

# New COST Action proposals

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## Action BM1101

### European network for the study of dystonia syndromes

#### Objectives

The main objective of the Action is foster the creation of an interdisciplinary network of experts in neurology, genetics, neuroscience, behavioural sciences, neurosurgery, bioinformatics, and statistics, with the goal to develop experimental animal models, improve the standard of care and educate professionals and increase public awareness about the disorder.

#### Abstract

Dystonia syndromes (DS) are the third most common movement disorder, yet they are poorly understood and are under diagnosed. The causes of these disabling neurological conditions are poorly known and the mechanisms that give rise to the uncontrollable involuntary movements have not been elucidated. Particularly the role played by genetic and environmental factors is unclear. Scientific initiatives are fragmented across Europe and hampered by insufficient dimension. This Action will foster the creation of an interdisciplinary network of experts to promote genetic studies of DS, develop experimental animal models, standardise and harmonise patient care and educate the public and professionals about the disorder. It will create a unified platform for sharing expertise and exchanging procedures among centres in COST countries.



**Keywords:** Dystonia, genetics, diagnosis and treatment, animal models, pathophysiology

#### Working Groups

- WG1 Genetic studies of DS
- WG2 Animal models of DS
- WG3 Standardisation and harmonisation of clinical practices
- WG4 E-infrastructure for European cooperation on DS

#### Interested Countries: 11

Proposer: **IT**  
BE, CZ, DE, ES,  
FR, HR, PL, RS,  
TR, UK



## Action BM1102

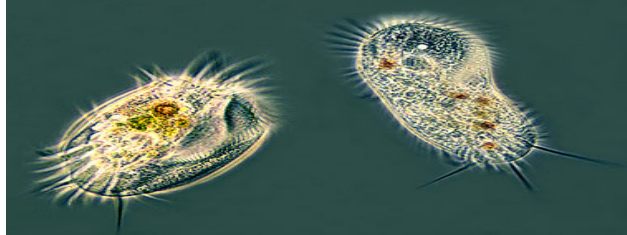
### Ciliates as model systems to study genome evolution, mechanisms of non-Mendelian inheritance, and their roles in environmental adaptation

#### Objectives

The aim of this Action is to establish a network of ciliatologists in order to strengthen and consolidate European research in this area aiming at deciphering the molecular mechanism underlying epigenetics, non-Mendelian inheritance and environmental adaptation.

#### Abstract

Darwinian selection of random mutations is considered the driving force for evolution. However, it is now clear that acquired characters can also be transmitted from one generation to the next through non-Mendelian inheritance, with influence on cell differentiation and occurrence of diseases. Important questions are whether environmental changes can induce such epigenetic variation and if these variations drive adaptation. COST Action on ciliates will greatly contribute to unravelling the molecular mechanisms of non-Mendelian heredity.



**Keywords:** Epigenetics, comparative genomics, environmental changes, molecular adaptation, DNA rearrangements

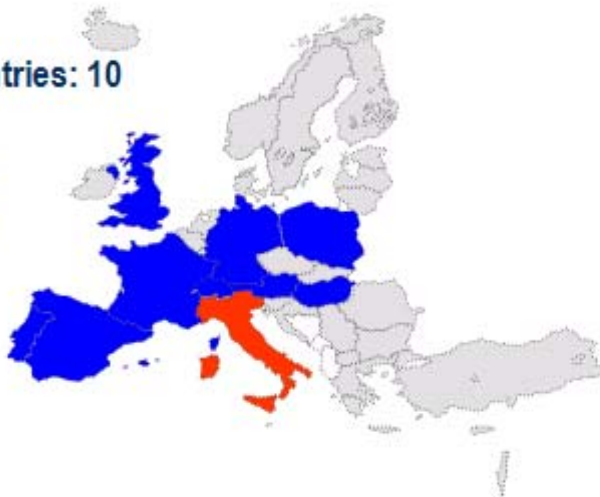
#### Working Groups

- WG1 Developmentally regulated, alternative genome rearrangements showing non-Mendelian inheritance
- WG2 Genetic variation of adaptive significance
- WG3 Linkage of non-Mendelian inheritance to environmental adaptation

**Non-COST participation:** Canada, China, Japan, Russia, Ukraine, USA

#### Interested Countries: 10

Proposer: **IT**  
AT, CH, DE, ES,  
FR, HR, PL, PT,  
UK



## Action BM1103

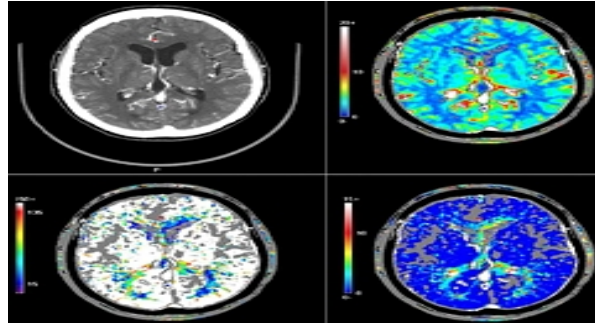
### Arterial spin labelling Initiative in Dementia (AID)

#### Objectives

The main objective of the Action is to improve and validate the Arterial Spin Labelling MRI technology to permit development as a reliable clinical tool for the diagnosis and follow-up of dementia, providing reproducible and comparable quantitative measurements of cerebral perfusion independent of the hardware manufacturer together with the necessary harmonised post-processing, statistical analysis and cross-validation software to be employed in clinical trials.

#### Abstract

Dementia is a major clinical challenge with care costs approaching 1% of global GDP. Recent estimates suggest that delaying disease onset by 5 years would halve its prevalence. As new disease-modifying treatments will be specific to causative diseases, expensive and bear significant side effects, early diagnosis of dementia will be essential. Current diagnostic criteria include the use of image-based biomarkers using radiotracers. The AID Action aims at coordinating the development of an alternative and cost-effective tool based on an MRI technique, Arterial Spin Labelling (ASL), to obtain reproducible brain perfusion measurements in dementia patients by bringing together scientists and clinicians from across Europe through the flexibility of the COST mechanism.



**Keywords:** Magnetic Resonance Imaging, Arterial Spin Labelling, Cerebral Blood Flow, Dementia, Biomarker

#### Working Groups

- WG1 ASL data acquisition
- WG2 ASL data analysis
- WG3 Clinical validation of ASL in cognitive impairment
- WG4 Establishment of ASL-derived CBF as a biomarker

#### Interested Countries: 12

Proposer: **UK**  
BE, CH, DE, DK,  
ES, FR, IT, NL,  
PT, SE, TR



## Action BM1104

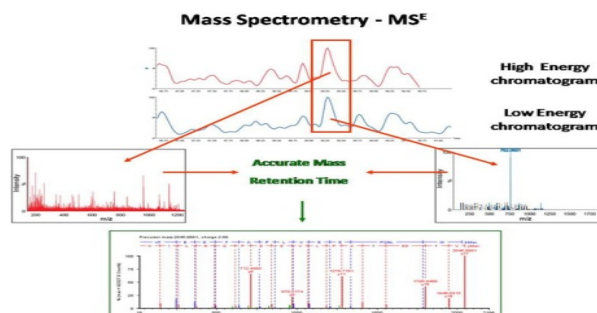
### Mass Spectrometry Imaging: New Tools for Healthcare Research

#### Objectives

The main objective of the Action is to establish imaging mass spectrometry and related translational technologies in clinical research. It will lead to standardized protocols for describing tissues by their molecular content and distribution, which will then be exploited to develop new molecular histological signatures for improved disease diagnosis as well as new methods for quantitative imaging of lead formulations for pharmaceutical development.

#### Abstract

Mass spectrometry imaging is a rapidly developing technique that uses spatially resolved proteomic and metabolomic techniques to simultaneously trace the distributions of hundreds of biomolecules directly from patient tissue samples. Using essentially the same technology peptides, proteins, pharmaceuticals and metabolites can be analyzed, without a label and without prior knowledge. The driving force behind the high and increasing popularity of imaging mass spectrometry is its demonstrated potential for the determination of new diagnostic/prognostic biomarkers, across several chemical domains, including pathologies of overlapping/identical morphology that cannot be distinguished using established histopathological methods.



**Keywords:** imaging mass spectrometry, biomarker discovery, cancer, pharmaceuticals, diagnosis

#### Working Groups

- WG1 Best practice guidelines for imaging MS data acquisition
- WG2 Data analysis and data sharing
- WG3 Application to topical diseases

#### Interested Countries: 14

Proposer: **NL**  
AT, BE, CH, CZ,  
DE, EE, ES, FI,  
FR, HU, IT, SE,  
UK



## TD1101

### A Collaborative European Network On Rabbit Genome Biology (RGB-NET)

#### Objectives

The main objective of the Action is to establish a multidisciplinary and cooperating network of experts in different research areas and applied fields interested in developing new scientific and commercial opportunities, resources and tools from the European rabbit genome and to strengthen and consolidate Europe as a leader in the scientific and economic exploitation of the European rabbit and related species.

#### Abstract

This COST action will bring together experts in all rabbit research areas and in other complementary research fields (breeders, geneticists, bioinformaticians, physiologists, evolutionists, embryologists, immunologists, industry experts, etc.) in order to facilitate the transition of rabbit genomic information from experimental data into usable benefits and applications by means of networking expertise. Four Working Groups will be focused on (i) the refinement of the European rabbit genome resource and the development of genome-based platforms, (ii) genetic aspects in meat, fur and pet rabbits and biodiversity resources, (iii) the rabbit as a model in basic biology and human diseases and as a tool for biotechnology applications and (iv) genetic and comparative genomic aspects for the study, exploitation and management of wild lagomorphs. The outcome is a coordination of rabbit research activities and a transfer of knowledge which will produce a strong European added value across a broad spectrum of biology research fields.



