Characterization methods of materials for material engineering applications ● Materials engineering: Structural properties of materials ● Materials engineering: Thermal properties of condensed matter for materials engineering applications	● materials under extreme conditions ● understanding the role of crms in high-tech materials ● design of a novel microstructure with reduced/without crms ● value chain impact - environmental and economic

NETWORK OF PROPOSERS

Main Proposer: IT
Network of Proposers (25): AT, BE, BG, CZ, DE, EE, ES, FI, FR, HU, IT, LT, LU, LV, NL, NO, PL, PT, RO, RS, SE, SI, SK, TR, UK (ITC: 56%)
Industrial participation: SMEs (Estonia, Italy, Latvia, Portugal, Spain), Large companies (Belgium, Finland, Poland, Spain, Turkey)
Gender balance of Proposers: 41% F / 59% M

CA15103 - Uncovering the Mediterranean salt giant

OBJECTIVE

The main objective is to determine the causes of: Timing and emplacement mechanisms of the Mediterranean salt giant Early salt deformation and fluid flow across the salt Mechanisms underlying the vertical motions inside the basins and to explore the possibility that salt giants promote the development of a diverse and active deep biosphere.

SUMMARY

The Action aims to create a new flexible scientific network that will address the causes, timing, emplacement mechanisms, and consequences at local and planetary scale of the largest and most recent 'salt giant' on Earth: The late Miocene (Messinian) salt layer in the Mediterranean basin.
This inter-sectorial and multinational cooperation network will comprise a critical mass of both experienced and early-career researchers from Europe and beyond. The goal will be achieved through capacity building, researchers' mobility, skills development, knowledge exchange and scientific networking.
The study of the unique salt giant is inherently cross-disciplinary, embracing geology, geophysics, geochemistry, microbiology, and paleoclimatology. It is an opportunity for the scientific community to share objectives, data, expertise and tools with industry since there is considerable interest in oil and gas exploration, and consequent hazards, targeting the Mediterranean's deep salt deposits.
The Action has been conceived as a joint initiative coordinating scientific targets from existing research efforts including the European Consortium for Ocean Research Drilling (ECORD), the Japanese and US branches of the International Ocean Discovery Program (IODP), the EU- FP7 ITN MEDGATE, TOPO-EUROPE, and other national and international research programmes focussing on the Mediterranean salt giant.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Earth and related Environmental sciences: Geological oceanography ● Earth and related Environmental sciences: Paleoclimatology, paleoecology ● Earth and related Environmental sciences: Sedimentology, soil science, palaeontology, earth evolution ● Earth and related Environmental sciences: Biogeochemistry, biogeochemical cycles	● mediterranean salt giant ● messinian salinity crisis ● deep biosphere ● salt deformation and subsalt fluids ● deep earth and surface connections

NETWORK OF PROPOSERS

Main Proposer: IT
Network of Proposers (15): AT, CH, CY, DE, EL, ES, FR, IL, IT, ME, MT, NL, NO, PT, UK (ITC: 20%)
Near Neighbour Country: Egypt, Morocco, Palestinian Authority, Tunisia
International Partner Country: Japan, United States
Industrial participation: SMEs: France, Norway - Large companies: Italy, Norway
Gender balance of Proposers: 29% F / 71% M

CA15104 - Inclusive Radio Communication Networks for 5G and beyond

OBJECTIVE

The main objective is to address the technologies for supporting wireless connectivity for any rates, type of communicating units, and scenario, in and beyond 5G. The envisioned Wireless Internet of Things of 2020 will in particular require revolutionary approaches in theoretical foundations of Radio Communication Technologies, Networks and Systems.

SUMMARY

Radio Communications have become one of the pillars on which our Society relies for performing many daily tasks. Today, the number of connected devices is increasing exponentially, reflecting not only enthusiastic smartphone adoption but also increasing connectivity of machines, sensors, vehicles and other devices for health and smart environments.
The Inclusive Radio Communications (IRACON) concept defines those technologies aimed to support wireless connectivity at any rates, for any communicating units, and in any type of scenarios. The Wireless Internet of Things beyond 2020 will require revolutionary approaches in Radio Access technologies, networks and systems. Some theoretical foundations have to be revisited and breaking technologies are to be discovered during the coming decade.
This Action aims at scientific breakthroughs by introducing novel design and analysis methods for the 5th-generation (5G) and beyond-5G radio communication networks. Challenges include i) modelling the variety of radio channels that can be envisioned for future inclusive radio, ii) capacity, energy, mobility, latency, scalability at the physical layer and iii) network automation, moving nodes, cloud and virtualisation architectures at the network layer, as well as iv) experimental research addressing Over-the-Air testing, Internet of Things, localization and tracking and new radio access technologies.
The group of experts supporting this Action comes from both academia and industry, from a wide spread of countries all over Europe, with the support of some non-COST institutions and R&D associations and standardisation bodies worldwide. The proposers have also long experience on COST Actions in the Radiocommunications field.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Electrical engineering, electronic engineering, Information engineering: Communications engineering and systems (select for additional explanation)	● radio access networks ● propagation modelling ● wireless internet of things

NETWORK OF PROPOSERS

Main Proposer: ES
Network of Proposers (32): AT, BA, BE, BG, CH, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IL, IT, LU, ME, MK, NL, NO, PL, PT, RO, RS, SE, SI, SK, UK (ITC: 47%)
Near Neighbour Country: -
International Partner Country: Canada, China, Colombia, Japan, South Korea, United States
Industrial participation: SMEs (Finland, United States), Large companies (France, Japan, Norway, South Korea, Sweden, United Kingdom, United States)
Gender balance of Proposers: 19% F / 81% M

CA15105 - European Medicines Shortages Research Network – addressing supply problems to patients

OBJECTIVE

The main objective is to denominate the steps needed to be taken to reduce the medicines shortage problem affecting patients and healthcare systems.

SUMMARY

The problems created by supply shortages of medicines have been widely reported by healthcare professionals and patients over recent years, and acknowledged at the European level by the European Medicines Agency and European Commission. The cited causes are multifaceted ranging from production disruptions, natural disasters, discontinuations as well as difficulties created by various legal, trade and pricing frameworks.

Healthcare professionals require access to reliable and up-to-date information regarding the unavailability of a medicine in order that they can treat the patient in the best way possible. The lack of a medicine can have significant impact for the patient, in terms of safety and management of their condition. In addition the forced substitution to an alternative product or requirement to produce a medicine may increase the risk of error, stress and overall cost to the healthcare system.

According to the largest pan-European survey of healthcare professionals yet conducted on the topic, the products mainly affected in the European hospital sector are antimicrobials and oncology products used for large populations.

This Action will encourage systematic sharing of information and research about past, ongoing and future shortages of medicines and nutritional products. The Action aims to achieve coordination and agreement on definitions of a shortage, criteria for measurement and analysis of the problem, and reflection on best practices. The Action is also intended to highlight any restrictive legal and economic frameworks, erroneous incentives in the supply chain, conflicts of interest, and problematic cost-benefit ratios that serve to exacerbate or create shortages.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Health Sciences: Health services, health care research ● Health Sciences: Public and environmental health ● Political Science: Public administration, public policy	● medicine ● shortages ● healthcare ● patients ● supply

NETWORK OF PROPOSERS

Main Proposer: CH

Network of Proposers (23): AT, BE, BG, CH, CY, CZ, DE, DK, EL, FR, HR, HU, IT, LV, MK, MT, NL, PT, RO, RS, SI, TR, UK (ITC: 57%)

Near Neighbour Country: Egypt

International Partner Country: Canada, United States

Industrial participation: SMEs (Canada), Large companies (Croatia, Romania, United States)

Gender balance of Proposers: 48% F / 52% M

CA15106 - C-H Activation in Organic Synthesis

OBJECTIVE

The main objective is to render C-H activation a truly versatile, practical and environmentally credible tool for organic chemistry, applicable in both industry and academia.

SUMMARY

In principal, organic chemists have the tools in hand to prepare any thermodynamically stable molecule by one way or the other. However, even though great achievements have been made in the past century, most of the bond forming reactions rely on preactivated substrates. Additionally, in complex synthesis, protecting group techniques are often required either to block alternative sites of reactivity, or to protect functional groups labile under reaction conditions required for a specific step of a sequence. The paradigm in organic synthesis has shifted from “getting the job done (the molecule synthesized)” towards getting the job done in the most efficient way possible. The method of metal catalysed C-H activation of organic small molecules has great potential in this regard. At the moment, the field has includes many examples of transformations which can be carried out only on specific types of substrates and only few contributions deal with the application of C-H activation in the synthesis of complex molecules such as natural products. Additionally, applications of C-H activation in industrial processes are scarce. Hence, broad applicability, similar to the well establish cross-coupling reactions, has to be established. The time is ripe now to make a big collaborative effort in the area of C-H activation.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Chemical sciences: Catalysis ● Chemical sciences: Chemical reactions: mechanisms, dynamics, kinetics and catalytic reactions ● Chemical sciences: Organic chemistry	● matal catalysis ● C-H bond activation ● homogeneous catalysis ● organic synthesis ● direct functionalization

NETWORK OF PROPOSERS

Main Proposer: AT
Network of Proposers (13): AT, BE, CH, CZ, DE, ES, FR, IE, IT, NL, PL, SE, UK (ITC: 15%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: Large companies (Switzerland)
Gender balance of Proposers: 26% F / 74% M

CA15107 - Multi-Functional Nano-Carbon Composite Materials Network

OBJECTIVE

The main objective is to develop lighter, stronger materials which are needed for a variety of applications such as transport, energy storage/conversion and bone/tooth replacement. MultiComp COST Action is designed to bring together theorists, experimentalists, technologists and industrialists in the field of nanocarbon materials technology to overcome the current high costs through optimized synthesis techniques.

