

COST & MPNS

European <u>COoperation in Science and Technology</u> & the <u>Materials</u>, <u>Physics and NanoSciences Domain</u>

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Presentation overview

- Introduction to COST
- MPNS Domain Scope & Portfolio
- COST Strategic Workshops & Conferences
- Action Dissemination



COST Mission

COST enables break-through scientific developments leading to new concepts and products and thereby contributes to strengthen Europe's research and innovation capacities

COST is a unique means for European researchers to jointly develop their own ideas and new initiatives across all scientific disciplines through trans-European networking of nationally funded research activities.

COST Strategy June 2011 renewing our strengths shaping our future COST CSO Document **COST 4157/11**

COST Mission

Building the ERA

- Enhance research progress through creation of new international networks
- Connect scientists with policy-makers, governmental + regulatory bodies
- Foster innovation through technology transfer (academia, spin-offs, industry)
- Build capacity through inclusive participation (trans-disciplinary)



A brief history

- Oldest and widest running European intergovernmental network for cooperation in research in Europe
- Established by Ministerial Conference of 19 European States in 1971, Brussels, as a Framework for coordinating nationally funded research in Europe, pre-dates
- Predates 1974 European Science Foundation; 1983 First Framework Programme; 1985 Eureka Programme
- From 19 countries in 1971 to currently 36 COST countries with 1 cooperating state & International organizations and research institutions from non-COST countries
- From 7 Actions in 1971 to over 270 Actions running in 2010, networked research projects
- From 7 Domains in 1971 to 9 Domains plus a trans-domain

COST Features

- Open to global cooperation
 mutual interest
- Enabling Early Stage Researchers
- Pan-European intergovernmental
- Light-weight administration
- Flexible implementation

- Science driven topics
 "Bottom-up"
- Inclusive à la carte participation
- Bridging research communities – multidisciplinary
- Coordinating national research funding
- Public utility pre-normative research
- Pre-competitive technology - industry

COST Structure



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9 COST Domains

- Biomedicine and Molecular Biosciences (BMBS)
 - Chemistry and Molecular Sciences & Technologies (CMST)
- Earth System Science & Environmental Management
 (ESSEM)
- Food & Agriculture (FA)

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- Forests, their Products and Services (FPS)
 - Individuals, Society, Culture & Health (ISCH)
 - Information & Communication Technologies (ICT)
- Materials, Physics & Nanosciences (MPNS)
- Transport & Urban Development (TUD)

+ Trans-Disciplinary Proposals can be submitted to Open Calls

COST Countries



- The 27 EU Member States
- EFTA Member States
 - Iceland
 - Norway
 - Switzerland
- EU Acceding & Candidate Countries
 - Croatia
 - Former Yugoslav Republic of Macedonia
 - Turkey
- EU Potential Candidate Countries
 - Bosnia and Herzegovina
 - Republic of Serbia
- COST Cooperating States
 - Israel



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COST Actions – Global participation



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COST Action Life Cycle





Assessment criteria – Preliminary Proposals

l.1	RIGHT FOR COST?	yes no
	Is COST the best mechanism for achieving the Action's objectives?	rrrrr
		654321
I.2	PUBLIC UTILITY/SCIENCE	yes no
	Does the proposed Action address real current problems/ scientific issues?	rrrrr
		654321
I.3	INNOVATION	yes no
	Is the proposed Action innovative?	rrrrr
		654321
1.4	IMPACT	yes no
	Would the proposed network make a significant difference in terms of knowledge, capacity	rrrrr
	building, social impacts, etc?	654321
l.5	NETWORKING	yes no
	Are networking aspects well motivated and developed in the proposal?	rrrrr
		654321
I.6	PRESENTATION	yes no
	Is the proposed Action presented in a clear, rational and understandable	rrrrr
	way?	654321