**Keywords:** European rabbit, lagomorphs, genome biology, translational research, networking expertise

#### Working Groups

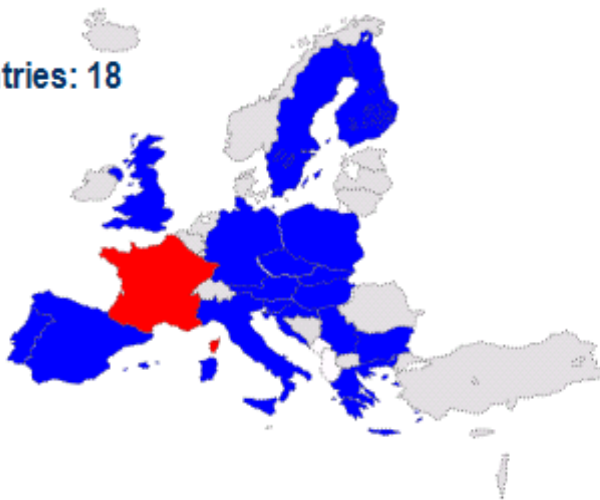
- WG1 Refinement of the European rabbit genome resource and development of genome-based platforms
- WG2 Genetics in meat, fur and pet rabbits and biodiversity resources
- WG3 The European rabbit as a model in basic biology and human diseases and as a tool for biotechnology applications
- WG4 Genetics and comparative genomic aspects for the study, exploitation and management of wild lagomorphs

**Non-COST participation:** China, Japan, Taiwan, USA, South Africa

#### Interested Countries: 18

Proposer: **FR**

AT, BG, CZ, DE,  
EL, ES, FI, HR,  
HU, IT, PL, PT,  
RS, SE, SI, SK,  
UK





## Action FA1101

### Omics Technologies for Crop Improvement, Traceability, Determination of Authenticity, Adulteration and Origin in Saffron

#### Objectives

The multidisciplinary network will increase our knowledge of the structural organization of Saffron genome DNA fingerprinting, chemical fingerprinting, proteomics, transcriptomics, and metabolomics. This integrated knowledge will be the basis for the development of Saffron genetic improvement, and the maturity of reliable techniques to combat bio-adulteration and fraud.

#### Abstract

Saffron is the highest priced agricultural product and a good example of profitability, sustainability, cultural and social values, and high labour demand. This COST Action addresses coordinated research on Saffron -OMICS for crop improvement, traceability, determination of authenticity, adulteration and origin to provide new insights that will lead a sound Saffron Bio-Economy. Amongst others novel genomic tools and modern genetic and breeding approaches for crop improvement in saffron and ornamental crocuses will be exploited; and omics techniques will be developed to detect new-generation biological adulterants in saffron, based on DNA and chemical fingerprintings. Increased knowledge of genetics and physiology of traditional crops through the omics 'revolution' is a need. The development of sustainable rural economies based on High Value Agricultural Products such as Saffron is in synergy with DG SANCO's policies and contributes to the fulfilment of the aim of CAP, which is to guarantee long-term food security, quality, value and diversity of food produced sustainably, and creating local employment.



**Keywords:** *Crocus sativus* L., Saffron, biodiversity, genetic resources, breeding, genomics, metabolomics, molecular markers, phytochemistry, traceability, adulteration, authenticity, fraud

#### Working Groups

- WG1 Genetics, Genomics & Transcriptomics
- WG2 Phytochemistry & Metabolomics
- WG3 Molecular and Phytochemical fingerprinting for breeding, traceability, and authenticity
- WG4 Dissemination, Project Management & Coordination International outreach

**Non-COST participation:** Azerbaijan, Egypt, India

#### Interested Countries: 13

Proposer: DE

AT, BE, DK, EL,  
ES, FI, FR, IE, IT,  
NL, PL, UK



## Action FA1102

### Optimising and Standardising Non-Destructive Imaging and Spectroscopic Methods to Improve the Determination of Body Composition and Meat Quality in Farm Animals. Acronym: FAIM

#### Objectives

The network will contribute significantly to the optimisation and standardisation of non-destructive in vivo and post mortem imaging and spectroscopic methods for the measurement of body composition and meat quality in major farm animal species, and to facilitation of automation, effective data capture and management on the level of individual animals.

#### Abstract

The Action aims to optimise non-destructive in vivo (iv) and post mortem (pm) imaging and spectroscopic methods for the measurement of body composition and meat quality (MQ) in major farm animal species and to devise standardised principles of carcass classification and grading (CCG) across countries. These actions are necessary for the development of value-based payment and marketing systems (VBMS) and to meet the urgent need for market orientated breeding programmes. FAIM encompasses collaboration of hard- and software manufacturers with livestock and imaging academic experts to develop required products for implementing the scientific work. This is essential for achieving the required advances in CCG systems to measure carcass yield and MQ, to meet the industry need for VBMS, and to improve production efficiency throughout the meat supply chain (MSC). FAIM aims also to support EU legislation on individual animal identification through showing the additional benefits of feeding back abattoir data on individual animals for optimising management, breeding and providing phenotypic information which will facilitate future implementation of genome wide selection.



**Keywords:** farm animals, imaging, carcass quality, meat quality, traceability

#### Working Groups

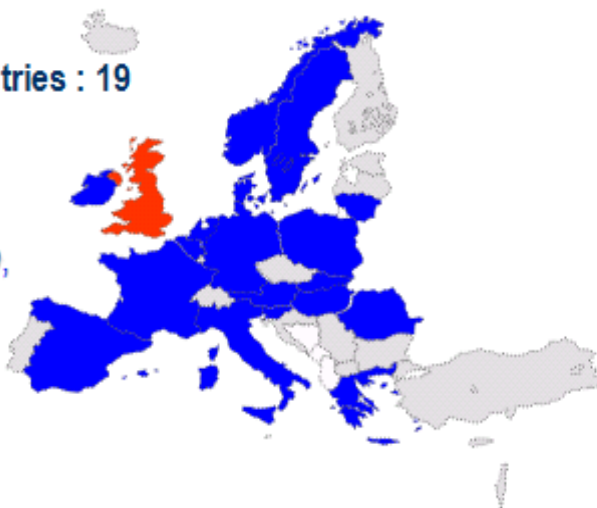
- WG1 Body composition
- WG2 Meat Quality
- WG3 Algorithms
- WG4 Traceability

**Non-COST participation:** Australia, Brazil, Canada, New Zealand, USA, Uruguay

#### Interested Countries : 19

Proposer : UK

AT, BE, DE, DK,  
EL, ES, FR, HU,  
IE, IT, LT, NL, NO,  
PL, RO, SE, SI,  
SK



## Action FA1103

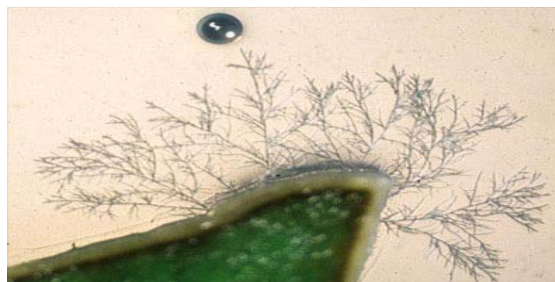
### Endophytes in Biotechnology and Agriculture

#### Objectives

The main objective of the Action is to identify bottlenecks limiting the use of endophytes in biotechnology and agriculture and to provide solutions for the economically and ecologically compatible exploitation of endophytes.

#### Abstract

Endophytic bacteria and fungi, which live inter- and intracellularly in plants without inducing pathogenic symptoms, interact with the host biochemically and genetically. Endophytic microorganisms (EMOs) may function as plant growth and defense promoters by synthesising phytohormones, producing biosurfactants, enzymes or precursors for secondary plant metabolites, fixing atmospheric nitrogen and CO<sub>2</sub> or control plant diseases as well as providing a source for new bioactive natural products with utility in pharmaceutical, agrochemical and other Life Science applications. The use of these EMOs to control plant-pathogenic bacteria and fungi is receiving increasing attention as a sustainable alternative to synthetic pesticides and antibiotics. Furthermore, these EMOs are likely to be adapted to the presence and metabolism of complex organic molecules and therefore show useful biodegradation activities. In order to reduce the input of pesticides and fertilizers and to bring European added value to eco-friendly agriculture, it will be important to develop inocula of biofertilizers, stress protection and biocontrol agents.



[http://bugs.bio.usyd.edu.au/learning/resources/Mycology/images/Topics/Plant\\_Interactions/Endophytes/fungiOnBanksia.jpg](http://bugs.bio.usyd.edu.au/learning/resources/Mycology/images/Topics/Plant_Interactions/Endophytes/fungiOnBanksia.jpg)

**Keywords:** Endophytes, plant growth promoters, secondary metabolites, agriculture, plant-microbe-interaction

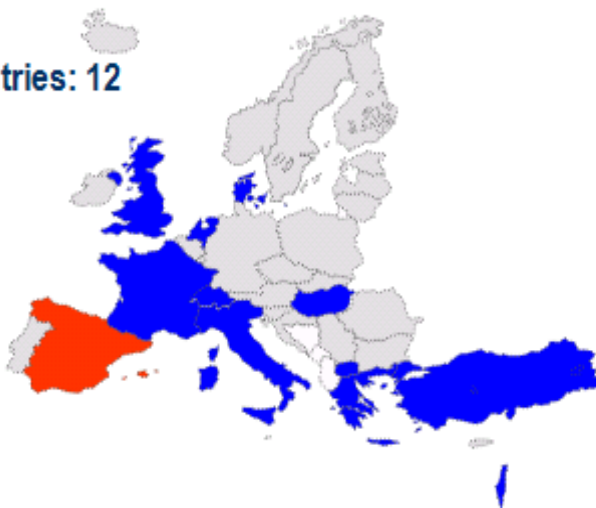
#### Working Groups

- WG1 Ecology of endophytes
- WG2 Identification of new competent endophytes
- WG3 Development of new microbial inocula
- WG4 New industrial products in life sciences

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

#### Interested Countries: 12

Proposer: ES  
CH, DK, EL, FR,  
HU, IL, IT, MK,  
NL, TR, UK



## Action FP1101

### Assessment, Reinforcement and Monitoring of Timber Structures

#### Objectives

The main objective of the Action is to increase the confidence of designers, authorities and end-users in the safe, durable and efficient use of timber and consequently increase its acceptance and use in the design of new and in the repair of old buildings.

#### Abstract

In recent years, the use of timber in structures has become particularly important, considering that it is the only truly renewable building material and carbon storage. Timber has been used as structural material for centuries and numerous examples demonstrate its durability if properly designed and built and when adequate assessment and monitoring has been applied. The objective of the Action is to increase the acceptance of timber in the design of new structures and in the repair of old buildings by developing and disseminating methods to assess, reinforce and monitor them. The need for assessment, reinforcement and monitoring of timber structures can arise from multiple motivations such as the expiration of the planned lifetime, materials aging, exceptional incidents, and ever more important, a change of use. The Action will benefit from multidisciplinary views of the problems and followed innovative solutions by the involved stakeholders, enable synergies between them and provide an effective way of discussing and disseminating the results from ongoing projects within this research area to the European industry. The Action will increase the confidence of designers, authorities and end-users in the safe, durable and efficient use of timber and consequently increase its use in construction.