SUMMARY

This Action is designed to bring together theorists, experimentalists and industrialists in the field of nano-carbon materials technology. Although carbon nanotubes, graphene and Few-Layer Graphene (FLG) have been used to improve the properties of composite materials, two main problems remain to be solved before these composite materials can realize their full potential: (1) adequate dispersion of the nano-carbon reinforcement material, and (2) strong enough interfacial bonding between the nano-carbon reinforcement elements and the composite matrix. In addition to making modified MWNTs such as branched-MWNTs, the Action will explore other possibilities of strengthening composites by integrating FLG (using existing as well as unpublished methods); theoretical modelling of these nano-carbons and composites; due consideration and evaluation of the Health, Safety and Environmental implications; making and testing composites e.g. mechanical and electrical/thermal, HRTEM of interphases, voltage-contrast SEM of percolation networks, sensing and photocatalytic properties; development of new composite materials with Electronic and Multi-Functional properties. This Action will provide an ideal platform, especially via STSM exchanges, for permanent established researchers, post-doctoral workers and ECIs to enhance their research-related skills as well as their innovation and enterprise skills in this international network involving both academic and business enterprises.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Materials engineering: Characterization methods of materials for material engineering applications ● Chemical sciences: Characterization methods of materials (theoretical aspects) ● Nano-technology: Nano-materials and nano-structures ● Mechanical engineering: Sustainable engineering ● Materials engineering: Structural properties of materials	● multi-functional materials ● nano-carbon composite materials ● high-performance materials ● atom-economy

NETWORK OF PROPOSERS

Main Proposer: DE
Network of Proposers (16): AT, BE, CH, CY, CZ, DE, ES, FI, FR, IE, IL, IT, NO, SI, SK, UK (ITC: 25%)
Near Neighbour Country: -
International Partner Country: Australia, China, New Zealand
Industrial participation: SMEs (Austria, Cyprus, Norway, Spain, Switzerland)
Gender balance of Proposers: 38% F / 62% M

CA15108 - Connecting insights in fundamental physics

OBJECTIVE

The main objective is to exploit complementary expertise of different research groups in Europe to enhance the understanding of the fundamental laws of nature beyond the Standard Model by connecting insights from collider-physics, flavour and neutrino physics, and astro-particle physics and cosmology

SUMMARY

The coming years will be crucial for High Energy Physics, which currently stands at a crossroads. For example the next run of the LHC is about to tackle a multitude of urgent questions. Chief among these are the nature of electro-weak symmetry breaking, and the properties of the Higgs particle, which is central to the whole enterprise. The properties of the electroweak symmetry breaking sector remain very nebulous, and yet there is no doubt their influence is crucial in many areas of physics such as flavor structure and neutrino physics, early Universe cosmology, dark-matter, baryogenesis, CP violation.
These areas comprise the current frontiers of human knowledge, and there is high expectation that they will be significantly pushed back by anticipated experiments, including the upgraded LHC. The Action aims to meet this challenge with an ambitious and global range of works, focussed on connecting the insights that will undoubtedly be gained in all these areas, and greatly strengthening the interaction between collider physics, flavor and neutrino physics, astro-particle physics and cosmology. It will provide a platform to exploit the latest experimental results not only from the LHC, but also from a host of new facilities. At the same time the insights gained will be used to inform and guide theoretical endeavors, and address the most pressing questions surrounding the electro-weak sector, including its puzzling apparent stability, the huge hierarchies between mass scales, the origin of flavour structure and the origin of dark matter.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Physical Sciences: Particle physics (theory)	● high energy physics ● particle phenomenology ● dark matter ● flavor physics ● neutrino physics

NETWORK OF PROPOSERS

Main Proposer: DE
Network of Proposers (22): AT, BE, CH, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IL, IT, NL, NO, PL, PT, SE, SI, UK (ITC: 32%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: Large companies (United Kingdom)
Gender balance of Proposers: 35% F / 65% M

CA15109 - European Cooperation for Statistics of Network data science

OBJECTIVE

The main objective is to critically assess commonalities and opportunities for cross-fertilization of statistical network models in various applications, such as economics, sociology, epidemiology, ecology and biology, with particular attention to scalability in the face of Big Data, while creating a broad and inclusive research community.

SUMMARY

A major challenge in many modern economic, epidemiological, ecological and biological questions is to understand the randomness in the network structure of the entities they study: for example, the SARS epidemic showed how preventing epidemics relies on a keen understanding of random interactions in social networks, whereas progress in curing complex diseases is aided by a robust data-driven network approach to biology.
Although analysis of data on networks goes back to at least the 1930s, the importance of statistical network modelling for many areas of substantial science has only been recognised in the past decade. The USA is at the forefront of institutionalizing this field of science through various interdisciplinary projects and networks. Also in Europe there are excellent statistical network scientists, but until now cross-disciplinary collaboration has been slow.
This Action aims to facilitate interaction and collaboration between diverse groups of statistical network modellers, establishing a large and vibrant interconnected and inclusive community of network scientists. The aim of this interdisciplinary Action is two-fold. On the scientific level, the aim is to critically assess commonalities and opportunities for cross-fertilization of statistical network models in various applications, with a particular attention to scalability in the face of Big Data. On a meta-level, the aim is to create a mainly online community which includes researchers across the whole of Europe and at every stage in their scientific career and to facilitate contact with stakeholders.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Mathematics: Statistics ● Computer and Information Sciences: Machine learning algorithms	● data science ● networks ● statistics ● big data ● stochastic modelling

NETWORK OF PROPOSERS

Main Proposer: NL
Network of Proposers (14): CH, DE, DK, ES, FR, HU, IE, IT, NL, NO, SE, SI, TR, UK (ITC: 21%)
Near Neighbour Country: -
International Partner Country: United States
Industrial participation: SMEs (Denmark, United Kingdom)
Gender balance of Proposers: 38% F / 62% M

CA15110 - Harmonising standardisation strategies to increase efficiency and competitiveness of European life-science research

OBJECTIVE

The main objective is to avoid duplication and overlap of existing standardisation activities and to achieve a breakthrough in standardisation efforts; the Action aims to bridge, combine and team up with other initiatives. This shall be achieved through a coordinated, long-term strategy by active involvement of all stakeholders from research, industry and policy.

SUMMARY

An essential prerequisite of modern life-science R&D is a high quality of the research data. By enabling the reuse of research assets, research becomes considerably more efficient and economical. This can only be achieved reliably and efficiently if these are generated according to standards and Standard-Operating-Procedures (SOPs). Thus, standards represent important drivers in the life-sciences and technology transfer because they guarantee that data become accessible, shareable and comparable along the value chain.
Several initiatives launched the development and implementation of standards. Unfortunately these efforts remain fragmented and largely disconnected. The Action will merge the different approaches in the field with a particular reference to systems biology, and thus avoid too many different solutions being generated in parallel universes that – in the worst case – are neither compatible nor suitable for large-scale approaches.
The Action will increase the awareness for the need of standards, enabling the reuse of research data and its interoperability within the scientific community. The Action provide a common ground for researchers from academia, research institutes, SMEs and multinational organizations.
The fruitful interactions between these sectors will firstly combine and review existing community standards and standardization options including the development of a common understanding/definition of the needs, secondly push the implementation of minimal standards in biotechnology especially in systems biology, and thirdly provide and establish interdisciplinary training for ESRs and emphasise inclusiveness by COST priority member countries. This will be achieved via workshops, short-term scientific missions, training schools and symposia, and deployment of standards optimising the transfer from basic research into innovation.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Biological sciences: Systems biology ● Industrial biotechnology: Industrial bioengineering, bioreactors ● Health Sciences: Applied mathematics, statistics, non-computational modeling for health sciences ● Agricultural biotechnology: Biotechnology (non-medical) ● Biological sciences: Bioinformatics	● standardisation ● harmonisation ● competitiveness ● life-sciences ● biotechnology

NETWORK OF PROPOSERS

Main Proposer: DE
Network of Proposers (26): AT, BE, BG, CH, CZ, DE, DK, EL, ES, FR, HR, HU, IE, IL, IT, LU, LV, MT, NL, PL, PT, SE, SI, SK, TR, UK (ITC: 46%)
Near Neighbour Country: -
International Partner Country: Australia, Brazil, Canada, Chile, Costa Rica, Mexico, New Zealand, Panama, South Africa, United States
Industrial participation: SMEs (Bulgaria, Germany, Slovenia, Turkey)
Gender balance of Proposers: 23% F / 77% M

CA15111 - European Network on Myalgic Encephalomyelitis / Chronic Fatigue Syndrome

OBJECTIVE

The main objective is to create a sustainable integrated network of researchers in Europe working in the field of Myalgic Encephalomyelitis/Chronic Fatigue Syndrome, this way tackling the research challenges arising from unknown aetiology, clinical variability, lack of diagnostic biomarkers and limited treatment options, high associated socio-economic burden.

SUMMARY

Chronic Fatigue Syndrome (also known as Myalgic encephalomyelitis, post-viral/post-infectious fatigue syndrome or effort syndrome) - ME/CFS - is a disabling condition of unknown aetiology that affects individuals of all ages. Disease is causing significant social and economic burden.
While there have been research efforts in the last 20 years on ME/CFS, they still remain rather fragmented, and there is clearly lack of coordination of European research on the topic. Action will provide clear benefits via coordination of research activities, support to development of common standards, database synchronisation, and promotion of new research projects in the area. Data depositories harmonisation, data collection protocol synchronisation can greatly benefit better use of existing data and allow the development of coherent future research strategies.
Innovation will benefit from coordination of introduction of new technologies in research area, experience on novel data analysis approaches, patient stratification, synergistic approach to existing data. All this will be supporting the development of translational platform which has a long-term potential of new product development addressing the challenge.
Early Carrier investigators will receive a special training package built on two training schools, training workshops, clinical research introductory, STSMs. Researchers with high potential from other areas will enrich their scientific focus by interaction on events and obtaining dissemination materials produced by the Action. Inclusiveness countries will get special supportive measures, as many of them still lack streamlined research agendas on ME/CFS.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Clinical medicine: Neurological disorders (e.g. Alzheimer's disease, Huntington's disease, Parkinson's disease) ● Basic medicine: Systems neuroscience	● chronic fatigue syndrome ● myalgic encephalomyelitis ● neuroinfections ● neuroinflammation ● neuroimmunology

NETWORK OF PROPOSERS

Main Proposer: IE
Network of Proposers (23): AT, BE, BG, CY, CZ, DE, DK, EE, ES, FI, FR, HU, IE, IL, IT, LU, NL, PL, RS, SE, SI, TR, UK (ITC: 43%)
Near Neighbour Country: Lebanon, Russian Federation
International Partner Country: Canada, New Zealand, South Africa, United States
Industrial participation: -
Gender balance of Proposers: 68% F / 32% M

CA15112 - Functional Annotation of Animal Genomes - European network

OBJECTIVE

The main objective is to improve the functional annotation of animal genomes in order to facilitate efforts to bridge the gap between genotype and phenotype, thus enabling predictive biology.

