PROJECT PART-FINANCED BY THE EUROPEAN UNION

EUROPEAN RESEARCH AREA

REGIONS OF KNOWLEDGE

MentorChem

REGIONAL RESEARCH COMPETENCES IN CHEMISTRY LOMBARDY, SAXONY-ANHALT AND ASTURIAS

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CENSUS
OF THE RESEARCH COMPETENCES
IN CHEMISTRY
AND CHEMICAL ENGINEERING
IN SAXONY-ANHALT,
LOMBARDY REGION
AND PRINCIPALITY OF ASTURIAS

Co-financed by the European Commission DG Research

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Summary

1.
INTRODUCTION

1. INTRODUCTION

The project Mentoring European Knowledge of the Chemical Regions (MentorChem), co-financed by the European Commission, is directed to support the cooperation among the regions of Saxony-Anhalt, Lombardy and Asturias in the framework of the pilot action "Regions of Knowledge".

The general aim is to demonstrate the central role of knowledge as driving force in the regional development and to show how different actors can take part in the definition of the future regional scene. The project chases to increase the interregional cooperation to favour the learning process and diffusion of the knowledge among the European Regions, as well as to identify models and activities to be developed in the different regional contexts.

MentorChem focused also on R&D: the priority is to improve and update the Chemical sector in the partner Regions, stressing the importance of innovation. In order to co-ordinate regional efforts towards the needs of an *European Technology Platform for Sustainable Chemistry*, it is mandatory to confront with its assessments: to pin point the players in the public research institutions, determine the size of human resources available, identify the fields where the activity is preferentially addressed and point out strengths and weaknesses of the actual situation.

One of the MentorChem products is an inventory of *Regional Research Competences* in chemistry and chemical engineering, with a focus on sustainable chemistry. In our Census the three key technology areas relevant for the *Technology Platform for Sustainable Chemistry* have been extended in order to have a more complete vision of the regional competencies in basic and applied research. The selected fields of activity are therefore the following:

- Materials Technology
- Recent Developments in Nanoscience and Nanotechnology
- Reaction and Process Design
- Biotechnology
- Conservation and Restoration of Cultural Heritage
- Environmental Pollution Monitoring

The followed methodology for the development of this work has been based the collection of all available information related to every research group in the three Regions, and the preparation of an exact information database.

The collected information is distributed according to the following scheme:

- **Data concerning the main researcher:** contact data, institution and main field of activity.
- **Data concerning the lines of research:** name and other relevant information:
    - **Human resources:** number of participants in the line of research, classifying them according to its category
    - **On-going projects:** all on-going projects are collected and classified according to the financial source; regional, national and European.
    - **Collaboration with companies**
    - **Competences** detailed explanation of expertise of the research team.

2.
SUSTAINABLE CHEMISTRY VERSUS AN EUROPEAN TECHNOLOGY PLATFORM

2. SUSTAINABLE CHEMISTRY VERSUS AN EUROPEAN TECHNOLOGY PLATFORM

The European Chemistry, with a turnover of €42,000 Million in 2002 and 25,000 companies employing 1.6 million persons, is a world leader and has 28% of the global market share. Although the turnover has not stopped growing in the last years, at present, the competitiveness of the Chemical European Industry is threatened by the high costs of production, the low growth of the market and the delocalisation of the industries. In all excepting the most optimistic future scenarios, the net trade balance falls and Europe could well become a net importer of chemicals by 2015!

The sector's role as an enabler of innovation to the downstream industry is therefore also in danger. The difference between the most optimistic scenario and all other scenarios lies in a European chemical industry driven by innovation.

The last decade has witnessed a impressive progress in chemical knowledge. The promise of Chemistry could bring great positive changes in our society, but this will only become a reality if the Chemical Industry succeeds in advancing breakthrough inventions from the lab into new products and services in the marketplace.

There is an urgent need to boost research, development and innovation in sustainable chemical technologies in Europe if the economic and strategic contribution of the industry is to be sustained. The enhancement of innovation efforts are to provide the technology base for more sustainable chemicals production, products and services, thereby increasing eco-efficiency and value added, and to boost investments in Europe by improving innovation framework conditions. Innovation will be a major determining factor to secure the sector's competitiveness and consequently the competitiveness of its vast downstream customer base.

Traditionally, there is a high degree of industry-academia chemistry research. Two major incentives for collaboration are: improved access to remote expertise and shorter time-to-market. Collaboration is increasingly important, driven by the trends towards leading organisations and outsourcing of "non-core" activities. Collaboration is particularly crucial to SMEs, however larger companies tend to benefit most from this trend. Unfortunately we are also witnessing sharp decline in the number of students graduating in chemistry and this trend is expected to continue in the foreseeable future. The decline reflects

the greater attraction of areas such services and IT. If the sector is to remain innovative and growing, this trend must be reversed.

In order to foment the R&D as a way to reach a certain level of innovation and sustainability which assures the future European competitiveness of this sector, the "*Technological Platform for a Sustainable Chemistry*" (SusChem) was launched in July, 2004 with the support of the sectorial organizations of chemistry and biotechnology, CEFIC and EuropeBIO, and the participation of the European Commission.

Research activities, engine of innovation and of growth in the chemical industry, is insufficient in Europe. Europe assigns to it (as an average) the 1.9 % of its business volume, Americans the 2,5 % and Japan the 3 %.

The European Platform gives special attention to research, development and innovation as instruments to improve the competitiveness of the European companies and place them on the markets with better perspectives of growth in the next years. In fact, one of the reasons for creating the Platform was to make proposals about the priority research areas to be included under the 7th R&D Framework Programme. On the longer term, the Platform may well become a suitable forum for public and private sectors, industrial and academic world, financial environment and European authorities, to discuss and improve all aspects related to innovation in the Chemical sector.

The Platform is orientated towards three prior areas due to its great strategic importance and special social relevancy:
- Industrial biotechnology
- Material technology
- Reactions and processes design

These technological areas have a great potential to transform the chemical industry and to create new opportunities for the European companies. Besides, given its numerous applications, they can influence in an important way our **quality of life** and favour the development of new **sustainable technologies** that increase the industrial **eco-efficiency**.

To transverse level, the Platform also will bear in mind the worries of the public relatively to the effective management of the risks for the **human health** and for the **environment**, besides matters like the education and the formation, the infrastructures, the application of regulations to the industry, the modality of adjudication of research support funds (with a view to the Seventh Framework Programme Support of the European Community for Research), as well as the problems that stop the innovation, such as the access to the risk capital and the aspects of sensitisation of the public.

Industrial Biotechnology is an emerging technology area entering its growth stage. It is increasingly impacting the chemical sector, enabling both the conversion of renewable resources, such as sugars or vegetable oils, and the

more efficient conversion of conventional raw materials using biotechnological processes (including bio-catalysis) into a wide variety of chemical substances, many of which cannot be made directly by synthetic routes.
Europe is facing fierce competition from the USA and Japan which have long term plans and large R&D commitments in place in this area. There are additional problems blocking industrial biotechnology's development. The raw materials or feedstock like vegetable oils and glucose needed for bioprocesses are expensive and the enzymes used to convert the material require a high investment in research and long development times. An increased level of research and investment in developing cheap feedstock and powerful enzymes is crucial.

Materials Technology is an interdisciplinary combination of physics, chemistry and engineering that, before the demand of the market and of the new technologies, directs for itself the design and production of innovative materials due to its applications, properties, costs, methods of manufacture and / or its characteristics of environmental and health protection.
Application areas of interest include: Functional Materials and bio-(compatible) materials with tailored properties using nano-technological and bio-mimetic materials concepts; Intelligent Materials with tailored electrical (*e.g.* superconducting), optical and magnetic properties; New sustainable technologies in the areas of both energy and environment, environment (which includes catalysis and renewable energy sources such as solar and fuel cell technologies); New methods of polymerization, including catalysis.
There is a need for enhanced identification of opportunities, in close cooperation with partner industries down the value chain, and to coordinate and enhance public-private research to move beyond the limited nature of industrial research programmes and avoid fragmentation and duplication of efforts. In this respect, the nanotechnology constitutes an area of special importance.

Design of reactions and processes is of vital importance for the chemical industry. Product life cycles are becoming shorter and specialty chemicals evermore rapidly become higher volume commodity products. The only way to remain profitable under these high cost pressure conditions is to keep a high level of excellence in the area of *process intensification*. It is of paramount importance to have the best, i.e. the fastest, cheapest and cleanest production processes.

Reaction and process design is an overarching technology that can be applied to all areas of chemistry. The importance of technology leadership in this area is even more relevant due to the commercial threat from Asia where chemical products are produced at lower costs than in Europe. In many cases, the focus of chemical research, as opposed to pharmaceutical and agrochemical research, does not lie in the search for novel structures, but in the optimization of production processes for basic chemicals, intermediates and fine chemicals known to society for many years.

In this field, two complementary, yet distinct, approaches have to be aligned: a Process Science and Engineering approach and a Chemical approach. There is a need to bring chemical sciences, chemical technology and engineering sciences closer to result in innovations, reaction and process design.

3.
REGIONAL RESEARCH COMPETENCES

3. REGIONAL RESEARCH COMPETENCES

3.1 RESEARCH COMPETENCES IN SAXONY-ANHALT

The universities, colleges and research institutes combine a strong research potential in Saxony-Anhalt. The new university plan will have a focus on chemical and environmental engineering to initiate a modernisation of basic and applied research. Several investments have been implemented, such as the Pilot Plant Centre for polymer synthesis and processing in Schkopau, which is a milestone both for the development of the research cluster in the area of material science and polymer research, and for the growth of the chemical enterprises. There is a sustainable cooperation between the research sector and the chemical industry.

In the chemical region of Central Germany and in particular in Saxony-Anhalt lies the grassroots of the German chemical industry. The traditional chemical centres of Bitterfeld und Wolfen or Leuna and Buna form parts of the classical chemical triangle. Halle, with its new bio-technological-triangle Halle-Magdeburg-Quedlinburg/ Gatersleben, is located at the intersection of this classical chemical triangle. From this geographical “overlapping” arise excellent research competences in the fields of chemistry and pharmacy in relation to biological and medical applications. At the same time, the advanced special and fine chemistry provides an industrial background for the production of advanced ingredients.

The research in the cluster **“Development of active ingredients and special chemistry”** focuses on:

- Development of lead compounds, development candidates, and target identification (neurobiology, diabetes, cancer, etc);
- Synthesis and development of drug components and other active ingredients, with extraordinary competence in chemical syntheses, complemented by expertise in green (and white / grey) biotechnology, phytochemistry, and use of renewable resources (biomonomers, nutraceuticals, dietary supplements, cosmetics);
- Protein chemistry (bio-chemistry, structure and folding, peptides und proteins, mimetics, fermentation, diagnostics, serums);
- Synthesis development for fine and speciality chemicals (supplier of pharmaceutical ingredients and building blocks for discovery research and production, DVD and film technology, liquid crystals, new materials, flavours & fragrances).

In the field of basic research interesting approaches have been developed in Saxony-Anhalt in the area of **development of "intelligent materials".**

This refers to very specific applications whereby new material properties are established through the combination of ingredients in structures of decreasing size and novel technologies. The aim is to generate new developments, where the implementation of nano-structured components leads to the development of new material or systemic characteristics in a compound.

In the area of Halle the leading research institutions with competence in these areas are the Martin-Luther University, the Max-Planck Institute of Micro-structure Physics and the Frauenhofer Institute for Mechanics of Materials. Additionally, the University of Magdeburg possesses interesting expertise in the field of materials research. Nanostructured materials for different uses, such as semiconductor technology, new magnetic materials, sensor, and bio-medical applications, catalysts, micro system technology, bio technology and environmental technology are a special focus of the research support of Saxony-Anhalt. Furthermore, a new technology centre for nano-technology will be established in Halle (TGZ III) for joint research projects.

The synthesis of new active substances is also a big challenge for the chemical sector in the future. The Leibniz Institute of Plant Biochemistry in cooperation with the Institute of Chemistry of the Otto-von-Guericke University in Magdeburg and the Institutes of Process Technology, Bioengineering, Pharmaceutical Technology and Biopharmacy in Halle and the fine and special chemistry of the TGZ Bitterfeld-Wolfen possess special competencies in these research areas.

Within the research cluster **"E-services and transregional networks"** a new Virtual Development and Training Centre (VDTC) will be established until the end of 2005. The Fraunhofer Institute for Factory Operation and Automation has strong experiences in the fields of interactive visualisation and simulation, training and qualification and knowledge transfer The Leibnitz Institute for botanical biochemistry is working on a data base for natural products from plants and higher fungi (Phytobase®), a scientific instrument, which enables sophisticated analysis of validated spectroscopic and physiochemical data of secondary metabolites and their bioactivities via multifunctional search tools. Within the framework of the general network theory, the Max-Planck-Institute Dynamics of Complex Technical Systems in Magdeburg develops modular models for chemical and biological systems and implements them by the object-oriented modelling tool PROMOT.

The association for the support of the **development of polymer and plastic technology** in Central Germany- Polykum e.V. has the task of establishing and strengthening the cooperation between universities, research institutions and small and medium sized enterprises in the polymer processing industry.

The main goal is to promote transferable research potentials and to initiate cooperation for the production of new, competitive products as well as the use of innovative technologies.

For this purpose workshops for the dissemination of information and establishment of contacts are organised. At the same time there is constant information for SMEs about the work and research focus of scientific organisations, published on the website (www.polykum.de). Additional online information concerns the equipment of analysis devices as well as the technical equipment of the research institutes.

Of special importance for the development of polymers and their processing in Central Germany is the establishment of the “Frauenhofer Pilot Plant Centre for Polymer Synthesis and Processing” in the Value Park in Schkopau that opens in June 2005. The Fraunhofer Institute IAP (Instituted for Applied Polymer Research in Golm) and the IWM (Institute for Mechanics and Materials in Halle) are managing the project. The institution is open for scientific institutions as well as for enterprises, which often lack their own research capacities.

3.2 RESEARCH COMPETENCES IN LOMBARDY REGION

The main geographic areas involved in the census are:

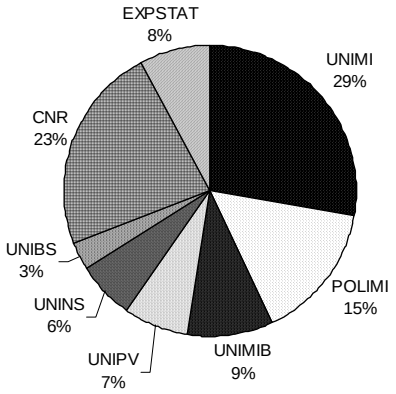
i) the **district of Milan**, where most of the public institution are located (11 out of 15), namely the University of Milan (UNIMI), the University of Milan-Bicocca (UNIMIB), the Technical University ("Politecnico") of Milan (POLIMI), four institutes of the Italian National Research Council (CNR), that are the Institute of Molecular Science and Technologies (CNR-ISTM), the Institute for Macromolecular Studies (CNR-ISMAC), the Institute for the Chemistry of the Molecular Recognizing (CNR-ICRM) and a section of the Institute for the Energetics and Interphases (CNR-IENI) and four Experimental Stations (Publc Private Partnership; EXPSTAT) for studies on Fuels (SSC), on Fats and Oils (SSOG), on Silk (SSS) and on Paper and Paper Derivatives (SSCCPC);

ii) the **district of Pavia**, with the University of Pavia (UNIPV) and a section of the Institute for the Energetics and Interphases (CNR-IENI);

iii) the **district of Como-Varese**, that are the two seats of the University of Insubria (UNINS);

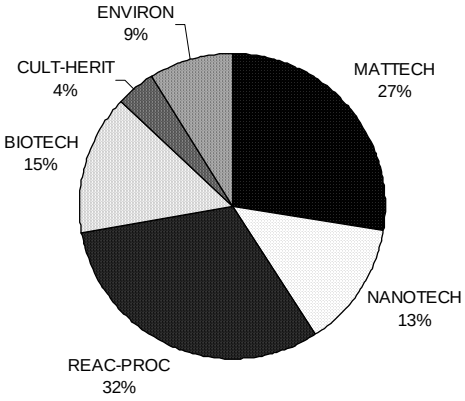
iv) the **district of Brescia**, with the University of Brescia (UNIBS).

The data were obtained from **90** forms filled in by the leaders of the research groups. The census encompasses **1178** people, which belong to **15** academic or public research institutions (*Graph 1*). Each research group is made up by **11** people on average and about half of the human resources involved in the research activity is non-permanent personnel (*i.e*. degree orPhD students, Post-Doc fellows, etc.) (*Graph 2*). This figure highlights how much the academic research in the most innovative subjects relies on young people, notwithstanding the marked decline in the number of students graduating in disciplines in the chemical science area. In addition, research teams are on average bigger in universities than in public non-academic institutions (*e.g*. 12 people in the Universities of Lombardy *vs*. 9 people in CNR), because in academy a good number of students and/or fellows is usually present and available.



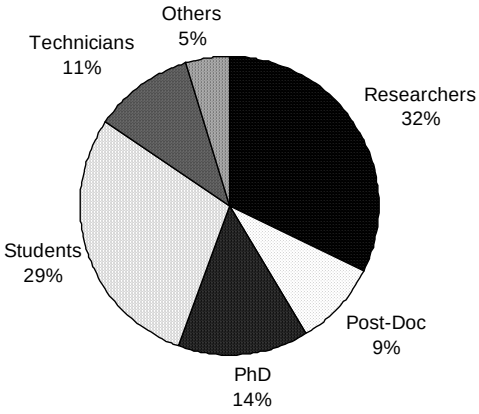
Graph 1. People considered in the census

With regard to the six fields of activity, in general the answers pointed out that most of the human resources are involved in the Materials Technology and Reaction and Process Design (*Graph 3*). Then, the research themes in Nanoscience and Nanotechnology and Biotechnology altogether absorb about the 30% of the workforce. Lastly, only few groups (16 out of 90) are involved in the Conservation of Cultural Heritage and in the Environmental Pollution Monitoring.



Graph 2. People involved in each field of activity

However, the peculiar competences in these main fields in Lombardy are neither evenly distributed throughout the institutions, nor rigorously concentrated in especially devoted research centres, but the situation is rather articulated, as many groups developed polyhedral expertise in different topics.



Graph 3. Human resources

In particular, the research in **Materials Science and Technology** occurs principally at the Dept. of Inorganic, Metallorganic and Analytical Chemistry of UNIMI (hybrid polymeric materials for the transmission of photonic information, new catalytic membranes for sustainable selective reactions, supramolecular assemblies with electrochemical properties), at the Dept. of Physical Chemistry and Electrochemistry of UNIMI (intelligent materials with tailored electrical properties as electrodes and sensors, nanostructured materials for hydrogen and gas storage, conducting polymers for anticorrosion purposes), at the Dept. of Structural Chemistry and Inorganic Stereochemistry of UNIMI (crystal engineering of coordination polymers, characterisation of hydrogen storage

materials and of photonic materials), at the Dept. of Organic and Industrial Chemistry of UNIMI (polycondensates having controlled molecular masses and architecture, heterohelicenes for non-linear optics), at the Dept. of Chemistry, Materials and Chemical Engineering of POLIMI (new functional materials in textile and rubber chemistry, molecular modelling of bio-compatible materials, halogenated polymers for optics, catalysis and electronics), at the Dept. of Materials Science of UNIMIB (organic polymers for photonics, luminescent glasses, electrochromic smart devices, innovative energy storage systems), at the Dept. of Physical Chemistry of UNIPV (lead-free alloys for microelectronics, new electronic and ionic conductors), at the Dept. of Organic Chemistry of UNIPV (photoprotective agents for plastics), at the Dept. of Physical Chemistry for Engineering and Materials of UNIBS (thin films obtained by colloidal lithography, intelligent polymeric and composite gels, polymers for sensing applications), at the Institute for Molecular Science and Technology of CNR (improved electrocatalysts for direct ethanol fuel cells, high-performance thermoelectric materials, organic electroconductive polymers), at the Institute for Macromolecular Studies of CNR (organic polymers and composites for optoelectronics, polymeric photovoltaic devices, ecosustainable packaging), at the Institute for the Energetics and Interphases of CNR, in both Milano and Pavia (ceramic and polymers for fuel cells and batteries, functional materials for optical and optoelectronic applications, high-temperature materials for aerospace and power generation industry) and the four Experimental Stations, that are devoted to the processing, utilisation and technological evaluation of raw materials (fuels, fats, textiles and paper derivatives).