**Keywords:** Timber, timber structures, assessment, reinforcement, monitoring

#### Working Groups

WG1 Assessment of timber structures  
WG2 Reinforcement of timber structures  
WG3 Monitoring of timber structures.

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

#### Interested Countries: 19

Proposer: CH  
AT, BE, CZ, DE,  
ES, FI, FR, HU,  
IE, IT, NL, NO,  
PL, PT, SI, SK,  
SE, UK





## Action FP1102

### Determining Invasiveness And Risk Of Dothistroma (DIAROD)

#### Objectives

DIAROD will identify the biosecurity implications and determine the risk of changing behaviour of forest pathogens to aid policy makers, regulators and land managers in the successful management of pathogen outbreaks. This will be achieved using Dothistroma Needle Blight (DNB), a fungal disease of rising profile in Europe, as a model. The Action will encourage, on an international scale, collaboration and the co-ordination of research, data collection and knowledge transfer in order to tackle the fundamental issues.

#### Abstract

Dothistroma needle blight is an economically important tree disease caused by two fungal pathogens, *Dothistroma septosporum* and *Dothistroma pini*. Although the disease has been a problem in the southern hemisphere for many years, only recently has it caused significant damage to plantations and natural forest ecosystems in Europe. The biosecurity implications relating to this recent upsurge are unclear, and this has raised a number of important questions: Are these fungi recently introduced, or is it that they are changing in behaviour, possibly due to changing climatic conditions? Alternatively, is the dramatic increase in disease intensity and geographical and host range due to the introduction of more aggressive strains? Is this situation likely to worsen, or maybe improve under future management and climate change scenarios? What are the most suitable management strategies? This Action, DIAROD, plans to build on the foundations of the International Dothistroma Alliance (IDA), established in 2006 to help combat the new problems faced due to this disease. The aim of the DIAROD cost Action is to synthesize knowledge, encourage collaborative research to address the key questions, determine future research priorities, and use the resulting information to develop management strategies applicable to this evolving disease and other future disease threats.



**Keywords:** Dothistroma needle blight, biosecurity and pest risk analysis, invasive organisms, climate change, forest management

#### Working Groups

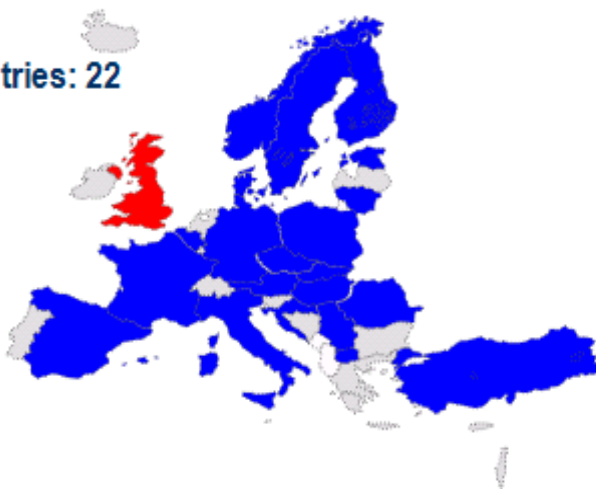
- WG1 The pathogen: Defining the current disease situation.
- WG2 The environment: Determining the risk of DNB
- WG3 The host: Resistance and susceptibility
- WG4 Identify knowledge gaps, disseminate findings and provide best practice guidance for the management of DNB

**Non-COST participation:** Belarus, Canada, New Zealand, Russia, South Africa, Ukraine

#### Interested Countries: 22

Proposer: **UK**

AT, BE, CZ, DE,  
DK, EE, ES, FI,  
FR, HR, HU, IT,  
LT, MK, NO, PL,  
RO, RS, SK, SE,  
TR



## Action CM1101

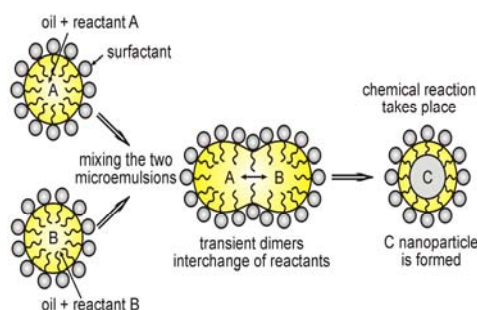
### Colloidal Aspects of Nanoscience for innovative Processes and Materials

#### Objectives

This Action will contribute to provide a platform for cooperation and coordination in the European colloid-science domain directed towards development of innovative materials and processes.

#### Abstract

Colloid chemistry is a steadily growing field of immense importance. The enormous diversity of the colloidal processes involved in novel materials and their applications in both advanced technologies and everyday life cannot be overstated. There is a compelling need for exchange, coordination and cooperation in the European colloid community. This Action will combine coherently the outstanding European expertise in this field, including: theoretical modelling and experimental formation of functional and patterned interfaces; self-assembly of molecules and colloidal particles; synthesis and up-scaling of novel nano-colloidal and bio-colloidal materials; the kinetic and catalytic aspects of these novel materials; and their applications in chemical, pharmaceutical and food industries, as well as in nano-devices such as sensors, assays, photonics and bio-fuel cells. This includes many of the Grand Challenges in energy, health and environmental protection. The Action will provide a platform for coordination of national programs and will stimulate academia-industry cooperation. The Action's main deliverables will be the increased networking in colloid chemistry through the organization of scientific events (conferences, workshops), training schools and STSMs. Through an extensive mobility program targeted to early-stage researchers, it will encourage their involvement in the research at the international level.



**Keywords:** colloids, interfaces, nanoparticles, nanostructures, interactions

#### Working Groups

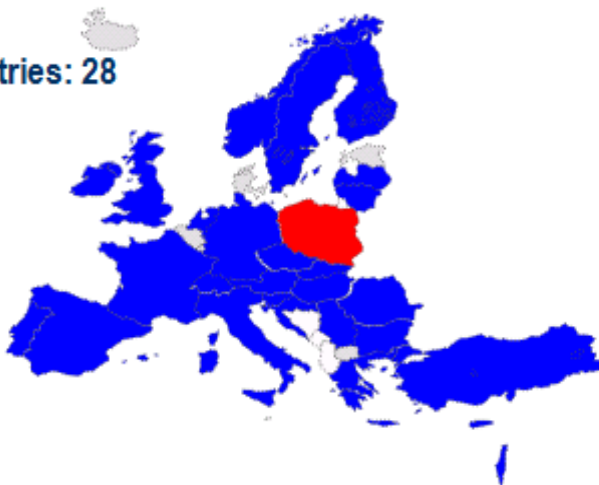
- WG1 Interfacial phenomena – fundamentals, modelling and analytical methods
- WG2 Self-assembly and colloidal interactions: from specific to long-range
- WG3 Synthesis of nano- and bio-colloidal materials: development and up-scaling
- WG4 Kinetic and catalytic aspects of nano-colloids and nano-structured surfaces
- WG5 Processes and materials for everyday life and biomedical applications
- WG6 Colloid-based devices: sensors, assays, photonics and micro-fluidics

**Non-COST participation:** Australia, China, Egypt, India, Palestine, Russia, Ukraine

#### Interested Countries: 28

Proposer: PL

AT, BG, CH, CY,  
CZ, DE, EL, ES,  
FI, FR, HR, HU,  
IE, IL, IT, LT, LV,  
NL, NO, PT, RO,  
RS, SE, SI, SK,  
TR, UK



## Action CM1102

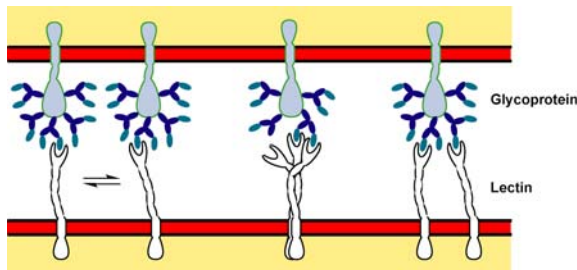
### Multivalent Glycosystems for Nanoscience - MultiGlycoNano

#### Objectives

The main objective of the Action is to develop novel nanoscale glycoconjugates suitable for biomedical applications.

#### Abstract

Carbohydrates constitute the most abundant class of biomolecules on Earth. They have diverse biological roles ranging from energy storage to mediating interactions between living cells. Carbohydrates that are attached to proteins, lipids and synthetic multivalent scaffolds (i.e. glycoconjugates) can be used as anti-adhesive drugs against bacteria or viruses, or bioimaging agents that can target specific tissues. However, they can also have applications in materials science as nanoscale building blocks for hydrogels and templates for making nanostructured hard materials. The Action aims to build a dynamic network across Europe focused on developing glycoconjugates for nanoscience applications. The network will develop new methods for producing nanomaterials for applications in drug delivery, in gene targeting and as diagnostic/prognostic tools. The Action will foster new collaborations to transform glycoconjugate research in Europe by establishing a new frontier at the interface with nanoscience.



**Keywords:** Glycoconjugates; carbohydrates; nanoscience; nanoparticles; multivalency

#### Working Groups

- WG1 Glycoconjugates for drug/gene delivery
- WG2 Glycoconjugates for diagnostics
- WG3 Vaccines/modulators of the immune system
- WG4 Glycoconjugates as anti-pathogenic agents

#### Interested Countries: 10

Proposer: CH

CZ, DE, DK, ES,  
FR, IE, IT, NL, UK



## Action CM1103

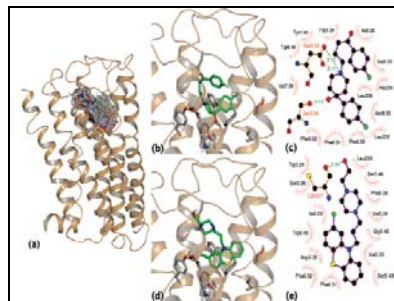
### Structure-based drug design for diagnosis and treatment of neurological diseases: dissecting and modulating complex function in the monoaminergic systems of the brain

#### Objectives

The main objective of the Action is to forge interdisciplinary collaborations that will build the capacity to design chemical tools to diagnose and treat the pathology underlying neuropsychological disorders including dementia.