SUMMARY

Research on domesticated animals has important socio-economic impacts, including underpinning improvements in the livestock sector, contributions to medical research, animal health and welfare, the evolution of domestication and the understanding of natural animal populations.
Whilst progress has been made with the identification of genome sequences, which determines the proteins encoded by farm and domseticated animal genomes, there is little information on the sequences that are transcribed but not coding, and in particular sequences that regulate gene expression. Thus, although the genomes of the major domesticated animal species have been sequenced, significant investment is now required in order to identify the functional elements within these genomes, especially the regulatory sequences. The recently launched “Functional Annotation of Animal Genomes” (FAANG) initiative aims to improve the functional annotation of animal genomes. This Action will facilitate the aims of the FAANG project through coordination, development of agreed standards for experiments, data and metadata, training and dissemination of standards and results.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Biological sciences: Genomics, comparative genomics, functional genomics ● Veterinary science: Databases, data mining, data curation, computational modelling	● genomes ● functional annotation ● farmed and domesticated animals ● epigenetics ● gene regulation

NETWORK OF PROPOSERS

Main Proposer: UK
Network of Proposers (15): CZ, DE, DK, EL, ES, FI, FR, IE, IT, NL, PL, PT, SE, SI, UK (ITC: 27%)
Near Neighbour Country: -
International Partner Country: Australia, New Zealand, United States
Industrial participation: -
Gender balance of Proposers: 41% F / 59% M

CA15113 - Science and Management of Intermittent Rivers and Ephemeral Streams

OBJECTIVE

The main objective is to concentrate, refine and analyse the currently sparse and fragmented knowledge on intermittent rivers and ephemeral streams (IRES) with the aim to support the incorporation of these prevalent and unique ecosystems into current water resource and biodiversity management and conservation plans.

SUMMARY

More than half of the global river network is composed of intermittent rivers and ephemeral streams (IRES), which are expanding in response to climate change and increasing water demands. After years of obscurity, the science of IRES has bloomed recently and it is now recognised that IRES support a unique high diversity, provide essential ecosystems services and are functionally part of river networks and groundwater systems. However, they still lack protective and adequate management, jeopardizing the water resource at the global scale.

This Action will bring together hydrologists, biogeochemists, ecologists, environmental economists, social researchers and stakeholders from 14 different countries to develop a research network for synthesising the fragmented and recent knowledge on IRES, improving our understanding of IRES ecology, and translating this into science-based, sustainable management of river networks.

Deliverables will be provided through i) research workshops synthesising and addressing key challenges in IRES science, supporting research exchange and educating young researchers, and ii) combined researcher-stakeholder workshops translating improved knowledge into tangible tools and guidelines for protecting IRES and raising awareness of their importance and value in societal and decision-maker spheres.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Biological sciences: Ecology ● Earth and related Environmental sciences: Hydrology, water resources ● Earth and related Environmental sciences: Biogeochemistry, biogeochemical cycles	● climate change ● environmental flow management ● ecological status assessment ● drought ● flow intermittence

NETWORK OF PROPOSERS

Main Proposer: FR

Network of Proposers (14): CH, CZ, DE, EL, ES, FR, HR, HU, IL, IT, ME, NL, PT, UK (ITC: 29%)

Near Neighbour Country: -

International Partner Country: -

Industrial participation: SMEs (Austria, Estonia, Finland, Germany, Ireland, Netherlands, United Kingdom)

Gender balance of Proposers: 33% F / 67% M

CA15114 - Anti-Microbial Coating Innovations to prevent infectious disease

OBJECTIVE

The main objective is to evaluate the impact of (introducing) AntiMicrobial Coatings in healthcare on the spread of infections and on the efficacy in fighting HealthCare Associated Infections and bacterial resistance to current antibiotics.

SUMMARY

Infections and infectious diseases are a continuous threat to human health. According to the European Centre for Disease prevention and Control (ECDC), over 4 million people are estimated to acquire a HealthCare Associated Infection (HCAI).The AMICI-consortium is convinced that new methods, additional or alternatively to an appropriate use of disinfectants and antibiotics, are required to reduce microbial activity, associated infections and the increase of Antimicrobial Resistance.
A potential and promising weapon against bacterial growth and possibly the development of multi-drug resistant bacteria has been found in AntiMicrobial (nano)-Coatings (AMC). In coatings fortified with an active ingredient, the ingredient is responsible for the elimination of the microorganisms.
So far, little is known about the effectiveness of AMC application on surfaces, on the prevention of spreading infections and their impact on induction of multi-drug resistant bacteria in healthcare (e.g. hospitals, nursery homes). The presence of active substances in AMC may promote/induce resistance mechanisms which needs to be understood and alternative strategies sought. A balanced risk-benefit analysis of widespread application is needed to guide a 'Safe-by-Design' development and introduction in complicated chains with high demand for compliance such as healthcare.
AMICI brings together partners from different countries and disciplines with the central aim of evaluating the impact of (introducing) AMC in healthcare on spreading infection episodes and on the efficacy in fighting bacterial resistance to current antibiotics. The partners involved include knowledge institutes, producers and processors of antimicrobial coatings, and organizations involved in the compliance with international standards on hygiene.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Health Sciences: Infectious diseases ● Health Sciences: Public and environmental health ● Health Sciences: Health services, health care research ● Nano-technology: Nano-materials and nano-structures ● Biological sciences: Microbiology	● antimicrobial resistance ● antimicrobial (nano)coatings ● health sector ● LCA ● OneHealth

NETWORK OF PROPOSERS

Main Proposer: NL
Network of Proposers (12): AT, BE, CH, DE, EE, FI, IE, NL, PL, PT, TR, UK (ITC: 33%)
Near Neighbour Country: Lebanon, Russian Federation
International Partner Country: Canada, New Zealand, South Africa, United States
Industrial participation: SMEs (Austria, Estonia, Finland, Germany, Ireland, Netherlands, United Kingdom)
Gender balance of Proposers: 29% F / 71% M

CA15115 - Mining the European Anthroposphere

OBJECTIVE

The main objective is to to assess anthropogenic resources in terms of availability for future commodity markets. The systematic and standardized evaluation and classification of these resources is pursued in order to maximally optimize comparability with existing classification frameworks for geogenic resources.

SUMMARY

Traditional mining continuously shifts raw materials from the geosphere to the anthroposphere. These materials accumulate in anthropogenic deposits (e.g. cars, buildings) and pose a resource potential that includes the secondary materials of tomorrow. To provide information on the future availability of primary materials, inventories of geogenic deposits (resources) and the economically extractable shares (reserves) have been developed. In contrast, information on the availability of secondary materials is lacking. Even though the amount of materials in the anthroposphere has risen dramatically in the last few decades, the resource potential in anthropogenic deposits has not been explored in an adequate way. This prevents, firstly, a comparison of resources/reserves between primary and secondary materials and, secondly, integrated information on the availability of materials from reaching future commodity markets. To overcome this gap, this COST Action aims to actuate the reporting of material resources/reserves in the anthroposphere. The focus is on (1) construction and demolition waste, (2) waste regained from landfills and (3) solid residues from waste incineration. Today, there are large differences concerning the recovery of secondary materials from these three types of waste across Europe due to isolated national research, waste management technologies and policy strategies. A pan-European approach is needed to establish a common knowledge base for the assessment of resource potentials on various spatial levels. By means of coordinating national research activities in European countries, this COST Action is striving for a breakthrough in the integrated assessment of primary and secondary resource potential, which is a prerequisite for effective resource management.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Environmental engineering: Waste treatment (environmental engineering) ● Environmental engineering: Sustainable engineering	● secondary resources ● urban mining ● landfill mining ● recycling technology ● resource management

NETWORK OF PROPOSERS

Main Proposer: AT
Network of Proposers (23): AT, BE, CH, CZ, DE, DK, EE, EL, ES, FI, FR, HU, IT, LT, LV, MK, NL, NO, PT, RO, SE, SI, UK (ITC: 39%)
Near Neighbour Country: Georgia, Russian Federation, Ukraine
International Partner Country: Canada, Japan, Taiwan, United States
Industrial participation: SMEs (Austria, Denmark, Ukraine), Large companies (France, Sweden)
Gender balance of Proposers: 33% F / 67% M

CA15116 - Understanding and combating African Swine Fever in Europe

OBJECTIVE

The main objective is to stop African Swine Fever from spreading further in Europe and protecting the European pig industry by combating ASF through a comprehensive, multi- and interdisciplinary approach.

SUMMARY

African swine fever (ASF) is a viral haemorrhagic fever of domestic pigs and wild boar. The disease causes massive loss of animals due to mortality and the essential eradication control policies which give rise to animal welfare problems as well as further economic loss from trade restrictions. There are no vaccines for ASF. ASF has been present in Russia and neighbouring countries since 2007 and recently the disease has entered the EU.

This Action tackles the main challenge of stopping ASF from further spread in Europe and protecting the European pig industry. Specifically, how to:

-better manage and control wild boar populations given their importance in ASF spread and maintenance

-develop methods of surveillance to increase the early detection of ASF incursion into new areas

-understand the epidemiology of ASF in the unique European context; to determine the epidemiological role of wild boar, ticks vectors of the virus, and the environment

-develop and improve management tools; such as an ASF vaccine and novel diagnostics, determine how to involve stakeholders and the general public in preventing ASF spread and determine how policy and legislation can contribute to prevention, control and eradication of ASF.

This Action aims to bring together the leading European teams in these fields to improve the knowledge, diagnosis, surveillance and management of ASF. The Action by supporting the reduction of overlap and identification of knowledge gaps will facilitate a shared European vision and innovative approaches to an ASF-free domestic pig sector and wild boar population in Europe.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Veterinary science: Veterinary medicine (miscellaneous) ● Biological sciences: Virology ● Biological sciences: Population biology, population dynamics, population genetics, plant-animal interactions	● african swine fever ● wild boar ● african swine fever virus ● vaccine ● pig industry

NETWORK OF PROPOSERS

Main Proposer: SE

Network of Proposers (20): AT, BG, CH, DE, DK, EL, ES, FI, FR, HU, IT, NL, NO, PL, PT, RS, SE, SI, SK, UK (ITC: 35%)

Near Neighbour Country: Albania, Russian Federation

International Partner Country: Canada

Industrial participation: SMEs (France, Spain, Sweden, Switzerland)

Gender balance of Proposers: 34% F / 66% M

CA15117 - Cosmology and Astrophysics Network for Theoretical Advances and Training Actions

OBJECTIVE

The main objective is to construct an effective theory of gravity capable of encompassing both the phenomenology related to the lack of a quantum field theory of gravity, and phenomenology related to the various astrophysical and cosmological scales that cannot be explained within the framework of General Relativity without including dark matter and dark energy.