Assessment criteria – Full Proposals

А	SCIENCE AND NETWORKING	
	Does the proposed Action address real current problems/scientific issues?	
	Does the proposed Action show awareness of the state-of-the-art of the relevant scientific/technical/socio-economic fields?	
	Is the proposed Action innovative?	
	Does the proposed Action answer a need for the networking of experts in the field?	Total = 32
В	IMPACT	
	A COST Action may make impacts in various valuable directions. This Action mainly aims at impacts in : (1) meeting European economic or societal needs [YES] [NO] If YES go to B.1A	
	(2) developing the scientific or technological field [YES] [NO] If YES go to B.1B (3) both (1) and (2) [YES] [NO] If YES go to B.1C	
	Are there clear plans for stimulating the production of high quality outputs?	
	Is attention given to the involvement of stakeholders in order to increase the potential application of results (including, where appropriate, fostering their commercial exploitation)?	24
С	STRUCTURE AND ORGANISATION	
	Is the proposal presented in a clear, convincing, and appropriate way?	
	Are the workplan and organisation appropriate?	
	Are the time schedule and the setting of milestones appropriate?	
	Are appropriate plans made for monitoring and evaluating the achievement of objectives?	16
D	CONTRIBUTION TO WIDER COST GOALS	
	How well does the proposed Action aim to involve early stage researchers?	
	How well does the proposed Action aim at gender balance?	
	Does the proposed Action have the potential to contribute to the	
	solution of global challenges in a global dimension?	3

COST Action

- Network of (nationally) funded projects
- Based on a joint work programme for 4 years
- At least 5 countries (average 20 countries)
- Across 9 Domains or interdisciplinary (transdomain)
- COST funds networking activities



COST Action activities

- Science management meetings
- Working Group meetings
- Scientific workshops & seminars
- Training schools
- Scientific Exchange Visits (STSMs)
- Dissemination + publications

Exploratory + strategic Workshops: to explore future scientific or societal needs, support policy developments or stimulate innovative activities

COST – Statistics 2010



- 269 COST Actions
- > 1000 scientific workshops and meetings > 30 000 participants
- 1250 STSMs ~ 3 weeks
- > 90 Training Schools > 1200 participants
- > 100 high ranking publications



COST Vision



- Develop into THE research networking instrument for the ERA
 - Bottom-up complementary to EU FP
 - Trans-disciplinary stimulate innovative research
 - Pre-competitive attractive for companies
 - Flexible suit researchers' creativity
 - International open to the world
 - Strategic connect with member states' strategies (JPIs, early weak signals)
 - Efficient best practice in network funding
 - Inclusive entry for ESRs, à la carte participation

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Materials, Physics & Nanosciences Domain (MPNS) http://www.cost.eu/domains_actions/mpns

- Description: The Domain is home to material science, extending from conception through to production including characterization, examination, evaluation, fabrication and development, to actual application and service, as well as related databases, codes, standards and inspections. The Domain thus also incorporates nanomaterials and nanosciences and the nanotechnological applications thereof. It also supports exploratory basic and applied research in physics, theoretical and experimental, as a key to understanding the laws governing the behaviour of matter and energy.
- History:

1971 Domain "Materials"; 1997 Domain "Physics" ; 2006 Domain MPNS; 2010 Materials, Physical & Nanosciences became Materials, Physics & Nanosciences

• Sept. 2011 - 23 running MPNS Actions, 5 on standby

MPNS Domain Scope

- New developments in industrial technology requiring the development, characterisation and production of new materials and providing solutions for sectors such as energy, transport, telecommunications, informatics and health. Example Action MP0602 Advanced Solder Materials for High Temperature Application (HISOLD)
- **Technology-Driven Physics** underpinning many industries and technological processes and contributing to the development of new materials and a broad variety of new devices for areas such as optics and plasma or surface physics. **Example** Action MP0804 Highly Ionised Pulse Plasma Processes
- Physics and the Human Condition for Actions studying the relationships between physics and the environment, medicine or biology.
 Example Action MP1002 Nano-IBCT– Nanoscale Insights into Ion Beam Cancer Therapy
- Emerging Technologies in the hydrogen, solar and bio- related sectors, which also trigger innovative progress in conventional sectors such as power generation, transport, aerospace and lighting. Example Action 543 Research and Development of Bioethanol Processing for Fue₂₀Cells (BIOETHANOL)

MPNS Domain Scope

- **Cultural Heritage** in which the most fundamental questions as to the structure of matter, birth of the universe and the origin of life are considered in addition to Actions focusing on the restoration and conservation of ancient architecture, the built environment and historical artifacts. **Example** Action IE0601 Wood Science for Conservation of Cultural Heritage (WoodCultHer)
- **Multidisciplinary Research**: The Domain maintains close interaction with other COST Domains on wide-ranging issues such as the environment, global warming and social aspects of nanotechnology. By recognising the huge potential of Nanosciences in such different areas, the Domain encourages multidisciplinary Actions and cooperates especially closely with BMBS, CMST and ICT. Therefore, new ideas and initiatives are welcome as well as those with high interdisciplinary elements and close links and overlaps with other Domains. **Example** Action TD0906 Biological Adhesives: From Biology to Biomimetics