The **Reaction and Process Design** is even more widespread than the other fields of activity, as it is directly linked to the main aim of chemical research, *i.e*. the synthesis and/or modification of chemicals. Virtually every group is concerned in this topic, but the most promising developments are in the optimisation of production processes with particular focus on the guidelines of sustainable chemistry, in innovative catalytic processes and in the synthesis of novel compounds with improved performances. In this field, the main research groups, which are working on ground-breaking topics, resulted to be present at the Dept. of Inorganic, Metallorganic and Analytical Chemistry of UNIMI (chiral ligands for the stereocontrolled catalysis, organometallic compounds as models for surface species), at the Dept. of Organic and Industrial Chemistry of UNIMI (alternative syntheses of natural products with pharmaceutical activity, stereoselection in organic synthesis, organic synthesis in non-conventional media), at the Institute of Organic Chemistry of the Faculty of Pharmacy of UNIMI (stereocontrolled homogeneous catalysis, amplification of homochirality, catalytic synthesis of heterocyclic systems), at the Dept. of Chemistry, Materials and Chemical Engineering of POLIMI (chemical processes in presence of electromagnetic fields, catalytic processes for clean production of energy and fuels, new fluorous media for safer chemistry), at the Dept. of Organic Chemistry of UNIPV (reaction mechanism with high-level computational methods, stereocontrolled synthesis by asymmetric catalysis), at the Dept. of Chemical and Environmental Sciences of UNINS (polymorphs in organometallic and pharmaceutical chemistry), at the Institute for Molecular Science and

Technology of CNR (catalytic transformation of renewables, hybrid supported heterogeneous catalysts, ionic liquids as sustainable solvents, phase-transfer catalysis, design and advanced characterisation of catalytic materials) and at the Experimental Station for Fuels (processing of conventional and alternative fuels, safety and loss prevention in process industry).

The research topics in **Recent Developments in Nanoscience and Nanotechnology** occur less frequently then in the other two above-mentioned fields, in spite of the large effort of the Italian Government for a wider diffusion of research themes dealing with nanoscience and nanotechnology in the years from 1998 to 2004. Additionally, a large part of the research topics deal with nanoscience rather than nanotechnology, for a direct development to industrial application of the reported findings is often hard to envisage. In such field, the outstanding institutions in Lombardy are the Dept. of Inorganic, Metallorganic and Analytical Chemistry of UNIMI (nanoparticles from colloidal solutions, metallic nanoparticles for catalytic purposes, metal carbonyl clusters functional to nanomaterials, nanotechnologies for optical transmission), the Dept. of Physical Chemistry and Electrochemistry of UNIMI (nanostructured composite materials for fuel cells, nanocrystalline semiconductors for gas sensing), the Dept. of Organic and Industrial Chemistry of UNIMI (photo-optical molecules in nanostructured polymers), the Dept. of Chemistry, Materials and Chemical Engineering of POLIMI (liquid crystals and macromolecules for nano-organised structures), the Dept. of Materials Science of UNIMIB (hybrid nanostructures for photonics, growth of transition metal nanoclusters, nanostructured luminescent oxides, nanotechnologies applied to wood manufacture), the Dept. of Physical Chemistry of UNIPV (nanostructured oxides for functional applications), the Dept. of Physical Chemistry for Engineering and Materials of UNIBS (nanostructured polymers with improved physico-mechanical performances, magnetic nanostructures obtained by lithography, nanostructuring in glasses for second harmonic generation), the Institute for Molecular Science and Technology of CNR (structured magnetic nanoparticles, chalcogenide nanoparticles for chemical and biomedical applications, nano-organisation of molecular components, nanostructured materials for photonic and optoelectronic, hybrid nanosystems for fuel cell developments, surface and interface nanofunctionalisation, nanoengineering of high-performance thermoelectrics, molecular manipulation for nanometric machines), the Institute for Macromolecular Studies of CNR (designed nanostructured hybrid polymers) and the Institute for the Energetics and Interphases of CNR, in both Milano and Pavia (high-temperature synthesis of nanoparticles for sensing and power generation, nanostructured ceramics).

The research groups active in **Biotechnology** are more localised than those active in the other fields, as their competences are a combination of organic chemistry, biochemistry and biology. The studies in this field occur primarily at the Dept. of Organic and Industrial Chemistry of UNIMI (bioactive compounds in medicinal plants, biodegradation of organic pollutants, peptide nucleic acids, chemoenzymatic synthesis of chiral compounds), at the Institute of Organic Chemistry of the Faculty of Pharmacy of UNIMI (modification of pharmaceutical

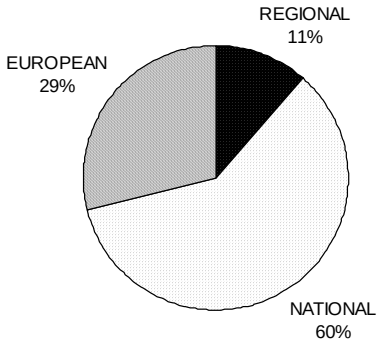
compounds with isolate enzymes and microbial cells, enzymatic enantioselective oxidation of fine chemicals, biotransformation of conjugated polyenic systems), at the Dept. of Chemistry, Biochemistry and Biotechnolgy for Medicine of UNIMI (compounds with cancer chemopreventive activity, study of molecular recognition in biological interactions, development of synthetic vaccines), at the Dept. of Chemistry, Materials and Chemical Engineering of POLIMI (whole cell biocatalysis, enzymatic manipulation of non-natural aminoacids and phospholipids), at the Dept. of Biotechnology and Bioscience of UNIMIB (biocatalysis, metabolic engineering, bioinformatic platform for protein structure investigation and new drug design, computational investigation on proteic systems and biomimetic metal complexes), at the Dept. of Organic Chemistry of UNIPV (bioactive compounds from medicinal plants and higher fungi, biomimetic methodologies, stereocontrolled synthesis of bioactive compounds), at the Dept. of General Chemistry of UNIPV (metalloenzymes and chemical biomimetics, metal ions in metabolic processes), at the Institute for Molecular Science and Technology of CNR (bio-organometallic synthesis of DNA analogs, bioactive heterocyclic compounds), at the Institute for the Chemistry of the Molecular Recognizing of CNR (inhibitors of proteinases for cancer and heart failure therapy, small molecules for targeting of angiogenesis, nanobiosensors for intermolecular interaction, stereospecific bio- and enzymo-catalysis) and at the Experimental Stations for studies on Silk (SSS) and on Paper and Paper Derivatives (SSCCPC) (biotechnologies for textile processes, high-performance industrial protein matrices through bioprocessing, enzyme modification of lignocellulosic fibers).

Then, a smaller number of research teams is involved in the **Environmental Pollution Monitoring** and they are mainly located in only 5 institutions, namely the Dept. of Inorganic, Metallorganic and Analytical Chemistry of UNIMI (characterisation of aerosol particulate matter, determination of natural organic matter from soil, sediment and water, biowaste composting process), the Dept. of Physical Chemistry and Electrochemistry of UNIMI (removal of PCB by electrochemical methods, determination of heavy metals at ultratrace level), the Dept. of Chemistry, Materials and Chemical Engineering of POLIMI (bioremediation of contaminated soils, modelling of volatile pollutant formation), the Dept. of General Chemistry of UNIPV (speciation of organic and inorganic compounds in seawater, investigation of metal species in beverages, development of receptors for pollutants) and the Dept. of Chemical and Environmental Sciences of UNINS (determination of trace and ultratrace pollutants in environmental matrices, new analytical instrumentation and chemometric techniques for environmental monitoring, interaction between environmental pollution and surfaces of historical monuments).

Finally, only few groups (6 out of 90) carry out studies on **Conservation and Restoration of Cultural Heritage**. This is a quite surprising figure, if one considers the huge amount of historical monuments to be studied and restored in Italy. The teams involved in this field of activity are located at the Dept. of Inorganic, Metallorganic and Analytical Chemistry of UNIMI (archaeometrical studies on pottery, resins and food residues, laboratory and on-field

spectroscopic identification of artistic pigments), at the Dept. of Chemical and Environmental Sciences of UNINS (interaction between environmental pollution and surfaces of historical monuments, analytical investigation of ancient mortars, application of chemometrics in archaeometry), at the Dept. of Physical Chemistry for Engineering and Materials of UNIBS (advanced laboratory techniques applied to conservation of historical stones), at the Pavia section of the Institute for the Energetics and Interphases of CNR (provenance assignments of archaeological obsidian, marble and ceramic artefacts) and at the Experimental Station for studies on Silk (SSS) (conservation of historical textile materials).

Likewise, one of the aims of the present survey is to estimate the number and the type of the **official running projects** in which the research groups are involved. The total number of projects resulted **192**, which implies an average number of projects per group of **2**. The largest part of them is financed by national Italian institutions, a third by European ones and only a small part of it by Regional organizations (mainly by CARIPLO Bank Foundation) (*Graph 4*).

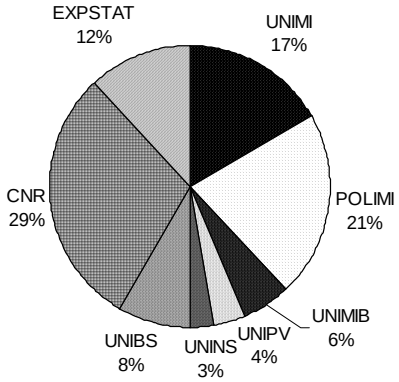


Graph 4. Project type

The European projects are primarily focussed on Reaction and Processes Design, Materials Technology and Biotechnology, followed by few projects based on conservation of Cultural Heritage and Environmental Protection. A similar distribution is observed in the projects funded by the Italian government, but, in this case, Reaction and Process Design represent the main topic in national programmes (more than one third of the overall projects). At regional level, since CARIPLO Foundation directed its funding predominantly towards the development of Materials Technology, the 60 % of the projects converge on this subject. It is worth highlighting that, in several cases, the project titles do not match with the main competences described in the questionnaire by each research group. This means that the available national and supra-national project themes do not cover completely the existing know-how that in Lombardy. As an example, a great funding effort is devoted to crucial fields, such as the development of novel intelligent materials with improved physico-chemical properties or the enhancement of biotechnological processes enabling new synthetic routes. Nevertheless, other key topics for a sustainable chemistry, such as the development of innovative environmentally and economically friendly processes to commodities and fine chemicals or the use

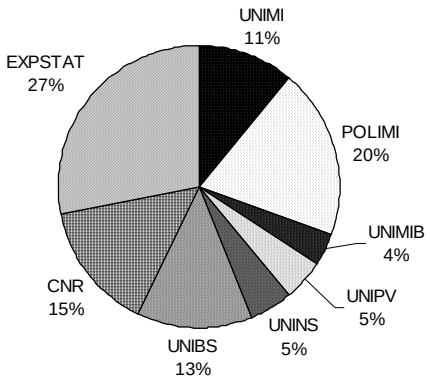
of renewable raw materials instead of compounds from fossil origin, are often neglected and this could be a drawback in keeping a high level competitiveness in chemical industry. Similarly, the small number of projects dealing with pollution monitoring and prevention could be somehow undersized for a region, as Lombardy, hosting the 16 % of the Italian population and the 41 % of the Italian chemical industry and coping daily with atmospheric and groundwater pollution problems.

With regard to the **running collaborations between research institutions and industry**, it is worth splitting the partnerships with large enterprises (LE; with more than 100 employees) and those with small or medium enterprises (SME). In this census, **190** collaborations have been recorded, of which **108** with LE (*Graph 5*) and **82** with SME (*Graph 6*).



Graph 5. Collaborations with Small-Medium Enterprises

In both cases, the Technical University (POLIMI), the National Research Council (CNR) and the four Experimental Stations (EXPSTAT) all account for about two thirds of the partnerships with industries. Actually, these institutions have, among their missions, the technological transfer from the base research to the industrial application in a more marked way than universities. In particular, the competences of CNR seem to be preferentially chosen by LE, while those of the Experimental Stations are the privileged choice of SME. Furthermore, these data reveal that cooperation between academic or public research is stronger and easier if the companies are considerable in size, whereas it is weaker if they are small.



Graph 6. Collaborations with Large Enterprises

The Italian national Ministry of University and Research (M.I.U.R.) has recently started a process of restructuring the university structures with the aim of concentrating research activities and focusing on research excellence. In Lombardy three Centres of Excellences have been assigned: NEMAS (NanoEngineered Materials and Surfaces) of the “Politecnico” of Milan *http://nanolab.cesnef.polimi.it/*, CIMAINA (Interdisciplinary Center for Nanostructured Materials and Interfaces) of the University of Milan *http://users.unimi.it/cimaina/* and CISI (Centre for bio-molecular Interdisciplinary Studies and Industrial applications) of the University of Milan *http://bioinfo.itb.cnr.it/cisi/*.

3.3 RESEARCH COMPETENCES IN THE PRINCIPALITY OF ASTURIAS

In this compilation of information a series of research groups of investigation in the University of Oviedo, fitted basically by Departments, has been identified. In the field of Chemistry and Chemical Engineering the following units were considered:
Dept. of Organic and Inorganic Chemistry
Dept. of Physical and Analytical Chemistry
Dept. of Physics
Dept. of Chemical Engineering and Environmental Technology
Dept. of Energy
Dept. of Materials Science and Metallurgical Engineering
Dept. of Construction and Manufacturing Engineering
Dept. of Exploitation and Mining

Close to the University Groups of Investigation, the investigation and public innovation in Asturias it is led by the Technological Centres, among which :
INCAR – National Institute of Coal
- *Dept. of Science and Technology of Coal and Coal Products*
- *Dept. of Environmental Chemistry*
- *Dept. of Materials Chemistry*
- *Dept. of Energy and Environmental Technology*

SERIDA – Regional Department for Agricultural Food Production Research and Development, *Research Department*
IPLA – Asturias Dairy Products Institute, *Research Department*
LILA – Interdisciplinary Milk and Agricultural Food Production Laboratory of Asturias
ITMA – Material Technological Centre

The compilation of chemical competences in chemical in Asturias allowed us to state that a good part of the lines of research that follow the main research groups in Asturias are in agreement with the European Platform of Sustainable Chemistry and they focus on three areas that in the Platform distinguish themselves as priority fields of activity, namely Materials Technology, Reaction and Process Design and Biotechnology.

Materials Technology

The European Platform of Sustainable Chemistry includes several areas of interest in the Materials Technology:

Novel productive processes
The modern technology requires materials with a variety of properties, with a low obtaining cost versatile enough to be transformed into structural elements in the manufacturing processes. The modern technologies associated with the industrial contemporary production, demand product development which accomplishment is linked to the use of materials with specific properties and the

selection of procedures better adapted to the economic success of the products.
The new general production lines, tend to shape trustworthy light and resistant materials with an ideal economy of resources. Inside this great research area can be included the investigations carried out in Asturias by several research groups active in:
Minerallurgy and Recycling, Siderurgy, Metallurgy and Materials, Rocks and Industrial Minerals Technology, Functional Porous Materials, Solid State Chemistry.
The research groups of the Technological Centres related to this area are:
the Technological Centre of Materials (ITMA), the group of Composed Materials of the Coal Institute (INCAR), the Carbon Materials Surface Chemistry Group of INCAR.

Sustainable technologies in the field of energy and environment
The introduction of the new materials in the industries is motivated by the energy saving in the manufacturing processes and the elimination of harmful residues for health and environment. In this area, there are several research groups in Asturias.

Functional or intelligent materials
The Functional or Intelligent materials represent those materials that are both useful for their structural, chemical, physical or mechanical properties and are capable of playing a role in a process. This means, that for effect of electricity, magnetism, deformation, heat or chemical reaction, can be activated and be an important physical, chemical or mechanical agent. These materials have an operative function inside a system, not only inside the Engineering, but also inside other areas of knowledge.
The University of Oviedo has research groups centred on this area:
Polymer and Composed Materials, Magnetism and Intermetallic Compounds, Inorganic Polymers.

Nanotechnology and nanoscience.
The University of Oviedo has research groups centred on this area dealing with:
Theoretical Physics of the Condensed Matter, Behaviour under Working Conditions of Metallic Materials, Magneto-optics, Magnetism of Amorphous and Nanostructured Materials, Magnetism of Thin Layers and Amorphous and Nanostructured Films, Nanosensors and Nanostructured surfaces.
Likewise, the National Institute of Coal has a research group in Nanostructured Materials for Structural and Functional applications.

Reaction and Process Design

Optimisation of the processes of production
There are research groups active in the optimisation of processes and technologies of the agrarian and agroalimentary system in the Regional Service of Research and Agrarian Development (SERIDA). In a different area, within the

National Institute of Coal (INCAR), there is a research group specialized in the optimisation of the coking processes.

New Synthetic and Reactions routes
One of the objectives on this area is the development of new reactions of interest, which allow to overcome in many reactions some of the difficulties mentioned in the literature.
There are different the Groups of the University of Oviedo that can be mentioned inside this section and are active in:
Bioprocesses and Reactors Technology, Reactive Processes of Separation, Modelling in Chemical Reactivity, Organic and Organometallic Synthesis.

Catalysis
Here it is possible to mention the following Groups from University of Oviedo that support lines of research on the Catalysis:
Reactors and Control, Kinetic Electrochemistry, Organometallic Chemistry and Homogeneous Catalysis.

Biotechnology

The technological centre SERIDA plays the major role in the biotechnological research.
SERIDA develops research tasks focused on the study of the Genetics and Animal Reproduction and is also studying the development of new vegetable varieties and the detection and identification of pathogenic in hortofruit cultures and forest.
Also, the University of Oviedo has several Research Groups related to this area: Biological Processes of Development, Biocatalytic Processes applied to the preparation of biologically interesting compounds.

After this one follow-up of the competences in Chemical matter in Asturias we can conclude that there exist three well separated research areas, which are the Technology of Materials, the Design of Reaction and Process and the Biotechnology.
Inside the area of the Technology of the Materials, the majority of the studies are centred on the field of the Nanotechnology and Nanoscience. The area of the Nanotechnology includes knowledge areas related to Chemistry, Chemical Engineering, the Environment, Biotechnology and Physics. That is why exists a Thematic Association of Research ("clusters" of knowledge), the Nanotechnology ATI in the University of Oviedo.
With these objectives in mind, the Thematic Association of Nanotechnology Research includes several groups from Departments of: Organic and Inorganic, Physical and Analytical Chemistry, Energy and Physics, of the University of Oviedo, and the National Institute of the Coal (INCAR).
Inside the area of Reaction and Process Design, the majority of the research topics are centred on the development of new synthetic routes and reactions,

including in this section topics related to the production of chemical basic, intermediate products and of fine chemistry and the organic synthetic chemistry.

Finally the area of Biotechnology includes the majority of research groups of SERIDA. The University of Oviedo created The Biotechnology Institute of Asturias (IUBA), bringing together diverse research groups of the Departments of Functional Biology, Biology of Organisms and Systems, Biochemistry and Molecular Biology, Chemical Engineering and Technology of the Environment and Organic and Inorganic Chemistry. The IUBA wants to bring together and promote the multidisciplinary researches to reach levels of excellence in the postgraduate education.

4.
CONCLUSIONS

4. CONCLUSIONS

The resulting picture, based on the information received, is not exhaustive, but it can be considered rather representative of the research competences in Saxony-Anhalt, Lombardy and Asturias.

The three regions are at different stages of development and with different experiences in R&D. However, the Census allows us to state that in the three regions most of the human resources are involved on the area that the European Technological Platform for a Sustainable Chemistry points out as prior: Materials Technology, Reaction and Process design and Biotechnology.

However, the peculiar competences in these main fields are neither evenly distributed throughout the institutions, nor rigorously concentrated in especially devoted research Centers, but the situation is rather articulated, as many groups developed polyhedral expertise in different topics.

Quite similar approaches has recently been developed to start a restructuring process of the public research structures, with the aim of concentrating research activities and focusing on research excellence. In Lombardy three Centers of Excellences have been assigned by the Ministry of University and Research (M.I.U.R.): NEMAS (NanoEngineered Materials and Surfaces) Politecnico of Milan, CIMAINA (Interdisciplinary Center for Nanostructured Materials and Interfaces) of the University of Milan and CISI (Centre for bio-molecular Interdisciplinary Studies and Industrial applications) of the University of Milan.

In Saxony-Anhalt new technology Centre for nano-technology will be established in Halle (TGZ III) for joint research projects. The University of Oviedo created the Biotechnology Institute of Asturias (IUBA), brings together diverse research groups. With the same objectives the Thematic Association of Nanotechnology ATI has been founded at the University of Oviedo in relationship with the National Institute of the Coal (INCAR).

With regard to the Regional, National and European financed projects in which the research groups are involved, in several cases, the project titles do not match with the main competences described in the questionnaire by each research group. This means that the available national and supra-national project themes do not cover completely the existing know-how. As an example, in Lombardy a great funding effort is devoted to crucial fields, such as the development of novel intelligent materials with improved physico-chemical

properties or the enhancement of biotechnological processes enabling new synthetic routes. Nevertheless, other key topics for a sustainable chemistry, such as the development of innovative environmentally and economically friendly processes to commodities and fine chemicals or the use of renewable raw materials instead of compounds from fossil origin, are often neglected and this could be a drawback in keeping a high level competitiveness in chemical industry.

It is worth to highlighting that the small number of projects dealing with pollution monitoring and prevention could be somehow undersized for Regions like Saxony-Anhalt and Lombardy. In fact Saxony-Anhalt represents the hearth of the German chemical industry, while Lombardy hosts the 16% of the Italian population and the 41% of the Italian chemical industry, coping daily with atmospheric and groundwater pollution problems.

With regard the collaboration between public research institution and industry, our Census reveals that cooperation is stronger and easier if the companies are of considerable size, whereas it is weaker if they are small. In this contest, we should take into account the weight and importance of SMEs. Their role is not at all marginal in the European chemical industry, whereas in Lombardy it is of paramount importance. It is demanding to emphasize the link between Universities and public Research Centres in the three Regions involved with special researcher and teacher exchange programmes and with exchanges of researchers between Universities and companies of different Regions. In this contest, the association for the support of the development of polymer and plastic technology in Central Germany- Polykum e.V. has the task of establishing and strengthening the cooperation between universities, research institutions and SMEs in the polymer processing industry

The Census should be used to facilitate development of joint research projects between entities in different Regions permitting more active participation in European support programmes and projects supported in the future by the Regions themselves.