SUMMARY

Observations of unprecedented quality reveal a Universe that is at tension with the standard, and very successful description of matter and energy in Physics. Around 95% of the substratum of the Universe is of unknown nature, split into an accreting component (dark matter) and a repelling component (dubbed dark energy). There are auspicious prospects that the combination of state-of-the-art experiments, and theoretical advances will provide us with tools to elucidate this fundamental issue. The Action explores the viewpoint that cosmological observations reveal a degree of incongruous with theory not because of mysterious elements, but because of a need to review and extend Einstein Relativity to scales where it has not been properly tested. So the present Action gathers a team of European leading experts in gravitational physics and cosmology around the timely goal of investigating the extension of Einstein's theory of General Relativity. A program including complementary aspects of theoretical physics, cosmology and astrophysics is put forward which is set to consider, in a coordinated and multidisciplinary way, the build up self-consistent models at the various scales and, in principle, to find out some *"crucial feature"* capable of confirming or ruling out ETG with respect to GR. Within the proposed program, we will enhance already existing collaborations and we will start an European *pilot project* with the goal of developing a synergy between our expertise and competences, leverage female gender representation, and foster participation of young researchers.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Physical Sciences: Fundamental interactions and fields (theory) ● Physical Sciences: Relativity ● Physical Sciences: Mathematical physics	● modified gravity ● relativistic effects ● observational discriminators

NETWORK OF PROPOSERS

Main Proposer: ES
Network of Proposers (8): EL, ES, IT, NO, PL, PT, SE, UK (ITC: 25%)
Near Neighbour Country: Russian Federation
International Partner Country: -
Industrial participation: -
Gender balance of Proposers: 21% F / 79% M

CA15118 - Mathematical and Computer Science Methods for Food Science and Industry

OBJECTIVE

The main objective is to support the food sector in facing futures challenges in production and processing, by adopting modelling and optimization methods from the Math and Computer Science.

SUMMARY

The agriculture and food processing sector (agri-food) is facing sustainability challenges of growing complexity, from consumer expectations to concerns over food security, right through to environmental regulations. In such a context, innovation is becoming a decisive factor of competitiveness for companies in this field. Methodologies and tools from Maths and Computer Science (MCS) are emerging as key contributors to modernization and optimization of processes in various disciplines: the agri-food sector, however, is not a traditional domain of application for MCS, and at the moment there is no community organized around solving the issues of this field. The proposed COST Action aims at bringing together scientists and practitioners from MCS and agri-food domains, stimulating the emergence of new research, and structuring a new community to coordinate further investigation efforts. Exploiting approaches originating at different sub-fields of MCS, from applied mathematical models to knowledge engineering, this COST Action will cover two main topics: understanding and controlling agri-food processes; and eco-design of agri-food products.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Agriculture, Forestry, and Fisheries: Databases, data mining, data curation, computational modelling ● Agriculture, Forestry, and Fisheries: Sustainable production ● Animal and dairy science: Databases, data mining, data curation, computational modelling ● Computer and Information Sciences: Machine learning algorithms ● Mathematics: Control theory and optimization	● food science ● computer science ● applied mathematics ● modeling methodology ● industrial applications

NETWORK OF PROPOSERS

Main Proposer: FR
Network of Proposers (12): BE, CZ, DE, DK, EL, ES, FR, HR, IT, NL, PT, SI (ITC: 33%)
Near Neighbour Country: Morocco
International Partner Country: Canada
Industrial participation: -
Gender balance of Proposers: 27% F / 73% M

CA15119 - Overcoming Barriers to Nanofluids Market Uptake

OBJECTIVE

The main objective is to create a Europe-wide network of leading R+D+i institutions, and of key industries, to develop and foster the use of nanofluids as advanced heat transfer/thermal storage materials to increase the efficiency of heat exchange and storage systems.

SUMMARY

Nanofluids are defined as fluids that contain nanometre-sized particles with enhanced heat transfer properties. Since 1995, active research on this topic has been conducted (more than 1,700 papers in the last 3 years). Nanofluids improve the efficiency of heat exchange and thermal energy storage systems and they are specifically mentioned in the Strategic Energy Technology Plan and the Materials Roadmap to enable Low-Carbon Technologies as potential elements to improve the efficiency of heat exchange and thermal energy storage systems. Consequently, nanofluids address the European Horizon 2020 Energy and Climate objectives (Societal Challenges 3: Secure, efficient and clean energy; and 6: Climate action, environment, resource efficiency and raw materials). In addition, nanofluids fall within one of the Key Enabling Technologies (KET) supported by the European Commission. Although some nanofluid commercial applications currently exist, most of the current nanofluids are at Technological Readiness Levels (TRL) 1 to 3. Most of the nanofluids research in COST countries has been conducted by Research, Development and Innovation (R+D+i) centres through national funding. Additional coordinated research and development efforts are required to develop nanofluids up to higher TRL levels and to overcome commercial application barriers. If these barriers are overcome, nanofluids will be an important player in the Value Added Materials (VAM) for the energy sector.The objective of the NANOUPTAKE COST Action is to create a Europe-wide network of leading R+D+i institutions, and of key industries, to develop and foster the use of nanofluids as advanced heat transfer/thermal storage materials to increase the efficiency of heat exchange and storage systems.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Mechanical engineering: Applied mechanics, thermodynamics ● Materials engineering: Thermodynamics for materials engineering applications ● Nano-technology: Nano-materials and nano-structures ● Environmental engineering: Energy and fuels ● Chemical engineering: Colloid and surface chemistry	● nanofluid ● heat transfer ● thermal energy storage

NETWORK OF PROPOSERS

Main Proposer: ES
Network of Proposers (13): BE, CZ, DE, DK, ES, FR, IT, NO, PL, PT, RO, SE, UK (ITC: 31%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: SMEs (Czech Republic), Large companies (Spain)
Gender balance of Proposers: 28% F / 72% M

CA15120 - Open Multiscale Systems Medicine

OBJECTIVE

The main objective is to develop novel multiscale systems medicine concepts, methods and technologies that provide effective, efficient and economical solutions for emerging and future approaches to multiscale systems medicine; as well as a transdisciplinary multiscale systems medicine framework that integrates systems medicine, multiscale modelling, multiscale data science, and multiscale computing.

SUMMARY

Multiscale systems medicine assumes that the growing amounts of highly diverse (multiscale) data relevant to human health and disease are the key to address current and future medical challenges. Transforming these data into effective and economical medical solutions requires appropriate means for multiscale data modelling, integration and analysis. The overarching aim of the Open Multiscale Systems Medicine (OpenMultiMed) COST Action is to gather a critical mass of international researchers and coordinate them as a team that develops and evaluates a transdisciplinary framework for multiscale systems medicine, consisting of novel concepts, methodologies and technologies. The unique concept and ambition of the OpenMultiMed Action rests on three pillars: (1) A transdisciplinary strategy in which medical researchers, mathematical modellers, data scientist, and computer scientists work jointly using a shared conceptual framework and combined disciplinary-specific approaches. (2) A strong focus on multiscaleness across systems medicine, multiscale modelling, multiscale data science and multiscale computing. (3) An open-science approach, making scientific research, data and dissemination in multiscale systems medicine accessible to all levels of an inquiring European and international society. The potential impacts resulting from the OpenMultiMed Action include more effective and economical ways of health promotion, disease prevention and therapy; more effective and efficient concepts, methods and tools for multiscale systems and data modelling, and multiscale computing; and a strengthening of scientific excellence and industrial competitiveness of individuals and organizations in medical, analytical and technological areas.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Biological sciences: Biological systems analysis, modelling and simulation ● Mathematics: Numerical analysis ● Computer and Information Sciences: Mathematics applied to computer science, mathematical aspects of computer science	● multiscale systems medicine ● multiscale modeling and simulation ● multiscale data science ● multiscale computing ● complex disease

NETWORK OF PROPOSERS

Main Proposer: UK
Network of Proposers (17): BG, CH, DE, ES, FR, HU, IE, IT, LU, MT, NL, NO, PL, PT, SI, TR, UK (ITC: 47%)
Near Neighbour Country: Lebanon, Russian Federation
International Partner Country: Canada, New Zealand, South Africa, United States
Industrial participation: SMEs (Austria, Estonia, Finland, Germany, Ireland, Netherlands, United Kingdom)
Gender balance of Proposers: 17% F / 83% M

CA15121 - Advancing marine conservation in the European and contiguous seas

OBJECTIVE

By advancing transboundary conservation planning, proposing management actions, accounting for climatic change and biological invasions, the main objective is to bridge the gap between conservation science and policy makers, and substantially contribute to the challenge of halting biodiversity loss in the European Seas by 2020.