#### Abstract

The therapy of neuropsychiatric disorders is limited by the high variability of symptoms and behavioural disturbances. Few drugs are available to address specific subsets of neurological/mental symptoms and none to aid in diagnosis or to stop the progress of neurodegenerative disorders. Neurotransmitters such as dopamine and serotonin play a central role in the pathophysiology of major neuropsychiatric illnesses, such as anxiety and mood disorders, schizophrenia, autism-spectrum disorders, Parkinson's disease, epilepsy, and dementias. Neurotransmitter-binding proteins such as receptors, transporters and common metabolic enzymes are the starting points for development of tools to diagnose and drugs to treat specific clusters of symptoms. Structure-based drug design, synthetic chemistry and biological characterisation will inform the choice of lead compounds to treat select subsets of brain malfunction. This Action will facilitate the cross-disciplinary interaction for discovery of promiscuous drugs for diagnosis and treatment of complex brain diseases. In addition to addressing a clinical need, bringing together academic scientists with a broad range of techniques and knowledge, this close collaboration will enrich interdisciplinary scientific training to design chemical tools for neuropathology across Europe, and provide lead compounds with the potential for transfer to the European pharmaceutical industry.



**Keywords:** Structure-based drug design, computational and synthetic chemistry, monoamine receptors, transporters and metabolic enzymes, neurodegenerative and psychiatric disorders

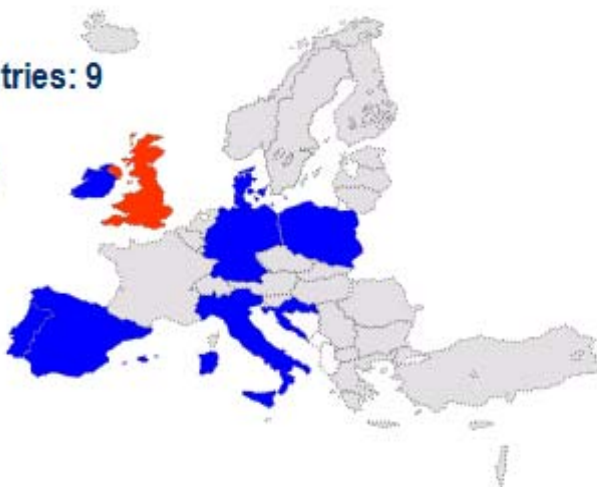
#### Working Groups

- WG1 Computational chemistry
- WG2 Medicinal chemistry
- WG3 Molecular & cellular biology
- WG4 Therapeutic potential

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

Interested Countries: 9

Proposer: UK  
DE, DK, ES, HR,  
IE, IT, PL, PT





## Action TD1102

### Photosynthetic proteins for technological applications: biosensors and biochips (PHOTOTECH)

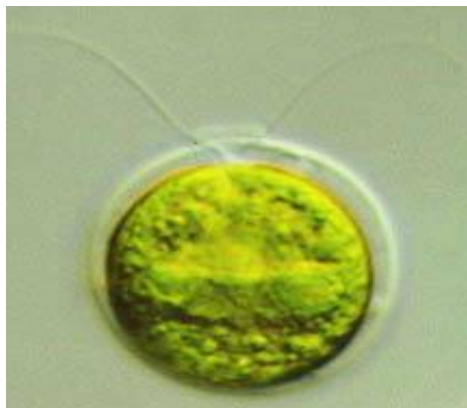
#### Objectives

This Action will contribute to promote a new research platform devoted to design and production of robust and reliable bioelectronic devices based on new photosynthetic elements to develop bio-organic-inorganic hybrid biosensors for environmental monitoring.

#### Abstract

By converting solar energy into chemical energy, photosynthesis supports basically all life on Earth. Key to this process is the use of light energy to power electron transfer across a charge-impermeable lipid membrane. In recent years the nanoscale photosynthetic pigment-protein complexes catalysing this reaction have been isolated and interfaced with metal or carbon electrode surfaces. The activity of these proteins when integrated with non-biological electronic components can be monitored through their highly distinctive absorbance and fluorescence properties, and through the measurement of light-induced photocurrents. Moreover, the structure and composition of these proteins can be altered through genetic engineering. These tools can be exploited for the construction of optoelectronic devices and mono- and/or multi-molecular layers of either natural or engineered proteins for the development of commercial biosensors and biochips.

The objective is to explore, interface and merge the various aspects of photosynthesis -based biodevices development that provide a complementary innovative tool to traditional analytical chemical methods. The purpose will be the creation of a new research platform for the Design and Production of Bioelectronic Devices whose main outcome will be the co-development of a fully characterized class of bio-organic-inorganic hybrid biosensors to be first applied in environmental and agro-food monitoring.



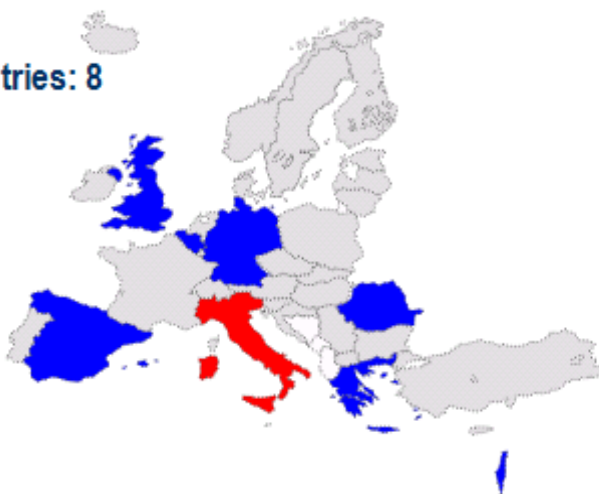
**Keywords:** photosynthetic protein biochip, hybrid layer, immobilization, genetic engineering, biosensor

#### Working Groups

- WG1    Photosynthetic Biomediator Selection and Engineering
- WG2    Biomediator Immobilization
- WG3    Biosensor Manufacture
- WG4    Components and System Characterization

#### Interested Countries: 8

Proposer: IT  
BE, DE, EL, ES,  
IL, RO, UK



## Action ES1101

### HarmBio - Harmonizing Global Biodiversity Modelling (HarmBio)

#### Objectives

The main objective of this Action is the harmonization of current models and datasets of terrestrial, freshwater and marine biodiversity to improve the reliability of future projections of biodiversity change under various policy options enabling environmental decision making.

#### Abstract

Global biodiversity is declining rapidly, largely as a result of human activities. Effective policy and adaptive management strategies in the face of global change require anticipation of future changes. Mid- to long-term planning will therefore depend, at least in part, on model-based projections. Unlike the well-coordinated climate modelling community, the biodiversity modelling community is currently disparate and largely uncoordinated. Hence, there are no agreed metrics of biodiversity produced as standard output from models, nor are there common datasets used for calibration and validation by modelling efforts. This Action facilitates the harmonization of current models and datasets of terrestrial, freshwater and marine biodiversity to improve the reliability of future projections of biodiversity change. This cross-community initiative aims to accelerate the development of transparent and scientifically robust biodiversity models, through validation, calibration and intercomparison of models and data, and ultimately to enable environmental decision making based on state-of-the-art projections of biodiversity change under various policy options.



**Keywords:** global biodiversity modelling, environmental assessments, biodiversity projections, global change

#### Working Groups

- WG1 Consensus on metrics of biodiversity
- WG2 Standardised datasets of biodiversity and environment
- WG3 Agreed standards for biodiversity models
- WG4 Inter-comparisons of biodiversity models

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

**Interested Countries: 9**

Proposer: **UK**  
**DE, DK, ES, FR,**  
**IT, NL, NO, PT**



## Action ES1102

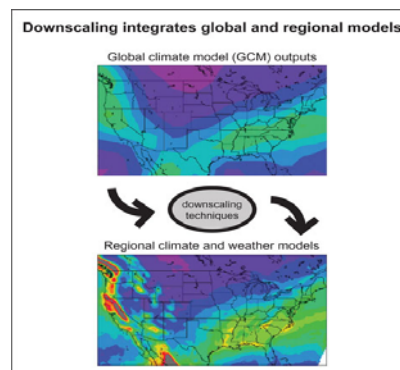
### VALUE - Validating and Integrating Downscaling Methods for Climate Change Research

#### Objectives

The main objective of the Action is to establish a network to systematically validate and improve downscaling methods for climate change research. The Action will assess the skill of various downscaling methods to represent temporal variability from sub-daily to decadal time scales including climate change; extreme events; spatial coherence and variability; and inter-variable consistency together with the related uncertainties. VALUE will in particular deliver an assessment of end user requirements, an inventory of downscaling methods, a set of validation measures and tailored guidelines for the use of downscaling methods. The validation will ultimately guide the development of improved local and regional-scale climate change scenarios for Europe for the 21st century, based upon the best performing downscaling methods.

#### Abstract

Our understanding of global climate change is mainly based on General Circulation Models (GCMs) with a relatively coarse resolution. Since climate change impacts are mainly experienced on regional scales, high-resolution climate change scenarios need to be derived from GCM simulations by downscaling. Validation of downscaling methods is crucial, but several aspects have not been systematically assessed: variability on sub-daily, decadal and longer time-scales, extreme events, spatial variability and inter-variable relationships. Different downscaling approaches such as dynamical downscaling, perfect prog statistical downscaling and model output statistics have not been systematically compared. Furthermore, collaboration between different communities, in particular regional climate modellers, statistical downscalers and statisticians has been limited. VALUE will provide a European network to validate and develop downscaling methods and improve the collaboration between the dispersed research communities and with stakeholders. The Action will systematically compare the different downscaling approaches and assess the aspects listed above. VALUE will deliver an assessment of end-user needs, a benchmark data set and pseudo reality for the validation, a set of validation measures, the validation of state-of-the-art methods and guidelines for stakeholders. It will guide the development of improved regional climate change scenarios for Europe and thereby be relevant for European societies and politics.