In the last ten years the support of the chemical research has been a very limited part of the activities carried out by the European Union. Chemistry has been only indirectly supported as part of new materials, of life science environment and life quality.

In order to really succeed to strongly support innovation in the chemical industry, in agreement with the priority of a *European Technological Platform for a Sustainable Chemistry*, the way to follow should be the implementation of a co-ordinated regional, national and European strategy that involves industry, public research community and governments.

CENSUS OF THE "CHEMISTRY" RESEARCH IN SAXONY-ANHALT

Table of contents

1. Drug development and speciality chemicals

In the chemical region of Central Germany and in particular in Saxony-Anhalt lie the grassroots of the German chemical industry. The traditional chemical centres of Bitterfeld and Wolfen, or Leuna and Buna form part of the so called "chemical triangle". The city of Halle is located at the intersection of this historic chemical triangle and the new biotec-triangle Halle-Magdeburg-Quedlinburg/Gatersleben. This overlap is the basis of excellent research and development in chemistry and pharmacy directed to biological and medicinal applications. At the same time, the advanced speciality and fine chemicals industry provides an ideal background for the production of advanced ingredients, from grams to multi-ton scale.

The research in the cluster “Drug development and speciality chemicals” focuses on:

- Development of lead compounds, development candidates, and target identification (neurobiology, diabetes, cancer, etc);
- Synthesis and development of drug components and other active ingredients, with extraordinary competence in chemical syntheses, complemented by expertise in green (and white / grey) biotechnology, phytochemistry, and use of renewable resources (biomonomers, nutraceuticals, dietary supplements, cosmetics);
- Protein chemistry (bio-chemistry, structure and folding, peptides und proteins, mimetics, fermentation, diagnostics, serums);
- Synthesis development for fine and speciality chemicals (supplier of pharmaceutical ingredients and building blocks for discovery research and production, DVD and film technology, liquid crystals, new materials, flavours & fragrances).

With regard to plant and production site-related services the following competences can be identified:

- Process technology and engineering services (e.g. crystallisation, fermentation, chromatography, plant safety, plant planning and development);
- Analytics (with focus on mass spectrometry (MS) with all MS-techniques, nuclear magnetic resonance (NMR), fluorescence microscopy, thin layer and film technology, and phytochemical analytics);
- Chem-informatics and bioinformatics (including modelling, drug design, mass spectrometry, special data-bases).

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2. New Materials

In the field of basic research, interesting approaches have been developed in Saxony-Anhalt in the area of development of “intelligent materials”. This refers to specific applications whereby new material properties are established through the special combination of materials, the application of structures with decreasing sizes as well as novel technologies. The aim is to generate new developments, where the implementation of nano-structured components leads to the development of new material or new systemic properties of a compound.

In the area of Halle the leading research institutions with competence in these areas are the Martin-Luther University, the Max-Planck Institute of Microstructure Physics and the Fraunhofer Institute for Mechanics of Materials. Additionally, the University of Magdeburg possesses interesting expertise in the field of materials research (e.g. in the following fields: semiconductors for optoelectronic applications, semiconductor-nano-structures, ferroelectronic thin layers).

Porous materials:

- Macro porous silicon (photonic crystals, magnetic microstructures through pore filling, coating of pores through polymer tubes, micro-biochemical reactions of proteins in these tubes, new pumping technologies,
- Controlled porous aluminum oxide;
- Nanoporous glasses for filtering, supports for catalysts

Nano-particles, nanowires (DFG research focus)

- Embedded Ag- und Au-nanoparticles in dielectric materials (glasses and polymers) for optical applications;
- Preparation of Si-nanoparticles by reduction of thin SiOx-layers for generation of luminescence in the visible spectral region
- Complex one-dimensional nanostructures;
- Multifunctional one-dimensional nanostructures;
- Microstructuring of ferroelectric materials for non-volatile memories.

Polymer materials

- copolymerisation,
- nano-composites crystallization,
- multilayered structures

Thin layers: magnetic thin-layers systems, GMR, spin electronics;

Materials for flexible electronics

- Electric functional ceramics based on $BaTiO_3$
- Functional layers (TGZ Chemistry Bitterfeld/ Wolfen).

Specific technologies: interference colour printing, nano-print technique, wafer bond (MPI, Fh-IWMH), sintering with microwaves (MLU), CVD and PVD (University of Magdeburg); Wet coating technology and modification of surfaces (TGZ Chemistry Fh-IWMH);

Dust-free rooms (MPI, University of Magdeburg)

Additionally, Halle has advanced scientific competences in material analytics.

Future Investments:

New building for the Fraunhofer Institute for Mechanics of Materials (2005/07)

TGZ III (Nano-structured materials) (2006/07)

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3. E-services for transregional Networks

With the support of Saxony-Anhalt and the Fraunhofer Association (FhG) a new **Virtual Development and Training Centre (VDTC)** will be established with a total investment of ca. 15-18 Mio €. The construction of the VDTC will be finished until 2005. Together with its responsible body, the **Fraunhofer Institute for Factory Operation and Automation**, the VDTC is already today an internationally recognised partner for applied research and innovative services with particular excellence in the following fields:

- Competences and methods of interactive visualisation and simulation;
- Methods and systems of qualification, training and know-how-distribution;
- Knowledge transfer among various branches and technological areas;
- Sustainable bundling of cooperation partners from enterprises, universities and research institutes;
- Supply of VR-based instruments and methods, in particular for regional medium sized businesses (supplying industry, educational institutions, etc.);
- Further objectives of VDTC include, inter alia, support of regional scientific- and economic clusters, e.g.:
- Automotive supply industry, mechanical and plant engineering and construction, machine tool manufacturing, as well as logistics and mobility industry**.** (Primary focus of Thuringia, Saxony, and Saxony Anhalt);
- Chemical industry (Saxony-Anhalt and Saxony);
- Optical tool building or production and process engineering (Thuringia).

Furthermore, the VDTC will serve as a platform for cluster integration into transnational networks.

Exemplary in this field is the **competence network "Innovative IT-services for the Improvement of Business Processes in medium-sized business and administration"** which brings together IT-enterprises and the Fraunhofer IFF. The competence network should, in medium-term perspective, operate at the Europe-wide scale. The objective is the establishment of a long-lasting relationship between the competence network and the VDTC. In order to ensure the sustainability of realised projects**,** selected project results will be transferred to VDTC.

During the first project phase**,** electronic services for the management of so called “shut downs” (short term shut downs of large-scale plants) will be worked out. Usage of e-Services should result in cost-savings for plant operators. Furthermore, local enterprises will profit from access to larger markets by offering their services in a cooperative network that extends beyond the borders of Saxony-Anhalt. As a consequence the project will have positive effects for the whole chemistry region of Saxony-Anhalt. The Fraunhofer IFF, as a research partner, contributes to the projects through its competences in particular in the fields of logistics and logistic technologies, professional know-how, expert knowledge of GIS, qualification, training and knowledge management. Besides the chemical industry, further application fields for eServices are pharmacy and the petrochemical industry.

A further example is the VDTC-PRODIMA project, which incorporates VR-technologies into different phases of development, production and operating of procedural sites. The VR-platform, which was developed for this purpose, constitutes the basis of the knowledge loop from operator to developer.

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The **Leibnitz Institute for botanical biochemistry** is working on a data base for natural products from plants and higher fungi (Phytobase®), a scientific instrument, which enables sophisticated analysis of validated spectroscopic and physiochemical data of secondary metabolites and their bioactivities via multifunctional search tools.

Using up-to-date methods of computer chemistry for the design of active compounds, the institute has extensive competence in the 3D-structural modelling of proteins as a prerequisite for structure-based design of active compounds; automatic docking methods for the analysis of optimal interaction between ligands and their target proteins; programmes for automatic structure generation and prediction of potential new active ingredients, as well as an extensive pool of quantal-chemical programmes.

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Within the framework of the general network theory, the **Max-Planck-Institute Dynamics of Complex Technical Systems** in Magdeburg develops modular models for chemical and biological systems and implements them by the object-oriented modelling tool PROMOT. These models can afterwards be simulated, optimised and analysed within the simulation environment DIVA. Both tools are unique, and in their capabilities they outperform any currently available commercial process-simulators.

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4. Polymer research

The association for the support of the development of polymer and plastic technology in Central Germany- “Polykum e.V.” has the task of establishing and strengthening the cooperation between universities, research institutions and small and medium sized enterprises in the polymer processing industry. The main goal is to promote transferable research potentials and to initiate cooperation for the production of new, competitive products as well as the use of innovative technologies. For this purpose workshops for the dissemination of information and establishment of contacts are organised. At the same time there is constant information for SMEs about the work and research focus of scientific organisations, published on the website (www.polykum.de). Additional online information concerns the equipment of analysis devices as well as the technical equipment of the research institutes.

Of special importance for the development of polymers and their processing in Central Germany is the establishment of the “Fraunhofer Pilot Plant Centre for polymer synthesis and processing” in Value Park in Schkopau (Finalisation in June 2005). The Fraunhofer Institute IAP (Institute for Applied Polymer Research in Golm) and the IWM (Institute for Mechanics of Materials in Halle) are managing the project. The centre is open for scientific institutions as well as for enterprises, which often lack their own research capacities. Furthermore, a new technology centre for nano-technology will be established in Halle. In conjunction with nano-technology, chemistry and development of new materials are often being put together. Hence the crucial role is played by nano-structured components (nano-products) and materials, which through addition of nano-particles change their properties considerably. While typical nano-products still belong to the area of fundamental research, the number of products, which benefit from nanotechnological knowledge, is increasing (e.g. nanocompounds, flexible electronics, surface finishing). Therefore, the exchange of knowledge, research-oriented services and transfer of scientific solutions into products are goals for a better use of regional potentials.

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Institution	Field of work	Research Focus
IPW **Institut für Polymerwerkstoffe e.V.** **Geusaer Str.** **06217 Merseburg** **Prof. Dr. Michler**	● development, production, specification and testing, processing and application of polymer : ●morphology and micromechanics ● plastics testing and diagnostics ● plastics processing and recycling ● synthesis and chemical modification	- investigation of the structure and morphology of polymer - mechanical and thermal testing of plastics - non-destructive testing of plastics - fracture mechanical material testing and component analysis - biocompatible materials and medical implant - plastics processing and modification - recycling of polymer materials - development of new polymer materials - chemical functionalisation - reactive blend production
IWMH **Fraunhofer Institut für Werkstoffmechanik Halle** **Heideallee 19** **06120 Halle** **Dr. Michael Busch** **www.iwmh.fhg.de**	● new application of materials ● security and availability of components ● simulation of manufacturing ● components with functional surfaces	- polymer - fibre reinforced materials - bio- und biomedical materials and implants - interface phenomenon - wear protection, tribology - component simulation - coating, structuring of surfaces
MLU **Martin-Luther-Universität Halle-Wittenberg,** **Fb Ingenieur-wissenschaften,** **Professur Kunststofftechnik** **Geusaer Str.** **06099 Halle/Saale** **Prof. Radusch**	● polymer blends ● reactive compounding ● machining of solids ● electrical isolation materials ● bio-polymer/ biomedical materials ● rubber and gum/ thermo-plast-elastomer-compounds ● plastics recycling	- characterisation of relations of morphological characteristics of polymer blends - examination of plastic deformation of polymers in relation to various operational demands - Improvement of rubber mixtures and elastomer-compounds, kinetic of cross-linking.

Institution	Field of work	Research Focus
MLU Halle-Wittenberg, **Fb Ingenieurwissen-schaften,** **Professur Allg. Werkstoffwissen-schaften** **Prof.Dr. Georg Michler**	● elektron microscopy and atomic force microscopy in material research ● micro-mechanical processes of deformation and breakage in polymers ● mechanism of tenacity in heterogenic polymers and their modelling ● structure-property-relations of polymer materials ● modification of polymer materials for property improvement	- relations between structure, micro-mechanics and properties of polymer micro-foams - improvement of tenacity of polymers through phase transformation; - analysis of structure-property-relations of modified semi-crystalline plastics through an investigation of micro-mechanical processes.
MLU Halle-Wittenberg, **Institut für Werkstoffwissen-schaften, Professur Werkstoffdiagnostik/ Werkstoffprüfung** **Prof. Dr. Wolfgang Grellmann**	● static and dynamic investigation of materials, ingredients diagnostics of plastics and compounds ● experimental methods of technical fracture mechanic ● morphology-tenacity-correlations of plastics ● clarification of crackinitiation and crackgrouth of plastics ● non-destructive plastics diagnostics ● improvement of circulation ability of polymer materials composites	- tenacity-optimised heterophasige polyolefin ingredients - fracture mechanical characterisation of rubber by quasi-static and abrupt loading - assessment of damage mechanisms for joining technology of for plastics through local laser optical Elongation measurement - examination of mechanical performance of bio-compatible materials and medical implants.
Polymer Service GmbH Merseburg **Geusaer Str.** **06217 Merseburg** **Prof. Dr. W. Grellmann** **Prof. Dr. G.H. Michler**	● polymer synthesis and – modification ● plastics technics ● characterisation, testing and diagnostics of plastics ● rubber and gum ● circulation ability of polymer materials	Accredited testing laboratory

Institution	Field of work	Research Focus
FH Merseburg, **Fb Chemie- und Umweltingenieurwesen** **Geusaer Str.** **06217 Merseburg** **Prof.Dr. Horst Hartmann** **www.fh-merseburg.de**	● environmental protection and disposal ● statistics and consultancy ● chemistry und synthesis	**Chemistry and Synthesis:** - synthesis und characterisation of dyestuffs and components for functional materials - rubber synthesis - polymer synthesis and analytics, polymerisation processes - interpretation of reaction- and technical processes **-** environmental analytics - thermal material separation processes **-** plastics recycling
PPM e.V. **Pilot Pflanzenöltechnologie Magdeburg e.V.** **Berliner Chaussee 66** **39114 Magdeburg** **Dr. Frank Pudel** **www.ppm-magdeburg.de**	- Vegetable oil technology Bio-polymers	Business unit bio-polymers: - development of bio-polymers based on vegetable oils and botanical resin - compounding with starch and fibres - compounding of all thermo-plastic materials - testing of plastics - development of additives for plastics industry based on renewable resources
IKTR **Institut für Kunststoff-technologie und –Recycling e.V.** **Radegaster Str. 14** **06369 Weißandt-Gölzau** **Prof. Marinow**	● R & D-services for manufacturing, modification, processing and application of polymer- and rubber-based materials, ● services for characterisation and examination of plastics ● consultancy in the field of up scaling	**-** development of materials for corrosion protection based on rubber-dispersions, production- and application technologies - development of unchlorinated, recycling-optimised plastisolen and organosolen based on polyolefin, manufacturing and application technologies.

CENSUS OF THE "CHEMISTRY" RESEARCH IN LOMBARDY REGION

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION UNIVERSITA' DI MILANO- Dip. Chimica Inorganica, Metallorganica e Analitica
LOCATION (postal address) via Venezian 21 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) D'Alfonso Giuseppe, Full Professor ADDRESS (fax, e-mail) fax ++39 2 503 14405 giuseppe.dalfonso@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 2	POST-DOC: 1
Ph. D.: 1	STUDENTS:
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. *Clusters assembly through metal-metal and metal-ligands interactions*
2. *Activation of E-H bonds for hydrogen transfer*.
3. *Reactivity of fluoro-boranes with Lewis and Bronsted bases.*

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

1) METAL CARBONYL CLUSTERS FUNCTIONAL TO NANOMATERIALS
2) CHIMICA PER MATERIALI AVANZATI E PER L'AMBIENTE

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

Basell Poliolefine (Ferrara)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Synthesis of mono and polynuclear organometallic compounds, in particular transition metal hydrides and carbonyl complexes. Spectroscopic characterisation in solution, mainly by NMR spectroscopy (mono and two-dimensional). Investigation of dynamic behaviour, reaction mechanisms, detection of unstable intermediates, determination of kinetic and thermodynamic parameters. Characterisation of weak interactions (unconventional hydrogen bonds, agostic interactions). Synthesis of extended frameworks and nanomaterials using polynuclear complexes as building blocks. Synthesis of luminescent complexes.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Università degli Studi di Milano
LOCATION (postal address) Dipartimento di Chimica Inorganica, Metallorganica e Analitica Via Venezian 21, 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology **X**- Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Edoardo Cesarotti Full Professor of General and Inorganic Chemistry ADDRESS (fax, e-mail) edoardo.cesarotti@unimi.it 02.503-14405
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 2	POST-DOC:
Ph. D.:1	STUDENTS: 3
TECHNICIANS:	OTHERS: 2

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Asymmetric hydroformylation with phosphine complexes of VIIIb group elements.
2. Asymmetric hydrogenation with phosphine complexes of VIIIb group elements.
3. Preparation of chiral phosphines and optically active cyclopentadienyl ligands.
4. Asymmetric catalysis with chiral cyclopentadyenil complexes of group IIIb elements.
5. Preparation of ferroelectric liquid crystals based on organic molecules incorporating metals.
6. Preparation of bioactive molecules by catalysis with microbial cells and enzymes.
7. Preparation of bioactive molecules by kinetic resolution and by dynamic kinetic resolution.

RUNNING PROJECTS (official title is required):

REGIONAL: METALLO-MESOGENI POTENZIALMENTE FERROELETTRICI: SNTESI DI CRISTALLI LIQUIDI INCORPORANTI METALLI

NATIONAL: STRATEGIE PER L'OTTIMIZZAZIONE DI LEGANTI CHIRALI PER LA CATALISI OMOGENEA STEREOCONTROLLATA. FIRB 2003 – FINANZIATO DAL MIUR; COD: RBAUO1FEPP

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

ACS Dobfar

Fournier-Pharma

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION University of Milan - Dipartimento di Chimica Inorganica Metallorganica e Analitica
LOCATION (postal address) Via Venezian 21 20133 Milano Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) x - Recent developments in nanoscience and nanotechnology x - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Prati Laura , associate professor ADDRESS (fax, e-mail) Fax +39 50314405 e-mail Laura.Prati@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: -	POST-DOC: -
Ph. D.: 1	STUDENTS: 3
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Catalytic liquid phase processes for fine chemicals production
2. Metallic nanoparticles – production, characterisation and application to catalysis
3. Catalytic solutions for pollutant disposal

RUNNING PROJECTS (official title is required):
EUROPEAN:
Catalysis by gold – Research Training Network

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
Cargill
Max Plank Institute
CNRS – Lyon

EXPERTISE (100 words max.)
Recent studies dealing with the oxidation of polyols in liquid phase, show that low selectivity and poisoning problems, typical of platinum group metal catalysts, can be overcome by using gold based catalysts. The expertise of the team is finalised to the wide application of this metal, both as catalyst and modifier, in the liquid and gas phase oxidation of various substrates in order to provide new chemical processes characterised by a low environmental impact for the synthesis of wide-use as well as high added-value organic compounds.
A second expertise lies in the removal of organic pollutants from waters; in particular catalytic systems for wet air catalytic oxidation have been developed.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Dipartimento di Chimica Inorganica, Metallorganica e Analitica – Università degli Studi di Milano
LOCATION (postal address) Via G. Venezian, 21 - 20133 Milano (Italia)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology **X** - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Bruni Silvia, Prof., associate professor ADDRESS (fax, e-mail) fax +39-0250314405 e-mail: silvia.bruni@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC:
Ph. D.: 1	STUDENTS: 2-3
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Identification of artistic pigments by laboratory and field spectroscopic techniques
2. Study of provenance, firing conditions and decoration of archaeological pottery by elemental, mineralogical and pigment analysis.
3. Identification of archaeological organic residues by instrumental chemical analysis: resins, pitches, food residues.

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL: PROGETTO TARQUINIA, IN COLLABORAZIONE CON LA CATTEDRA DI ETRUSCOLOGIA DELL'UNIVERSITÀ DI MILANO

EUROPEAN:

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Our research group owns the know-how and databases for the chemical analysis by spectroscopic techniques of a wide range of materials of artistic and/or archaeological value, both organic and inorganic, as specified below. Raman spectroscopy is used for the identification of pigments and a portable equipment has been developed in our laboratory. The investigation of ancient ceramics is performed by atomic emission spectroscopy, infrared spectroscopy, visible-NIR diffuse reflectance spectroscopy, X-ray diffraction and energy-dispersive X-ray analysis for the most complete characterization. Archaeological organic residues are identified by infrared spectroscopy, nuclear magnetic resonance spectroscopy and gas chromatography-mass spectrometry. For each class of materials spectral databases have been constructed and are steadily upgraded.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION: DEPARTMENT OF INORGANIC, METALLORGANIC AND ANALITICAL CHEMISTRY-MILAN UNIVERSITY.
LOCATION (postal address): Via Venezian 21, 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)): Cenini Sergio, full professor, senior researcher, Director of the Department. ADDRESS (fax, e-mail): Tel. 02-50314392; Fax 02-50314405: E-mail: sergio.cenini@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 4	POST-DOC:
Ph. D.: 2	STUDENTS: 6
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Reductive carbonylation of organic nitro compounds: synthesis of carbamates and isocyanates, without the use of phosgene, and of heterocycles.
2. Synthesis and use of porphyrin complexes, even chiral, of transition metals as catalysts in the C-C, C-N and C-O bond formation. Extension to the use of Schiff bases and tetraazaderivatives.
3. Synthesis and use as ligands of diimine derivatives of acenaphthenequinone, even chiral, in homogeneous catalysis.
4. Design and synthesis of multitopic ligands and use of them to prepare nonostructural materials showing catalytic activity, and assembled structures having different topology and porosity. Use of organic membranes as support of these new catalysts.

