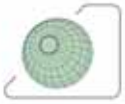


Natural Sciences Cluster



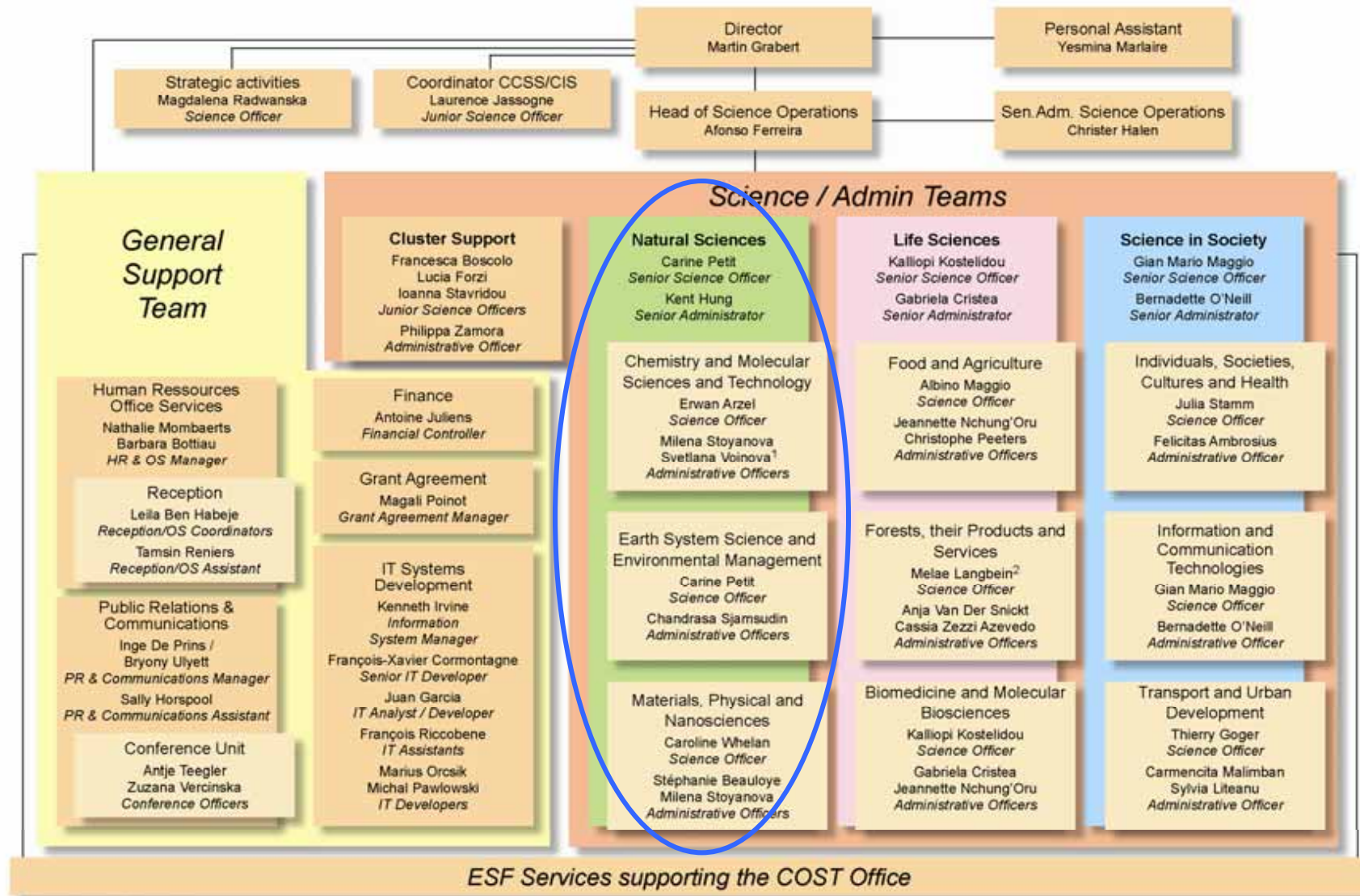
Dr. Magdalena Radwanska
Science Officer for Strategic Activities
On behalf of Dr. Carine Petit
COST Day in South Africa
Pretoria, 8 September 2009



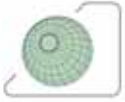
Natural Sciences Cluster and 9 COST Domains

- Chemistry, Molecular Sciences & Technologies
- Materials, Physical & Nanosciences
- Earth System Sciences & Environmental Management
- Biomedecine & Molecular Biosciences
- Food & Agriculture
- Forests, their Products & Services
- Information & Communication Technologies
- Transport & Urban Development
- Individuals, Society, Culture & Health