**Keywords:** Regional Climate Change; Regional Climate Models; Statistical Downscaling; Bias Correction; Validation; Pseudo Reality; Extreme Events; Sub-Daily Variability; Decadal Variability; Spatial Coherence; End User Needs

#### Working Groups

- WG1 Synthesis & Stakeholders
- WG2 Benchmark data set & pseudo reality
- WG3 Spatio-temporal variability Inter-variable relationships
- WG4 Extremes
- WG5 Sub-daily scales

**Interested Countries: 14**

Proposer: **DE**

AT, CH, CZ, DK,  
ES, FR, IT, NL,  
NO, PL, RO, SE,  
UK



## Action ES1103

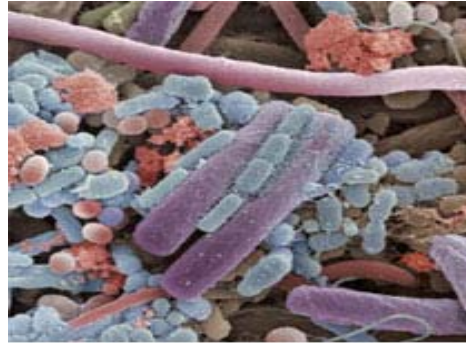
### Microbial ecology & the earth system: collaborating for insight and success with the new generation of sequencing tools

#### Objectives

The main objective of the Action is to lay the foundation for the systematic exploration of microbial diversity in the European Union by creating catalytic and synergistic interactions between the myriad individual national and transnational studies of microbial diversity using next generations sequencing and the skills of advanced theoreticians and other numerate scientists across Europe. The Action will secure or increase the quality of each individual study, ensuring that data is gathered, analysed and curated to agreed standards so that the results can be pooled and compared to generate new and collective theoretical insights and deeper and wider map of this frontier in Science.

#### Abstract

The microbial world is a vast frontier of intrinsic scientific importance and profound practical importance. The exploration of this frontier has been revolutionised by the introduction of molecular techniques. However, recent advances have only served to emphasise the enormity of the task before us. The improvements in sequencing technology have enormous implications for those at this frontier. Nevertheless description of this huge resource and the discovery of the rule governing its occurrence transcend the ability of not simply any one research group, but of any one nation. The purpose of this Action is to coordinate research groups across Europe to meet this challenge in the belief that if we agree upon common protocols and procedures we will share and pool knowledge to create a whole which is far greater than the sum of the parts. The Action will not only seek to document this frontier but to analyse it, to seek patterns, generate hypotheses and to test theories and thus deepen our knowledge. Perhaps most importantly of all, we will be preparing and enabling the next generation of researchers to use the next generation of technologies to ensure that Europe can lead the world in the exploration of this frontier.



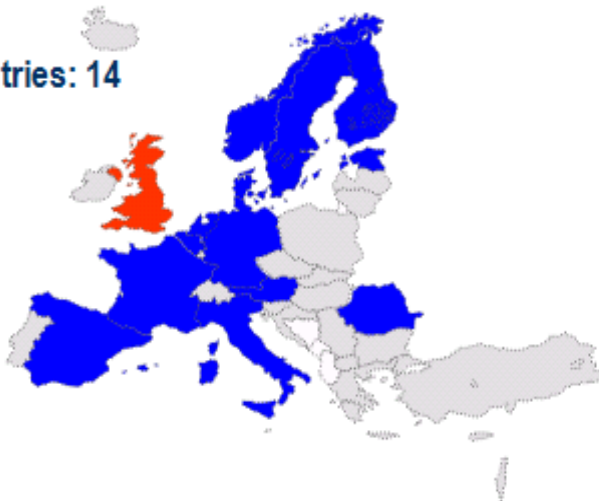
**Keywords:** Microbial diversity, Pyrosequencing, massively parallel sequencing, Pyronoise, bioinformatics, metagenomics, mathematical modelling

#### Working Groups

- WG1 Data Generation Protocols
- WG2 The analysis of raw data for diversity estimates
- WG3 The analysis of raw data for metagenomics, RNA expression and beyond
- WG4 Data comparison pooling and exploration
- WG5 Towards a systematic survey

#### Interested Countries: 14

Proposer: UK  
AT, BE, DE, DK,  
EE, ES, FI, FR,  
IT, NL, NO, RO,  
SE



## Action MP1101

### Bio-Plasma - Biomedical Applications of Atmospheric Pressure Plasma Technology

#### Objectives

Bio-Plasma will intensify the knowledge base relevant to medical and biomedical applications of atmospheric pressure plasma technology within Europe, and raise the general awareness of the potential of this technology via the establishment of a communication platform. The network will look towards early exploitation of plasma treatment techniques with enormous potential for patient care, particularly to reduce infection, enhance the speed of wound healing and treat cancer.

#### Abstract

Providing health care at tolerable cost is one of the greatest challenges facing the world in this century. Technologies that may offer enhanced quality of care at reduced cost, such as plasma technology, will be of immense societal and commercial value. This Action will focus on medical and biomedical applications of low-temperature, non-thermal atmospheric pressure plasmas, in fields including surface treatment of biomedical devices, sterilisation, and therapeutic techniques, such as wound sterilisation and cancer treatment. This is an interdisciplinary topic, involving clinicians, biologists, chemists and physicists, together with industrialists ready to exploit the results. The collective purpose of the participants in this Action is to develop synergistic links between their research programmes, and to take full advantage of the opportunities that follow to create a leadership position for Europe in this important emerging area.



**Keywords:** Plasma technology, biomedical applications, biofilms, sterilisation, therapeutic techniques, tumour suppression, biomaterials, plasma diagnostics, plasma chemistry, surface morphology, chemically functional surfaces

#### Working Groups

- WG1 Plasma therapeutics
- WG2 Functional coatings for biomaterials
- WG3 Bio-plasma interactions
- WG4 Plasma sources for biomedical applications

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

#### Interested Countries: 15

Proposer: IE  
BE, CH, DE, ES,  
FR, EL, IT, LU,  
NL, PL, RO, SI,  
TR, UK





## Action MP1102

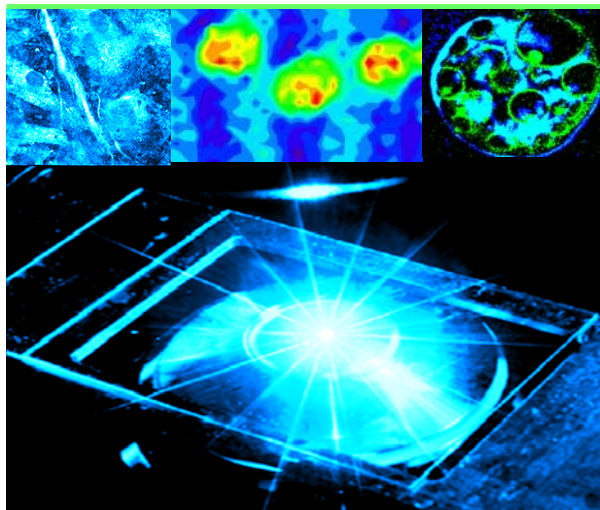
### microCoR – Chemical imaging by Coherent Raman Microscopy

#### Objectives

The aim of the Action is to establish active scientific exchange between European experts for the development and use of Coherent Raman (CoR) microscopy.

#### Abstract

The aim of the proposed Action is to establish active scientific exchange between European experts for the development of the emerging category of Coherent Raman (CoR) microscopy techniques – the optical correspondent to MRI, enabling non-invasive tomographic imaging of molecular species in innovative materials and living matter with high specificity at sub-wavelength resolution by probing natural molecular vibrations. Specifically we intend to: (i) offer networking opportunities for the scientific and technical communities of laser instrumentation, microscopy, spectroscopy, and ultrafast optics for efficient development of the broad range of technologies required for CoR microscopy; (ii) reach out to potential users within the material-, nano-, chemical-, bio- and life sciences to push CoR microscopy beyond proof-of-principle measurements, and (iii) to attract the interest of the next generation of promising scientists by outreach activities and thereby ascertain that Europe remain at the frontline of microscopy research in the increasing competition from Asia and America.



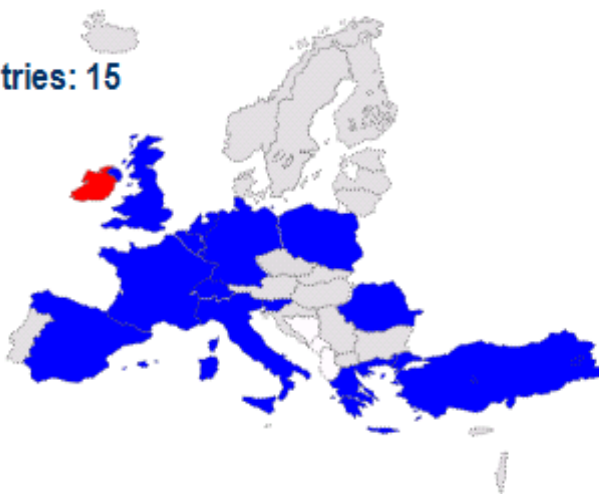
**Keywords:** molecular microscopy, nonlinear optics, vibrational spectroscopy, sub-diffractive imaging, soft- and living-matter characterization

#### Working Groups

- WG1 Fundamentals and technical development
- WG2 Applications within the material- nano- and chemical sciences
- WG3 Applications within the bio- and life sciences

#### Interested Countries: 15

Proposer: IE  
BE, CH, DE, ES,  
FR, EL, IT, LU,  
NL, PL, RO, SI,  
TR, UK



## Action MP1103

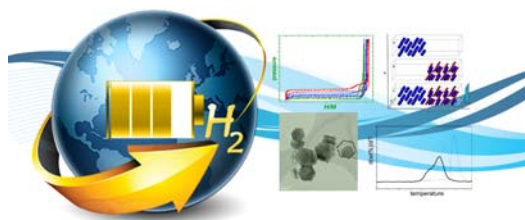
### NANOSTHYS - Nanostructured Materials for Solid-State Hydrogen Storage

#### Objectives

NANOSTHYS will develop innovative nanostructured materials that meet the targets for practical Solid-State Hydrogen Storage, creating the conditions for their adequate implementation in stationary and transport applications to sustain in medium-long terms the economies of European countries. Establishment of a pan-European and multidisciplinary research and communication platform that can develop the science and technology potential of SSHS, thus contributing actively to the regional and European economy and social welfare.