SUMMARY

Marine biodiversity in the European Seas is under threat due to the intensity of cumulative human impacts. Despite the high-level goals to halt the loss of biodiversity and ecosystem services by 2020, there are no signs of improved trends in the state of biodiversity. Most services derived from marine and coastal ecosystems are being used unsustainably and therefore marine ecosystems are deteriorating faster than other ecosystems. The challenges of biodiversity conservation and sustainability of ecosystem services are further complicated by climate change, which is expected to decrease the effectiveness of current-state-of-the-art marine management measures by inducing range shifts and biodiversity reshuffling and favouring biological invasions. This Cost Action will consolidate a network of scientists and stakeholders who are involved in marine conservation in European and contiguous seas, promote collaboration, reduce redundancy of research efforts in conservation science and practice, make significant progress beyond the state-of-the-art by developing and promoting novel and relevant concepts, methods, and tools, provide support to the related European policies, and enable effective and informed decision-making for the improvement of marine conservation in the European Seas and adjacent regions. By advancing the science of integrated conservation planning, promoting regional coordination and transboundary conservation, proposing specific conservation actions, accounting for climatic change and biological invasions, and providing guidance for assessing governance issues to make marine spatially managed areas more effective, this Cost Action aims to bridge the gap between conservation science and policy makers and substantially contribute to the challenge of halting biodiversity loss in the European Seas by 2020.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Biological sciences: Environmental and marine biology ● Biological sciences: Conservation biology, ecology, genetics ● Biological sciences: Biodiversity, comparative biology	● conservation planning ● marine biodiversity ● European Seas ● marine protected areas

NETWORK OF PROPOSERS

Main Proposer: EL
Network of Proposers (23): BE, BG, CY, DE, DK, EE, EL, ES, FI, FR, HR, IL, IT, LT, ME, MT, NL, NO, PL, PT, SI, TR, UK (ITC: 44%)
Near Neighbour Country: Albania, Egypt, Morocco, Tunisia
International Partner Country: Australia, United States
Industrial participation: -
Gender balance of Proposers: 38% F / 62% M

CA15122 - Reducing Old-Age Social Exclusion: Collaborations in Research and Policy

OBJECTIVE

The main objective is to overcome fragmentation and critical gaps in conceptual innovation on old-age exclusion across the life course, in order to address the research-policy disconnect and tackle social exclusion amongst older people in Europe.

SUMMARY

Reducing the number of people at risk of social exclusion is a headline target of the Europe 2020 strategy. Population ageing and low economic growth pose major challenges to meeting this target, emphasising the necessity to tackle old-age exclusion. While risks of exclusion of older people are widening and deepening, damaging gaps in understanding old-age exclusion exist across Europe. Existing knowledge is poorly developed, lacks synthesis and is spread across highly disparate disciplines. This Action aims to overcome fragmentation and critical gaps in conceptual innovation on old-age exclusion across the life course, in order to address the research-policy disconnect and tackle social exclusion amongst older people in Europe. The action will engage with researchers and policy stakeholders to develop shared understandings and to direct the development of new policy and practice interventions, that can be practically and effectively implemented, for reducing exclusion in diverse European ageing societies. The Action will establish an innovative participatory, interdisciplinary and cross-European collaboration that will: (1) synthesise existing knowledge; (2) critically investigate the construction of life-course old-age exclusion (3) assess the implications of old-age exclusion across the life course; (4) Develop new conceptual frameworks on old-age exclusion; and (5) identify innovative, and implementable, policy and practice for reducing old-age exclusion. The Action focuses on economic, social, service, civic rights, and community/spatial exclusion. With deliverables that include conferences, workshop-policy events, briefing papers, early-career investigator development, and a repository of innovative practice and policy, the Action will forge much-needed new links between research and policy, enhancing evidence-based and effective innovation.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Sociology: Ageing	● ageing ● social exclusion ● active and healthy ageing ● participatory interdisciplinary collaboration ● policy and practice innovation

NETWORK OF PROPOSERS

Main Proposer: IE
Network of Proposers (23): AT, BE, BG, CY, CZ, DE, DK, EE, ES, FI, FR, HU, IE, IL, IT, LU, NL, PL, RS, SE, SI, TR, UK (ITC: 43%)
Near Neighbour Country: Lebanon, Russian Federation
International Partner Country: Canada, New Zealand, South Africa, United States
Industrial participation: -
Gender balance of Proposers: 68% F / 32% M

CA15123 - The European research network on types for programming and verification

OBJECTIVE

The main objective is to develop and use expressive type systems as a basis for improved programming techniques and for methods and tools to implement computer artifacts and verify them.

SUMMARY

Types are pervasive in programming and information technology. A type defines a formal interface between software components, allowing the automatic verification of their connections, and greatly enhancing the robustness and reliability of computations and communications. In rich dependent type theories, the full functional specification of a program can be expressed as a type. Type systems have rapidly evolved over the past years, becoming more sophisticated, capturing new aspects of the behaviour of programs and the dynamics of their execution.

This Action will give a strong impetus to research on type theory and its many applications in computer science, by promoting (1) the synergy between theoretical computer scientists, logicians and mathematicians to develop new foundations for type theory, based on the recent development of ``homotopy type theory'', (2) the joint development of type theoretic tools as proof assistants and integrated programming environments, (3) the study of dependent types for programming and its deployment in software development, (4) the study of dependent types for verification and its deployment in software analysis and verification. The action will also tie together these different areas and promote cross-fertilisation.

Europe has a strong type theory community, ranging from foundational research to applications in programming languages, verification and theorem proving, which is in urgent need of better networking. A COST Action that crosses the borders will support the collaboration between groups and complementary expertise, and mobilise a critical mass of existing type theory research.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Computer and Information Sciences: Theoretical computer science and formal methods	● programming with rich type information ● type theory based proof assistants ● trustworthy software ● software verification ● computer formalised mathematics

NETWORK OF PROPOSERS

Main Proposer: NL
Network of Proposers (14): DE, DK, EE, ES, FR, IT, NL, NO, PL, PT, RS, SE, SI, UK (ITC: 36%)
Near Neighbour Country: -
International Partner Country: United States
Industrial participation: Large companies (Germany, United Kingdom, United States)
Gender balance of Proposers: 22% F / 78% M

CA15124 - A new Network of European BioImage Analysts to advance life science imaging

OBJECTIVE

The main objective is to establish a BioImage-Analysts network to maximise the impact of advances in imaging technology in Life Sciences and to boost bioimaging-based research. “BioImage-Analysts” recently emerged in research institutions to support biologists with image analysis resources, but their own network is missing, thus hindering the exchange of experience, knowledge and techniques.

SUMMARY

This Action is a program for establishing a BioImage Analysts’ (BIAlysts) network. Its high-level goals are to maximize the impact of imaging technology advances on the Life-Sciences (LSc), and to boost the productivity of bioimaging-based research projects in Europe.
BIAlysts have recently started to appear in various research institutions but this new specialism is still not well recognized in the LSc community. They are specialized in customizing image analysis (IA) workflows by assembling and automating multiple computational tools, and by interacting with Software developers and Life Scientists to facilitate IA.
The Action aims to provide a stronger identity to BIAlysts by organizing a new type of meeting fostering interactions between all stakeholders including: Life scientists, BIAlysts, microscopists, developers and companies. It will collaborate with European Imaging research infrastructures to set up best practice guidelines for IA. The Action plans to create an interactive database for BioImage analysis tools and workflows with annotated image sample datasets, to help match practical needs with software solutions. It will also implement a benchmarking platform for these tools, applied to identified biology problems. To increase the overall level of IA expertise in the LSc, the Action proposes a novel of training program with three levels of courses, as well as open textbooks and a short term scientific missions program to foster collaborations, IA-technology access, and knowledge transfer for scientists and specialists lacking these locally. This Action will support the long-term scientific goals of European science and industry by bridging essential fields of scientific excellence.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Biological sciences: Morphology and functional imaging of cells ● Biological sciences: Molecular biology and interactions ● Biological sciences: Cell biology and molecular transport mechanisms ● Electrical engineering, electronic engineering, Information engineering: Computer vision ● Electrical engineering, electronic engineering, Information engineering: Development of scientific computing, data processing, simulation and modelling tools	● bioimage analysis ● imaging ● digital image processing ● advanced microscopy

NETWORK OF PROPOSERS

Main Proposer: ES
Network of Proposers (15): BE, CH, DE, DK, ES, FI, FR, HR, IL, LU, NL, PL, PT, SE, UK (ITC: 27%)
Near Neighbour Country: -
International Partner Country: United States
Industrial participation: SMEs (France, Germany, Switzerland)
Gender balance of Proposers: 34% F / 66% M

CA15125 - Designs for Noise Reducing Materials and Structures

OBJECTIVE

The main objective is to bring together scientists and industrial partners working on MetaMaterials/MetaSurfaces/Sonic Crystals and conventional Porous Materials around one common project: to design innovative, light, thin, and multi-functional noise reducing treatments with enhanced mechanical and thermal properties, and to develop objective and subjective methods and standards for their performance characterisation and exploitation.

SUMMARY

The aim of the project is to design multifunctional, light and compact noise reducing treatments. In order to achieve this, DENORMS will bring together skills and knowledge of the complementary, but still disconnected, communities of EU scientists working on acoustic metamaterials, sonic crystals and conventional acoustic materials. This Action will provide a framework for an efficient information exchange, help to avoid duplication of research efforts and channel the work of groups involved in different projects towards the common goal. New approaches to the theory of sound interaction with materials and structures and standard methods of their performance characterization will be developed. The participation of EU companies in the network will facilitate the knowledge transfer from the academia to industry.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Physical Sciences: Acoustics ● Materials engineering: Characterization methods of materials for material engineering applications	● sound absorption ● functional acoustic metamaterials ● energy-harvesting metamaterials ● community noise ● sound localization

NETWORK OF PROPOSERS

Main Proposer: FR
Network of Proposers (10): BE, CH, DK, EL, ES, FR, IE, IT, SE, UK (ITC: 0%)
Near Neighbour Country: -
International Partner Country: United States
Industrial participation: SMEs (France, United Kingdom), Large companies (Belgium, France)
Gender balance of Proposers: 10% F / 90% M

CA15126 - Between Atom and Cell: Integrating Molecular Biophysics Approaches for Biology and Healthcare

OBJECTIVE

The main objective is to bridge efficiently the gap between atomic-scale structural determination and cellular-level in situ studies, by synergizing the power of spectroscopic, hydrodynamic, real-time microfluidic, thermodynamic and single-molecule approaches, thus shedding new light on intricate mechanisms involved in life and pathology and enabling significant discoveries of biomedical relevance.