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL: 1) FUNCTIONALIZATION OF HYDROCARBONS WITH HOMOGENEOUS CATALYSTS HAVING NITROGEN LIGANDS. REGIO AND STEREOSELECTIVE SYNTHESIS OF FINE CHEMICALS.
FIVE UNIVERSITIES ARE INVOLVED IN THE RESEARCH (PROF. SERAFINO GLADIALI OF THE UNIVERSITY OF SASSARI AS THE RESEARCH LEADER) : REGIO- AND STEREOSELECTIVE REACTIONS FOR INNOVATIVE PROCESSES IN THE SYNTHESIS OF FINE CHEMICALS CATALYZED BY TRANSITION METALS. COFIN
2) NEW CATALYTIC MEMBRANES AND REACTORS WITH CATALYTIC MEMBRANES FOR SELECTIVE REACTIONS WITH ADVANCED SYSTEMS FOR AN INDUSTRIAL SUSTAINABLE DEVELOPMENT.
SIX UNIVERSITIES ARE INVOLVED WITH PROF. ENRICO DRIOLI (UNIVERSITY OF THE CALABRIA) AS THE RESEARCH LEADER. FIRB

EUROPEAN: METAL PORPHYRIN COMPLEXES AS CHIRAL CATALYSTS IN ÈPOXIDATION, AMINATION AND CYCLOPROPANATION REACTIONS.
JOINT RESEARCH WITH DR. ERIC ROSE, DIRECTEUR DE RECHERCHE CNRS, LABORATOIRE DE SYNTHESE ORGANIQUE ET ORGANOMETALLIQUE, UNIVERSITY OF PARIS VI.

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.):

Well established knowledge in the field of catalytic reductive carbonylation of nitroaromatics; a book recently written on this subject is considered as the reference text for this kind of chemistry; see also Advanced Synthesis and Catalysis, 347(2005)105-120, for the last paper in this field where the most active catalyst known so far for the synthesis of carbamates is reported. Synthesis of new diimine ligands, studies of their properties and their use in the formation of allyl amines and heterocycles, catalysed by Ru(II) and Pd(II). Use of complexes of macrocycles like porphyrins, tetraazaderivatives and Schiff bases of transition metals such as Co(II) and Ru(II), as catalysts for the C-N, C-C and C-O bond formation. Fine chemicals synthesized: allyl amines, secondary amines, aziridines, vinyl aziridines and their transformations into other hetrocycles, cyclopropanes, indoles, oxidation of hydrocarbons with H_2O_2 and/or O_2. The synthesis of many of these products in their chiral form is also carried out.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION University of Milan
LOCATION (postal address) via Venezian, 21 20133 – MILAN (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology X- Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Michele Rossi, full professor ADDRESS (fax, e-mail) Michele.rossi@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:	POST-DOC:1
Ph. D.: 1	STUDENTS:2
TECHNICIANS:	OTHERS:1

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Preparation,characterisation and catalytic application of metal nanoparticles
2. Liquid and vapor phase processes for fine chemicals

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

EUROPEAN: CATALYSIS BY GOLD-AURICAT, GOLD CATALYSED OXIDATION OF GLYCOLS

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees) : BASF, GRACE

WITH SMALL OR MEDIUM ENTERPRISES.

EXPERTISE (100 words max.)

CATALYTIC HYDROGENATION, CATALYTIC OXIDATION, NEW CATALYTIC METHODS FOR ORGANIC SYNTHESIS. SELECTIVE OXIDATION OF ALCOHOLS, ALDEHYDES, AND CARBOHYDRATES. CATALYTIC HYDRODECHLORINATION. PREPARATION OF CATALYTIC SYSTEMS,COLLOIDAL PARTICLES AND SUPPORTED NANOPARTICLES. CATALYTIC TEST FOR FINE CHEMICALS

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Dipartimento di Chimica Inorganica, Metallorganica ed Analitica dell'Università degli Studi di Milano
LOCATION (postal address) Via Venezian 21 Milano 20133
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) UGO Renato, full professor, research leader
ADDRESS (fax, e-mail) Via Venezian 21 Milano 20133 FAX: 02 50314405

HUMAN RESOURCES (number of people involved in the activity fields here above)	
RESEARCHERS: 5	POST-DOC: 0
Ph. D.: 3	STUDENTS: 2
TECHNICIANS: 1	OTHERS (research fellows): 6

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Surface organometallic chemistry including silica-mediated syntheses
2. Synthesis of organometallic compounds as models of surface species
3. Synthesis, characterization and nanoorganization of organometallic and coordination compounds with non linear optical properties

RUNNING PROJECTS (official title is required):

REGIONAL:

CARIPLO 2003 : In the Program "Promuovere la valorizzazione della conoscenza attraverso il sostegno di progetti di ricerca applicata su tecnologie abilitanti" Title of the project: "Materiali ibridi polimerici, sopramolecolari e nanostrutturati, con superiori proprietà di stabilità e di trasmissione di informazioni fotoniche" (coordinated by Prof. R. Ugo).

NATIONAL:

1)**Fondo integrativo Speciale per la Ricerca (FISR) 2001**: Project: "Nanotecnologie molecolari per l'immagazzinamento e la trasmissione delle informazioni" directed by Prof. Fragalà; sottoprogetto 1 "Nanotecnologie per la comunicazione ottica".

2)Fondo per gli Investimenti della Ricerca di base (FIRB) 2001: Project: "Nanoorganizzazione di molecole ibride inorganiche/organiche con proprietà magnetiche ed ottiche" directed by Prof. D. Gatteschi; Research Unit 6.

3)PRIN 2003: Project: "Proprietà di singole molecole ed architetture molecolari funzionali supportate: caratterizzazione chimico-fisica, sviluppo di sintesi chimiche e di sistemi per l'indagine" coordinato dal Prof. D. Gatteschi; Specific title: "Chimica organometallica di superficie e nanoparticelle metalliche, caratterizzate con modelli molecolari e tecniche spettroscopiche e chimico-fisiche di superficie".

4) PRISMA 2003: Project: "Materiali ibridi filmabili a base polimerica con proprietà ottiche non lineari stabilizzati strutturalmente nel tempo" coordinated by Prof. R. Ugo; Specific title: "Complessi di Zn(II) con leganti π-delocalizzati opportunamente funzionalizzati e loro inserimento in network supramolecolari di poli(amido-ammine) reticolate, in condizioni di poling elettrico".

5)Fondo per gli Investimenti della Ricerca di base (FIRB) 2003: Project: "Composti molecolari e materiali ibridi nanostrutturati con proprietà ottiche risonanti e non risonanti per dispositivi fotonici" directed by Prof. R. Ugo, and Research Unit 1.

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

The research group has expertise in

(i) Surface organometallic chemistry including the synthesis of carbonyl compounds using the silica surface as reaction medium

(ii) Synthesis of organometallic compounds bearing more or less complex silanolate ligands to mimic silica-anchored species

(iii) Design and preparation of molecular materials with non linear optical (NLO) properties or with anisotropic electronic properties

(iv) preparation and characterization of hybrid inorganic/organic cristalline materials with NLO properties

(v) Second order NLO characterization with the Electric-Field Induced Second Harmonic generation (EFISH) technique in solution and with the Kurtz technique on powders, and THG (third harmonic generation) measurements in solution.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION UNIVERSITY OF MILAN DEPT. OF INORGANIC, METALLORGANIC AND ANALYTICAL CHEMISTRY
LOCATION (postal address) Via Venezian 21 20133 Milan (ITALY)
MAIN FIELD OF ACTIVITY (mark one or more boxes) x - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) x - Recent developments in nanoscience and nanotechnology x - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Porta Francesca, prof., associated professor. ADDRESS (fax, e-mail) Dept. Chimica Inorganica Metallorganica e Analitica, Via Venezian 21, 20133, Milano, Italy. Fax +39 02 50314405, francesca.porta@nimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 2 Ass. Prof.	POST-DOC: 1
Ph. D.: 1	STUDENTS: 8
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Preparation of preformed metallic nanoparticles from sols, immobilization on support and using in catalytic reactions of selective oxidation in liquid phase by O_2
2. Preparation of nanomaterial constituted by metal nanoparticles. Assemblies in network and architectures.
3. Preparation of supramolecular assemblies of organometallic compounds for the production of molecular devices having electrochemical properties

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL: MIUR EX 60%

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Synthesis of systems based or composed of metal or oxide nanoparticles and characterization of their properties in solid and solution. Application of colloidal system to support o resins and evaluation of the new properties (from a synthetic or spectroscopic point of view) acquired by binding. Use the nano-sized material as catalyst (in particular in the selective oxidation in the aqueous phase of polyols or sugar).

Self-assembly of metallic gold sol with simple biological strands. Studies are in progress for understanding their interaction with polypeptides .

Preparation of supramolecular assemblies from organometallic complexes. Use of the network as a junction in electrochemical devices.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION UNIVERSITY OF MILAN
LOCATION (postal address) VIA VENEZIAN 21 20133 MILAN (ITALY)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology X - Conservation and restoration of Cultural Heritage X - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) PAOLA FERMO, RESEARCHER IN ANALYTICAL CHEMISTRY ADDRESS (fax, e-mail) Fax. 0039 2 50314405 e-mail paola.fermo@unimi.it

HUMAN RESOURCES (number of people involved in the activity fields here above)	
RESEARCHERS:	POST-DOC:
Ph. D.: 1	STUDENTS: 3
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. CHEMICAL CHARACTERIZATION OF AEROSOL PARTICULATE MATTER
2. CHEMICAL CHARACTERIZATION OF ARCHAEOLOGICAL MATERIALS
3. SET-UP AND VALIDATION OF INNOVATIVE ANALYTICAL METHODOLOGIES AND INTERCALIBRATION STUDIES

RUNNING PROJECTS (official title is required):

REGIONAL:

PARFIL: PARTICOLATO FINE IN LOMBARDIA; 2003-2005

NATIONAL:

COFIN : SITECOS PROJECT (STUDIO INTEGRATO SUL TERRITORIO NAZIONALE PER LA CARATTERIZZAZIONE ED IL CONTROLLO DI INQUINANTI ATMOSFERICI); 2004-2005

FIRB : APPLYING ARCHAEOLOGY, ARCHAEOMETRY AND INFORMATION SYSTEMS TO IMPROVE THE KNOWLEDGE, THE CONSERVATION AND THE VALORISATION OF THE ANCIENT MEDITERRANEAN LANDSCAPE; 2005-2007

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

The expertises are in the field of both environmental chemistry and archaeometry. The chemical-physic characterization of aerosol particulate matter is carried by means of different analytical techniques including innovative thermal methods for the quantification of PM carbonaceous fraction. Integrated studies based on inter comparison campaign are carried out with others research groups working in this field in order to validate the methods. One of the mains topics is actually the identification of specific markers for the different sources.

Archaeometrical studies deal with: provenance studies, chemical characterization of pigments and archaeo-molecular investigations in order to identify the content and the usage of the ancient ware.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION: UNIVERSITÀ DEGLI STUDI DI MILANO
LOCATION (postal address): Dipartimento Chimica Inorganica, Metallorganica e Analitica Via G. Venezian, 21 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Banditelli Guido Associate Professor ADDRESS (fax, e-mail) 0250314405 – guido.banditelli@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: Dr. Anna Laura Bandini Dr. Maria Grassi	POST-DOC:
Ph. D.:	STUDENTS:
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Synthesis, characterization, and reactivity of groups 8-11 metal complexes bearing azoles, phosphines, hydrides and/or O-donors as ligands.
2. Molecular structure and dynamics of metal complexes investigated by X-ray, neutron diffraction , INS and multinuclear NMR spectroscopy.
3. Mass Spectrometry to approach structure and reactivity in vapour phase of metal containing species.
4. Characterization of natural organic matter (NOM) derived from soil, sediment and water: chemical and spectroscopic (multinuclear NMR, Fluorescence, Drift) properties.

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL: STRUCTURE AND DYNAMICS OF WEAK AND "NON-CLASSICAL" METAL-LIGAND AND METAL-HYDROGEN INTERACTIONS (MILAN'S UNIT OF COFIN 2004)

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

Biowaste composting process: spectroscopic (solid state NMR, EPR, Fluorescence, and FTIR) approach to assess material's quality parameters for proper use.

EXPERTISE (100 words max.)

Our thirty-year experiences may be summarized as follows:

• Wide know-how of synthetic and purification strategies of coordination compounds, particularly of gold and platinum group metals.
• Customary use of spectrometric measurements, e.g. diffraction and MS spectra, to approach the relationships between molecular structure, bonding and reactivity.
• High level knowledge, both theoretical and practical, of NMR techniques.
• Frequent practice of other techniques, such as FTIR, UV-Vis, and Fluorescence for structure, dynamics and reactivity studies of inorganic, metallorganic and environmental samples.
• Good experience of the chemistry of humic substances and their reactivity with heavy metals and organic pollutants.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION DIPARTIMENTO DI CHIMICA FISICA ED ELETTROCHIMICA, UNIVERSITA' DI MILANO
LOCATION (postal address) Via Golgi 19, 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Beltrame Paolo, full professor ADDRESS (fax, e-mail) Fax: +39.02.503.14300 e-mail: paolo.beltrame@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:	POST-DOC:
Ph. D.:	STUDENTS:
TECHNICIANS:1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) 1. Solid acid catalysts (zeolites, MCM-41, Nafion-Silica composite, sulphated zirconia). 2. Kinetics of benzylation of aromatics (biphenyl, naphthalene, toluene) by benzyl chloride or benzyl alcohol.
RUNNING PROJECTS (official title is required): REGIONAL: NATIONAL: EUROPEAN:
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees) WITH SMALL OR MEDIUM ENTERPRISES
EXPERTISE (100 words max.) Studies of applied chemical kinetics, for reactions of industrial interest, mainly in conditions of heterogeneous catalysis. More than 160 scientific publications.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION DIPARTIMENTO DI CHIMICA FISICA ED ELETTROCHIMICA, UNIVERSITA' DI MILANO
LOCATION (postal address) Via Golgi 19, 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Trasatti Sergio, full professor ADDRESS (fax, e-mail) Fax: +39.02.503.14224 e-mail: sergio.trasatti@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:	POST-DOC:
Ph. D.: 1	STUDENTS: 2
TECHNICIANS:1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Electrocatalysis (catalysis of electrode reactions)
2. Research & Developments of transition metal oxides for electrode processes
3. Structure and dynamics of electrode/solution interfaces

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL: INNOVATIVE ELECTROCHEMICAL SYSTEMS: NANOSTRUCTURES, SYSTEMS OF BIOLOGICAL INTEREST, ECOCOMPATIBLE SYSTEMS.

EUROPEAN:

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)
Corrosion; structure of electrode/solution interface; surface chemistry of oxides; relationship between physico-chemical and electrochemical properties; electrocatalysis; properties of single ions; adsorption at electrodes; solid state physics and electrochemistry; electrochemical kinetics.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Department of Physical Chemistry and Electrochemistry, Università degli Studi di Milano
LOCATION (postal address) Via C.Golgi, 19 I-20133 Milano, Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Forni, Lucio, Prof., full professor ADDRESS (fax, e-mail) v. C. Golgi 19, I-20133 Milano, Italy; Fax: +39-02-50314300; e-mail: lucio.forni@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC:
Ph. D. students: 2	STUDENTS: on average 5 graduating students/year
TECHNICIANS: 2	OTHERS: 2 associated professors; 1 grantee

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Perovskite-like oxides as catalysts for the low-temperature flameless combustion of methane, for the photoelectrocatalytic water splitting and for exhaust gas depollution
2. Selection, preparation and characterisation of mixed oxides, supported metals and zeolites as catalysts for given reactions of industrial importance
3. Development of microporous materials for H_2 and CH_4 storage and purification

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

Enitecnologie

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Long running experience in: i) catalysis and related topics; ii) selection, preparation, characterisation and testing of heterogeneous catalysts for industrially relevant chemical reactions; iii) preparation, characterisation and testing of high surface area, high porosity microporous materials.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION UNIVERSITY OF MILAN
LOCATION (postal address) Department of Physical Chemistry and Electrochemistry, Via Golgi 19, 20133 Milan, Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Silvia Ardizzone, Prof., full professor. ADDRESS (fax, e-mail) Department of Physical Chemistry, Via Golgi 19, 20133 Milano. E-mail: silvia.ardizzone @unimi.it Tel: 003902 50314225; Fax: 00390250314300
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:	POST-DOC: 2
Ph. D.: 1	STUDENTS: 4
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1 Research and development of nanostructured composite materials for fuel cells.
2. Synthesis of tailored nanocrystalline titanium dioxide for pollutant photodecomposition processes.
3. Synthesis and development of nanocrystalline semiconductors for gas sensing devices.

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
Pirelli Labs

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

The expertise of the group falls within the general framework of the physical chemistry of solid disperse systems and of interfacial processes. The studies and researches have big potentialities in the field of physical chemistry of materials, considered as a challenge to obtain tailored products, projected ad hoc, bearing a simultaneous control of morphological and structural features, surface state and composition, wettability and surface electrification.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION **UNIVERSITÀ DEGLI STUDI DI MILANO (UNIMI)** **DIPARTIMENTO DI CHIMICA FISICA ED ELETTROCHIMICA (DCFE)**
LOCATION (postal address) Via Camillo Golgi, 19 20133 Milano, Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Paolo CARNITI, Associate Professor in physical chemistry ADDRESS (fax, e-mail) 0039 0250314261 paolo.carniti@unimi.it

HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1 (Associate Professor)	POST-DOC:
Ph. D.: 1	STUDENTS: 4
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. **Materials Technology**:
(**a**) characterization of catalytic solids performed under real reaction conditions.
(**b**) development of composite metallic-core materials covered with ceramic oxides of high surface area and porosity to be used in the catalytic field for combustion reactions and other exothermic reactions.
2. **Recent developments in nanoscience and nanotechnology**: development of viable acidic materials for liquid phase catalysis in solvents of high polarity and proticity by dispersion of active oxidic phases on ceramic supports in nanosized dimension.
3. Reaction and Process design: kinetic study of complex reactions of industrial and environmental interest (e.g.; depolymerization and dehydration of carbohydrate to chemicals).

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL:
FIRST 2004: "*CINETICA DI REAZIONI COMPLESSE DI INTERESSE INDUSTRIALE E AMBIENTALE*"

EUROPEAN:

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
HENKEL S.p.A., Lomazzo (CO)

WITH SMALL OR MEDIUM ENTERPRISES
SOLANA (Green Steel Group), Oggiono (LC)

EXPERTISE (100 words max.)

Applied chemical kinetics: kinetic study of reactions with/without solid catalysts of industrial and environmental interest. The reactions are experimentally studied using reaction lines with batch and continuous reactors working at atmospheric or under higher pressure. The experimental data are interpreted by computational modelling in order to individuate the reaction mechanism and to obtain the kinetic parameters.

Study of surface characterization: characterization of solid surfaces with thermal approach (thermogravimetry, thermal desorption, etc.) as well as with liquid chromatographic techniques, by adsorption and/or desorption of molecular probes.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION University of Milan, Department of Physical Chemistry and Electrochemistry,
LOCATION (postal address) Via Golgi, 19 20133 Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) FORMARO, Leonardo, Associate Professor ADDRESS (fax, e-mail) Fax: 039 02 50314300 leonardo.formaro@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above): 2-3

RESEARCHERS:	POST-DOC: 1
Ph. D.:	STUDENTS: 1
TECHNICIANS: 1	OTHERS: 1

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) 1. Electrochemistry at supported catalysts for fuel cell application 2. Interfacial characterization of active carbons 3. Chemical Modification and Synthesis of carbons
RUNNING PROJECTS (official title is required): REGIONAL: NATIONAL: Oxygen Reduction on non-conventional catalytic electrodes EUROPEAN:
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees) WITH SMALL OR MEDIUM ENTERPRISES
EXPERTISE (100 words max.) - Surface electrochemistry and colloid chemistry of particulate matter (oxides, carbon), - Adsorption and acid-base behaviour of oxide-water interfaces, - High temperature corrosion and crud oxide deposition in power station boilers, - Oxide preparation, characterisation and electrochemistry.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION DIPARTIMENTO DI CHIMICA FISICA ED ELETTROCHIMICA, UNIVERSITA' DI MILANO
LOCATION (postal address) Via Golgi 19, 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage X - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Trasatti Sergio, full professor ADDRESS (fax, e-mail) Fax: +39.02.503.14300 e-mail: stefano.trasatti@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:	POST-DOC:
Ph. D.: 3	STUDENTS: 3
TECHNICIANS:2	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Neural networks in the study of corrosion processes
2. Conducting polymers for anticorrosion purposes
3. Electrochemical noise as a corrosion monitoring techniques
4. Demolition and/or removal of PCB by chemical and electrochemical methodologies
5. Dissolution phenomena of alumina-based catalysts in Fisher-Tropsch synthesis

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

Enitecnologie
Eni Divisione E&P (Agip)
Whirpool

WITH SMALL OR MEDIUM ENTERPRISES

Itelcond
Imaf
Acetati S.p.A.
MF Trasformatori

EXPERTISE (100 words max.)