#### Abstract

NANOSTHYS deals with the future of energy storage and aims to set up a competitive and coordinated network capable to define new and unexplored ways for Solid-State Hydrogen Storage (SSHS) by innovative and interdisciplinary research. NANOSTHYS focuses on SSHS in light-weight nanostructured materials to discover novel guidelines and phenomena for the design of advanced SSHS systems exploiting synthesis techniques, structure analysis and computer simulations. The final goal is the development of SSHS materials with tailored properties that find practical implementation in transportation and energy sectors. NANOSTHYS contributes to form a critical mass of researchers in the field of SSHS materials, in order to overcome the present bottlenecks for their widespread industrial application.



**Keywords:** Hydrogen storage, nanostructured materials, high sensitivity characterization methods, computational simulations, stationary and transport applications

#### Working Groups

- WG1 Synthesis of novel materials with optimized properties
- WG2 High resolution and high sensitivity characterization of atomic level structure and of microstructural features
- WG3 Characterization of hydrogen storage properties both at the laboratory level and at the scale of prototype tanks
- WG4 Computational modeling of processes relevant to SSHS

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

#### Interested Countries: 16

Proposer: **IT**  
BE, CH, CZ, DE,  
DK, ES, FR, EL,  
HU, LT, NL, NO,  
PL, RO, RS



## Action MP1104

### Polarization as a tool to study the Solar System and beyond

#### Objectives

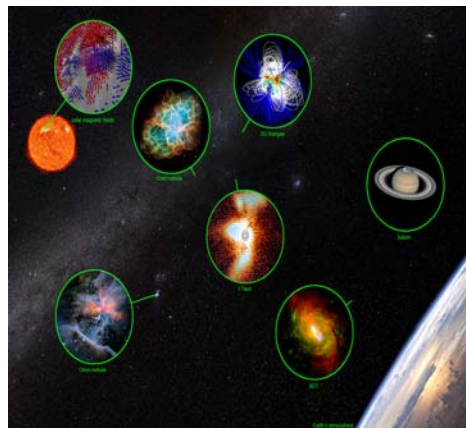
To promote polarimetry to advance knowledge about astrophysical objects within the Solar System and beyond.

#### Abstract

Polarization of light is a key observable to access essential information that lies encoded in the electromagnetic radiation reaching us from astronomical objects. Polarimetry is a powerful observational tool that complements the capabilities of imaging, photometry and spectroscopy in many fields of planetology and astrophysics.

In most research fields, notwithstanding some outstanding results, polarimetry is still too often overlooked. This Action will aim at promoting polarization as an invaluable tool to obtain a wealth of information about astrophysical bodies in our Solar System and beyond. With the benefit of the COST legitimacy, the Action will recommend to the European Space Agency, the European Southern Observatory, national space agencies, European industry and policy makers the development and addition of polarimeters in future ground-based observatories and space missions.

The current state of European polarization research faces a lack of interaction between communities working on different objects and/or in different wavelength domains. The Action will set up the first network of polarization experts in many disciplines and over a wide range of the electromagnetic spectrum, foster multi-wavelength and cross-disciplinary collaborations, and make Europe the world leader in all fields of polarimetric science.



**Keywords:** Polarization, planetology, astrophysics

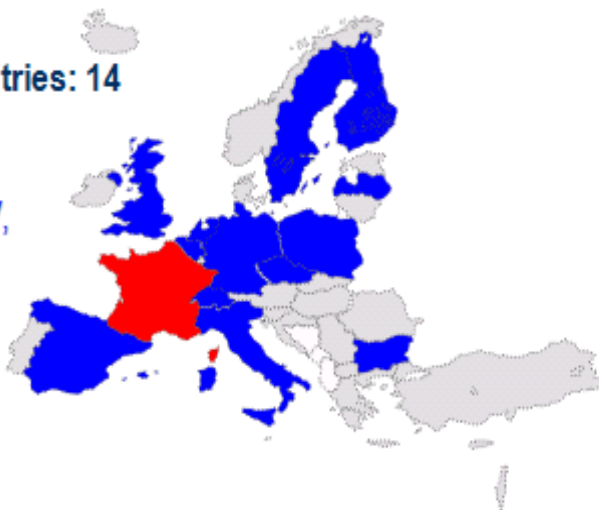
#### Working Groups

- WG1 Theory and modeling
- WG2 Observations
- WG3 Instrumentation
- WG4 Experimentation

**Non-COST participation:** Argentina, South Africa, Ukraine, USA

#### Interested Countries: 14

Proposer: **FR**  
**BE, BG, CH, CZ,**  
**DE, ES, FI, IT, LV,**  
**NL, PL, SE, UK**





## Action TD1103

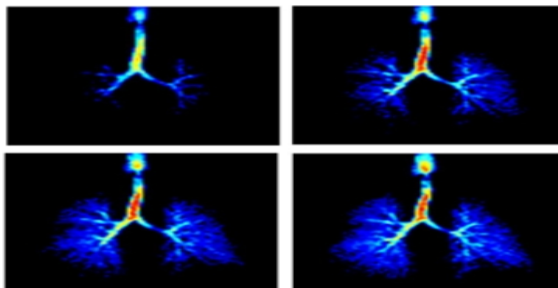
### European Network for Hyperpolarization Physics and Methodology in NMR and MRI

#### Objectives

The main objective of the Action is to develop and optimize robust strategies for the generation of spin hyperpolarization that provide a dramatic sensitivity increase of NMR spectroscopy and MR imaging experiments for a wide range of applications including medical diagnostics, molecular dynamics and structural investigations of biomolecules.

#### Abstract

Nuclear Magnetic Resonance (NMR) spectroscopy, microscopy and imaging techniques (MRI) play a crucial role in numerous fields of science ranging from physics, chemistry, material sciences, biology to medicine. However, despite all their versatility, the key issue is frequently sensitivity, which limits the applicability of NMR spectroscopy and imaging techniques in the case of fast dynamical processes and detection of low concentration molecules in both *in vitro* and *in vivo* applications. The Action aims to stimulate and accelerate collaborations and joint research efforts between European groups into hyperpolarization physics and methodology with the goal to develop robust strategies for sensitivity enhancement in NMR and MRI.



Hyperpolarized gases in the human lungs (J.Vild, University of Sheffield)

**Keywords:** Hyperpolarization, Nuclear Magnetic Resonance, Magnetic Resonance Imaging, Dynamic Nuclear Polarization, Sensitivity Enhancement

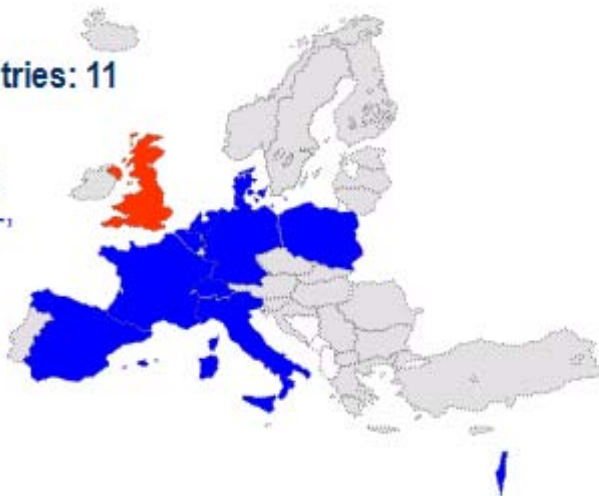
#### Working Groups

- WG1 Hardware and instrumentation for hyperpolarization
- WG2 Theoretical understanding of hyperpolarization strategies
- WG3 Strategies to minimise the effect of relaxation on spin hyperpolarization
- WG4 Strategies to maximise the information that can be acquired using hyperpolarized spin systems
- WG5 Synthetic chemistry - physics interface in hyperpolarization methodology

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

#### Interested Countries: 11

Proposer: UK  
BE, CH, DE, DK,  
ES, FR, IL, IT, NL,  
PL



## Action IS1101

### Climate Change and Migration: Knowledge, Law and Policy, and Theory

#### Objectives

The Action aims to enhance and improve understanding of climate change-induced migration by coordinating social science research activities across three related areas of investigation: knowledge, law and policy, and theory. This will be achieved by synthesizing existing knowledge across these three areas, advancing innovative interpretative frameworks, stimulating innovative questioning, methodologies and research, promoting specific projects, and disseminating the research to the widest possible array of stakeholders, including through peer-reviewed publications, a working paper series and direct engagement with policymakers through workshops and at least one side-event at a major UN conference. In addition, the Action will provide stakeholders with state-of-the-art research on climate change and migration and will inform the policy dialogue by addressing policy audiences at various levels, including the European Commission, national governments and international bodies.

#### Abstract

This Action brings together a diverse ensemble of established and early-stage social scientists to build upon and extend existing social science research into climate change and migration across three interrelated fields of investigation: knowledge; law and policy; and theory. The Action has five objectives: to enhance our understanding of climate change and migration; to provide state and non-state actors with state-of-the-art empirical, theoretical, legal and policy research on climate change and migration; to inform the national and international policy dialogue, such as the IPCC and other policy initiatives; to expand research capacity in the area of climate change and migration; and to establish a network of Europe-based social science researchers working on climate change and migration.



**Keywords:** migration, ethnicity, health, policy, implementation

#### Working Groups

- WG1 Empirical and methodological research issues specific to migration and climate change (computer modeling, remote sensing, field research and ethnography)
- WG2 Law and policy at the sub-national, national and international scales (policy sectors include immigration, development, humanitarian, environmental and security policy)
- WG3 Theoretical aspects of climate change and migration

**Non-COST participation:** Australia, Canada, India, International Organization for Migration

**Interested Countries: 9**

Proposer: **UK**  
**CH, DE, ES, FI,**  
**FR, NL, NO, SE**



## Action IS1102

### **SOCIAL SERVICES, WELFARE STATE AND PLACES. The restructuring of social services in Europe and its impacts on social and territorial cohesion and governance (SO.S.COHESSION)**

#### **Objectives**

The aim of the Action is to share and compare knowledge about the features and effects of the recent restructuring of social services in different national/regional contexts from five points of view: efficiency; democratic governance; social and territorial cohesion; the labour market; gender, with a view to identifying regulatory conditions, organisational configurations, and actual practices that maximise benefits from some or all mentioned points of view, thereby contributing recommendations to establish basic common European social policy guidelines. Among social services, the Action will especially focus on care services. This general objective will be pursued by building a flexible and open network for the structured exchange of comparative knowledge, analytical methodologies and research findings.