SUMMARY

Molecular-scale biophysics is a dynamic and ever-expanding interdisciplinary field that aims to study biological macromolecules and assemblies as a whole, at an intermediate level between atomic-resolution structural descriptions and cellular-level observations ("Between Atom and Cell"), with significant applications in biomedicine and drug discovery. The Action aims to seed a large-scale pan-European interdisciplinary synergistic clustering, allowing to ally and synergize the power of spectroscopic, hydrodynamic, real-time microfluidic, thermodynamic and single-molecule approaches. This novel open network will create an optimal environment for the development of innovative integrative biophysical approaches, at the level of data acquisition, analysis and modeling, as well as for the design of unprecedented and ambitious combinations of methodologies, to decipher more efficiently crucial biological phenomena and to overcome significant biomedical challenges. The Action will also broadly disseminate knowledge, notably through the organization of a strong programme of workshops and Training Schools, and the setting up of a STSM scheme, aimed in priority to Early Career Investigators and technical scientists. In parallel, it will place a special emphasis on the construction of a new distributed molecular-scale biophysics European infrastructure, aiming to facilitate the transnational access to instrumentation and expertise for a wide user community, in particular from Inclusiveness Target Countries. Finally, the Action will provide a platform for scientists to establish early contacts with instrument developers (at the level of concept or prototype), allowing to set-up win-win partnerships that will allow to define and develop together future instrumentation that genuinely meets the needs of the broad biomedical and life sciences communities.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Biological sciences: Biophysics ● Biological sciences: Molecular biology and interactions ● Biological sciences: Biochemistry ● Nano-technology: Biophysics for nano-technology applications ● Medical biotechnology: Medical biotechnology	● molecular-scale biophysics ● biomedicine and biotechnology ● hybrid and correlative integrative technologies ● R&D partnerships with instrument developers ● distributed Research Infrastructure

NETWORK OF PROPOSERS

Main Proposer: FR
Network of Proposers (17): AT, BE, CH, CZ, DE, DK, ES, FR, IT, LT, NL, PL, PT, RS, SE, SI, UK (ITC: 35%)
Near Neighbour Country: Lebanon, Russian Federation
International Partner Country: -
Industrial participation: SMEs (Austria, Germany)
Gender balance of Proposers: 39% F / 61% M

CA15127 - Resilient communication services protecting end-user applications from disaster-based failures

OBJECTIVE

The main objective is to develop a set of techniques and services providing end-user applications with communications resilience under disaster-based failures including natural disasters, technology-related disasters, and malicious attacks.

SUMMARY

Disaster-based disruptions seriously degrading the performance of any communication network (following from natural disasters, technology-related disasters, or malicious attacks) are now gaining importance due to observed increase of their intensity and scale. The problem is of the utmost importance due to lack of appropriate mechanisms deployed in practice in Europe. Each time, unavailability of communication networks services, considered as an important part of critical infrastructure, in the presence of disasters implies evident societal problems for people desperately seeking for information, or trying to communicate with each other.

The Action will fill this gap by offering the respective solutions to provide resilient communications in the presence of disaster-based disruptions of all types for existing communication networks (e.g., IPv4-based, current Internet), as well as emerging architectures of the global communications infrastructure (i.e., the Future Internet).

Geographical diversity characteristics of disaster-based disruptions across Europe requires creation of an international and geographically diverse group of researchers to provide the proper solutions. Therefore, COST Action is viewed as the best way to address this issue.

This output-oriented Action will be driven by researchers from academia and industry in strong cooperation with governmental bodies. The aim is to introduce the set of techniques of resilient communications, as well as recommendations on how to deploy/update topologies of communication networks to make them resistant to disruptions that can be applied in practice by network equipment operators and national/international network providers at the EU level. The topic of this Action has not been considered by any COST Action before.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Computer and Information Sciences: Algorithms, distributed, parallel and network algorithms ● Electrical engineering, electronic engineering, Information engineering: Communications engineering and systems (select for additional explanation) ● Electrical engineering, electronic engineering, Information engineering: Networking	● resilient communications ● disaster-based failures ● routing ● end-to-end uninterrupted service ● reliability of communications services

NETWORK OF PROPOSERS

Main Proposer: PL
Network of Proposers (8): BE, DE, ES, HU, PL, PT, SE, UK (ITC: 38%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: Large companies (Germany)
Gender balance of Proposers: 33% F / 67% M

CA15128 - Molecular Spintronics

OBJECTIVE

The main objective is to promote networking and collaboration among the different scientific communities that are active in Europe in Molecular Spintronics (namely Spintronics, Molecular Electronics and Molecular Magnetism communities) to consolidate the world leadership of Europe in this new and emergent field.

SUMMARY

Molecular spintronics is a new field of research that combines the ideas and concepts developed in spintronics with the possibilities offered by molecules to perform electronic functions, to form self-organized nanostructures and to exhibit quantum effects. Its ultimate goals are the creation of new spintronic devices using molecular materials, or in the longer term one or a few molecules in the race toward miniaturization. To reach these goals a coordinated effort of the communities of Spintronics, Molecular Electronics and Molecular Magnetism is needed. These communities are developing a very competitive and high-quality work in Europe in their respective fields. Still, Molecular Spintronics is so new that, for the moment, an initiative to encourage networking of researchers in this field is still lacking. The Action intends to fill this gap integrating these communities around a common Action that should serve to consolidate the world-leadership of Europe in this field.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Nano-technology: Spintronics for nano-technology applications ● Materials engineering: Spintronics for materials engineering applications ● Physical Sciences: Electronic properties of materials and transport (theory) ● Chemical sciences: Theoretical and computational chemistry ● Chemical sciences: Surface science	● single-molecule spintronics ● organic spintronics ● molecular quantum spintronics ● molecular spin qubits ● spin-polarized molecular devices

NETWORK OF PROPOSERS

Main Proposer: ES
Network of Proposers (14): BE, CH, DE, ES, FR, IE, IL, IT, NL, PL, PT, RO, SE, UK (ITC: 21%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: SMEs (Germany, Switzerland, United Kingdom), Large companies (France, United Kingdom)
Gender balance of Proposers: 16% F / 84% M

CA15129 - Diagnosis, Monitoring and Prevention of Exposure-Related Noncommunicable Diseases

OBJECTIVE

The main objective is to develop new concepts for better understanding of health-environment (or gene-environment) interactions in the etiology of exposure related Non-communicable diseases (NCD) and to enhance the complementarity and synergy between the separate disciplines giving attention to the joint development of skills in interdisciplinary problem-solving.

SUMMARY

Studying adverse health outcomes related to the environmental exposures (in the living and working environment) is a major societal challenge today. According to estimates made by the WHO, worldwide about 55 million people died in 2011 from non-communicable diseases (NCDs), including cancer, diabetes, chronic cardiovascular, neurological and lung disease. Although epidemiological and toxicological studies provide evidence for a significant role of environmental exposure in initiation and progression of degenerative diseases and cancer, there is still the challenge of identifying determinants of prevalence and morbidity of NCDs. After spending much time and resources to identify the contribution of genetic factors in the onset of NCDs, it is time to look closer at the evidence for a role of environment factors in the prevalence and morbidity of NCDs, DiMoPEx will develop an interdisciplinary collaborative network, providing insight into emerging issues of morbidity and mortality from exposure-related health outcomes. The action will offer interdisciplinary opportunities for cooperation between scientists and physicians/clinicians. In addition, DiMoPEx aims to attract the interest of next generation early career investigators to the emerging issues of exposure-related disease burden and various aspects of exposure sciences. DiMoPEx will foster the capacity building in Europe from the bottom up to advance ongoing long term studies and to promote new research projects in this field. DiMoPEx will meet current public health challenges in joint research and training to understand the health-environment interactions in NCD etiology. The action will contribute to the development of successful preventive strategies in European countries.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Health Sciences: Public and environmental health ● Health Sciences: Occupational medicine ● Environmental engineering: Risk assessment, prevention and mitigation ● Basic medicine: Environmental toxicology, environmental stress	● environmental exposure ● non-communicable exposure related diseases ● Interdisciplinary etwork on exposure assessment ● validated evidence based exposure assessment ● human biomonitoring

NETWORK OF PROPOSERS

Main Proposer: DE
Network of Proposers (9): BE, DE, DK, IT, NL, NO, RO, SE, TR (ITC: 22%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: -
Gender balance of Proposers: 50% F / 50% M

CA15130 - Study Abroad Research in European Perspective

OBJECTIVE

The main objective is to reflect the significant growth in international student mobility, this Action explores through an interdisciplinary prism the multifaceted nature of study and residence abroad in relation to the opportunities, experiences and outcomes for second language learning as well as the individual's social, personal, intercultural and educational development.

SUMMARY

In the context of increasing international education and study abroad at both European and international level, this project aims to explore the nature, experiences, benefits and limitations of study and residence abroad in the case of second language learners who participate in growing numbers in such international exchange programmes. We do so through a multi-thematic prism, drawing on research relating to the learner's linguistic, intercultural, social, personal, academic and professional development, reflecting the folk-belief in the wide-ranging benefits that can accrue to the learner in a study abroad context. With a view to exploring the specificity of those benefits from a trans-disciplinary perspective, the project includes researchers who bring cross- and inter-disciplinary insights, such as from the fields of second language acquisition, applied linguistics, language testing, language education, psychology, sociology and statistics. The project includes researchers working on different European languages among study abroad learners in different target language cultures, thereby offering insights at pan-European level into the potential of study abroad to enhance multilingual development and intercultural awareness among citizens of contemporary Europe. The project offers different insights into the complexity of study abroad as a context of second language learning through both quantitative and qualitative analysis, drawing on wide-ranging methodological approaches and tools of investigation. At a time when increased importance is attached to foreign language learning at European level, the project illuminates wide-ranging factors which may impact on study abroad as a context which can facilitate such an aim to varying degrees.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Languages and literature: Second language teaching and learning	● study abroad ● second language acquisition ● interculturality ● second language development ● international education and mobility

NETWORK OF PROPOSERS

Main Proposer: IE
Network of Proposers (6): ES, FI, FR, IE, SE, UK (ITC: 0%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: -
Gender balance of Proposers: 17% F / 83% M

CA15131 - Animal Behavioural Management and Training of Laboratory Non-human Primates and Large Laboratory Animals

OBJECTIVE

The main objective is to focus on Positive Reinforcement Training (PRT) and Animal Behaviour Management (ABM) essential when working with non-human primates (NHP) in biomedical research. The Action provides a network for personnel working with NHP (and other large laboratory animals) to facilitate the competence and skills needed to successfully apply PRT and ABM.