Corrosion and Anticorrosion; thermodynamics and kinetics of corrosion; corrosion and electrochemistry; properties of corrosive films; corrosion inhibition; metallurgy; artificial intelligence system applied to corrosion; corrosion monitoring; corrosion morphology and testing; designing for corrosion control; chemical analysis in corrosion.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION **DEPARTMENT OF PHYSICAL CHEMISTRY AND ELECTROCHEMISTRY, UNIVERSITY OF MILAN**
LOCATION (postal address) **Via Golgi 19, 20133 Milano (Italy)**
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage X - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Mussini Torquato, Prof., full professor of Electrochemistry Mussini Patrizia, Prof., associate professor of Analytical Chemistry ADDRESS (fax, e-mail) University of Milan, Department of Physical Chemistry and Electrochemistry, Via Golgi 19, 20133 Milano, phone +39 02 50314213; fax +39 02 50314300; e-mail patrizia.mussini@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:	POST-DOC: 1 (Dr. Luigi Falciola)
Ph. D.: 1 (Dr. Manuela Rossi)	STUDENTS: 5/6 stages per year
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Electrode and electrolyte thermodynamics, and ion and solvent transport in nonaqueous and mixed solvents, supported by EXAFS investigations
2. Potentiometric electroanalysis in nonaqueous and mixed solvents: pH-metry, salt bridges, rH-metry
3. Study of model processes and innovative electrode materials in organic electrocatalysis
4. Characterization, by electrochemical techniques, of complexes with high NLO activity
5. Characterization, by electrochemical techniques, of PNA oligomers labelled with electroactive groups for the development of nucleic acid biosensors
6. Characterization, by electrochemical techniques, of polyamidoamines and polyamidoamine hydrogels for biomedical and environmental applications [drug delivery, tissue regeneration, heavy metal ion detection and sorption]

RUNNING PROJECTS (official title is required):

NATIONAL:

1. "Termodinamica, trasporto e solvatazione in soluzioni elettrolitiche non acquose ed acquo/organiche: effetti del solvente e proprietà correlate" (FIRB 2001)
2. "Elettrocatalisi organica. Approcci innovativi nella riduzione catodica di alogenuri organici: materiali elettrodici, strutture molecolari e tecniche di indagine degli intermedi adsorbiti e del meccanismo di reazione" (COFIN 2004)
3. "Elettroanalisi ed elettrocatalisi in ambiente acquoso ed acquo/organico: pH-metria ed rH-metria e tecniche voltammetriche, fondamenti ed applicazioni" (FIRST 2004)

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Implementation of hydrogen electrode cells and amalgam electrode cells for determination of fundamental quantities in electrode and solution thermodynamics and ionic transport;
EXAFS spectra recording and interpretation (on solids and solutions);
Primary and secondary pH-metric standardization (IUPAC protocols) in nonaqueous and mixed solvents including new reference electrodes and salt bridges;
Application of modern electrochemical techniques (voltammetry, rotating disk electrode, impedance) to heterogeneous electron transfer and specific adsorption studies;
Optimization and implementation of organic electrochemical and electrocatalytical processes;
Application of potentiometric, conductimetric and voltammetric techniques to the characterization of innovative materials;
Determination of heavy metals at ppb level by stripping voltammetry.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Dipartimento di Chimica Strutturale e Stereochimica Inorganica
LOCATION (postal address) Via Venezian 21 20133 MILANO ITALY
MAIN FIELD OF ACTIVITY (mark one or more boxes) **X** - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) **X** - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Ciani Gianfranco, Dr., Full Professor ADDRESS (fax, e-mail) Phone: 39-02-50314445 fax: 39-02-50314454 e-mail: gianfranco.ciani@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above) **4**

RESEARCHERS: **3**	POST-DOC: **1**
Ph. D.:	STUDENTS:
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) 1. Nanoporous Materials; 2. Gas Storage; 3. Crystal Engineering of Coordination Polymers.
RUNNING PROJECTS (official title is required): REGIONAL: NATIONAL: *Crystal Engineering of Molecule-based Materials and their utilisation in Gas Absorption and 'Solvent-free' reactions. (PRIN 2004).* EUROPEAN:.
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees) WITH SMALL OR MEDIUM ENTERPRISES
EXPERTISE (100 words max.) Synthesis and Structural Characterisation co-ordination polymers using X-ray diffraction. Crystal Engineering of Inorganic-Organic Networks. Nanoporosity measurements

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Dipartimento di Chimica Strutturale e Stereochimica Inorganica
LOCATION (postal address) Via Venezian 21 20133 MILANO ITALY
MAIN FIELD OF ACTIVITY (mark one or more boxes) **X** - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) **X** - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Sironi Angelo, Dr., Full Professor ADDRESS (fax, e-mail) Phone: 39-02-50314448 fax: 39-02-50314454 e-mail: angelo.sironi@istm.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above) **6**

RESEARCHERS: **3**	POST-DOC: **1**
Ph. D.: **2**	STUDENTS:
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. *Structural characterisation of Photonic materials;*
2. *Metal Carbonyl clusters;*
3. *Relationships between 3D structure and properties in co-ordination compounds;*

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL: 1) *Cluster assembly as a route to molecular nanoparticles. (PRIN 2003).*
2) *Composti Molecolari e materiali Ibridi Nanostrutturati con Proprietà ottiche risonanti e non risonanti per dispositivi fotonici (FIRB 2003)*
EUROPEAN:.

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
BASELL POLIOLEFINE ITALIA SpA

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)
Non ambient (high pressures, low temperatures) X-ray diffraction of inorganic, organometallic and co-ordination compounds.
Ab-initio crystal structure determination of simple materials through X-ray (and neutron) powder diffraction.
Experimental determination of accurate charge densities and their theoretical analysis.
Structure properties correlations.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Dipartimento di Chimica Strutturale e Stereochimica Inorganica
LOCATION (postal address) Via Venezian 21 20133 MILANO ITALY
MAIN FIELD OF ACTIVITY (mark one or more boxes) **X** - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Albinati Alberto, Dr., Full Professor ADDRESS (fax, e-mail)
HUMAN RESOURCES (number of people involved in the activity fields here above) **5**

RESEARCHERS: **3**	POST-DOC: **2**
Ph. D.:	STUDENTS:
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Hydrogen Storage Materials;
2. Transition Metal Hydrides:
3. Relationships between 3D structure and reactivity in co-ordination compounds.

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL: *Structural and dynamical studies of M-H and M-ligand interactions in co-ordination Compounds. (PRIN 2004).*

EUROPEAN: *European Research Training Network: New Chemistry and Catalysis with Hydride Compounds". Project HYDROCHEM (2003-2006).*

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)
Study of the structure and dynamics of inorganic, organometallic and co-ordination compounds by using X-ray diffraction, neutron scattering and synchrotron radiation.
Study of the relationships between 3D molecular structure and catalytic activity.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION University of Milan
LOCATION Dipartimento di chimica organica ed industriale Via Venezian 21 Milano
MAIN FIELD OF ACTIVITY X- Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X- Recent developments in nanoscience and nanotechnology X- Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Di Silvestro Giuseppe associated professor in industrial chemistry ADDRESS (fax, e-mail) tel :++02 50314130; fax: ++02 50314133; E-mail Giuseppe.disilvestro@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC: 1
Ph. D.: 1	STUDENTS: 2
TECHNICIANS: 1	OTHERS: 3

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Synthesis and characterisation of polycondensates having controlled molecular masses and architecture. Optimisation of polymerisation conditions. Study of thermal and rheological behaviour.
2. Inclusion of photooptical intresting molecules in nanochannels. Studies of thermal behaviour of pure inclusion compounds and of their interaction with polymers.
3. Interaction of polymeric materials with micro- and nanostructured fillers.
4. Application of polymer synthetic procedure to the preparation of biological interesting oligomers
5. DSC application for safety studies

RUNNING PROJECTS (official title is required): All projects are in collaboration with industries.

REGIONAL: -

NATIONAL: FIRB (FOR NANOCHANNELS)

EUROPEAN: NANOCHANNELS NETWORK

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees) : Rhodia and Pirelli .

WITH SMALL OR MEDIUM ENTERPRISES : 2

EXPERTISE;

Synthesis of functional oligomers and macromolecules by different polymerisation mechanism (radical, anionic, cationic and living systems). Molecular characterisation by spectroscopic methods (NMR; IR, etc.), molecular mass determination by SEC. Study of thermal behaviour (Tg, Tm, stability of polymers). Rheology of linear, star-shaped and iper-branched polymers. Interaction with modified fillers (micro and nano).
Thermal stability and safety studies by DSC.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION UNIVERSITÀ DEGLI STUDI DI MILANO – DIPARTIMENTO DI CHIMICA ORGANICA E INDUSTRIALE
LOCATION (postal address) via Venezian, 21 – 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.) Giovanna Speranza, Prof., full professor ADDRESS (fax, e-mail) fax 0039 02 5031 4072; giovanna.speranza@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC: 1
Ph. D.: 1	STUDENTS: 4
TECHNICIANS: 1	OTHERS: 1

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Flavor enhancers: synthesis and structure/activity relationship
2. Studies of plant constituents: aloe gel.
3. Peptide with antiangiogenic activity: synthesis and molecular modelling.

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL: ISOLAMENTO E SINTESI DI COMPOSTI BIOATTIVI PRESENTI IN PIANTE MEDICINALI AFRICANE (COFIN 2003)

EUROPEAN: ANAEROBIC BIODEGRDATION OF ORGANIC POLLUTANTS BY ACETOBACTERIUM SPECIES (IN COLLABORATION WITH PROF. B. SCHINK, UNIVERSITY OF KONSTANZ, GERMANY)

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

synthesis and characterization of peptides and nucleotides;
investigation of enzymatic mechanisms through the synthesis of stereospecifically labelled compounds;
use of biotransformations for the preparation of chiral synthons;
isolation and chemical characterization of natural products from plants

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION DIPARTIMENTO DI CHIMICA ORGANICA E INDUSTRIALE – UNIVERSITA' DEGLI STUDI DI MILANO
LOCATION (postal address) VIA VENEZIAN, 21 20133 MILANO
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) DANIELI BRUNO Full Professor ADDRESS (fax, e-mail) Fax int + 02 50314048 Bruno.danieli@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 3	POST-DOC:
Ph. D.: 1	STUDENTS: 2
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Modification of polymers
2. laccase and hydrolytic enzymes
3. oxidation of cellulose
4. enzymatic synthesis of polyesters and polyamides

RUNNING PROJECTS (official title is required)

REGIONAL: APPLICATION OF ENZYMATIC SYSTEMS FOR THE ENVIRONMENTAL FRINDLY MODIFICATION SACCHARIDES, POLYSACCHARIDES AND CELLULOSE DERIVATIVES

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

LAMBERTI spa

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

The production of biodegradable polymers (BPs) is of great interest and actually biopolymers obtained from renovable materials such as starch are largely used for packaging in food and agrochemcal industry.
It has been shown that the use of isolated enzymes could be a valuable methodology for the synthesis and modification of polymers in ecocompatible and environmental friendly conditions.
In this project we are going to study the modification of cellulose using the oxidative system laccase/oxygen with the aim to modify the primary OH function. The laccase/oxygen system will also be used for the production of polyphenols and polyanilines.
In a parallel study, hydrolytic enzymes such as lipases, will be used for the synthesis of polymeric structures of the polyester and polyamide type.
The group has a sound experience in the use of enzymes in organic synthesis, as documented by a great number of publications. The activity is carried out in cooperation with CNR, Istituto di Biocatalisi e Riconoscimento Molecolare

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION DIPARTIMENTO DI CHIMICA ORGANICA E INDUSTRIALE
LOCATION (postal address) VIA VENEZIAN 21 20133 MILANO ITALY
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Cesare Gennari, Professor (Full Professor) ADDRESS (fax, e-mail) +39-02-50314072 cesare.gennari@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC: 4
Ph. D.: 1	STUDENTS: 1
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Synthesis of anticancer agents with microtubule stabilising properties
2. Synthesis of chiral ligands for asymmetric catalysis using combinatorial approaches
3. Resolution of racemates by extraction with chiral selectors

RUNNING PROJECTS (official title is required):
REGIONAL:
NATIONAL:
EUROPEAN:
Project Title: *"Enantioselective Recognition: Towards the Separation of Racemates"*
Contract Number: HPRN-CT-2001-00182

Project Title: A Modular Approach to New Chiral Phosphorus Ligands for Enantioselective Catalytic Reactions
Contract Number: MEIF-CT-2003-500097

Project Title: Synthesis of Eleutheside Analogues: Potential Microtubule-Stabilizing Anticancer Drugs
Catalytic Reactions
Contract Number: MEIF-CT-2003-500880

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees):
1) Nerviano Medical Sciences (Viale Pasteur 10, 20014 Nerviano, Milano)
2) DSM Fine Chemicals-Advanced Synthesis & Catalysis (P.O. Box 18, 6160 MD Geleen, The Netherlands)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)
The research interests include the design and development of new enantioselective methods, and their application to the synthesis of natural and unnatural targets with interesting biological and chemical properties. More recently, the group has been involved in the synthesis of combinatorial libraries of chiral ligands for enantioselective catalysis. Prof. Gennari is the author of 4 patents, 5 chapters of books and 138 papers published in international, refereed journals in the 1978-2005 period.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION UNIVERSITY OF MILAN DEPARTMENT OF ORGANIC AND INDUSTRIAL CHEMISTRY
LOCATION (postal address) Via Venezian 21, 20133 Milano Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (Helicenes as functional materials) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X – Biotechnology(peptide Nucleic Acids) ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER STEFANO MAIORANA FULL PROFESSOR IN ORGANIC CHEMISTRY ADDRESS Fax 00390250314139 ; e-mail: stefano.maiorana@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: four	POST-DOC: two
Ph. D.: four	STUDENTS:five
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) 1. HETEROHELICENES FOR NON LINEAR OPTICS : COLLABORATION WITH Prof.Ugo(Milano), Professor Ferruti (Milano),Professor Persoons (Leuven), Doctor Champagne(Strasbourg); Application for COST D35 2. Peptide Nucleic Acids : collaboration with Prof.Rosangela Marchelli (Parma)
RUNNING PROJECTS (official title is required): REGIONAL: NATIONAL: STEREOSELEZIONE IN SINTESI ORGANICA, METODOLOGIE E APPLICAZIONI EUROPEAN: COST D14 : FUNCTIONAL MOLECULAR MATERIALS (WORKING GOUP 8)
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees) WITH SMALL OR MEDIUM ENTERPRISES
EXPERTISE (100 words max.). stereoselective synthesis, metal mediated synthesis, synthetic methodologies in organic and organometallic synthesis. Peptide nucleic acids conjugated with organometallic moieties for diagnostic purposes, heterohelicenes for non linear optics and catalysis.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION UNIVERSITY OF MILAN DIPARTIMENTO DI CHIMICA ORGANICA E INDUSTRIALE
LOCATION (postal address) Via Golgi 19 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Cinquini Mauro Full professor ADDRESS (fax, e-mail) mauro.cinquini@unimi.it

HUMAN RESOURCES (number of people involved in the activity fields here above)	
RESEARCHERS: 5	POST-DOC: 2
Ph. D.: 3	STUDENTS: 8
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) 1. Stereoselective Synthesis 2. Supramolecular chemistry 3. Catalysis
RUNNING PROJECTS (official title is required): REGIONAL: NATIONAL:STEREOSELEZIONE IN SINTESI ORGANICA:METODOLOGIE E APPLICAZIONI (PRIN) EUROPEAN:
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees)   WITH SMALL OR MEDIUM ENTERPRISES OXON
EXPERTISE (100 words max.) Stereoselective synthesis of polifunctional molecules Organic and organometallic catalysis Phase-transfer catalysis Supported catalysts and ligands Cycloadditions Beta lactam synthesis molecular recognition

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION UNIVERSITA' DEGLI STUDI DI MILANO DIPARTIMENTO DI CHIMICA ORGANICA E INDUSTRIALE
LOCATION (postal address) Via Venezian, 21 20133 Milano Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Orsini Fulvia - Full Professor of Organic Chemistry ADDRESS (fax, e-mail) Fax n. 02 5031 4106 e-mail: fulvia.orsini@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 5	POST-DOC: 2
Ph. D.:	STUDENTS: 4
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1.New Synthetic Methods in Organic Synthesis. New Applications of Organometallic Compounds in Organic Chemistry.

2. Bioconversions. Chemoenzymatic Synthesis. Recombinant Strains. Oxidative Biocatalytic Processes.

3. Synthesis of Natural Compounds and analogues

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL: COFIN 2004: TITLE: USE OF OXIDATIVE BIOCATALYTIC PROCESSES TO PREPARE INTERMEDIATES FOR THE CHEMOENZYMATIC SYNTHESIS OF CHIRAL AND/OR BIOACTIVE COMPOUNDS

COFIN 2003. TITLE: ANTITUMORAL NATURAL AND RELATED SYNTHETIC COMPOUNDS

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Chemoenzymatic Synthesis of chiral and/or bioactive compounds. Biotransformation of xenobiotic compounds using recombinant catalysts. New regio- and stereoselective methods for carbon-carbon bond formation, finalized to the preparation of structural moieties characteristic of chemically and biologically interesting compounds. Synthesis of antitumoral natural compounds and synthetic analogues.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Istituto di Chimica Organica Alessandro Marchesini
LOCATION (postal address) Sede: via Venezian 21/Via Golgi 19 20133 Milano Tel. 0250314475 Fax 0250314476
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) x - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Prof. Riccardo Stradi ADDRESS (fax, e-mail) Tel. 02 503.14616 Fax 02 503.14615 E-mail riccardo.stradi@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 15	POST-DOC: 1
Ph. D.: 8	STUDENTS: 30
TECHNICIANS: 3	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

-Tecniche quantomeccaniche

1. Chemistry and reactivity of substituted benzopiranones
2. Synthesis of non natural aminoacids
3. Chemistry and reactivity of isothiazoldioxide nucleus
4. Synthesis and characterization of farnesyltransferasi and geranylgeranyltransferasi inhibitors
5. Chemistry of indol and of correlated structures
6. Stereoselective synthesis of eterocyclic compounds from chiral imine
7. Carotenoids extraction from biological materials and characterization
8. Solid state studies
9. Polyenic compounds: reactivity and modulation of solubility
10. Acetylenic compounds as sintons in eterocyclic chemistry
11. Diazadienes in eterocyclic chemistry
12. Enantioselective oxidations of organic compounds catalysed by enzymes for the production of useful products in fine chemistry
13. Amplification of homochirality by the use of poly-α-aminoacids in the epoxidation reaction of α,β-unsaturated carbonylic compounds
14. Synthesis of nitrogen eterocyclic compounds
15. Quantomechanic tecniques
16. Chemo regio and enantioselective modification of pharmaceutical compounds with isolate enzyme and microbial cells

RUNNING PROJECTS (official title is required):

NATIONAL:

EFFICIENT AND ENVIRONMENT FRIENDLY PROCESSES FOR SELECTIVE OXIDATION OF ORGANIC "TARGET" COMPOUNDS

EUROPEAN: THE USE OF SULFATES ANDVESCICLES FOR THE AMPLIFICATION OF HOMOCHIRALITY IN POLYPEPTIDE CHAINS

FIRST: Sintesi chimica e biotrasformazione di sistemi polienici coniugati: caratterizzazione chimico-fisica e valutazione della loro attività biologica

FIRB: Strategie per l'ottimizzazione di leganti chirali per la catalisi omogenea stereocontrollata (Rossi, Beccalli, Abbiati)

COFIN 2003: Sequenze sintetiche palladio-catalizzate finalizzate all'ottenimento di sistemi indolici policiclici

COFIN 2005: Processi catalizzati da metalli di transizione per l'ottenimento di sistemi eterociclici azotati (Rossi, Beccalli, Abbiati)

EXPERTISE (100 words max.)