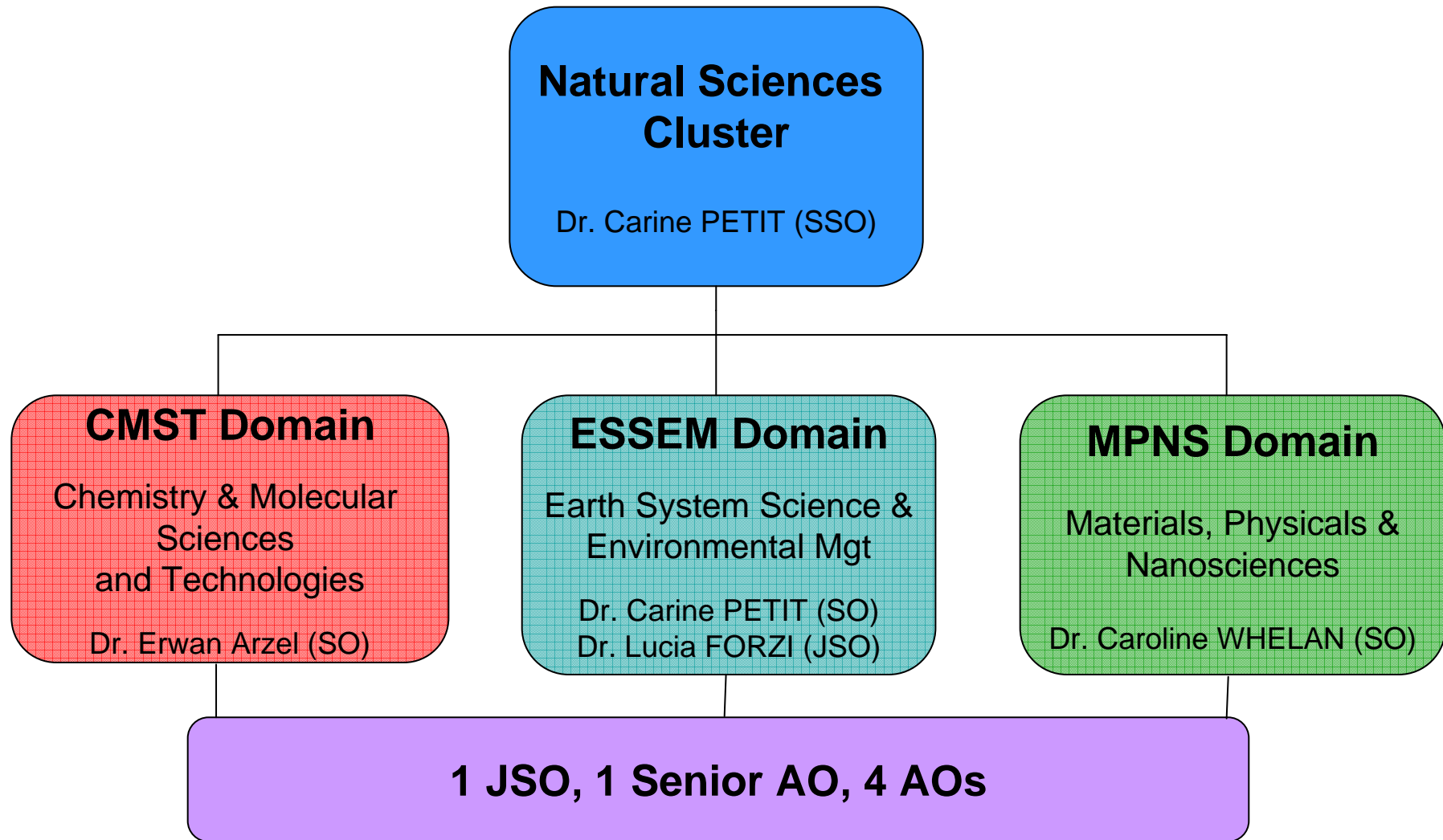
The COST Office

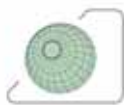


1. Co-ordinator for Balkan activities
2. Co-ordinator for Reciprocal Agreements



Natural Sciences Cluster Organisation

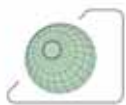




COST-CMST Domain

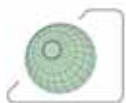
Chemistry & Molecular Sciences and Technologies

Domain Committee Chair:
Prof. Dieter Schinzer (DE)



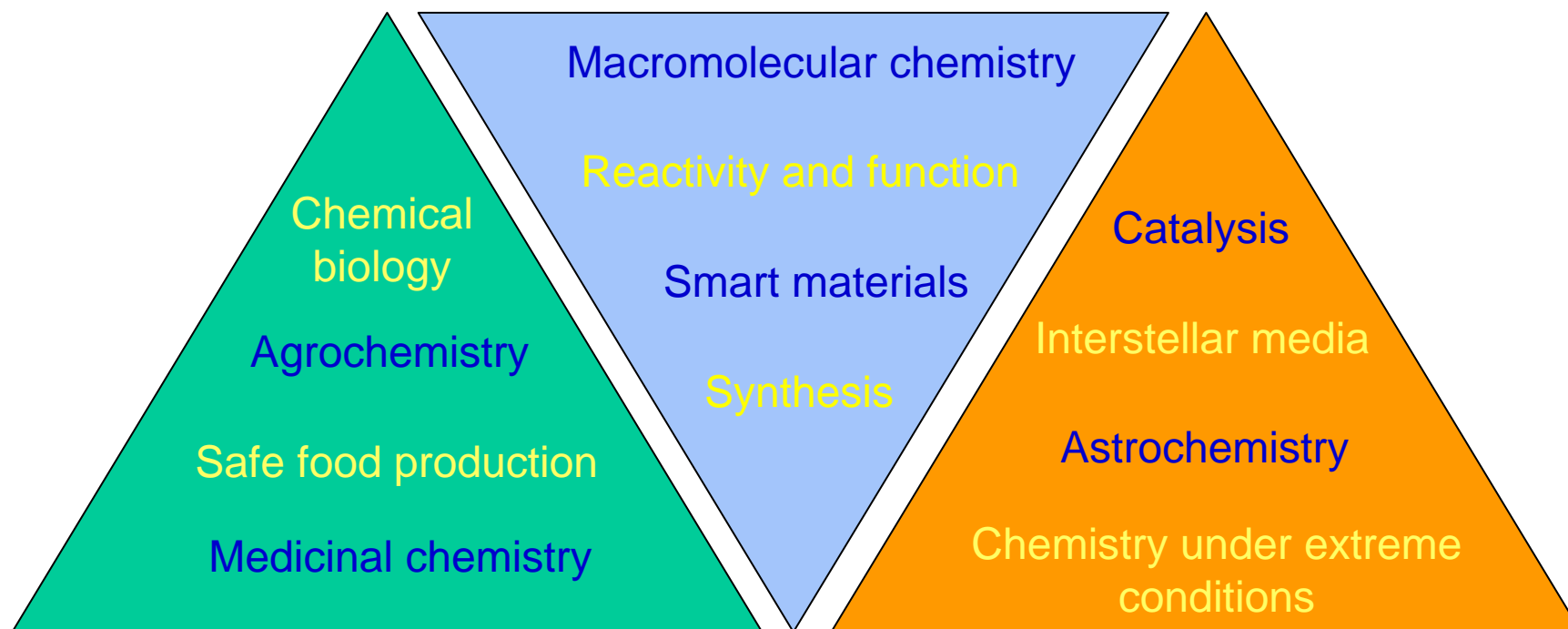
CMST – Domain Description

- **Scope:** The Domain has the mission of fostering expertise in discovering, understanding, producing and manipulating molecular species.
 - Chemistry for life
 - Manipulating molecular matter
 - Energy production
 - Caring for the planet
 - Space understanding and exploitation



