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DSCTM

NATIONAL RESEARCH COUNCIL OF ITALY

Department of Chemical Sciences and Materials Technology

A Brief Introduction

Director Dr. Maurizio Peruzzini

EuCheMS General Assembly: Rome, 26th September 2017

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BASIC FACTS

1

The largest public research performing organisation in Italy

8400

President
Prof. Massimo Inguscio

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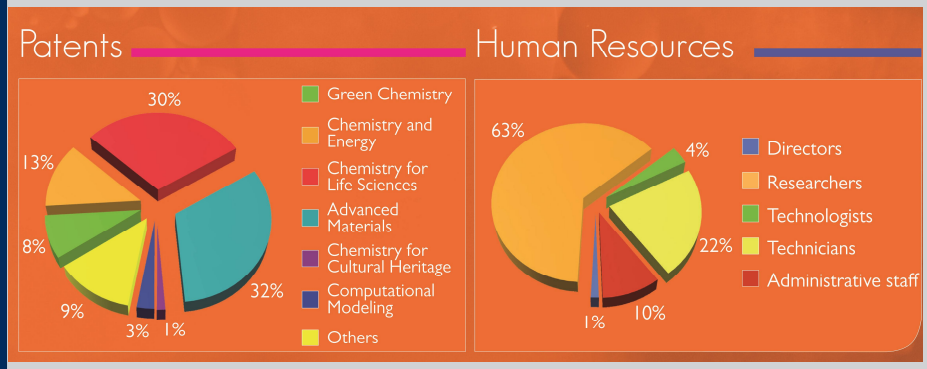
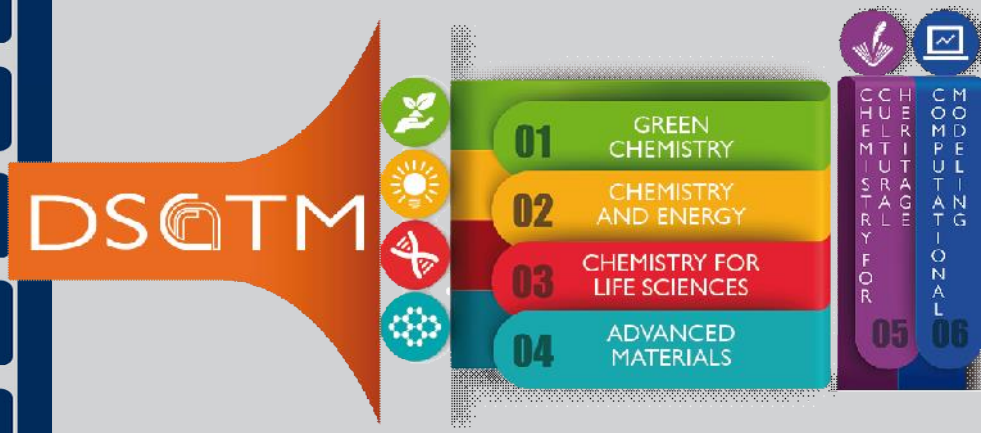
7 Departments

102 Institutes

- Earth system science and environmental technologies
- Engineering, ICT and technologies for energy and transportation
- Social sciences and humanities, cultural heritage
- Chemical sciences and materials technology
- Physical sciences and technologies of matter
- Biology, agriculture and food sciences
- Biomedical sciences





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DSCTM LOCATIONS

RESEARCH INSTITUTES 14

IC - Institute of Crystallography
ICB - Institute of Biomolecular Chemistry
ICCOM - Institute of Chemistry of Organometallic Compounds
ICMATE - Institute of Condensed Matter Chemistry and Energy Technologies
ICRM - Institute of Chemistry of Molecular Recognition
IMC - Methodological Chemistry Institute
IPCB - Institute for Polymers, Composites and Biomaterials
IPCF - Institute for Chemical and Physical Processes
ISMAC - Institute for Macromolecular Studies
ISMN - Institute of Nanostructured Materials
ISOF - Institute for Organic Syntheses and Photoreactivity
ISTEC - Institute of Science and Technology for Ceramics
ISTM - Institute of Molecular Science and Technologies
ITM - Institute on Membrane Technology

Permanent employees 938
608 researchers and technologists

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STRATEGIC AREA: GREEN CHEMISTRY

✓A PRIORITY OF NATIONAL RESEARCH PROGRAMME OF ITALY - PNR 2020
✓A CNR STRATEGIC AREA OF THE THREE-YEAR PLAN 2016-2018

Green Chemistry moves from the concept of production-consumption-disposal to the concept of continuous resource of starting materials for low environmental impacts. Path towards sustainability focuses sustainable transformation processes.

DSCTM activities with related application:

- biomass processing bio-technologic use of CO_2 as starting material for intermediates;
- development of systems in chemicals for the Bio-refineries;
- renewable chemical products;
- biomass into high value added products.

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STRATEGIC AREA: CHEMISTRY AND ENERGY

✓A PRIORITY OF THE NATIONAL RESEARCH PROGRAMME OF ITALY - PNR 2020
✓A CNR STRATEGIC AREA OF THE THREE-YEAR PLAN 2016-2018

Chemistry and Energy aim at environmental friendly energy production accompanied by the development of renewable energy and innovative energy storage systems. Towards the decarbonisation, chemistry and materials science can enable the shift to a new paradigm more respectful of the environment and the humans pursuing the dream of artificial photosynthesis and photocatalytic conversion.

DSCTM activities with related application:
- solar fuels and CO_2 utilization through nanostructured systems;
- organic and hybrid photovoltaics;
- hydrogen and fuel cells;
- processes and technologies for biomass.