The research lines of our institution regards the different aspects of organic chemistry.
In fact many studies are carried out about reactivity and synthesis of compounds with potential biological and pharmacological activity. Asymmetric synthesis with particular interest in the field of oxidations of organic compounds containing sulfur and/or nitrogen as heteroatoms is also invastigated. Another aspect regards the study of chemo regio and enantioselective modification of pharmaceutical compounds with isolate enzyme and microbial cells.
Besides, since in our laboratories there are many instruments, also analytical studies are carried out. For example determination of e.e. by chiral stationary phase HPLC and GC and by chiral H NMR shift reagents; solid state studies; analytical characterization of natural and synthetic compounds.
Available equipment: NMR, IR, DSC, DRX, GC, UV/vis, HPLC/UV/vis, HPLC/MS

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION UNIVERSITÀ DI MILANO – DIPARTIMENTO DI CHIMICA, BIOCHIMICA E BIOTECNOLOGIE PER LA MEDICINA
LOCATION (postal address) VIA SALDINI 50 – 20133 MILANO (ITALY)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) RONCHETTI, FIAMMA, PROF, Full Professor ADDRESS (fax, e-mail) +39-02-50316036 fiamma.ronchetti@unimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 2	POST-DOC: 2
Ph. D.: 2	STUDENTS: 3
TECHNICIANS: 2	OTHERS: 1

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Synthesis of natural and related compounds with cancer chemopreventive activity
2. Synthesis of glycolipid antigens for the study of molecular recognition in biological interaction
3. Synthesis of oligosaccharides for the development of synthetic vaccines
4. Synthesis of bioactive steroidal compounds

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

PRIN 03: ANTITUMORAL NATURAL AND RELATED SYNTHETIC COMPOUNDS

PRIN 04: SYNTHESIS OF GLYCOSPHYNGOLIPID AND NEOGLYCOSPHINGOLIPID ANTIGENS

PRIN 04: CHEMICAL APPROACH TO NEW FORMULATION VACCINES THROUGH THE SYNTHESIS OF COMPLEX SACCHARIDIC ANTIGENS AND NEW ADJUVANT APT TO POTENTIATE THE IMMUNE RESPONSE

FIRB 2001: "DEVELOPMENT OF NEW IMMUNE RESPONSE MODIFIERS AND OF PEPTIDE AND DNA VACCINES FOR TUBERCOLOSIS IMMUNOTHERAPY

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees): 1

WITH SMALL OR MEDIUM ENTERPRISES: 1

EXPERTISE (100 words max.)

The expertise of the research group is in bioorganic chemistry and in the field of natural compounds. The group is involved in the chemistry of bioactive carbohydrates and steroids, in particular in the synthesis of oligosaccharides, sphyngoid bases, steroidal compounds and glycoconjugates by chemical or chemoenzymatic approaches. Structural studies through advanced techniques in high field NMR spectroscopy complete the group expertise.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION: POLITECNICO DI MILANO, DIPARTIMENTO DI CHIMICA, MATERIALI ED INGEGNERIA CHIMICA "GIULIO NATTA"
LOCATION: VIA MANCINELLI 7, 20131 MILANO (ITALY)
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Full Professor Attilio Citterio ADDRESS (fax, e-mail): 02-23993080, attilio.citterio@polimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above): 15

RESEARCHERS: 3	POST-DOC: 2
Ph. D.: 2	STUDENTS: 2
TECHNICIANS: 1	OTHERS: 5 (industrial grant)

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Green chemistry (product and process design for intermediates and fine chemicals; metal catalysis, product and solvent substitution)
2. Synthetic organic chemistry (oxidation, olefin addition (polymerization) and homolytic aromatic substitution through free radical reactions, heterocyclic chemistry)
3. Functional materials (rubber chemistry, inorganic/organic hybrid materials)
4. Analytical chemistry (capillary electrophoresis, HPLC, GC-MS and bioseparations)

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL: Processi chimici realizzati in presenza di campo elettromagnetico per una Chimica Sostenibile (COFIN 2004)

EUROPEAN: ALLERGY CARD (New analytical platform for allergen detection) **FP6-2003-NEST-B1**

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees):
Pirelli Labs and Pirelli Polymers
Clariant(talia) SpA
Equipolymers SrL - Dow Chemical
Akzo Nobel Chemicals SpA

WITH SMALL OR MEDIUM ENTERPRISES:
Uquifa Italia SpA
Farchemia SrL
3V Sigma
ASER SrL/Commerfin
Dinamite/Dipharma SpA

EXPERTISE (100 words max.)
- Modern synthetic methods & reactions and rich experience in the synthesis of small molecules and pharmaceuticals (and their impurities)
- Chemical development (process and analytical)
- Compounding and chemistry of composite materials
- Chromatography (HPLC, GC-MS, capillary electrophoresis)
- Control of hydrophilicity/hydrophobicity, lipophilicity/lipophobicity

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION POLITECNICO DI MILANO
LOCATION P.za Leonardo Da Vinci, 32 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) **X** - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology **X** - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER Prof. Paolo Gronchi Associated Professor ADDRESS Tel 0038 02 23993274 003902 70638173
HUMAN RESOURCES 8

RESEARCHERS:	POST-DOC:1
Ph. D.:1	STUDENTS:2
TECHNICIANS:1	OTHERS:3

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. *Analysis of chemical reaction. Materials characterisation. Polymer synthesis. Optimization of production processes.*
2. *Catalysis with metal supported catalyst. Mechanism and catalyst design. C1 industrial chemistry.*
3. *Surface treatment with organic film coating. Design and characterisation.*

RUNNING PROJECTS

REGIONAL:

A) OXIDATION OF CELLULOSE FOR MEDICAL USE. PROCESS AND DEVELOPMENT.

B) SYNTHESIS AND CHARACTERISATION OF SUPERPLASTICISERS FOR CONCRETE USE.

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES

CTG (Italcementi group)

WITH SMALL OR MEDIUM ENTERPRISES

BIOLIFE (MASCIA & BRUNELLI GROUP)

EXPERTISE

Publications on international and national journal (more than 100).

Many collaborations with industries for chemical problems solving and new project.

Census of the "Chemistry and Chemical Engineering"
Research in Lombardy

GENERAL INFORMATION

INSTITUTION Dipartimento di Chimica, Materiali e Ing. Chimica "Giulio Natta" (http://www.chem.polimi.it/) del Politecnico di Milano (http://www.polimi.it).
LOCATION (postal address) Via Mancinelli, 7 I-20131 Milano Fax +39.02.2399.3180/3080
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Allegra Giuseppe, full professor ADDRESS (fax, e-mail) Fax +39.02.2399.3180/3080 e-mail giuseppe.allegra@polimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 6	POST-DOC: 1
Ph. D.: 4	STUDENTS: 2
TECHNICIANS: -	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Statistical mechanics approaches to conformation, structure and phase transitions in polymeric materials. Rubber elasticity and toughening.
2. Molecular dynamics and Monte Carlo simulations: coarse grained models of associating polymers in bulk and confined thin films, branched polymers and dendrimers.
3. Force field development for the atomistic simulation of conjugated oligomers and polymers in bulk: polymorphic behaviour, mesophases and surface properties.
4. Scattering (WAXS, SAXS) investigations of thiophene-based organic materials: properties, structure and morphology of new electro- and photoactive materials.
5. Experimental structure, modelling and phase transitions new polymers and complex materials: gels with clay nano-platelets, elastomeric nanocomposites, textile fibers.
6. Molecular modeling of biomaterials: mechanical properties and wettability, protein adhesion on surfaces, and surface modifications for enhanced biocompatibility.

RUNNING PROJECTS (official title is required):

REGIONAL:

-

NATIONAL:

PRIN 2003-2004
Liquid crystals and macromolecules for nano-organised structures
*(*Order and interfacial properties in synthetic and biological polymers*)*

PRIN 2005-2006
Nano-Analytical Systems for Chem & bio-sEnsing – NASCE
(Synthesis and structural investigations of well-defined organic materials for nanosensing applications)

EUROPEAN:

-

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Statistical mechanics, modeling and scattering structural characterization of innovative organic and macromolecular (synthetic, biological) materials in a synergic approach. Characterization of the interactions with surfaces and dispersed micro- and nanoparticles.

-*Wide angle X ray scattering:* single crystal structure determination; fiber diffraction structure analysis, texture, orientation and morphology of polymers; powder diffraction, phase analysis, structure and Rietveld refinement of unoriented polycrystalline materials.

-*Small angle X ray scattering):* morphology and structural models at the colloidal scale

-*Thermal analysis and polymorphism of organic materials*

-*Molecular modelling*: from high level ab inito calculations to atomistic or coarse-grained computer simulation of polymers, biomaterials and organic materials

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Laboratory of Catalysis and Catalytic Processes
LOCATION (postal address) Dipartimento di Chimica, Materiali e Ingegneria Chimica "G. Natta" Politecnico di Milano, Piazza Leonardo da Vinci 32, 20133 Milano, Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Fozatti Pio, full professor ADDRESS (fax, e-mail) + 39 02 23993318 pio.Forzatti@polimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 7	POST-DOC: 3
Ph. D.: 8	STUDENTS: 20
TECHNICIANS: 3	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. After-treatment catalytic systems for NOx and/or soot removal from stationary and mobile sources
2. Catalytic processes and materials for clean energy and fuels production
3. Structured catalysts for environmental and chemical process applications

RUNNING PROJECTS (official title is required):
REGIONAL:
PROGETTO CARIPLO- "Catalizzatori micro e nanostrutturati per l'energia e l'ambiente"

NATIONAL: Centro di eccellenza MIUR "Centro per l'ingegneria dei materiali e delle superfici nanostrutturati- NEMAS"; MIUR-PRIN-2003 "Development of catalytic materials for the simultaneous removal of NOx and soot from diesel engines"; MIUR-PRIN-2004 "Catalytic partial oxidation of hydrocarbons in short contact time reactors"

EUROPEAN: UE PROJECT ENK5-CT-2003-00683 – CATHLEAN; EUROPEAN CONSORTIUM EUROKIN

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
AlstomPower (CH), Enitecnologie (I), DaimlerChrysler (DE), Sapio Industrie

WITH SMALL OR MEDIUM ENTERPRISES
Lonza (I), Sol (I)

EXPERTISE (100 words max.)
The Laboratory of Catalysis and Catalytic Processes has matured a recognized experience in the field of catalysis and chemical reaction engineering with special focus on energy and environment-related technologies. In particular, such competences include: preparation of structured catalysts by extrusion and by deposition of active catalytic layers over ceramic and metallic supports; physico-chemical characterization of catalytic materials; testing of catalysts in the form of powders and structured geometries (honeycombs, plate-type monoliths, foams) under steady-state and/or transient dynamic conditions, kinetic studies, analysis of heat and mass transfer phenomena in structured catalysts; mathematical modelling of catalytic reactors.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION: DEPT. CHIMICA, MATERIALI E INGEGNERIA CHIMICA, POLITECNICO DI MILANO
LOCATION: Via Mancinelli, 7 I-20131 Milano Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage X - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Maurizio Masi, full professor Renato Rota, full professor ADDRESS Fax: ++39-02-23993180 Renato.rota@polimi.it Maurizio.masi@polimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 3	POST-DOC:2
Ph. D.:8	STUDENTS:15
TECHNICIANS:2	OTHERS: other 2 professors are involved in this group, G. Nano and M. Morbidelli

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Design of innovative burners with low environmental impact (flameless) through the detailed study of combustion reactions. Both experimental pilot plants and models are used together to select optimal operational parameters.
2. Development of chemical processes in innovative reactors and in industrial compartments often different than the traditional chemical industry (electronics and mechanics – transport industries).
3. Design of functional inorganic materials through chemical vapor deposition reactors (thermally or plasma activated).
4. Selection of operative criteria and methods that allow the production of polymers with designed properties for the applications of interest, such as adhesives.

RUNNING PROJECTS (official title is required):

NATIONAL:

- Progetto di ricerca e sperimentazione per lo sviluppo di metodologie finalizzate alla bonifica di terreni con tecnologie bioremediation. Finanziato da Ministero dell'Ambiente.

EUROPEAN:
- Poliprop, Polyolefins, improved property control and reactor operability, contract number G5RD-CT-2001-00597
- Nanophoto, progetto Strep, Sixth framework programme, priority 3-NMP, 'Nanocrystalline silicon films for photovoltaic and optoelectronic applications', proposal/contract no: 013944
- Aims, progetto IP, Sixth framework programme, priority 'Nanotechnology and Nanoscience', 'advanced interactive materials by design',proposal/contract no.: IP 500160-2 AIMs

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)
Memc , Novara
MG Mossi Ghisolfi, Tortona (Al)
Oxon, Pavia
Pirelli, Milano
Riello, Legnago (VR)
SNIA Caffaro, Torviscosa (UD)
Solvay Solexis, Bollate (MI)
Mapei, Milano
Sisas

WITH SMALL OR MEDIUM ENTERPRISES
LPE, Bollate (MI)
Carbochimica,
Temav

EXPERTISE (100 words max.)
The development of competitive technologies is nowadays based on the detailed understanding of the relevant physical-chemical processes involved. The approach followed by our group consists in the application of the physical chemistry principles to investigate and to elucidate these processes both experimentally and theoretically through suitable mathematical models. This methodology provides the possibility of scaling the development of new technologies at all required scales, from the molecular one to that relevant for the industrial production. A qualifying aspect concerns the application of molecular physical chemistry and of quantum chemistry to the analysis of the complex reacting systems occurring in the mentioned processes. That approach is valid for the events and transformations occurring either in gas phase or on surfaces, whose final aim is the highlight of the governing criteria of the examined process.
The horizontality of this approach makes it suitable for different areas of industrial activities, including the processes typical of the chemical industry, the design and synthesis of materials and the problems related to the environmental sustainability (for instance, industrial safety and pollution control).
Another important goal is the formulation of mechanistic models where the above-mentioned microscopic theories are embedded in fluid dynamic analysis accounting for mass, momentum and energy transport phenomena. Accordingly, effective tools are then available for the design of innovative units or for the efficiency increase of the existing ones.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION POLITECNICO DI MILANO: Dipartimento CMIC "GIULIO NATTA"
LOCATION (postal address) VIA MANCINELLI 7, 20131 MILANO (ITALY)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Prof. Francesco Minisci (Full Professor) Prof. Ombretta Porta (Full Professor) ADDRESS (fax, e-mail) VIA MANCINELLI 7 20131 MILANO (ITALY) Fax: +390223993080 e-mail: francesco.minisci@polimi.it; ombretta.porta@polimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: **5**	POST-DOC:
Ph. D.: **1**	STUDENTS:
TECHNICIANS: **1**	OTHERS: **2**

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Free radical reactions: study of reaction mechanisms and design of new reactions
2. Oxidations of organic compounds with oxygen and/or hydrogen peroxide in mild conditions
3. Functionalizations of heterocylic bases and quinones
4. Activation of hydrocarbons
5. Homogeneous catalysis for environmentally sustainable processes.
6. Nitroxyl radicals: applications in catalysis of organic reactions and material science
7. Multicomponent reactions for one pot synthesis of complex molecules
8. Stereoselective reactions mediated by titanium salts

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

PRIN 2004: SVILUPPO DI NUOVI CATALIZZATORI, NUOVI PROCESSI RADICALICI, NUOVI MECCANISMI E NUOVI PRODOTTI AD ALTA SELETTIVITÀ E BASSO IMPATTO AMBIENTALE

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

The main field of our research regards the application of new technology for the development of new oxidation processes with low environmental impact, by using oxygen or hydrogen peroxide as clean oxidants and suitable catalyst to carry out the reactions in the mildest condition possible (atmospheric pressure and room temperature).

We are also developing several processes for the synthesis of complex molecules by using short route reaction design.

The stereoselective synthesis of organic compounds mediated by titanium salts represent a key topic of interest more related to fine chemicals synthesis.

Census of the “Chemistry and Chemical Engineering” Research in Lombardy

GENERAL INFORMATION

INSTITUTION Combustion Simulation and Modeling (CoSMo) Laboratory
LOCATION (postal address) Dipartimento di Chimica, Materiali e Ingegneria Chimica "G. Natta "Politecnico di Milano, Piazza leonardo da Vinci 32, 20133 Milano, Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage X - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Ranzi Eliseo, full professor ADDRESS (fax, e-mail) + 39 02 70638173 eliseo.ranzi@polimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 6	POST-DOC: 2
Ph. D.: 4	STUDENTS: 10
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Kinetic modelling of pyrolysis, oxidation and combustion of hydrocarbons
2. Pollutant formation
3. Fluidynamics and interaction with chemistry
4. Combustion efficiency and greenhouse gases emission reduction.
5. Alternative fuels (Biomasses, waste).
6. Thermal Plastic reuse.

RUNNING PROJECTS (OFFICIAL TITLE IS REQUIRED):NATIONAL:
MIUR-PRIN-2003 "PARTICOLATO FINE DA COMBUSTIONE: MECCANISMI DI FORMAZIONE, TECNOLOGIE DI RIDUZIONE, EFFETTI SUL CLIMA E SULLA SALUTE"
MIUR-PRIN-2003 "PROCESSI DI RECUPERO DI MATERIA E DI ENERGIA DA RIFIUTI PLASTICI IN REATTORI A LETTO FLUIDO"
MIUR-PRIN-2004 "SVILUPPO DI UN APPROCCIO INTEGRATO ALLA VALUTAZIONE DELLA SOSTENIBILITÀ, DELLA SICUREZZA E DELL'IMPATTO AMBIENTALE DI MATERIALI CONTENENTI RITARDANTI DI FIAMMA ALOGENATI"
FIRB "STUDIO FONDAMENTALE DELLA DEVOLATILIZZAZIONE DEI COMBUSTIBILI SOLIDI: RELAZIONI FRA STRUTTURA E PRODOTTI DI PIROLISI"

EUROPEAN: UE PROJECT G1RD-CT-2002-03014 'HALOCLEANAPPLICATION'

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
ENEL (IT), ENITECHNOLOGIE (IT), TECHNIP(NL)

WITH SMALL OR MEDIUM ENTERPRISES
SOL (IT)

EXPERTISE (100 words max.)
Laboratory of Combustion Simulation and Modeling has a recognized experience in chemical reaction engineering with focus on detailed kinetics of pyrolysis, oxidation and combustion of gas, liquid and solid fuels. Applications are in energy and environmental technologies. They refer to autoignition and knocking in SI engines and new engines (HCCI). Coupling with detailed fluidynamic allows determination of pollutant formation (CO, unburned, aldehydes, polycyclic-aromatic-hydrocarbons, NO_x, SO_x, soot).
Investigation in alternative fuels:
-pyrolysis, gasification and combustion of biomasses, plastics and wastes for design and operation of plants environmentally compatible and operating according to a sustainable development;
-hydrogen production and combustion.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION

POLYTECHNIC OF MILAN

"LABORATORY OF NANOSTRUCTURED FLUORINATED MATERIALS"

LOCATION

MILAN SITE: C/O DEPARTMENT OF CHEMISTRY, MATERIALS, AND CHEMICAL ENGINEERING "G. NATTA"; VIA L. MANCINELLI 7; 20131 MILAN

COMO SITE: VIA CASTELNUOVO 7 – 22100 COMO
Web-site: http://nfmlab.chem.polimi.it

MAIN FIELD OF ACTIVITY

X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
X - Recent developments in nanoscience and nanotechnology
X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety)
❑ - Biotechnology
❑ - Conservation and restoration of Cultural Heritage
❑ - Environmental pollution monitoring

GROUP LEADER

RESNATI, GIUSEPPE, PROF., FULL PROFESSOR

ADDRESS

Tel.: +39-02-23993032; Fax: +39-02-23993080; E-mail: giuseppe.resnati@polimi.it

HUMAN RESOURCES

RESEARCHERS:	6	POST-DOC:	2
Ph. D.:	4	STUDENTS:	1
TECHNICIANS:	1	OTHERS:	1

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS

1. Chemistry of elemental fluorine, synthesis and manipulation of high energy intermediates *e.g.* fluoroalkyl-ipofluorites, bis-ipofluorites and perfluoroperoxides.
2. Preparation of new fluorinated monomers and polymers for sophisticated applications in the areas of energy storage, optics, catalysis and electronics.
3. Design and synthesis of "smart" nanomaterials with applications to new environmentally friendly nanotechnologies by combined self-organization and molecular recognition.
4. Asymmetric synthesis of fluorinated drugs and agrochemicals

RUNNING PROJECTS:

REGIONAL: "Nanostructured Fluorinated Materials via Molecular Modules Self-assembly" Promotion of International Projects Targeted to Joung Researchers
FONDAZIONE CARIPLO

NATIONAL: "Fluorous Coated Dendrimers as Nanoreactors in Catalytic Oxidations with Atmospheric Oxygen" Fluorinated Nanoreactors with Designed Structures and Optimized Functions
MIUR – PRIN 2003

EUROPEAN: "New Fluorous Media and Processes for Cleaner and Safer Chemistry" Sustainable/Green Chemistry and Chemical Technology
COST Chemistry Action D29 - WG 0011/03

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES

Solvay - Solexis S.p.A.: "Synthesis of fluorinated monomers via Diels-Alder reaction of norbornene derivatives: Towards new polymers for 157 nm microlithography"
"Reactivity of fluorinated intermediates"
"Synthesis and reactivity of highly fluorinated organic compounds"
"Fluoroorganic chemistry: Reagents and methods"
"Fluorinated intermediates as possible building blocks for macromolecules synthesis"
"New synthetic methods in fluoroorganic chemistry"
"Solvay-Solexis Chair on the chemistry of fluorite and fluorinated materials"

WITH SMALL OR MEDIUM ENTERPRISES

Euticals S.p.A.: "New chemical and enzymatic processes for the synthesis of 3-substituted cephalosporine"

EXPERTISE

Expertise in handling elemental fluorine and perfluoro-hypofluorites for the synthesis of organo-fluorine compounds. Use of low temperature, low volume, continuous flow analytically controlled reactor apparatus for the safe handling of highly reactive intermediates.
Polymerisation and copolymerisation of fluorinated monomers for the synthesis of perfluororubbers, fluoro-plastomers and sulfonic functionalised ionomeric materials.
Asymmetric synthesis of fluorinated amino acids, sugars, alkaloids, and agrochemicals. Use of fluorinating reagents.
Manipulation of fluorinated compounds at the micro- and nano-metric levels through a strategy based on combined self-organization and molecular recognition for acquiring functional information transfer and exploiting the peculiar properties of fluorinated compounds in "smart" nano-materials.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION POLITECNICO DI MILANO: Dipartimento CMIC "GIULIO NATTA"
LOCATION (postal address) VIA MANCINELLI 7, 20131 MILANO (ITALY)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑- Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Prof. SERVI Stefano (Full Professor) ADDRESS (fax, e-mail) VIA MANCINELLI 7 20131 MILANO (ITALY) Fax: +390223993080 e-mail: stefano.servi@polimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 3	POST-DOC: 2
Ph. D.: 2	STUDENTS: 4
TECHNICIANS:	OTHERS: 2

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Proteases in the deracemization of non-natural amino acids
2. Deracemization of aromatic aminoacids via coupled D-amino acid oxidase / amino transferase biotransformation.
3. L- and D- hydantoinases in the preparation of β2 and β3 amino acids
4. Hydrolytic enzymes in the kinetic resolution of N-protected amino acids
5. Enzymatic modification of phospholipids
6. Site directed mutagenesis of phospholipase D in E. coli

RUNNING PROJECTS (official title is required):

NATIONAL: PRIN 2004: Polipeptidi Bioattivi e Nanostrutturati: Struttura Molecolare e Supramolecolare, Attività Biologica, Sintesi Innovative

EUROPEAN: Enzymatic approaches to the synthesis and manipulation of non-natural amino acids WG 006 COST D25

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

FLAMMA SPA Enzymatic modification and synthesis of non-natural amino acids

EXPERTISE (100 words max.)