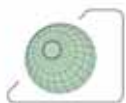
CMST Domain – Actions Portfolio

Nanochemistry & Functional Materials (11)



Biochemistry & Medical Applications (9)

Molecular systems (5)



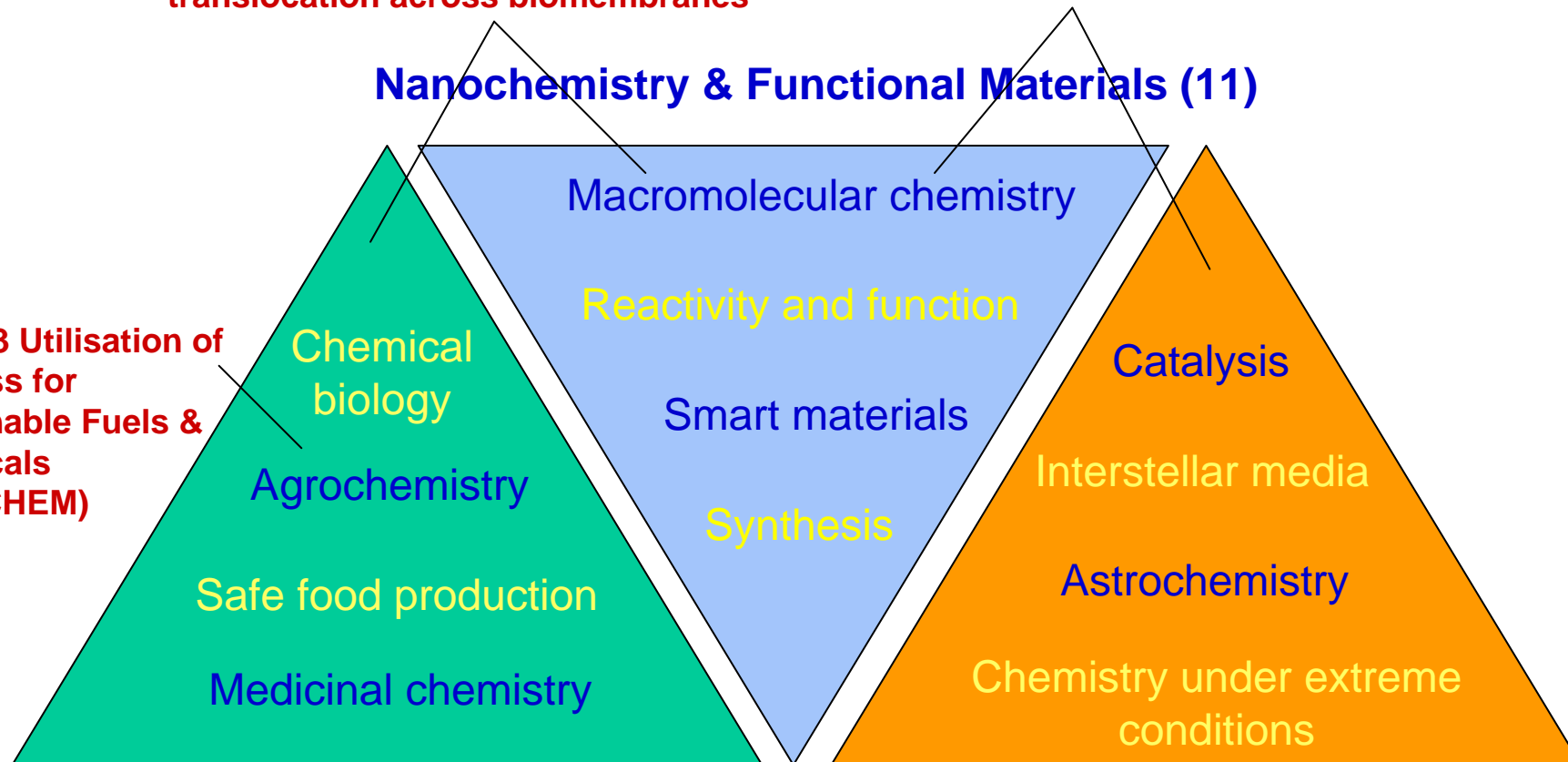
CMST Domain – Actions Portfolio

CM0902 Molecular machineries for ion translocation across biomembranes

CM0901 Detailed chemical kinetic models for cleaner combustion

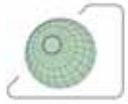
Nanochemistry & Functional Materials (11)

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



Biochemistry & Medical Applications (9)

Molecular systems (5)



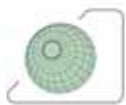
COST Action CM0801: New drugs for neglected diseases

The Action aims at developing new trypanocidal drug compounds to fight African Sleeping Sickness, Chaga's disease and Leishmaniasis.

Validated drug targets will serve as tools in drug discovery processes using:

- high throughput screening of natural products
- in silico screening of virtual libraries
- chemical synthesis of identified leads
- structure based inhibitor design

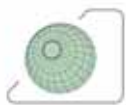




COST – D39: Metallo-Drug Design and Action

The main objective of the Action is to increase knowledge and understanding of the design and mechanism of action of metallo-drugs, and to use this knowledge in combination with modern genomics to develop new classes of drugs.

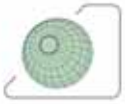
South African participation: Mintek represented by Dr. Judy Coates having expertise in gold-based compounds as potential HIV inhibitors.



COST - CM0701: Cascade Chemoenzymatic Processes – New Synergies Between Chemistry and Biochemistry

The main objective of the Action CM0701 “CASCAT” is to enhance the synthetic potential of biocatalysis by coupling biotransformations one to another and integrating them with chemical steps to increase the products purity and the yields close to quantitative values, thus bringing this methodology closer to the application sphere.

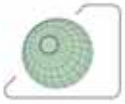
South African participation: CSIR Biosciences represented by Dr. Dean Brady having expertise in enzyme technology.