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STRATEGIC AREA: CHEMISTRY FOR LIFE SCIENCES

✓A PRIORITY OF THE NATIONAL RESEARCH PROGRAMME OF ITALY - PNR 2020
✓A CNR STRATEGIC AREA OF THE THREE-YEAR PLAN 2016-2018

Chemistry for Life Sciences targets high-impact social diseases. Scientific developments in Chemistry and Materials for Health and Life Sciences relate to “innovative medicine” contributing to bio-molecular materials and systems (analytical and bio-sensors micro-systems, molecular imaging) and to better classification of specific patient subgroups.

DSCTM activities with related application:

- advanced methodologies for precision medicine;
- theranostics for precision medicine;
- nutraceuticals for the quality of life;
- therapeutic agents with "omics“;
- molecular profiling;
- multifunctional biomaterials for tissue regeneration and repair;
- drug delivery.

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STRATEGIC AREA: ADVANCED MATERIALS

✓A CNR STRATEGIC AREA OF THE THREE-YEAR PLAN 2016-2018

Advanced Materials develop chemistry and techology of materials with the focus on innovative methodologies for materials design and development with related technological approaches. This area participate in high level research. Research activities contribute to the European Graphene Flagship and to the ERC groundbreaking excellent science with an advanced grant on 2D materials. Materials Chemistry and Technology and innovative characterization techniques enable and feed different research areas in Chemistry. This area is highly relevant for Cultural Heritage which is a Priority Area of Italy PNR 2020.

DSCTM activities with related application:

- materials synthesis and preparation;
- innovative materials design and realization;
- spectroscopic, morphological, structural investigation, structure-function relationship, understanding of physical-chemical characteristics;
- innovative process technologies, up to the up-scale in systems and device;
- advanced methodologies for materials investigation.

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AREA: CHEMISTRY FOR CULTURAL HERITAGE

✓ A PRIORITY OF THE NATIONAL RESEARCH PROGRAMME OF ITALY - PNR 2020

Chemistry for Cultural Heritage Area is highly important for both society and the economy. Research focuses materials science and green chemistry areas contributing to high level research for innovative technologies and sustainable processes to meet grand challenges and producing great impact on society. The need of better science-based approaches and tools for protection, enhancement and use of Chemistry for Cultural Heritage is highly potential at global level.

DSCTM activities with related application:

- understanding of materials;
- molecular scale processes for degradation or of environmental factors;
- advanced diagnostic and monitoring;
- advanced analytical techniques;
- advanced conservation and restoration nano-structured materials;
- advanced carachterization tecniques;
- green and sustainable processes;
- experimental and computational modelling.

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AREA: COMPUTATIONAL MODELING

✓ A PRIORITY OF THE NATIONAL RESEARCH PROGRAMME OF ITALY - PNR 2020

Computational Modeling represents a relevance at national level. This area provides multi-scale computational methods (from ab initio to coarse grain) to enable a shift in the design and predictive screening of innovative systems with specific functionalities through the atomistic understanding of the fundamental phenomena. Modeling competences require integration and synergy within the academic system and target different fields such as electronics, optoelectronics, energy, biology, cultural heritage within international programmes.

DSCTM activities with related application:

- theoretical and computational methodologies;
- innovative algorithms and models for materials sciences with practical applications;
- computer simulations of molecules, biological systems and materials;
- computational grids;
- customized solutions for new application.

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MOTIVATIONS TO PARTICIPATE

Expected benefits:

- extending and strengthening its scientific relations within the European research community;
- knowledge exchange in focus areas for grand and societal challenges (education);
- participation to EU Chemistry policy actions for research and innovation.

EuCheMS benefits:

- a large network of competences and resources in Chemistry in Italy;
- high added value in strategic research areas and innovation.

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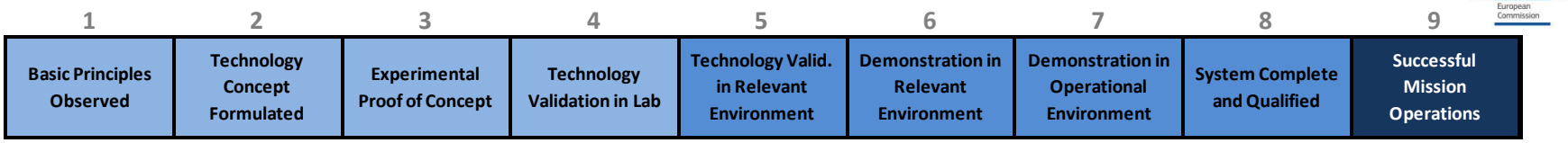
FULL-CYCLE RESEARCH
TECHNOLOGY READINESS LEVELS (TRL) EU H2020



Technological Research

KET Pilot Line and Demonstrator Projects

Manufacturing & KET deployment Project

Department of Chemical Sciences and Materials Technology

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Where a topic description refers to a TRL, the following definitions apply, unless otherwise specified:

- TRL 1 - basic principles observed
- TRL 2 - technology concept formulated
- TRL 3 - experimental proof of concept
- TRL 4 - technology validated in lab
- TRL 5 - technology validated in relevant environment (industrially relevant environment in the case of key - enabling technologies)
- TRL 6 - technology demonstrated in relevant environment (industrially relevant environment in the case of key - enabling technologies)
- TRL 7 - system prototype demonstration in operational environment
- TRL 8 - system complete and qualified
- TRL 9 - actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space)

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COMMUNICATION MATTERS

NEXT DSCTM RESEARCHERS EVENT:

DSCTM Assembly
"Conferenza di Dipartimento"
First Young Research Award
2017/10/19-20
Sardinia - Alghero

DSCTM CONTACTS

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DSCTM WEBSITE

http://www.dsctm.cnr.it/en/

CNR WEBSITE

https://www.cnr.it/en/

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