The group has been active in biocatalysis for more than 30 years. Whole cell biocatalysis (yeast) has been applied on multiple synthesis of natural products. Phospholipase D from *Streptomyces* has been isolated from nature, purified, and identified through crystal structure determination. The mechanism of the catalysis has been identified. It is applied on industrial scale for the production of modified phospholipids. New enzymatic activities are being applied to the synthesis of α- and β-amino acids. This include DAO from *R.glutinis*¸L- and D-hydantoinases on six membered rings, multi-substrate amino transferases and new applications of commercially available enzymes in water solution, biphasic systems and membrane bioreactors.

Census of the "Chemistry and Chemical Engineering"
Research in Lombardy

GENERAL INFORMATION

INSTITUTION POLITECNICO DI MILANO: Dipartimento CMIC "GIULIO NATTA"
LOCATION (postal address) VIA MANCINELLI 7, 20131 MILANO (ITALY)
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Prof. Vismara Elena (associate professor) ADDRESS (fax, e-mail) VIA MANCINELLI 7 20131 MILANO (ITALY) Fax: +390223993080 e-mail: elena.vismara@polimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:	POST-DOC:
Ph. D.: 2	STUDENTS: 1
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) 1. Synthesis of multifunctional new textile materials. 2. Synthesis of glycomimetics. 3. Chemical and radiochemical modification of heparin to prepare low and very low MW heparin.
RUNNING PROJECTS (official title is required): REGIONAL: NATIONAL: FIRB "Heparanase Inhibitors in Antiangiogenic and Antimetastatic Cancer Therapy" 2001-2003 EUROPEAN: Subcontractor UE Project Shared-cost RTD "Heparanase Inhibitors in Antiangiogenic and Antimetastatic Cancer Therapy" 2002-2005
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees) Linificio e Canapificio Nazionale srl (Fara e Gera d'Adda, Bergamo) Italy WITH SMALL OR MEDIUM ENTERPRISES LDO Lab. derivati Organici (Trino Vercellese, Vercelli) Italy Opocrin spa (Corio di Modena, Modena) Italy
EXPERTISE (100 words max.) Elena Vismara is an expert in radical chemistry with experience in organic synthesis applied to carbohydrates and polysaccharides. She undertakes both fundamental and applied researches. She always involves in her activity mainly young people giving them training in research. She has been involved as a leader in national and international projects both with public and private financial supports on the synthesis of non- natural carbohydrates and glycomimetics, structural modifications of cellulose natural fibers by ionic and radical pathways, radical reactions applied to textile finishing, and chemical and radiochemical reactions on heparin. Publications, Patents, Meeting Contributions: 60 papers, 13 patents, over 50 Meeting Contributions.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION :
UNIVERSITÀ DEGLI STUDI DI MILANO-BICOCCA, DIPARTIMENTO DI BIOTECNOLOGIE E BIOSCIENZE

LOCATION (postal address) Piazza della Scienza,2 20125 Milano

MAIN FIELD OF ACTIVITY (mark one or more boxes)

❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)

❑ - Recent developments in nanoscience and nanotechnology

❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety)

X - Biotechnology

❑ - Conservation and restoration of Cultural Heritage

❑ - Environmental pollution monitoring

GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.))

Piercarlo Fantucci full professor
Luca De Gioia associated professor

ADDRESS (fax, e-mail)
Piercarlo Fantucci Fax 02-6448-3478 e-mail piercarlo.fantucci@unimib.it
Luca De Gioia Fax 02-6448-3478 e-mail luca.degioia@unimib.it

HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:	1	POST-DOC:	0
Ph. D.:	3	STUDENTS:	15
TECHNICIANS:	0	OTHERS:	4

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Computational investigations on structure-activity relationships of proteic system (Fantucci)
2. Development of a bioinformatic platform for protein structure investigation and new drug design (Fantucci)
3. Quantum chemical investigations of structure and function of metallo proteins and biomimetic metal complexes (De Gioia)

RUNNING PROJECTS (official title is required):

REGIONAL: Sperimentazione di un modello consortile tra Università di Milano-Bicocca, PMI biofarmaceutiche, enti locali ed ospedalieri per l'implementazione di piattaforme informatiche nel campo dello sviluppo di nuovi farmaci e della diagnosi"

NATIONAL: COMPOSIZIONE CHIMICA, SORGENTI, TOSSICITÀ DEL PARTICOLATO ATMOSFERICO NELLA REGIONE LOMBARDIA (MIUR 04 MORO)

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Le linee di ricerca hanno come tema caratterizzante lo studio delle relazioni tra la struttura tridimensionale e l' attività in enzimi e loro modelli sintetici. In particolare, recentemente sono pubblicati studi riguardanti le proprietà catalitiche di modelli del sito attivo di metallo enzimi ([NiFe] e [Fe] idrogenasi, Vanadio perossidasi), i fenomeni all abase del riconoscimento molecolare in enzimi e sistemi modello contenenti il gruppo prostetico eme, il ruolo degli ioni metallici nell'idrolisi della guanosina trifosfato e altri fosfati di rilevanza biologica. Tra le altre attività di ricerca si sottolineano gli studi sulle proprietà strutturali di peptidi e proteine di rilevanza biomedica e/o biotecnologica quali la proteina prionica umana, la proteina C reattiva e gli enzimi lipasi e lattato deidrogenasi.Il gruppo collabora con altri centri di ricerca italiani e stranieri tra i quali l'Università di Pavia, l'Università di Torino, l'Istituto Farmacologico Mario Negri di Milano, il Dipartimento di Chimica Biologica del John Innes Center di Norwich (UK), il Dipartimento di Chimica dell'Università dell'Illinois (USA), il Dipartimento di Chimica dell'Università del Michigan (USA).

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION . UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA, DIPARTIMENTO DI BIOTECNOLOGIE E BIOSCIENZE
LOCATION (postal address) Piazza della Scienza, 1 20125 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Francesco Nicotra full professor ADDRESS (fax, e-mail) Fax 02.6448.3569 e-mail Francesco.nicotra@unimib.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 4	POST-DOC: 3
Ph. D.: 2	STUDENTS: 10
TECHNICIANS:	OTHERS: 2 (pre-doc fellow)

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Design and Synthesis of Bioactive compounds
2. Biocatalysis

RUNNING PROJECTS (official title is required):
REGIONAL: "Start-up Biotecnicum (BBC). Erogazione di servizi di sviluppo di prodotti e processi biotecnologici per l'innovazione nelle imprese lombarde"

NATIONAL: FIRB 2001, COFINB 2003, CIB 2004

EUROPEAN: RTN GLYCIDIC SCAFFOLDS

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
NERVIANO MEDICAL SCIENCE, DIASORIN

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)
Research in the group ranges across the synthesis of various biologically active compounds, in particular carbohydrates, peptides and structural analogues, the development of new synthetic methods and the use of biocatalysis.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION: UNIVERSITY OF MILANO BICOCCA. DEPT BIOTECHNOLOGY AND BIOSCIENCE
LOCATION (postal address) P.zza della scienza 2. 20126, Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Danilo Porro (full professor) ADDRESS (fax, e-mail) danilo.porro@unimib.it fax 02.64.48.35.69
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 2	POST-DOC: 1
Ph. D.: 4	STUDENTS: 5
TECHNICIANS: 0	OTHERS: 1

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) 1. Production of fine chemicals 2. Metabolic engineering 3. Industrial Biotechnology
RUNNING PROJECTS (official title is required): REGIONAL: NATIONAL: EUROPEAN:
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees)   WITH SMALL OR MEDIUM ENTERPRISES
EXPERTISE (100 words max.) Production of eterologous proteins in conventional and non-conventional yeasts with rDNA technologies, and metabolic engineering; expression system optimisation

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION: UNIVERSITY OF MILANO-BICOCCA
LOCATION (postal address): Dipartimento di Scienza dei Materiali- via Roberto Cozzi 53 20126 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X- Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Giorgio Pagani –Full Professor of Organic Chemistry – Leader of the Organic Materials Group ADDRESS (fax, e-mail) +39 (0)2 6448 5400 giorgio.pagani@mater.unimib.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:1	POST-DOC:2
Ph. D.:1	STUDENTS:4
TECHNICIANS:1	OTHERS: prof. Alessandro Abbotto – Associate professor in Organic Chemistry Dr. Silvia Bradamante Senior Researcher of CNR (National Council of Research)

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. …PHOTONICS: Synthesis, preparation and characterization of Organic Materials for 2nd (electro-optic materials) and 3rd harmonic generation
2. …MULTIPHOTONICS: Synthesis, preparation and characterization of Organic Materials for two photon absorption (imaging and nanofabrication)
3. … Synthesis, preparation and characterization of Organic Materials with electronic absorption in the NIR (Near infrared) for PDT (Photodynamic Therapy) and solar cells

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL: FIRB PNR 2001-2003 DELAYED TO 2003-2006 MOLECULAR AND ORGANIC/INORGANIC HYBRID NANOSTRUCTURES FOR PHOTONICS

EUROPEAN: 1) NANOEFFECTS: NANOCOMPOSITES WITH HIGH COLORATION EFFICIENCY FOR ELECTROCHROMIC SMART PLASTIC DEVICES. PROJECT COORDINATOR: FRAUNHOFER INSTITUTE, WUERZBURG

2) ODEON: DESIGN AND FABRICATION OF OPTOELECTRONIC DEVICES BASED ON INNOVATIVE SECOND-ORDER NONLINEAR ORGANIC NANOMATERIALS. PROPOSAL/CONTRACT NO.: FP6-505478- PROJECT COORDINATOR UNIVERSITY OF ROME TOR VERGATA

.3) PRIN 2005-06: Leader: UNIVERSITY OF PADOVA
MATERIALI MOLECOLARI E NANOSTRUTTURE PER FOTONICA E NANOFOTONICA

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

Active Collaboration is running within the Consortium CORIMAV (Consorzio di Ricerche su Materiali avanzati) a Consortium between Pirelli spa and the University of Milano-Bicocca

WITH SMALL OR MEDIUM ENTERPRISES –

EXPERTISE (100 words max.

The Research Unit of the University of Milano-Bicocca is a team of many different individuals interested in organic chemistry, polymers, and materials science:
a) design and synthesis of new push-pull conjugated molecular systems, exploiting the multiyear expertise in synthesis and investigation of heteroaromatics with tunable electron-withdrawing and electron-donating properties; b) design and synthesis of conjugated oligomers and polymers with large 3rd order NLO activity;
c) ground state characterization, absorption and emission spectroscopy, multinuclear NMR spectroscopy, quantum-mechanical, computations;
Collaborations: Universities of Padova, Rome, Evanston (Northwestern University - USA), Kaiserslautern (D), Potsdam (D), Bayreuth (D), and Orsay (F).

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION DIPARTIMENTO DI SCIENZA DEI MATERIALI, UNIVERSITÀ DI MILANO BICOCCA
LOCATION (postal address) Via R. Cozzi, 53 – 20125 Milano, Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Pacchioni Gianfranco, Full Professor, Department Director ADDRESS (fax, e-mail) Fax: ++39-02-6448 5400; e-mail gianfranco.pacchioni@unimib.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC: 1
Ph. D.: 2	STUDENTS: 4
TECHNICIANS: 0	OTHERS: 1

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Metal nanoparticles on oxide substrates: structure, activity, physical properties
2. Defects in oxides materials, surfaces, and thin films
3. Electronic and chemical properties of ceramic materials

RUNNING PROJECTS (official title is required):
REGIONAL: NONE

NATIONAL: PRIN 2004-05 Nature, properties, and control of oxide surface defects: an integrated approach towards defect engineering

EUROPEAN: STREP GSOMEN Growth and Supra-Organization of Transition and Noble Metal Nanoclusters

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)
Theoretical and structural aspects of inorganic and organometallic chemistry
Electronic structure of metal clusters
Theory of chemisorption and surface chemistry
Relationships between homogeneous and heterogeneous catalysis
Structure and properties of inorganic materials
Interpretation of optical, vibrational, photoemission and electron spin resonance spectra in solids and on surfaces.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Università degli Studi di Milano-Bicocca
LOCATION (postal address) Dipartimento DI Scienza dei Materiali Via R. Cozzi 53, 20125 Milano Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Mari Claudio Maria, full professor ADDRESS (fax, e-mail) +39 02 6448 5400 claudiomaria.mari@unimib.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:	POST-DOC: 1
Ph. D.:	STUDENTS: 1
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Lithium batteries
2. Fuel cell
3. Electrochromics
4. Gas sensors

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

OSSIDI MISTI A STRUTTURA PEROVSKITICA E OLIVINICA PER APPLICAZIONI ALLA CONDUZIONE IONICA E ALL'ACCUNMULO ENERGETICO

EUROPEAN:

NANOCOMPOSITES WITH HIGH COLOURATION EFFICIENCY FOR ELECTROCHROMIC SMART PLASTIC DEVICES

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

ESSILOR

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Electrical and electrochemical characterization of electrolytes (solid and polymeric) and electrode materias (for fuel cells and lithium batterys).
Electrohemical prepazation of polymers and their electrochemical characterization.
Design and characterization of semiconductor and electrochemical solid state gas sensors

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION UNIVERSITY OF MILANO BICOCCA, DEPT. MATERIALS SCIENCE
LOCATION (postal address) Via R. Cozzi 53, 20125 Milano (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Dario Narducci, Associate Professor ADDRESS (fax, e-mail) Fax: 02-6448-5137 e-mail: dario.narducci@unimib.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC: 1
Ph. D.: 2	STUDENTS: 3
TECHNICIANS: 0	OTHERS: 1

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Self-assembly of organic molecules onto inorganic surfaces
2. Development of gas sensors

RUNNING PROJECTS (official title is required):
REGIONAL: PARTICIPATION IN THE L-NESS LABORATORY, REGIONAL CENTER OF EXCELLENCE IN COMO

NATIONAL: ADSORPTION OF MOLECULES AT SOLID SURFACES: FUNDAMENTAL THEORETICAL ASPECTS AND EXPERIMENTAL INVESTIGATIONS (MIUR) PRIN

EUROPEAN: -

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
Bellotti, Development of nanotechnologies to modify the physico-chemical properties of wood

WITH SMALL OR MEDIUM ENTERPRISES
Dani Instruments S.p.A., Development of gas sensors improving indoor safety
Dani Instruments S.p.A., Development of gas sensors for security applications

EXPERTISE (100 words max.)
This research group has developed over the last decade a portfolio of chemical procedures to self-assemble organic moieties onto semiconductor and insulator surfaces. These techniques have led to the development of a novel class of gas sensors with enhanced capabilities of selective detection of organic species. The method is being also considered as a technique to modify properties of porous solids ranging from porous silicon to natural materials such as wood. The laboratory is fully equipped for the electrical characterization (resistance, current-voltage and capacitance-voltage measurements) of simple devices under controlled atmospheres.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Department of Materials Science, University of Milano-Bicocca
LOCATION (postal address) Via Roberto Cozzi 53, 20125 Milano, Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage X - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) MORAZZONI FRANCA, Full Professor of Inorganic Chemistry ADDRESS (fax, e-mail) 003902 64485400 franca.morazzoni@mater.unimib.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC: 3
Ph. D.: 1	STUDENTS: 3
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) *1. Semiconductor based gas sensors* *2 .New photocatalytic materials* *3. Sol- gel obtained luminescent glasses*
RUNNING PROJECTS (official title is required): REGIONAL: CARIPLO GRANT "IMMOBILIZED INORGANIC SEMICONDUCTORS FOR WATER AND AIR PHOTOCATALYTIC PURIFICATION" 2004-2006 NATIONAL: MIUR, COFIN – NANOSTRUCTURED LUMINESCENT OXIDES 2003-2005 EUROPEAN:
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees) WITH SMALL OR MEDIUM ENTERPRISES
EXPERTISE (100 words max.) Sol-gel syntheses of ceramics and glasses Spectroscopic and spectromagnetic characterization Electrical (conductivity) and optical (absorption and luminescence) functionality evaluation Phocatalytic reactivity and kinetics

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Department of Environmental Sciences – University of Milano - Bicocca
LOCATION (postal address) Piazza della Scienza, 1, 20126 Milano, Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Bruno Rindone, Prof., full professor ADDRESS (fax, e-mail) Bruno.Rindone@unimib.it; fax +39 02 6448 2890
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:	POST-DOC:
Ph. D.:	STUDENTS:2
TECHNICIANS:1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Reactivity of organic molecules in gas phase. Relevance for the chemistry of the troposphere
2. Enantioselective oxidative phenol coupling
3. Alternative to phosgene: the cobalt-catalyzed oxidative carbonylation of amines

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL:
1. Ossidazione catalitica di fenoli fenilpropanoidici per la demolizione della lignina e per la sintesi diastereo- ed enantioselettiva di lignani FISR
2. Composizione chimica, sorgenti, tossicità del particolato atmosferico nella Regione Lombardia COFIN

EUROPEAN:

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES
Chorisis S.R.L. (Determination of the components of wax esters from natural sources and comparison with materials enriched in ω–3 unsaturated fatty acids).

EXPERTISE (100 words max.)
Reactivity of organic compounds in the environment
Synthetic procedures with low environmental impact
Organic physical chemistry
Wastewater treatment

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION DIPARTIMENTO DI CHIMICA GENERALE UNIVERSITÀ DI PAVIA LABORATORY OF ANALYTICAL CHEMISTRY
LOCATION (postal address) Via Taramelli 12 27100 Pavia
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage X - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Pesavento Maria, full professor of Analytical Chemistry ADDRESS (fax, e-mail) Dipartimento di Chimica Generale, Via Taramelli 12, 27100 Pavia ++390382 987589 ++390382 528544
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 4	POST-DOC: 0
Ph. D.: 4	STUDENTS: 5
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1.Investigation of metal species in complex matrices as natural waters and beverages, in particular of the strong metal complexes.

2. Synthesis of new materials for the selective sorption of species, for separation and development of sensors.

3. Development of new SPE methods for metal ions and organic pollutants at trace and ultratrace level.

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

FIRB 2000: SPECIATION, CHARACTERIZATION AND PHOTOCHEMICAL PROPERTIES OF ORGANIC AND INORGANIC SUBSTANCES IN SEA WATER

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Determination of trace metal ion concentration in complex matrices as natural waters at high and low salinity, and in beverages as for instance tea infusion and wine. Determination of trace metal ion concentration in soil, sediments, and aerosol. Determination of the species in which the metal ions are distributed in complex and unknown matrices.

Kinetical and thermodynamic characterization of sorbing solids for separation and preconcentration of trace metal ions and organics. Solids are for instance activated carbon and complexing resins.

Development and characterization of biological and synthetical receptors for pollutants, for sensor development.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION: DIPARTIMENTO DI CHIMICA GENERALE, UNIVERSITA' DI PAVIA
LOCATION (postal address): via Taramelli 12, I-27100, Pavia
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology x - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) x - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Casella, Luigi, Dr., full professor ADDRESS (fax, e-mail): Fax: +39-0382528544 Email: bioinorg@unipv.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC: 2
Ph. D.: 3	STUDENTS: 10
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Analysis of the mechanism of reaction and activity of copper containing enzymes
2. Characterization of the structure activity relationship in heme containing proteins
3. Synthesis and characterization of small molecular weight metalloproteins model systems

RUNNING PROJECTS (official title is required):

REGIONAL: NONE

NATIONAL:

The role of metal ions in metabolic processes (cofin2003)

EUROPEAN:

a) Metals in Biological Systems (Marie Curie Training Site)

b) Metalloenzymes and Chemical Biomimetics (COST Chemistry Action D21)

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees): None

WITH SMALL OR MEDIUM ENTERPRISES: NONE

EXPERTISE (100 words max.)