COST-MPNS Domain

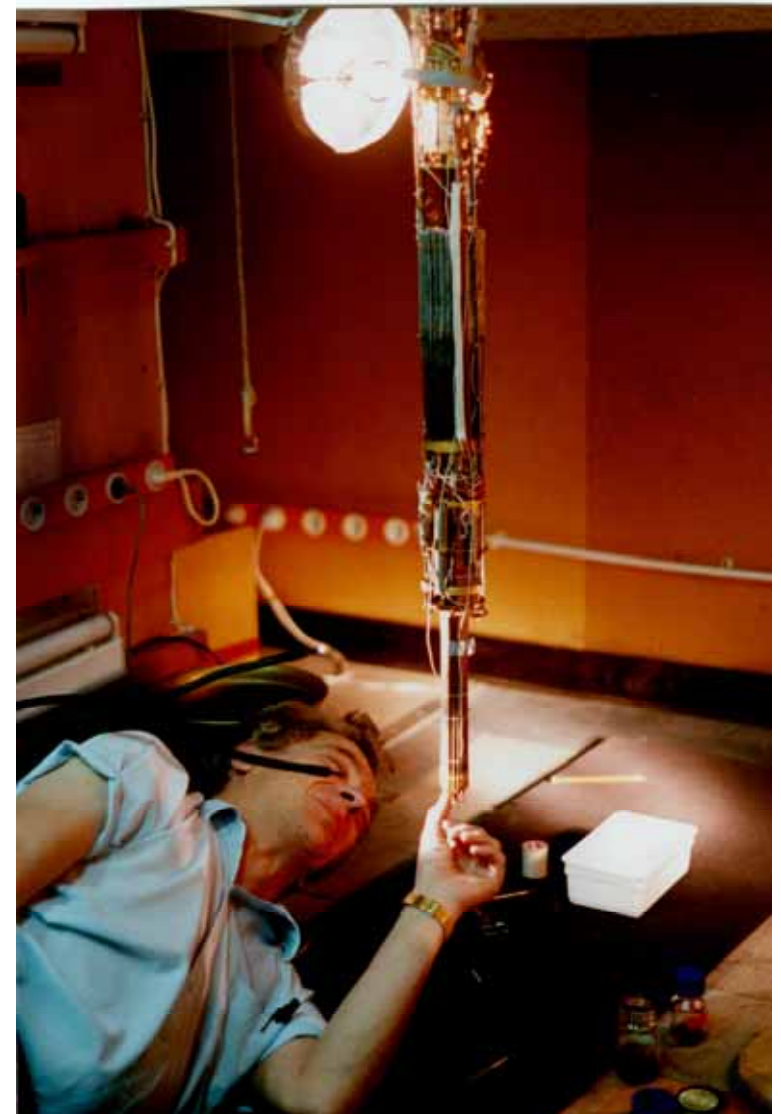
Materials, Physical & Nanosciences

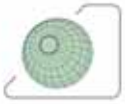
Domain Committee Chair:
Prof. Eva OLSSON (SE)



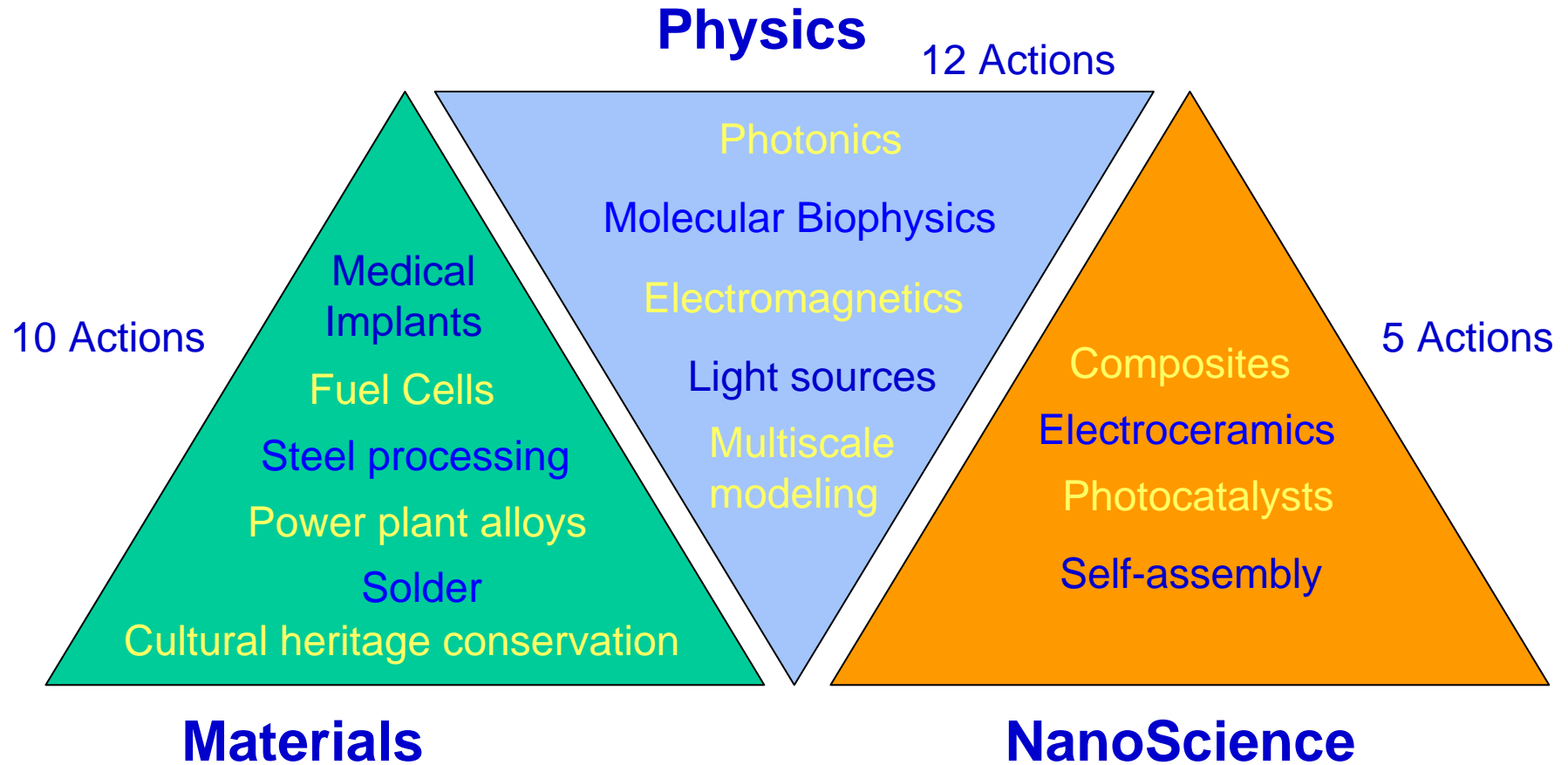
MPNS – Domain Description

- **Scope:** The Domain is home to materials science and physics:
 - conception and characterization,
 - examination and evaluation,
 - application and service,
 - databases, simulation tools, standards and inspections.