SUMMARY

Positive Reinforcement Training (PRT) and Animal Behavioural Management (ABM) of non-human primates (NHP) and other large laboratory animals used in biomedical research reduce the stress level for the animals, promote more reliable results, facilitate the refinement of methods and procedures and lead to increased safety, both for animals and personnel. Furthermore, well trained animals, which are physically and psychologically healthy, are very much in demand and have a high market value. Laboratory animal training was introduced in Europe as best practice in the last two decades. However, animal facilities are yet poorly connected and despite Directive 2010/63/EC which boosted the education of laboratory animal staff, there is no systematic approach for animal trainers and ABM experts for NHP and other large laboratory animals. This lack can now be closed through the Action, a network of animal care takers, animal trainers, ethologists, veterinarians, neuroscientists, and other biomedical researchers using NHP and large laboratory animals. Besides the recommendation of a minimum European standard for all primate laboratories with regard to animal training, new training protocols will be developed and existing training protocols will be exchanged. Moreover a catalogue of relevant literature will be compiled. The Action will offer Workshops, Training Schools, and STSM for staff working with NHP or other large laboratory animals. Especially early-stage researcher and staff from animal facilities in smaller COST countries will be encouraged to get involved. This will yield the largest network of animal trainers and ABM staff in Europe and in the world.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Biological sciences: Zoology, including animal behaviour ● Basic medicine: Behavioral neuroscience (e.g. sleep, consciousness, handedness) ● Veterinary science: Veterinary medicine (miscellaneous) ● Health Sciences: Infectious diseases ● Animal and dairy science: Ethics of animal and dairy science	● non-human primates (nhp) ● large laboratory animals ● animal behavioural management (abm) ● positive reinforcement training (prt) ● education, capacity building, increase competency

NETWORK OF PROPOSERS

Main Proposer: DE
Network of Proposers (9): BE, DE, DK, ES, FR, IL, IT, NL, UK (ITC: 0%)
Near Neighbour Country: Russian Federation
International Partner Country: -
Industrial participation: SME (France)
Gender balance of Proposers: 42% F / 58% M

CA15132 - The comet assay as a human biomonitoring tool

OBJECTIVE

The main objective is to reduce inter-laboratory variation in future studies, by providing standard protocols. The mass of available data on DNA damage and DNA repair in humans, obtained with the comet assay, requires a pooled analysis to produce definitive information on factors causing or preventing DNA damage.

SUMMARY

Many human biomonitoring studies have used the comet assay to measure DNA damage (some also measuring DNA repair). In most cases, the assay is applied to peripheral blood mononuclear cells. Results from relatively small individual studies are often inconsistent, and it is advantageous to carry out a pooled analysis of the combined data from all available studies. hCOMET will be a network comprising researchers who are active (or intend to be active) in human biomonitoring with this assay. Results supplied by these researchers will be compiled as a single database representing an estimated 19,000 individual DNA damage measurements. The pooled analysis will allow us to determine which factors (smoking, age, nutrition, sex, occupational exposure etc.) affect DNA damage, and to what extent. Fewer studies have included DNA repair capacity as an endpoint; we will collect what data we can and carry out a detailed review (or a pooled analysis if enough data). In addition, hCOMET will address the issue of inter-laboratory reproducibility of the assay by devising standard protocols, for both DNA damage and DNA repair measurement, coordinating ring studies to test these protocols, and offering training courses and exchanges, so that in future comparison of results from different studies will be facilitated. We will review applications of the assay to other human cell types and isolation methods (such as leukocytes obtained from frozen blood).

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Biological sciences: DNA synthesis, modification, repair, recombination and degradation ● Health Sciences: Epidemiology	● DNA damage ● comet assay ● human biomonitoring ● pooled analysis ● standardisation

NETWORK OF PROPOSERS

Main Proposer: NO
Network of Proposers (10): BE, DK, ES, HR, IT, NL, NO, PT, SK, TR (ITC: 40%)
Near Neighbour Country: -
International Partner Country: Cuba, India
Industrial participation: SMEs (Norway), Large companies (Italy)
Gender balance of Proposers: 52% F / 48% M

CA15133 - The Biogenesis of Iron-sulfur Proteins: from Cellular Biology to Molecular Aspects

OBJECTIVE

The main objective is to address iron-sulfur (Fe/S) protein biogenesis in living systems and to investigate molecular mechanisms underlying human diseases related to Fe/S protein biogenesis dysfunctions. The Action will provide a molecular view of Fe/S proteins assembly processes and trafficking pathways at a systemic level, including their connections with cellular iron homeostasis processes.

SUMMARY

The importance of iron-sulfur (Fe/S) proteins for human life and the comprehension, at molecular and cellular level, of their biogenesis is documented by an increasing number of diseases linked to functional impairment of these proteins and of their maturation processes. Fe/S protein biogenesis needs to guarantee that the right metal reaches the right binding site in any subcellular compartments, through specific cellular pathways, which control the steps of Fe/S cluster assembly and transfer. This Action is an intersectoral, pan-European network to: address Fe/S protein biogenesis in living systems; investigate pathophysiological mechanisms underlying human diseases related to Fe/S protein biogenesis dysfunctions; provide a molecular view of Fe/S protein assembly processes and trafficking pathways in the context of the cellular metallomes. The Action will build a joined research agenda and a translational consortium with different expertises and infrastructures, henceforth it will be able to i) support young researchers and research groups from emerging countries; ii) frame the research of individual groups within wider scenarios; iii) achieve scientific deliverables that could not be reached without knowledge and infrastructure sharing based approaches.The understanding of molecular mechanisms at the basis of Fe/S protein biogenesis needs to be addressed by a team of chemists, biologists and genetists in order to provide a full picture of the possible and feasible cures to these genetic diseases. We will foster knowledge exchange among different areas, explore the intersection of fundamental science with applications,act as incubator for translational studies, diffuse good practice of gathering different expertises under the same Action.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Biological sciences: Systems biology ● Biological sciences: General biochemistry and metabolism ● Biological sciences: Structural biology (crystallography, NMR, EM) ● Biological sciences: Molecular biology and interactions	● iron-sulfur protein biogenesis ● human diseases ● spectroscopy ● iron trafficking and homeostasis

NETWORK OF PROPOSERS

Main Proposer: IT
Network of Proposers (9): CZ, DE, EE, FR, IT, PL, PT, SE, UK (ITC: 44%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: SME (Italy)
Gender balance of Proposers: 40% F / 60% M

CA15134 - Synergy for preventing damaging behaviour in group housed pigs and chickens

OBJECTIVE

The main objective is to reduce the incidence of damaging behaviours in group-housed animals by refining methods of genetic selection and by developing husbandry innovations that improve early and later life conditions.

SUMMARY

The GroupHouseNet aim is to provide the European livestock industry with innovations in breeding and management for pigs and poultry that are needed for a successful transition to large group housing systems without necessitating painful tail docking and beak trimming. Allowing the animals greater opportunities to display their species-specific behaviour while avoiding the routine use of painful procedures, group housing of unmutilated animals sits at the core of the new animal welfare paradigm driven by consumer demand. Group housing is associated with increased risks of damaging behaviours among the animals, such as feather pecking, aggression and cannibalism in laying hens and tail biting, bellynosing, excessive aggression and cannibalism in pigs. Recent research suggests the key to reducing the incidence of these behaviours lies in refining and applying methods of genetic selection, and developing husbandry innovations that improve early and later life conditions - which is exactly what GroupHouseNet will use the COST Action framework and tools to do. GroupHouseNet brings together researchers and industrial partners dealing with animal breeding and genetics, animal nutrition, epidemiology, engineering, animal behaviour and welfare, epigenetics, immunology, (neuro)physiology, economics and ethics. To strengthen the scientific and technological basis in these areas the Action will facilitate knowledge sharing, creation and application in pigs and laying hens in both experimental and commercial environments. The activities will be conducted in an open, output-oriented transnational, multisectorial, and multidisciplinary research and development network emphasising COST Excellence and Inclusiveness Policy.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Animal and dairy science: Agriculture related to animal husbandry, dairying, livestock raising, animal welfare	● animal welfare ● damaging behaviour ● breeding ● health ● husbandry

NETWORK OF PROPOSERS

Main Proposer: NO
Network of Proposers (15): BE, CH, ES, FI, FR, HR, LT, NL, NO, PL, SE, SI, SK, TR, UK (ITC: 40%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: -
Gender balance of Proposers: 53% F / 47% M

CA15135 - Multi-target paradigm for innovative ligand identification in the drug discovery process

OBJECTIVE

The main objective is to promote European interaction among Medicinal Chemistry research groups. The goal is to speed up the discovery process of novel therapeutic agents against multiple targets, combining competencies from synthetic chemistry, natural products and biophysics, to theoretical chemistry, molecular modelling and biological screening

SUMMARY

The aim of this Action is to join highly-qualified research teams working in disciplines around the field of Medicinal Chemistry, into a novel network devoted to the multi-target issue in drug discovery. The choice of this theme is related to its marked multidisciplinary character, which can ensure a strong interaction among all COST participants. Currently, an important and emerging issue in modern drug discovery is to design novel or identify existing bioactive compounds, endowed with the capability to interact selectively with two or more macromolecular targets, exerting their effects against certain therapeutic goals in a synergic fashion. This leading concept stimulated to propose the Action “Multi-target paradigm for innovative ligand identification in the drug discovery process” MuTaLig, focusing on novel ligands able to recognize selected multiple targets, to promote closer scientific links among European research groups involved in Medicinal Chemistry field at both academic and industrial level. Their research competencies will span around medicinal chemistry, from synthetic chemistry, natural products and biophysics to theoretical chemistry, molecular modelling and biological screening.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Chemical sciences: Theoretical and computational chemistry ● Chemical sciences: Organic chemistry ● Chemical sciences: Databases, data mining, data curation, computational modelling	● medicinal chemistry ● multi-target paradigm ● lead identification ● chemical databases ● lead optimization

NETWORK OF PROPOSERS

Main Proposer: IT
Network of Proposers (5): AT, IT, PT, SI, UK (ITC: 40%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: SMEs (Austria, United Kingdom)
Gender balance of Proposers: 40% F / 60% M

CA15136 - European network to advance carotenoid research and applications in agro-food and health

OBJECTIVE

The main objective is to implement a network for the advancement of carotenoid research and applications in agro-food and health. The key research question is: what novel sources of carotenoids, little studied carotenoids and/or beneficial actions can be harnessed to increase the competitiveness of the European agro-food industry and promote health?