#### **Abstract**

In the last 20 years social services have experienced significant restructuring throughout Europe (involving cuts in public funding, devolution to local governments, externalisation to private providers). The fiscal crisis of states (on the supply side) and the need to ensure greater efficiency, wider consumer choice and more democratic governance (on the demand side) are among the reasons for such changes. The recent global financial crisis and the awareness that social services are a major vehicle of social and territorial cohesion have brought social services back on the EU agenda. The COST frame will allow existing knowledge to be shared and valorised within a structured comparative framework, with a view to disseminating findings at the local and international scale and to identifying inputs for a European social policy platform.



**Keywords:** Social services, welfare regimes, restructuring, social and territorial cohesion, social innovation.

#### **Working Groups**

- WG1 Comparison of regulatory frameworks and organizational trajectories in social services.
- WG2 Analysis of the effects of changes in care services.
- WG3 Comparative assessment of good practices, to provide policy inputs.

**Interested Countries: 9**

Proposer: **UK**

**CH, DE, ES, FI,  
FR, NL, NO, SE**



## Action IS1103

### Adapting European health systems to diversity (ADAPT)

#### Objectives

The aim of ADAPT is to identify obstacles to translating into action the existing body of knowledge concerning health and health-care inequalities among migrants and ethnic minorities, and to propose ways of overcoming these obstacles. Deliverables will in most cases consist of publications. As a means to ensure the influence of the Action on policy, policy makers and health service managers will be invited to participate to Action meetings, together with representatives of migrant and ethnic minorities. One or more conferences will be held to disseminate the results of the Action.

#### Abstract

European societies are becoming ethnically and culturally more diverse, yet their health systems are failing to keep pace. This Action aims to promote the adoption and implementation of policies responding to this increased diversity. It builds on the achievements of COST Action IS0603 Health and Social Care for Migrants and Ethnic Minorities (HOME), which reviewed health inequalities among migrants and ethnic minorities as well as the measures designed to remedy them. ADAPT will take this work forward, identifying obstacles to translating this knowledge into action as well as 'levers for change'. Interdisciplinary teams will identify bottlenecks and missed opportunities, while the pan-European nature of COST will provide a unique opportunity to identify the factors driving policy and implementation. The results will have implications for effective policy making and organisational change, not only in health but also in other fields of public policy.

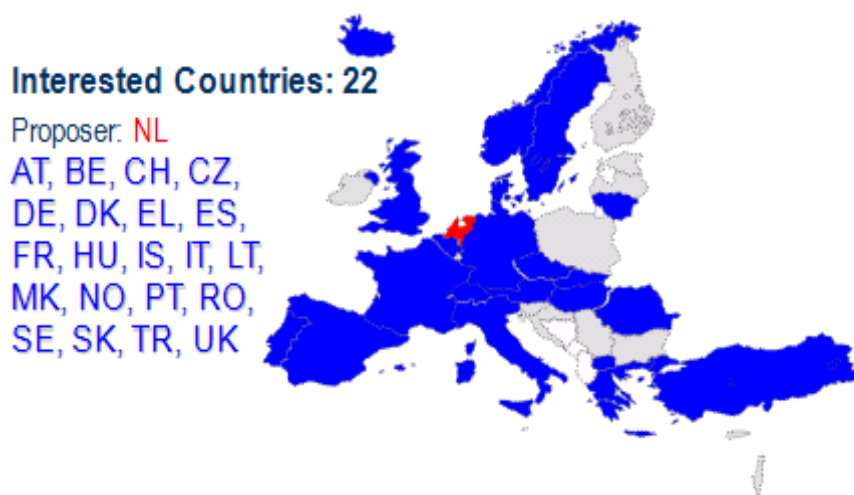


**Keywords:** migration, ethnicity, health, policy, implementation

#### Working Groups

- WG1 Reviewing policies and their implementation in each country and investigating the sources of variation in policies and practices
- WG2 Strengthening the evidence base, strategies for organizational change, public health principles and professional standards and user involvement
- WG3 Human rights arguments and policies concerning migration and diversity
- WG4 Economic arguments and socio-economic inequalities

**Non-COST participation:** International Organization for Migration, World Health Organization





## Action IC1101

### Optical Wireless Communications - An Emerging Technology (OPTICWISE)

#### Objectives

The aim of OPTICWISE is to increase the scientific understanding and technical knowledge of the emerging field of OWC by exploring and developing novel methods, models, techniques, strategies and tools in infrared, visible and ultraviolet spectral bands that will facilitate the implementation of future generations of OWC systems. The resulting high-performance, high-reliability, ultra-fast, power-efficient, and low-cost OWC systems are envisioned as an indispensable part of a future wireless eco-system. OPTICWISE will help establish OWC as a mature communication technology and present a powerful alternative and/or complement to existing technologies in a diverse range of communication applications. OPTICWISE will serve as an internationally recognized reference point through capacity building of OWC stakeholders. It will educate and influence decision makers at all levels of the OWC market chain and lead trends in emerging OWC applications to increase the awareness on OWC. It will also provide training opportunities for graduate students and early-stage researchers (ESRs).

#### Abstract

Wireless transmission via optical carriers opens doors of opportunity in areas as yet largely unexplored. Offering significant technical and operational advantages, optical wireless communication (OWC) can be, in some applications, a powerful alternative to and, in others, complementary to existing radio frequency (RF) wireless systems. Variations of OWC can be employed in a diverse range of communication applications ranging from very short-range (on the order of millimetres) optical interconnects within integrated circuits through outdoor inter-building links (on the order of kilometres) to satellite links (larger than 10,000 kilometres). In many respects, OWC research is still in its infancy and calls for extensive research to begin to harness the enormous potential of the optical spectrum. This COST Action will serve as a high-profile consolidated European scientific platform for interdisciplinary OWC research activities, spanning from characterization of diverse propagation media to modelling, design and development of devices, components, algorithms/protocols and systems. It will make significant contributions to the fundamental scientific understanding, technical knowledge, engineering design and applications while promoting community awareness of this emerging field. Development of novel and efficient communication technologies resulting from integrated research activities made possible through this Action will be a significant enabler for future-generation heterogeneous communication networks supporting a wide range of wireless services/applications.



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**Keywords:** Optical Wireless Communication, Wireless Communication Technologies, Propagation Modelling and Channel Characterization, Physical Layer Algorithms and Networking Protocols, Photonic Components

#### Working Groups

- WG1 Propagation Modelling and Channel Characterization
- WG2 Physical Layer Algorithm Design and Verification
- WG3 Networking Protocols
- WG4 Advanced Photonic Components

**Interested Countries: 12**

Proposer: **TR**  
**AT, BE, CZ, DE,**  
**EL, ES, FR, IL, IT,**  
**PT, UK**



## Action IC1102

### Versatile, Integrated, and Signal-aware Technologies for Antennas (VISTA)

#### Objectives

The main objective is to assist and coordinate research in the field of integrated and versatile antennas for wireless applications, by bringing together experts from the distinct areas of radio, RF and microwave engineering, as well as related topics such as signal processing or (micro) fabrication techniques. This will foster the development of innovative radiating systems devoted to communication and sensing, as well as their supporting technologies.

#### Abstract

Communications and sensing in varying wireless environments require resilient, adaptive antenna systems for reliable data transmission and seamless access to various infrastructures. The emergence of new technologies in radio coding and the need for more efficient use of the spectral and energy resources shifts antenna system design towards cross-disciplinary approaches, covering electromagnetic field theory, RF engineering, signal processing, integrated fabrication technologies and even micro- and nano-technologies. With these new challenges, it is vital to review the existing expertise and direct efforts in the right direction. This Action identifies key research topics, facilitating the networking and coordination between different R&D teams. The objectives are to assess the needs for new technologies and applications, to foster the development of radiating systems in green, smart environments, to provide the necessary supporting technologies and to promote the career start of young researchers.



**Keywords:** Antennas & sensors, enabling & supporting technologies, energy efficiency, situation aware embedded devices, reconfigurable & agile frontends

#### Working Groups

- WG1 Application & requirements for future wireless systems
- WG2 Enabling technologies and integration
- WG3 Supporting technologies: modelling and characterisation
- WG4 Societal aspects and ESR support

#### Interested Countries: 22

Proposer: DE

BE, BG, CH, CY,  
CZ, DK, EL, ES,  
FI, FR, HR, IE, IL,  
IT, NL, PL, PT,  
RO, SE, TR, UK



## Action IC1103

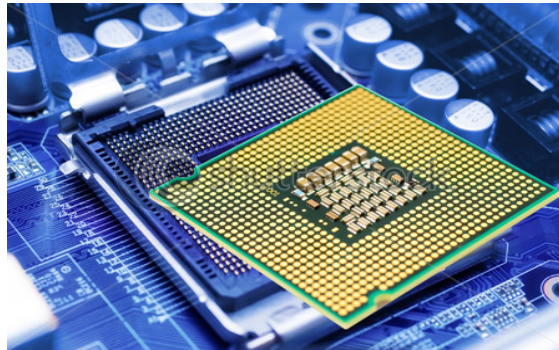
### Manufacturable and Dependable Multicore Architectures at Nanoscale

#### Objectives

The aim is to create a strong network of European competences and expertise on design, manufacturing, testing, and validation issues of dependable multicore processors at nanoscale, promoting collaboration between industry and research.

#### Abstract

Constant advances in manufacturing yield and field reliability are important enabling factors for electronic devices pervading our lives, from medical to consumer electronics, from railways to the automotive and avionics sectors. At the same time, both technology and architectures are today at a turning point; many ideas are being proposed to postpone the end of Moore's law such as extending CMOS technology as well as finding alternatives to it like CNTFET, QCA, memristors, etc, while at the architectural level, the spin towards higher frequencies and aggressive dynamic instruction scheduling has been replaced by the trend of including many simpler cores on a single die. These paradigm shifts imply new dependability issues and thus require a rethinking of design, manufacturing, testing, and validation of reliable next-generation systems. These manufacturability and dependability issues will be resolved efficiently only if a cross-layer approach that takes into account technology, circuit and architectural aspects will be developed.