MPNS COST Actions ending 2012-2013

- MP0701 | Composites with Novel Functional and Structural Properties by Nanoscale Materials (Nano Composite Materials-NCM)
- MP0801 | Physics of Competition and Conflicts
- MP0802 | Self-assembled Guanosine Structures for Molecular Electronic Devices
- MP0803 | Plasmonic Components and Devices
- MP0804 | Highly Ionised Pulse Plasma Processes
- MP0805 | Novel Gain Materials and Devices Based on III-V-N Compounds
- MP0806 | Particles in turbulence
- MP0901 | Designing Novel Materials for Nanodevices from Theory to Practice (NanoTP)
- MP0902 | Composites of Inorganic Nanotubes and Polymers (COINAPO)

MPNS COST Actions ending 2014-2015

- MP0903 | NANOALLOY Nanoalloys as Advanced Materials: From Structure to Properties and Applications
- MP0904 | SIMUFER: Single- and Multiphase Ferroics and Multiferroics with Restricted Geometries
- MP0905 | Black Holes (BH) in a Violent Universe
- TD0906 | Biological Adhesives: From Biology to Biomimetics
- MP1002 | Nano-IBCT– Nanoscale Insights into Ion Beam Cancer Therapy
- MP1003 | ESNAM European Scientific Network For Artificial Muscles
- MP1004 | Hybrid Energy Storage Devices and Systems for Mobile and Stationary Applications (Hybrid-ES)
- MP1005 | From nano to macro biomaterials (design, processing, characterization, modeling) and applications to stem cells regenerative orthopaedic and dental medicine (NAMABIO)
- MP1006 | Fundamental Problems in Quantum Physics (FPQP)
- TD1007 (MPNS, CMST, BMBS) | Bimodal PET-MRI molecular imaging technologies and applications for in vivo monitoring of disease and biological processes

oc-2010-2, New Actions

- MP1101- Biomedical Applications of Atmospheric Pressure Plasma Technology
- MP1102 Chemical imaging by Coherent Raman microscopy (microCoR)
- MP1103 Nanostructured materials for solid-state hydrogen storage
- MP1104 Polarization as a tool to study the Solar System and beyond
- TD1103 (MPNS, CMST, BMBS) European Network for Hyperpolarization Physics and Methodology in NMR and MRI

For details see Action websites http://www.cost.eu/domains_actions/mpns/Actions



MP1101 Biomedical Applications of Atmospheric Pressure Plasma Technology

Objective

to promote research on and use of medical and biomedical applications of atmospheric pressure plasma technology



Non-COST participation: AU, CA, JP, RU, US



WG1	Plasma therapeutics
WG3	Bio-plasma interactions
WG4	Plasma sources for biomedical applications

MP1102 Chemical imaging by Coherent Raman microscopy (microCoR)

Objective

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





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

MP1103 NANOSTHYS - Nanostructured Materials for Solid-State Hydrogen Storage

Objective

to develop innovative nanostructured materials that meet the targets for practical Solid State Hydrogen Storage for their adequate implementation in stationary and transport applications





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
L	processes relevant to SSHS

MP1104 Polarization as a tool to study the Solar System and beyond

Objective

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





WG1	Theory and modeling
WG2	Observations
WG3	Instrumentation
WG4	Experimentation

TD1103 European Network on Hyperpolarization Physics and Methodology in NMR and MRI

Objective

to develop and optimize robust strategies for the generation of spin hyperpolarization that provide a dramatic sensitivity increase of NMR techniques for a wide range of applications including medical diagnostics, molecular dynamics and structural investigations of biomolecules





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

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

oc-2010-2, New Actions on standby

- **MP1105** Sustainable flame retardancy for textiles and related materials based on nanoparticles substituting conventional chemicals. (Acronym : FLARETEX)
- **MP1106** Smart and green interfaces from single bubbles and drops to industrial, environmental and biomedical applications (SGI)

For details see Action websites http://www.cost.eu/domains_actions/mpns/Actions Contact your CNC to join the MC 1st MC and Kick-Off meetings in May 2012



MP1105 FLARETEX

Sustainable flame retardancy for textiles and related materials based on nanoparticles substituting conventional chemicals

Objective

to form a European multidisciplinary Knowledge Platform on Sustainable Flame Retardancy to facilitate the rapid development of fire safe textiles and related materials of low toxicity and ecotoxicity, using all the available technologies.