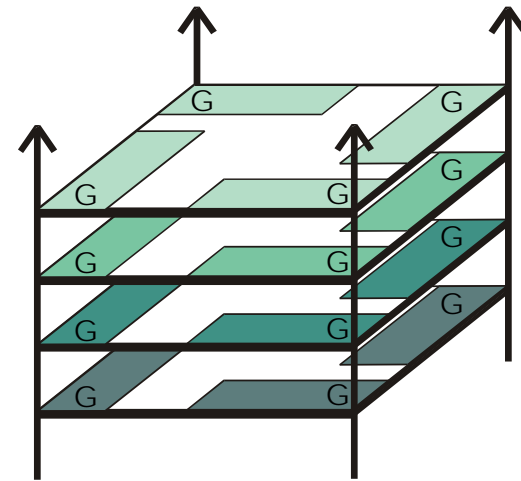
MPNS Domain – Actions Portfolio





COST Action MP0802: Self-assembled guanosine structures for molecular electronic devices

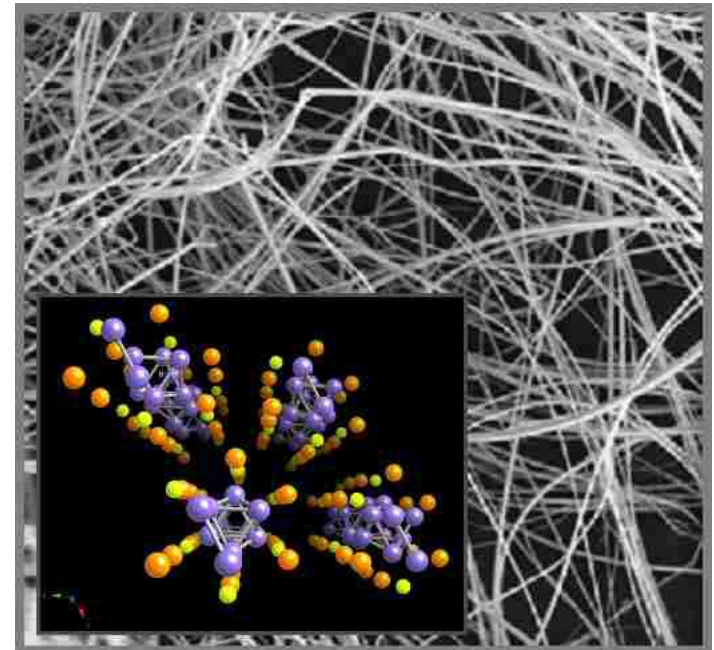
- The main objective is the design of novel guanosine-based molecular architecture and exploration as possible building blocks for new hybrid biomolecular electronics and investigate their electronic and optical properties.

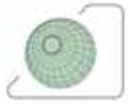


ESSEM

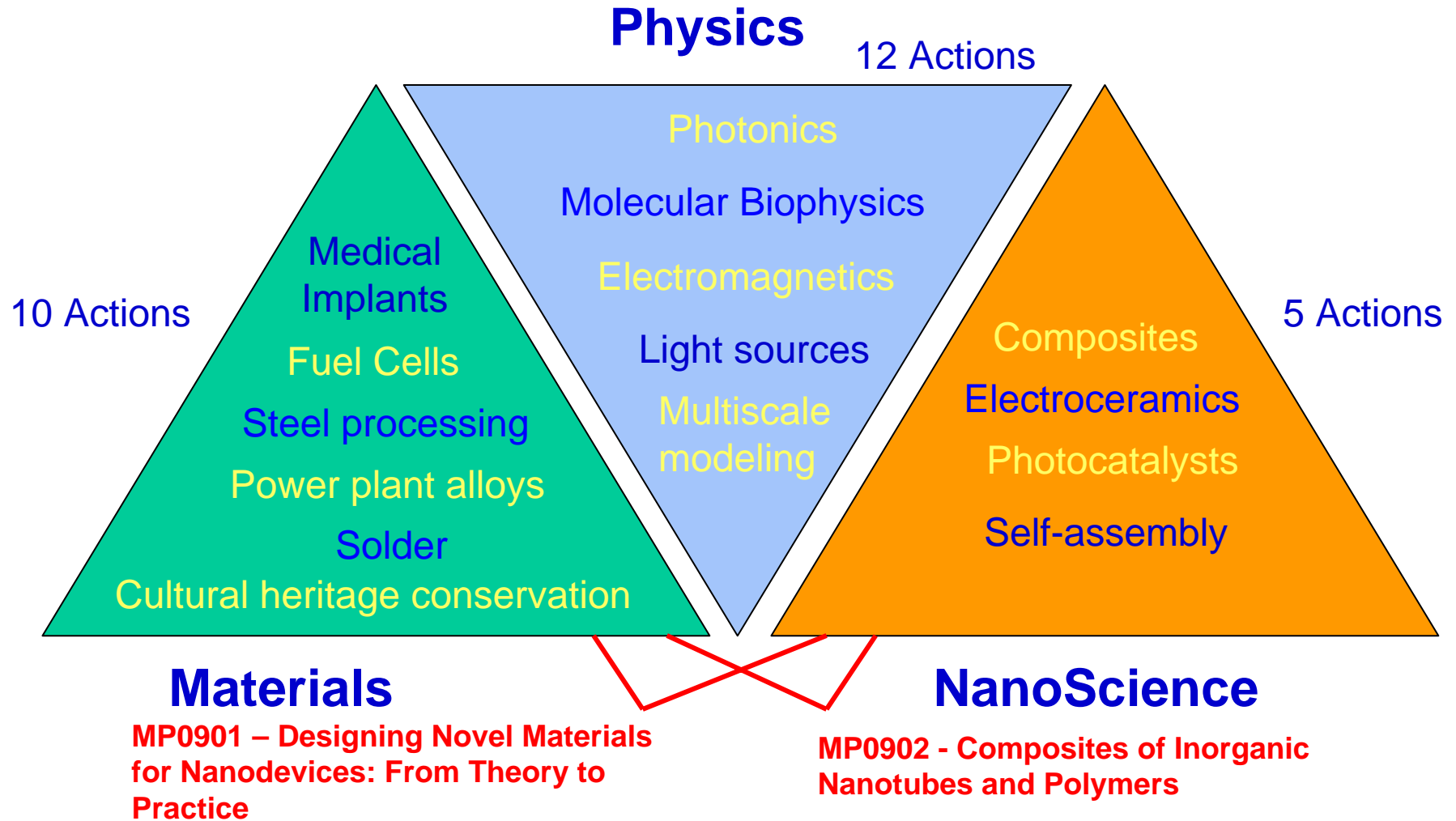
COST Action MP0902: Composites of Inorganic Nanotubes and Polymers