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**Keywords:** Manufacturability, reliability, dependability, fault tolerance, nanoscale, testing, multicore architectures

#### Working Groups

- WG1 Methodologies and techniques for manufacturing reliable nanoscale devices
- WG2 System level design, on-line testing/fault tolerance
- WG3 Verification and Validation/Debug Methodologies
- WG4 Fault tolerance for space applications
- WG5 Fault tolerance for transportation systems
- WG6 Fault tolerance for medical devices

**Non-COST participation:** USA

#### Interested Countries: 15

Proposer: **IT**  
BE, CH, CY, CZ,  
DE, EE, EL, ES,  
FR, IE, NL, SE,  
TR, UK



## Action TU1101

### Towards safer bicycling through optimization of bicycle helmets and usage

#### Objectives

The main objectives of this Action is to increase scientific knowledge concerning bicycle helmets in regards to traffic safety and to disseminate this knowledge to stakeholders, including cyclists, legislators, manufacturers, and the scientific community. An additional aim is to stimulate international collaboration within the domain of this Action. The Action focuses on head protection in the event of an accident and also on preventing accidents from occurring. The participation of experts in the primary scientific fields dealing with helmet function and bicycle traffic safety, on a European scale, is the basis of this unique, integral approach.

#### Abstract

Cycling is an excellent sustainable alternative to driving for many journeys. However, cyclists have fewer safety options than car-users, with a helmet being the main safety device that is available. Nonetheless, there are strong indications that increasing bicycle helmet usage for cyclists through legislation causes confounding factors which might cancel out the positive effect of helmets on head and brain injury. Furthermore, current helmet design is suboptimal. Since several fields are important to bicycle helmet optimization, a combined effort involving all of these is necessary so that a given parameter is not optimized at the cost of another. Finally, the attitudes of cyclists towards helmets must be considered if helmet usage is to be changed. This multidisciplinary approach respects the complex nature of the issue, is unique in Europe, and will provide more complete information to legislators, manufacturers, end-users, and scientists, ultimately leading to increased safety for cyclists.



**Keywords:** Bicycle helmets, In-depth accident observations and injury statistics, Traffic psychology, Impact engineering, Ergonomics

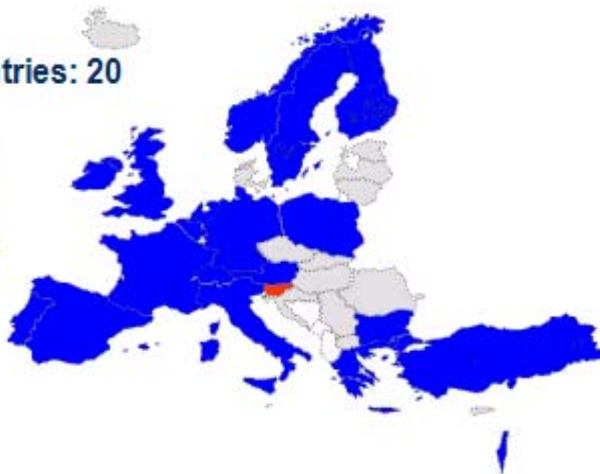
#### Working Groups

- WG1 In-depth accident observations and injury statistics
- WG2 Traffic psychology
- WG3 Impact engineering
- WG4 Ergonomics of thermal aspects

#### Interested Countries: 20

Proposer: SI

AT, BE, BG, CH,  
DE, ES, FI, FR,  
EL, IE, IL, IT, NL,  
NO, PL, PT, SE,  
TR, UK





## TU1102

### ARTS - Towards Autonomic Road Transport Support Systems

#### Objectives

ARTS will unite and align groups from transport studies, computer science and engineering into a world leading research community that will develop radically new ways of designing road transportation support systems based on the ideas of autonomic systems.

#### Abstract

A current, well recognised societal problem is the frequent failure of road transportation networks, resulting from traffic incidents, system overloading and lack of optimised support systems. If used as a platform on which to implement leading edge road transport support (RTS) technologies, Autonomic Systems have the potential to deliver savings in the cost of system configuration, maintenance, and infrastructure, while potentially improving network efficiency and reducing the chances of human error. Using an autonomic approach to RTS is a novel and very ambitious idea requiring interdisciplinary community building, hence the need for a European-wide network. This Action will bring together disparate strands of research into an integrated discipline, putting Europe at the leading edge of autonomic RTS development, and will deliver a transformative change within the field of autonomic systems.

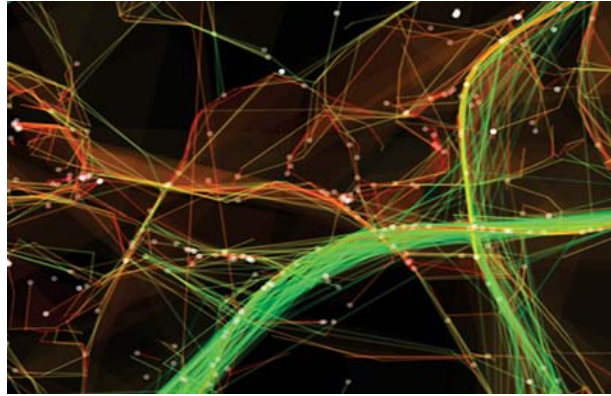


Image by permission of Pedro Miguel Cruz, P. Machado, J. Bicker

**Keywords:** Intelligent Transportation Systems, Road Transportation Support, Autonomic Systems

#### Working Groups

- WG1 Architecture, Methods and Models
- WG2 Exploiting the results of previous research and technological development
- WG3 External Factors, Environmental Benefits and Application Scope
- WG4 Human Interaction and Human Factors

#### Interested Countries: 14

Proposer: **UK**  
**BE, BG, CZ, DE,**  
**ES, FI, FR, EL,**  
**IE, IT, NL, PT, SE**



## Action TU1103

### Operation and safety of tramways in interaction with public space

#### Objectives

The main objective of the Action is to improve tram and Light Rail Transit (LRT) safety, through a better management of their insertion in urban spaces, and therefore to minimize accidents and their impacts on both transport system and society.

#### Abstract

The Light Rail Transit (LRT) is spread in many countries all over the world, and particularly in Europe. Some historical networks have a very long experience and others are (re)discovering LRTs with a high disparity in terms of institutional and economic contexts, safety management, operational monitoring and technical choices.

In this context, the Action aims at improving LRT safety and reducing the impact of their conflicts with other public space users. This can be achieved by sharing European experiences on LRTs' accidents and their interaction with public space, practices and operating methods, taking into account the different cultural and historical contexts. Through exchanges with other LRT specialists on available data and results, analysis and comparisons on accident and incident data, the Action will allow to give the greatest safety benefits at best costs.

This Action is built on a bottom-up approach in order to give practical results and solutions to operators and authorities. Beyond internal exchanges, communication and dissemination of outcomes by various means (guidelines, recommendations, website...) will allow to reach most concerned actors at the European level. It will also encourage a common approach and possible transpositions of some good practices in a context of internationalisation.



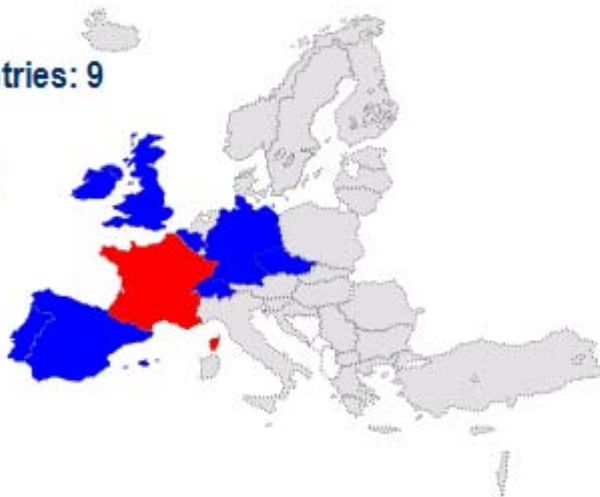
**Keywords:** light rail transit, tram, safety, urban insertion, accidents

#### Working Groups

- WG1 Institutional and regulatory aspects, data collection (state level) - State of the art and context exploration
- WG2 Data collection on accidents (national and local level) - State of the art and context exploration
- WG3 Infrastructure design - State of the art and context exploration
- WG4 Data collection, monitoring and evaluation tools – Comparison / analysis / best practices ; Prospects and recommendations
- WG5 Accident scenarios, tramlines design and operating methods - Comparison / analysis / best practices ; Prospects and recommendations

#### Interested Countries: 9

Proposer: FR  
BE, CH, CZ, DE,  
ES, IE, PT, UK



# Participation of Non-COST countries

## Life Sciences Cluster

### Biomedicine and Molecular Biosciences (BMBS)

BM1102 – Canada (CA), China (CN), Japan (JP), Russia (RU), Ukraine (UA), USA (US).....	6
TD1101 – China (CN), Japan (JP), Taiwan (TW).....	9

### Food and Agriculture (FA)

FA1101 – Azerbaijan (AZ), Egypt (EG), India (IN) .....	10
FA1102 – Australia (AU); Brazil (BR), Canada (CA), New Zealand (NZ), USA (US), Uruguay (UY) .....	11
FA1103 – Ukraine (UA), USA (US) .....	12

### Forests, their Products and Services (FPS)

FP1101 – Australia (AU), Canada (CA) .....	13
FP1102 – Belarus (BY), Canada (CA), New Zealand (NZ), Russia (RU), South Africa (ZA), Ukraine (UA).....	14

## Natural Sciences Cluster

### Chemistry and Molecular Sciences and Technologies (CMST)

CM1101 – Australia (AU), China (CN), Egypt (EG), India (IN), Palestine (PS), Russia (RU), Ukraine (UA).....	15
CM1103 – Australia (AU), USA (US) .....	17

### Earth System Science and Environmental Management (ESSEM)

ES1101 – Australia (AU), Canada (CA), USA (US).....	19
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### Materials, Physical and Nanosciences (MPNS)

MP1101 – Australia (AU), Canada (CA), Japan (JP), Russia (RU), USA (US) .....	22
MP1103 – Australia (AU), Canada (CA), India (IN) .....	24
MP1104 – Argentina (AR), South Africa (ZA), Ukraine (UA), USA (US).....	25
TD1103 – New Zealand (NZ), Russia (RU) .....	26

## Science in Society Cluster

### Individuals, Societies, Cultures and Health (ISCH)

IS1101 – Australia (AU), Canada (CA), India (IN), International Organization for Migration.....	27
IS1103 – International Organization for Migration, World Health Organization .....	29

### Information and Communication Technologies (ICT)

IC1103 – USA (US) .....	32
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