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MP1106 SGI

Smart and Green Interfaces: from single bubbles/drops to industrial/environmental/biomedical applications

Objective

to organize a Europe-wide interdisciplinary cooperation platform directed towards scientific added value and improvement of applications concerning highly efficient, adaptive, selective and eco-friendly interfaces.



WG1	Fundamentals
WG2	Materials
WG3	Diagnostics
WG4	Technology

Theodoros Karapantsios karapant@chem.auth.gr





Quantitative Nanostructure-Toxicity Relationships (QNTR) 3-6 April 2011, The Vaeshartelt Castle (near Maastricht), The Netherlands

The **aim** of the workshop is to bring together leaders in the emerging field of computational nanotoxicology to form an international Community of Practice for accelerated development of the science of QNTR. The workshop involves policy makers, relevant COST Actions as well as experts from institutions, ranging from the European Commission's Joint Research Centre to the Australian Commonwealth Scientific & Industrial Research Organisation.

The deliverables from the workshop are

• a 10-year plan defining steps to produce software based on QNTR for predicting the health effects of manufactured nanomaterials, useful for regulation and industry (to be written as a peer-reviewed publication);

• and a COST Action to support the international Community of Practice, specifically by exchange of staff between key laboratories, to fast-track international efforts in QNTR.

More Information http://www.cost.esf.org/events/qntr

Workshop Chair Maxine McCall Commonwealth Scientific & Industrial Research Organisation, AU

Steering Committee Frederic Bois

Institut National de l'Environnement et des Risques Industriels, FR **Bengt Fedeel** Karolinska Institute, SE Antonio Pietroiusti Università Tor Vergata, IT Lang Tran Institute of Occupational Medicine, UK **Caroline Whelan** Lucia Forzi COST Office, BE **Dave Winkler** Computational Modelling, Commonwealth Scientific & Industrial Research Organisation, AU **Andrew Worth** Institute for Health & Consumer Protection, European Commission's Joint Research Centre, IT

Graphita Workshop 15-18 May 2011, GRAN SASSO NATIONAL LABORATORIES ASSERGI (L'AQUILA), ITALY

A MULTIDISCIPLINARY AND INTERSECTORIAL EUROPEAN WORKSHOP ON SYNTHESIS, CHARACTERIZATION AND TECHNOLOGICAL EXPLOITATION OF GRAPHENE

Special Opening Lecture by Nobel Prize 2010 Konstantin S. NOVOSËLOV Sponsored by COST

http://graphita.bo.imm.cnr.it



Action Dissemination

Websites, books, conference proceedings, teaching materials, videos, brochures



ACRONYMS (1/2)

AO	Administrative Officer
APC	Annual Progress Conference
BMBS	Biomedicine and Molecular Biosciences (Domain)
CGA	COST Grant Agreement
CGS	COST Grant System
CG	Core Group
CMST	Chemistry and Molecular Sciences and Technologies (Domain)
CNC	COST National Coordinator
CSO	Committee of Senior Officials
DC	Domain Committee
DCCCCM	Domain Committee Chairs Cluster Consensus Meeting
EEP	External Experts Panel
ESF	European Science Foundation
ESR	Early Stage Researcher
ESSEM	Earth System Science and Environmental Management (Domain)
FA	Food and Agriculture (Domain)
FPS	Forests, their Products and Services (Domain)
GH	Grant Holder
HOSO	Head Of Science Operations



ICT	Information and Communication Technologies (Domain)
IE	Interdisciplinary Exploratoria
ISCH	Individuals, Societies, Cultures and Health (Domain)
JAF	Judiciaire, Administratif, Financière, Working party of Legal, Administrative and Financial Affairs within COST(CSO Executive Group)
JSO	Junior Science Officer
MC	Management Committee
MoU	Memorandum of Understanding
MPNS	Materials, Physical and Nanosciences (Domain)
SAO	Senior Administration Officer
SO	Science Officer
SSO	Senior Science Officer
STSM	Short-Term Scientific Mission
TD	Trans-Domain
TDP	Trans-Domain Proposal
TDP-SAB	Trans-Domain Proposal Standing Assessment Body
ToR	Terms of Reference
TUD	Transport and Urban Development (Domain)
WG	Working Group

COST Office



i.e. scientific and technical secretariat to the COST Programme

- Science activities:
 - Domain Committees
 - COST Actions
- Outreach and strategic activities:
 - Year of visibility 2011



www.cost.eu

Domain pages: e.g. www.cost.eu/bmbs

Open Call:

www.cost.eu/opencall

Guidelines:

www.cost.eu/guidelines

FAQ:

www.cost.eu/service/faq

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