SUMMARY

The goal of the Action is to enhance the competitiveness of the European agro-food industry and promote health by coordinating research on carotenoids. These are of great importance in this context as they are versatile and can be used as natural colorants, antioxidants, sources of vitamin A and functional ingredients. Of the over 750 carotenoids described ca. 10 are being thoroughly studied, so there is much potential to produce positive impacts at different levels. The research question the Action will address is: what novel sources of carotenoids, little studied carotenoids and/or beneficial actions can be harnessed to increase the competitiveness of the European agro-food industry and promote health? However, research on carotenoids is challenging as they are very difficult to work with. This and the lack of dialogue between largely scattered groups result in a waste of resources that hinders progress. Unlike in other regions, there is not a European network on carotenoids. This scenario is not appropriate to optimize efforts and create synergies and undoubtedly places Europe in a disadvantageous position. The Action will gather and articulate a critical mass of European actors to promote the co-operative use of infrastructures, synergistic interactions and the sharing, generation, application and communication of knowledge. This will contribute to strengthening Europe's research and innovation capacities. As a result it will generate breakthroughs leading to applications like new technologies and/or high-quality foods and the establishment of health-promoting nutritional recommendations. Thus, the Action will contribute to create wealth, improve health and reduce costs related to serious diseases.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Other engineering and technologies: Food science and technology ● Health Sciences: Nutrition and dietetics ● Health Sciences: Public and environmental health ● Agriculture, Forestry, and Fisheries: Sustainable production	● carotenoids ● agro-food ● functional foods ● health ● ingredients

NETWORK OF PROPOSERS

Main Proposer: ES
Network of Proposers (27): AT, BE, CH, CZ, DE, DK, EL, ES, FR, HR, HU, IE, IL, IT, LT, LU, LV, NL, NO, PL, PT, RO, SE, SI, SK, TR, UK (ITC: 44%)
Near Neighbour Country: Algeria, Tunisia
International Partner Country: -
Industrial participation: SMEs (Spain, Switzerland), Large companies (Denmark)
Gender balance of Proposers: 51% F / 49% M

CA15137 - European Network for Research Evaluation in the Social Sciences and the Humanities

OBJECTIVE

The main objective is to enable the Social Sciences and Humanities (SSH) to demonstrate their place in academia and society, by bringing together different strands of work consecrated to SSH research evaluation in different parts of Europe, in order to gain momentum, to exchange best practices, and to avoid unnecessary duplication

SUMMARY

The challenge of the Action is to enable the Social Sciences and Humanities (SSH) to better demonstrate their true place in academia and society. To do so, the Action proposes to bring together different strands of work consecrated to SSH research evaluation, currently under development in different parts of Europe, in order to gain momentum, to exchange best practices and results, and to avoid unnecessary duplication. Its main aims, deeply interrelated, are:
- to improve evaluation procedures in order to take into account the diversity and the wealth of SSH research;
- to make a robust case for the ways in which the SSH add value to the society;
- to help SSH scholars better appropriate their research agenda and overcome fragmentation.
The Action will improve the understanding of how SSH fields generate knowledge, what kind of scientific and societal interactions characterise different SSH disciplines, and what are the patterns of dissemination in the SSH. It will therefore benefit to European and international scholars in research evaluation and in the sociology of sciences; to research managers and policy makers at all levels; to research data managers and information system designers; and, last but not least, to researchers in the SSH fields themselves.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Sociology: Sociology of science ● Political Science: Political systems and institutions, governance ● Media and communications: Library science	● SSH research evaluation ● qualitative indicators ● societal relevance of research ● SSH databases

NETWORK OF PROPOSERS

Main Proposer: FR
Network of Proposers (17): AT, BE, CH, CZ, DE, DK, EE, ES, FR, HR, LT, NL, NO, PL, RO, SI, UK (ITC: 41%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: -
Gender balance of Proposers: 61% F / 39% M

CA15138 - European Network of Multidisciplinary Research and Translation of Autophagy knowledge

OBJECTIVE

The main objective is to extend multidisciplinary knowledge about Autophagy and to accelerate its translation: for biomedical purposes, particularly prevention, accurate disease diagnosis and therapy development, and for biotechnological applications, such as enhanced crop production and energy generation.

SUMMARY

Maintaining homeostasis is a necessary condition for an independent cellular or a whole organism life. It is central our understanding of the connection between cellular homeostatic disequilibrium and organ and system dysfunction. Autophagy is a mechanism by which the cell purges excessive or damaged organelles, misfolded proteins, and invading microorganisms and it also provides nutrients to maintain crucial cellular functions. Autophagy has over the past decade been recognized as an essential process of cellular metabolism and homeostasis. In the health spectrum, recent discoveries have shown that is possible to destroy tumour cells by targeting autophagy; that some autophagy-based treatments, already in phase III of clinical trials may serve to cure lupus erythematosus, or that autophagy is now recognized as a an anti-aging mechanism. Biotechnological innovative applications for optimum agro-food production or obtaining alternative energy sources from microalgae are possible by modulating autophagy.
The present consortium is a platform of stakeholders from different disciplines such as nanotechnology, bioinformatics, physics, chemist, biology and medicine, and activities including researchers from public institutions and 11 SMEs sharing the common interest in autophagy. We cooperate within the Action to generate and accelerate translation of multidisciplinary knowledge in autophagy for biomedical and biotechnological purposes. Among the expected outcomes are included recommendations for healthy aging or to prevent diseases or the discovery of new specific drugs, bio-based components or nanodevices capable to specific modulate autophagy to be applied at the clinics, as antineoplasic or neuroprotective agents for instance, and to exploit plants and microorganisms to improve environmental conditions.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Industrial biotechnology: Industrial biofuel production ● Agricultural biotechnology: Sustainable production ● Basic medicine: Organelle biology ● Basic medicine: Pharmacology, pharmacogenomics, drug discovery and design, drug therapy ● Basic medicine: Organ physiology	● membrane dynamics ● organelle handling ● biomedicine ● agronomy ● biofuel

NETWORK OF PROPOSERS

Main Proposer: ES
Network of Proposers (21): AT, BE, CH, CZ, DE, DK, EL, ES, FI, FR, HU, IE, IT, LU, NL, NO, PL, PT, SE, TR, UK (ITC: 29%)
Near Neighbour Country: -
International Partner Country: United States
Industrial participation: SMEs (France, Italy, Spain, Sweden), Large companies (Portugal)
Gender balance of Proposers: 36% F / 64% M

CA15139 - Combining forces for a novel European facility for neutrino-antineutrino symmetry-violation discovery

OBJECTIVE

The main objective is to demonstrate that it is possible, using a world-uniquely powerful linear-accelerator, to measure the neutrino-antineutrino asymmetry at the second neutrino-oscillation maximum, where the sensitivity is three times higher than at the first maximum, and thereby elucidate the origins of the matter-antimatter asymmetry in Universe.

SUMMARY

After the Big Bang, matter and antimatter were produced in equal quantities; however only matter now remains in the Universe. A new concept based on the use of a 5 MW beam from a linear proton accelerator has been proposed for the experimental detection of an asymmetry between neutrinos and antineutrinos, implying leptonic Charge-Parity (CP) Violation, with the aim to elucidate this major cosmological problem. The two major goals of EuroNuNet are to aggregate the community of neutrino physics in Europe to study this concept in a spirit of inclusiveness and to impact the priority list of High Energy Physics policy makers and of funding agencies to this new approach to the experimental discovery of leptonic CP violation. The proposal is to study the possibility of producing a world-uniquely intense neutrino beam from a 5 MW proton beam generated with a linear, as opposed to circular, accelerator and to direct this neutrino beam to a Megaton size underground Water Cherenkov neutrino detector. The outstanding potential of this infrastructure stems from the uniquely high power of the linear accelerator that allows positioning the detector at the second neutrino oscillation maximum, located at some 500 km from the accelerator and neutrino target, where the sensitivity to the CP violation signal is about three times higher as compared to at the first oscillation maximum, where other experiments are planning to measure. The study of this facility will build upon the further exploitation of the experience gained in the EU FP7 Design-Studies EUROnu and LAGUNA-LBNO.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Physical Sciences: High energy and particles astronomy, X-rays, cosmic rays, gamma rays, neutrinos ● Physical Sciences: Instrumentation - telescopes, detectors and techniques	● leptonic CP violation ● second neutrino oscillation maximum ● high power linear proton accelerator ● water cherenkov detector ● underground laboratory

NETWORK OF PROPOSERS

Main Proposer: SE
Network of Proposers (7): BG, ES, FR, IT, PL, SE, UK (ITC: 29%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: -
Gender balance of Proposers: 17% F / 83% M

CA15140 - Improving Applicability of Nature-Inspired Optimisation by Joining Theory and Practice

OBJECTIVE

The main objective is to bridge the gap that exists between the application of nature-inspired search and optimisation heuristics and the theoretical research that aims at improving our understanding of these heuristics. This will be achieved by making theory more practical and by facilitating interaction between practitioners and theoreticians involved in this area.

SUMMARY

Nature-inspired search and optimisation heuristics are easy to apply to new problems but difficult to understand and not easy to apply successfully. Theoretical foundations for the understanding of such approaches have been built very successfully in the past 20 years but there is a huge disconnect between the theoretical basis and practical applications. The development of powerful analytical tools, significant insights in general limitations of different types of nature-inspired optimisation methods and the development of more practically relevant perspectives for theoretical analysis have brought impressive advances to the theory-side of the field without making adequate impact on the application-side and without helping more people in diverse areas of potential applications benefitting from these advances.
The main objective of the COST action plan is to bridge this gap and improve the applicability of all kinds of nature-inspired optimisation methods. It aims at making theoretical insights more accessible and practical by creating a platform where theoreticians and practitioners can meet and exchange insights, ideas and needs; by developing robust guidelines and practical support for application development based on theoretical insights; by developing theoretical frameworks driven by actual needs arising from practical applications; by training young academics and young researchers in a theory of nature-inspired optimisation methods that clearly aims at practical applications; by broadening participation in the ongoing research of how to develop and apply robust nature-inspired optimisation methods in different application areas.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
● Computer and Information Sciences: Artificial intelligence, intelligent systems, multi agent systems	● natural computation ● nature-inspired optimisation ● evolutionary algorithms ● heuristic optimisation

NETWORK OF PROPOSERS

Main Proposer: UK
Network of Proposers (8): AT, CH, DE, DK, FR, NL, PT, UK (ITC: 13%)
Near Neighbour Country: -
International Partner Country: -
Industrial participation: -
Gender balance of Proposers: 14% F / 86% M