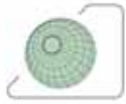
- The main objective is to develop new composite materials. These nanotubes are very promising candidates as fillers for polymer composites with enhanced thermal, mechanical, and electrical properties.
- Target applications for this kind of composites are materials for heat management, electrostatic dissipaters, wear protection materials, photovoltaic elements, etc





MPNS Domain – Actions Portfolio

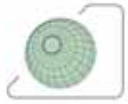




COST-ESSEM Domain

Earth System Science and Environmental Management

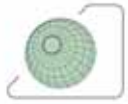
Domain Committee Chair:
Prof. Sylvain Joffre (FI)



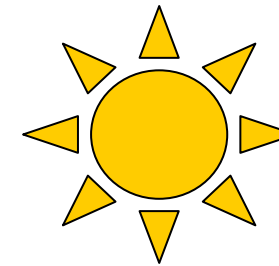
ESSEM – Domain Description

•**Scope:** The domain aims at better understanding, observing, modelling and predicting the Earth system and thereby at improving the management of environmental conditions.

- Modelling and understanding of Earth systems: physical and biochemical principles
- Prediction and mitigation of hazards
- Environmental Management of natural resources and minimising environmental degradation

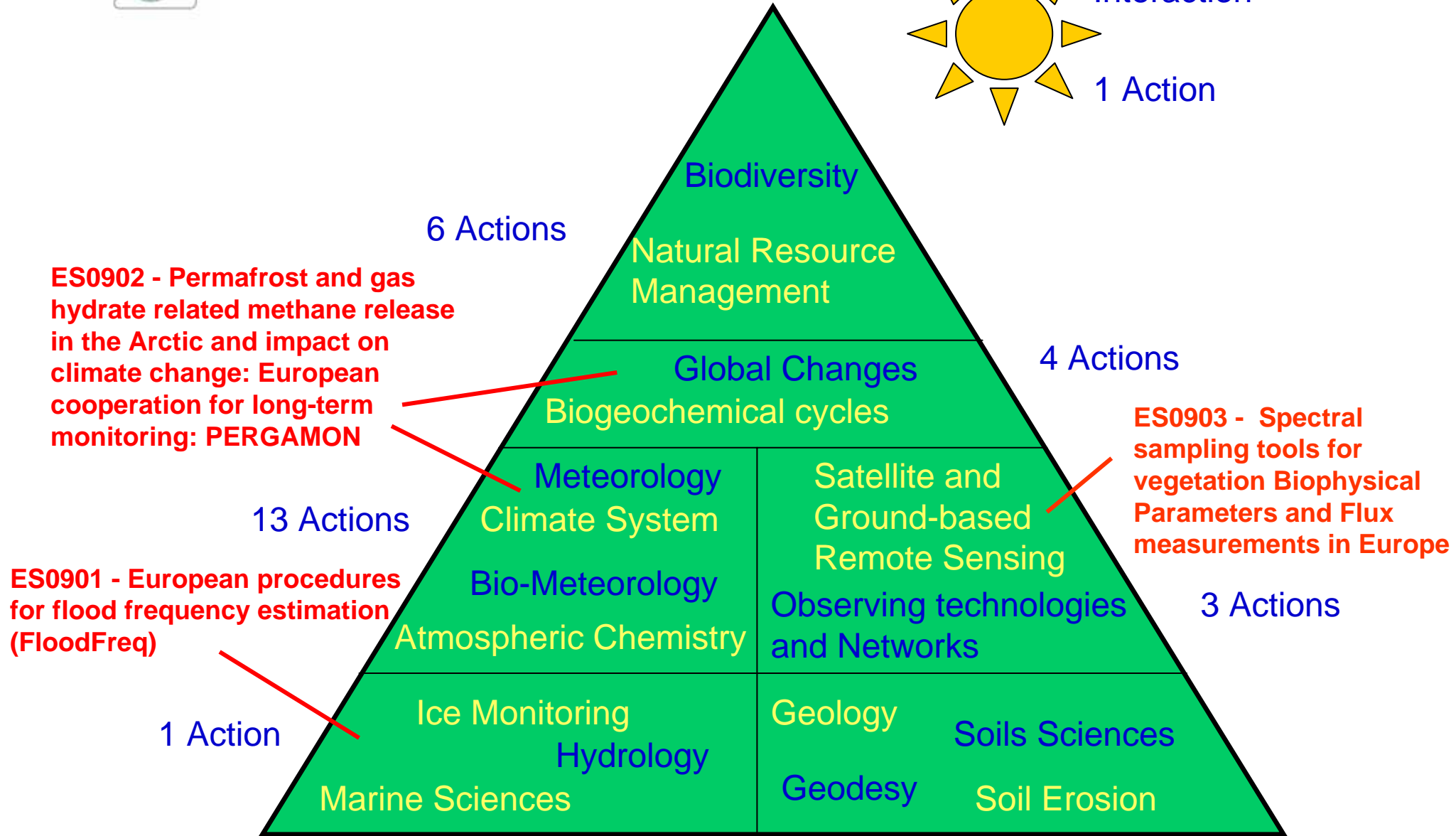


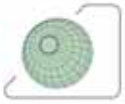
ESSEM Actions Portfolio



Sun-Earth Interaction

1 Action



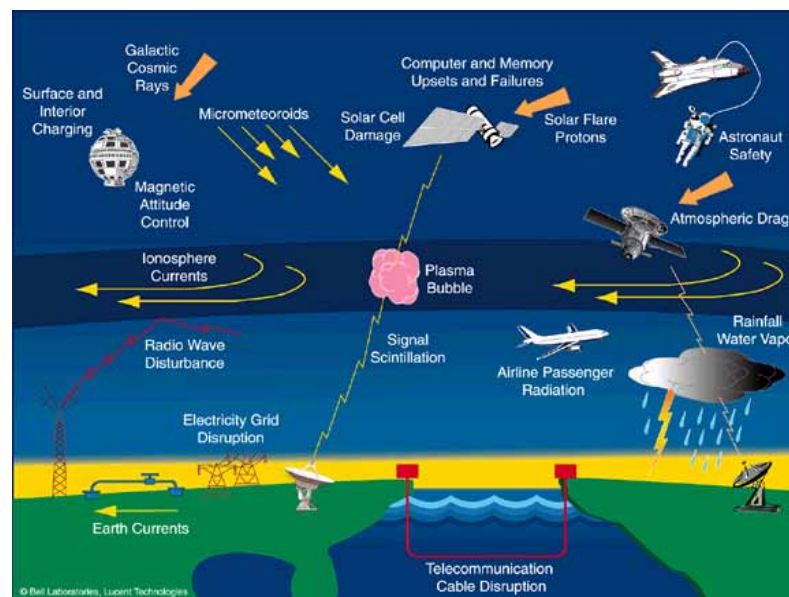
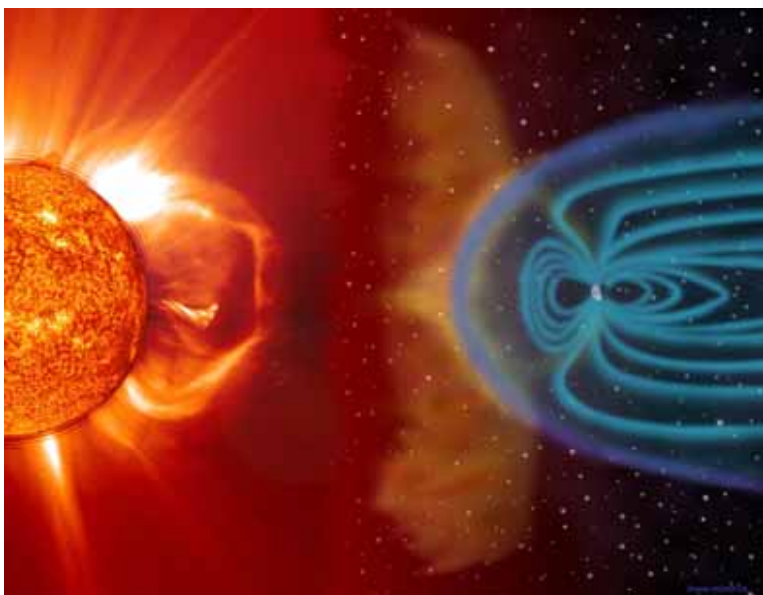


Examples of action in ESSEM Domain

COST Action ES0803: Developing space weather products and services in Europe

In Europe, a better coordination between the national research programmes, and warning system developers and operators is needed to develop European reliable Space Weather observational and forecasting products and services.

They will validate and demonstrate **prototypes of near-real time SW information services for operational use.**



COST Action ES0802: Unmanned aerial systems (UAS) in atmospheric research

Unmanned aerial systems (plane, sensor, antenna, data transmission, ground station) are of large and increasing importance for environmental monitoring (focus on monitoring of the atmospheric boundary layer and the underlying surface)

They offer cost-efficient data acquisition in remote and dangerous regions.

The Action will develop
prototypes for a European fleet.

Legal aspects related to safe
and permanent operations.



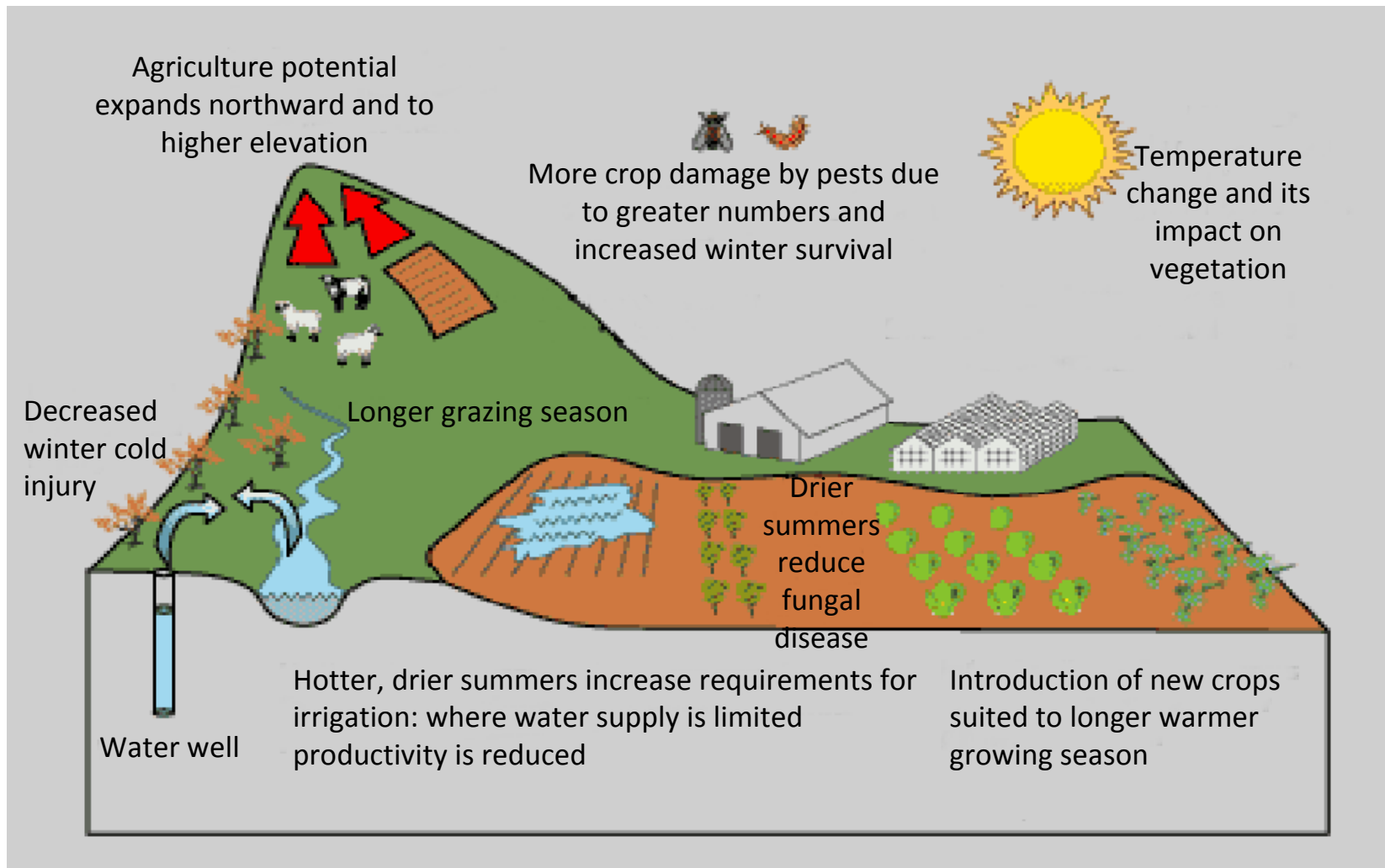


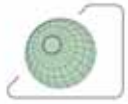
Energy research Centre of the Netherlands

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



COST Action 734: Evaluation of **POSSIBLE IMPACTS** from climate change and variability on **AGRICULTURE** and the assessment of critical thresholds for various European areas





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

- Pan-European comparison and evaluation of methods for **flood frequency estimation** under the various climatologic and geographic conditions found in Europe, and **different levels of data availability**.



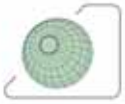
Goals:

Compile dataset and inventories of existing data and methods

Use of statistical methods for flood frequency estimation

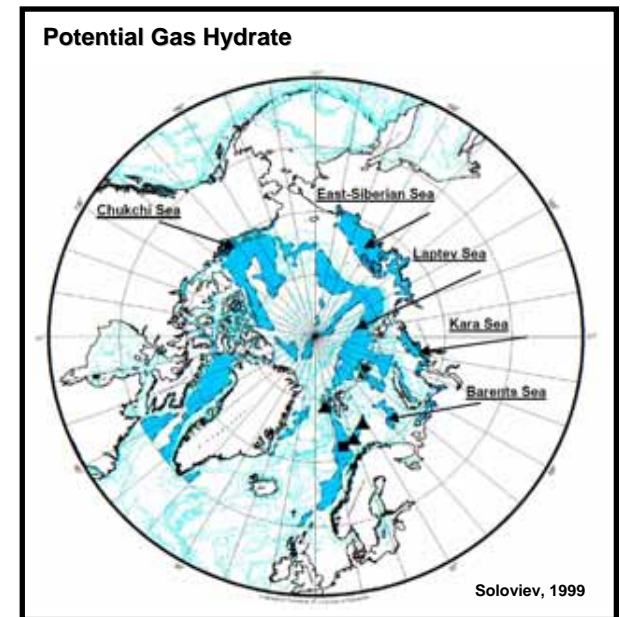
Flood frequency analysis using rainfall-runoff methods

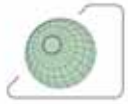
Flood frequency estimation methods and environmental change



COST Action ES0902 Permafrost and gas hydrate related methane release in the Arctic and impact on climate change: PERGAMON

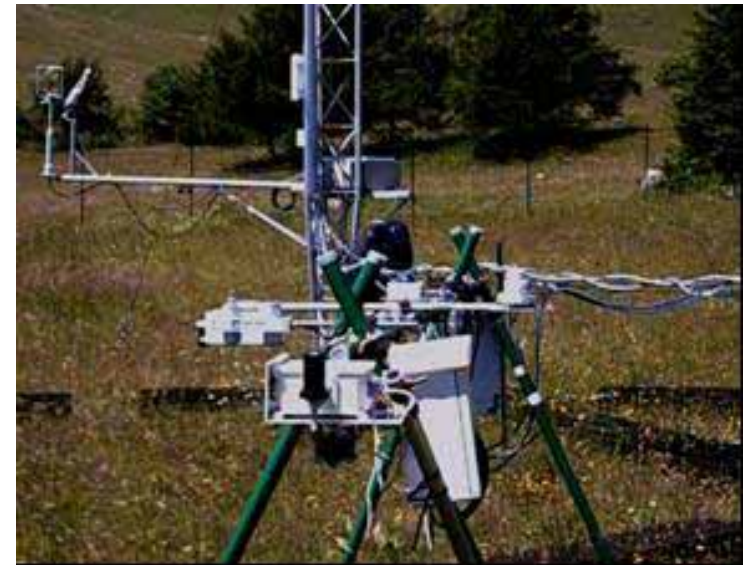
- To quantify the methane input from marine and terrestrial sources into the atmosphere in the Arctic region
- To evaluate the impact of Arctic methane seepage on global climate.
- To implement a EU cooperation for a long-term monitoring.

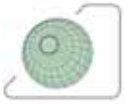




ES0903 Spectral sampling tools for vegetation Biophysical Parameters and Flux measurements in Europe

- To standardise ground spectroradiometric measurements across different ecosystems
- To develop common protocols and new instruments within a larger network for optical measurements
- To bring together scientists from the existing research networks **with** those from scientific instruments **industries.**
- **To analyse the saturation problem of the current vegetation indices**
- To introduce a new low-cost sensor for continuous monitoring of biomass and fluxes.





- Welcome to join us at any time during the lifetime of an Action!
- Do not to hesitate to contact the Science Officer of the COST Natural Sciences Cluster:
 - CMST: Dr Erwan Arzel, earzel@cost.esf.org
 - ESSEM: Dr Lucia Forzi, lforzi@cost.esf.org
Dr Carine Petit, cpetit@cost.esf.org
 - MPNS: Dr Caroline Whelan, cwhelan@cost.esf.org
- Thank you for your attention!