The research, mainly focused on bioinorganic chemistry, covers two main fields. The first involves the preparation of heme containing proteins mutants and purification of copper and iron proteins from their natural sources. The active site of the metalloproteins thus obtained are characterized by spectroscopic techniques in order to obtain information on the structure/activity relationship.
The second field involves the synthesis of model for the active site of the protein with the aim of isolating active species and check their reactivity. These study are useful for the characterization of the elusive enzyme intermediates and for the clarification of the catalytic mechanisms.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION University of Pavia
LOCATION (postal address) Dep. of Physical Chemistry "M. Rolla", Viale Taramelli 16, 27100 PAVIA
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Massarotti Vincenzo, Professor, full professor ADDRESS (fax, e-mail) 039-0382-987575; vincenzo.massarotti@unipv.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 5	POST-DOC:
Ph. D.:	STUDENTS:2
TECHNICIANS: 1	OTHERS:1

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Synthesis and chemico-physical characterization of electrode materials: electronic and ionic conductors (*e.g.* pure and doped $LiMn_2O_4$, Li_3VO_4)
2. Synthesis and characterization of electrical properties of dielectric materials (*e.g.* pure and doped $CaCu_3Ti_4O_{12}$ and $SrTiO_3$)

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES
REDOX s.n.c.
FARMABIOS s.p.a.

EXPERTISE (100 words max.)
Preparation of pure and doped compounds through different synthesis processes (solid state, sol-gel, high energy mechanical grinding) to optimize the peculiar properties of the material.
Purity control of the compounds by X-Ray powder diffraction measurements. Structural characterization both by ab initio procedures and by Rietveld refinement full profile fitting.
Microstructural study by peaks broadening analysis of X-ray diffraction reflections (Debye-Scherrer and Warren-Averbach methods).
Characterization of the chemico-physical properties of the materials by Electron Paramagnetic Resonance and conductivity measurements and by micro-Raman, Nuclear Magnetic Resonance and complex impedance spectroscopy.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION DIPARTIMENTO DI CHIMICA FISICA *M. ROLLA* – UNIVERSITY OF PAVIA
LOCATION (postal address) Viale Taramelli, 16 I 27100 Pavia
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Giorgio Spinolo Full professor ADDRESS (fax, e-mail) 0382 987575 gs@unipv.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 3	POST-DOC: 1
Ph. D.: 2	STUDENTS: 2
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) 1. SHS (Self-sustained high temperature synthesis) and related techniques (FACS, Thermal explosion) 2. SPS (Spark plasma sintering) 3. Nanostructured oxides for functional applications 4. Lead-free alloys for microelectronics
RUNNING PROJECTS (official title is required): REGIONAL: NATIONAL: EUROPEAN:
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees) Magneti Marelli Power Train SpA WITH SMALL OR MEDIUM ENTERPRISES
EXPERTISE (100 words max.) Characterization of advanced materials (XRD, SEM, TA, EXAFS, electrical and magnetic properties) Synthesis of advanced materials (SHS, SPS, FACS and related techniques, Solid state synthesis of ceramic materials) Chemical reactions in inter - metallic systems

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Department of Organic Chemistry, University of Pavia
LOCATION (postal address) Via Taramelli 10 27100 Pavia
MAIN FIELD OF ACTIVITY (mark one or more boxes) x - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology x - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Albini, Angelo, Dr, Professor ADDRESS (fax, e-mail) Fax 39 0382 987323, angelo.albini@unipv.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 2	POST-DOC: 1
Ph. D.: 2	STUDENTS:1
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. New methods for sustainable synthesis: photoarylation and photocatalytic alkylation reactions
2. Photoactivable molecules with biologic action

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL: ACTIVATION OF ORGANIC MOLECULES VIA CATALYTIC AND PHOTOCATALYTIC METHODS

EUROPEAN:

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
Photoprotective agents for plastics

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)
The group has a long-standing (30 years) interest in organic photochemistry from the preparative and mechanistic point of view. The main fields of activity in the last decade have been:
a) new sustainable synthetic methods based on photoactivation (arylation via photogenerated arylium cation, photocatalytic activation of C-H bond, mild methods of alkane and sulfide oxidation, photochemical properties of nanomaterials)
b) biological effects of the photoreactions of xenobiotics: photolability and phototoxicity of drugs, photoactivated drugs; photostabilization of materials.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Università di Pavia
LOCATION (postal address) Dipartimento di Chimica Organica, V.le Taramelli 10 I-27100 Pavia (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Gandolfi Remo Full Professor ADDRESS (fax, e-mail) +039 0382 987323 remo.gandolfi@unipv.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:1	POST-DOC:
Ph. D.:1	STUDENTS:4
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Oxidation reaction mechanisms with high level computational methods.
2. Mild photo-activation of selective alkylating and cross-linking agents toward nucleosides and nucleic acids.

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL: PRIN 2003. EFFICIENT AND ENVIRONMENT FRIENDLY PROCESSES FOR SELECTIVE OXIDATION OF ORGANIC "TARGET" COMPOUNDS

EUROPEAN:

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES
ICROM

EXPERTISE (100 words max.)

Computational approach to oxidation reactions in both gas and condensed phase with DFT methods and PCM solvation models.
Synthesis and photo-activation of stable and water soluble alkylating and cross-linking agents of amino acids, oligopeptides, nucleosides and DNA.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION: UNIVERSITÀ DI PAVIA
LOCATION (postal address) Dipartimento di Chimica Organica, V.le Taramelli 10 – I-27100 Pavia (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Giovanni DESIMONI Full Professor ADDRESS (fax, e-mail) +39 0382 987323 giovanni.desimoni@unipv.it

HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC:
Ph. D.: 1	STUDENTS: 1
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Synthesis of chiral ligand based on bis(oxazolines) as chiral fragment
2. Stereocontrolled synthesis by asymmetric catalysis

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

PRIN 2004: NON-AROMATIC HETEROCYCLES IN STEREOCONTROLLED PROCESSES

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

GSK (Glaxo-Smith-Kline)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

New protocols for the stereocontrolled synthesis of enantiopure 4,5-cis and trans-disubstituted bis(oxazolines) have been developed and optimised. Such ligands as well as new monosubstituted ones have been fruitful used in the preparation of asymmetric catalysts used in several enantioselective C-C bond forming reactions. The main target of the research is the optimisation of catalytic systems able to control the enatioselectivity obtainable by using the same chiral source through small achiral modification (cation, anion, achiral addivites).

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION UNIVERSITY OF PAVIA – DEPARTMENT OF ORGANIC CHEMISTRY
LOCATION (postal address) Viale Taramelli, 10 27100 – PAVIA (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology **X** - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.) CARAMELLA, PIERLUIGI (FULL PROFESSOR) ADDRESS (fax, e-mail) pierluigi.caramella@unipv.it tel. +39 0382 987315 fax. +39 0382 987323
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1 (Quadrelli, Paolo)	POST-DOC:
Ph. D.:	STUDENTS: 4
TECHNICIANS: 1	OTHERS: 1

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) 1. 1,3-Dipolar cycloadditios of nitrile oxides to 2-oxa-3-aza- and 2-aza-norbornene systems as synthons towards modified carbocyclic nucleosides with potential anti-viral acitivity. 2. Use of environmental sustainable methodologies to perform 1,3-dipolar cyclcoadditions and to generate nitrosocarbonyl intermediates through solid phase syntheses. 3. Computational methods towards the study of selectivities in pericyclic reactions.
RUNNING PROJECTS (official title is required): REGIONAL: NATIONAL: EUROPEAN:
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees)   WITH SMALL OR MEDIUM ENTERPRISES
EXPERTISE (100 words max.) Synthetic Organic Chemistry Diels-Alder Cycloadditions 1,3-Dipolar cycloadditions Nitrile oxides Heterocyclic Chemistry, Isoxazoles, Pyrazoles Solid Phase Chemistry Theoretical calculations, ab initio, DFT

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Department of Organic Chemistry - University of Pavia
LOCATION Viale Taramelli, 10 27100 Pavia
MAIN FIELD OF ACTIVITY ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER Vita Finzi Paola, full professor ADDRESS (fax, e-mail) ++39 0382 987323 vitafinz@unipv.it
HUMAN RESOURCES

RESEARCHERS: 1	POST-DOC: 1
Ph. D.: 6	STUDENTS: 1
TECHNICIANS: 0	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS

1. Isolation and structure determination of biologically active compounds from medicinal plants and higher fungi (Basidiomycetes*).* Study of compounds with cytotoxic, antitumoral, cholesterol lowering, antibacterial and antifungal activity
2. Stereocontrolled total synthesis and semisynthesis of biologically active chiral compounds and intermediates.
3. Organometallic Chemistry, Biomimetic Methodologies

RUNNING PROJECTS:

NATIONAL:

1. MAE (MINISTERO AFFARI ESTERI): "STUDI FITOCHIMICI E FARMACOGNOSTICI DI PIANTE PERUVIANE"
2. FIRB (MIUR): "DISEGNO E SINTESI DI COMPOSTI PER L'INIBIZIONE DI ENZIMI COINVOLTI IN MECCANISMI SPECIFICI DI CONTROLLO DELLA PROLIFERAZIONE DELLE CELLULE TUMORALI"
3. COFIN (MIUR): "SINTESI TOTALI ENANTIOSELETTIVI D'IMPORTANTI COMPONENTI DI AROMI E FRAGRANZE"
4. FAR (UNIVERSITY OF PAVIA): "STUDI STRUTTURALI E SINTETICI DI MOLECOLE D'INTERESSE BIOLOGICO"

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES

Indena; Intertrading.

WITH SMALL OR MEDIUM ENTERPRISES

Cornelli Consulting; Sunflower

EXPERTISE

Methods for the extraction, separation and purification of organic compounds. Analytical and preparative chromatographic methods (GC and HPLC). Determination of the structure of organic molecules by spectroscopic and chemical methods. Interpretation of IR, NMR, MS and CD spectra of organic molecules (chiro-optical methods). Studies on variation of metabolism in plants. Synthesis of organic compounds. Enantioselective synthesis of natural products. Synthesis using organometallic species in an inert atmosphere. Traditional and innovative synthetic methods. Simple assays of biological activity.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION DIPARTIMENTO DI SCIENZE CHIMICHE E AMBIENTALI, UNIVERSITÀ DELL'INSUBRIA
LOCATION (postal address) Via Valleggio 11, 22100 Como (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology X - Conservation and restoration of Cultural Heritage X - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Carlo Dossi, Full Professor ADDRESS (fax, e-mail) carlo.dossi@uninsubria.it, fax 031-2386475, phone : 031-2386235
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 6	POST-DOC:
Ph. D.: 2	STUDENTS:10
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Characterization and speciation of trace and ultratrace micropollutants in environmental matrices (ice, snow, water, soils and air).
2. Development of new analytical instrumentations and chemometric techniques for environmental monitoring and material characterization.
3. Study of the interaction between environmental pollution and stone surfaces of historical monuments

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

EUROPEAN:

INTERREG IIIA ITALIA-SVIZZERA, MISURA 2.2, 'L'arte dello stucco nel parco dei Magistri Comacini (Intelvesi, Campionesi e Ticinesi) delle Valli e dei Laghi: valorizzazione, conservazione e promozione'

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

Metrohm Italiana

AMEL srl

EXPERTISE (100 words max.)

- Development of analytical procedures and protocols based on electrochemical, spectrometric and chromatographic techniques for the isotopic characterisation and speciation analysis of trace and ultratrace micropollutants in the environment and in works of art.
- Analytical investigation of ancient and conservation mortars.
- Analytical and geochemical investigation of lacustrine and mountain environments.
- Design and development of advanced instrumentation for trace/ultratrace environmental analysis and for material characterization
- Applications of Chemometrics in material study, environmental analysis and archeometry.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION DIPARTIMENTO DI SCIENZE CHIMICHE E AMBIENTALI
LOCATION (postal address) UNIVERSITA' DELL'INSUBRIA, VIA VALLEGGIO 11, 22100 COMO (ITALY)
MAIN FIELD OF ACTIVITY (mark one or more boxes) X- Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADERS (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Full professors: Girolamo La Monica, Attilio Ardizzoia, Norberto Masciocchi, Aldo Gamba, Gabriele Morosi, Gaetano Zecchi, Giovanni Palmisano ADDRESS (fax, e-mail) Same as above
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 14	POST-DOC: 10
Ph. D.: 10	STUDENTS: 10
TECHNICIANS: 4	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Polyfunctional materials based on transition metals and organic ligands.
2. X-ray structural characterization of coordination compounds.
3. Development of powder diffraction methods for the structural characterization of polymorphs in organometallic, organic and pharmaceutical chemistry (polymorphs and solvates).

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL: SEVERAL PRIN PROJECTS (PENDING).

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

Bracco Imaging; ST Microelectronics, Edison.

WITH SMALL OR MEDIUM ENTERPRISES

Gammatex; Maglab

EXPERTISE (100 words max.)

Structural and analytical procedures for the characterization of amorphous, polycrystalline and monocrystalline materials by diffraction, spectroscopic and thermal methods.
Development of analytical procedures for the structural analysis (also under non-ambient conditions) of technologically relevant functional materials (pharmaceuticals, pigments and dyes, polymers).

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION: LABORATORIO DI CHIMICA PER LE TECNOLOGIE – UNIVERSITÀ DI BRESCIA
LOCATION (postal address) Via Branze 38, 25123 Brescia (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology X - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Depero Laura E., full professor ADDRESS (fax, e-mail) Fax: + 39 (0)30 3702448 e-mail: laura.depero@ing.unibs.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 4	POST-DOC: 2
Ph. D.: 4	STUDENTS: 5
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Structural and microstructural characterisation of coatings deposited with different techniques (as for example galvanostatic, sol-gel, sputtering, chemical vapour deposition, etc..)
2. Study and development of cantilever based micromechanical systems as biosensor for genomic and proteomic diagnostics applications.
3. Synthesis and characterisation of thin films obtained by colloidal lithography for magnetic, catalytic, and optical applications.
4. Study of chemical-physics phenomena generating aluminium-ceramic composites at the interface between liquid aluminum and alluminosilicate refractories.
5. Advanced laboratory techniques applied to cultural heritage characterisation.

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL:
FIRB - Fondo per gli Investimenti per la Ricerca di Base, "Nano- and micro-spectroscopy by synchrotron radiation integrated with advanced STM/AFM systems to study of manmade atomic scale functional materials".
PRIN Progetti di Ricerca Scientifica di Rilevante Interesse Nazionale, "Sintesi e caratterizzazione strutturale, chimica e nanomeccanica di multistrato magnetici e nanostrutture magnetiche ottenute mediante litografia".
PRIN Progetti di Ricerca Scientifica di Rilevante Interesse Nazionale, “Chemical and physical investigations of manufacts after Laser Cleaning/Ablation treatments.”
FIRB - Fondo per gli Investimenti per la Ricerca di Base, “Micro-Technology Laboratory for Bioelectrochemical Diagnostics and Research”

EUROPEAN:
BRITISH –ITALIAN PARTNERSHIP PROGRAMME FOR YOUNG RESEARCHERS-2005 “Study of biodeterioretion of Candoglia marble from Milan Cathedral façade” For this project the application for beamtime at the Deresbury Laboratory have been accepted.
RESEARCH INFRASTRUCTURES: TRANSNATIONAL ACCESS 2005 “Crystallization and nanostructuring in glasses for second harmonic generation (SHG)”

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

ARPA Lombardia, sede di Brescia
ASM di Brescia
Sincrotrone ELETTRA di Trieste
CAFFARO S.p.A.
Centro Orafo il TARI’ - Caserta

WITH SMALL OR MEDIUM ENTERPRISES:

UNISANTIS S.p.A. ; DELTA PHOENIX s.r.l. ; ELCOM s.r.l.; EURAND S.p.A.; GRACE Davison Italiana S.p.A. NOVELLINI S.p.A.; PROTEC s.r.l.; PROTIM s.r.l. ; ASO S.p.A. ; AUROMET

EXPERTISE (100 words max.)
The research of the Chemistry for Technologies group is focused on the relationships between structure, microstructure, physical, and chemical properties of materials. In particular: chemical analysis to identify the elements, optical and electronic spectroscopy and X-ray diffraction techniques to study the structure and scanning probe microscopy, electron and optical microscopy to study the morphology. The researchers have experience in structure simulation employing dedicated software, like Cerius2, Materials Studio and Endeavour. They have expertise on set-up and operating different equipments, performing experiments, data analysis, writing reports and proposals, preparing manuscripts, presenting papers and delivering seminars nationally and internationally.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Università degli Studi di Brescia – Dipartimento di Chimica e Fisica per l'Ingegneria e per i Materiali
LOCATION (postal address) Via Valotti 9, 25133 Brescia (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Theonis Riccò, full professor ADDRESS (fax, e-mail) +39 030 3715788 ricco@ing.unibs.it

HUMAN RESOURCES (number of people involved in the activity fields here above)	
RESEARCHERS: 7	POST-DOC: 3
Ph. D.:	STUDENTS: 8
TECHNICIANS: 2	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Development of polymer nanocomposites with both thermoplastic, thermoset and elastomeric matrices
2. Development of intelligent polymeric and composite gels
3.New polymeric materials for sensing applications
4. Development of engineering materials with improved toughness and mechanical performance
5. Polymer blends

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

1. "Sviluppo di nuove fibre ottiche plastiche"
2. "Valorizzazione di idrolizzati proteici ottenuti da sottoprodotti dell'industria conciaria"

EUROPEAN:

INTERNATIONAL: MAP/ICE/CRUI project entitled "Development and production of nano-structured polymeric materials by simple and low cost processing"

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

Pirelli S.p.A. (Milano, Italy)
Radici Novacips S.p.A. (Villa d'Ogna, Bergamo, Italy)
Smiths Detection (Pasadena, CA, USA)
Sicit Chemitech S.p.A. (Chiampo, Vicenza, Italy)

WITH SMALL OR MEDIUM ENTERPRISES

Luceat S.p.A.(Dello, Brescia, Italy)

EXPERTISE (100 words max.)

The expertise of the group is mainly in the field of polymeric materials and covers both the aspects related to the synthesis and chemical modification of polymers as well as their physico-chemical and mechanical characterisation. The main researches in progress deal with the development of: advanced engineering materials, nanocomposite materials for engineering applications, stimuli-responsive polymeric and composite materials, polymeric materials and conductive nanocomposites for gas sensing, composites for environmental applications, polymer blends and biomaterials. In the above investigations special emphasis is given to the development of novel materials and/or synthetic procedures, which allow to obtain materials with tailored properties. Techniques available for materials characterisation are spectroscopic (NMR, FT-IR and UV), thermal (DSC) thermo-mechanical (DMTA), rheological (capillary rheometry) and mechanical (static and impact testing).

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION CNR - ISTM
LOCATION (postal address) Via C. Golgi, 19 I-20133 MILANO (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) RAVASIO, Nicoletta, Ph.D., senior researcher ADDRESS (fax, e-mail) +39 02 50314382 n.ravasio@istm.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC: 1
Ph. D.:	STUDENTS: 2
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Selective transformations over heterogeneous catalysts: hydrogenation, epoxidation, oxidation, isomerizations;
2. Heterogeneous acid catalysed reactions and bifunctional processes without inorganic wastes production
3. Catalytic transformations of renewables (vegetable oils, terpenes, essential oils)

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

Grace Davison, Worms (D)

Mitsubishi Chemical Corporation (J)

WITH SMALL OR MEDIUM ENTERPRISES

Dynamite Dipharma SpA

EXPERTISE (100 words max.)

Supported Cu catalysts; graphted Ti catalysts; heterogeneous acidic catalysts; ordered and non-ordered mesoporous solids; ultra-selective catalytic hydrogenations of intermediates for the pharmaceutical and F&F industry ; catalytic dehydrogenation of unactivated secondary alcohols; selective epoxidation of olefins including unsaturated vegetable oils; polyfunctional processes involving acidic+hydrogenation, hydrogenation+acidic, acidic+epoxidation, isomerization+acidic+hydrogenation activity; isomerization of epoxides using amorphous acidic heterogeneous catalysts; stabilization of vegetable oils to be used as environmentally friendly lubricants or in biodiesel formulations through selective hydrogenation; evaluation of the stereochemical course of reactions; kinetic resolution; heterogeneous catalysts characterization by means of surface techniques; zero waste processes; simple, clean, safe processes.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION: CNR- NATIONAL RESEARCH COUNCIL: INSTITUTE OF MOLECULAR SCIENCE AND TECHNOLOGIES
LOCATION (postal address) Via C. Golgi, 10 20133 MILANO - Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) BALDOLI Clara (senior researcher) ADDRESS (fax, e-mail) clara.baldoli@istm.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC:
Ph. D.: 2	STUDENTS: 1
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Organic synthesis
2. Organometallic chemistry
3. Synthesis of DNA analogs

RUNNING PROJECTS (official title is required):

NATIONAL: Devolopment of analytical Microsystems: Qualifying Technologies in Biology and Medicine

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
BRACCO Imaging (Milan)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Use of Organometallic compounds in organic and bioorganic synthesis. Polymer supported synthesis. Bioorganometallic chemistry.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Istituto di Scienze e Tecnologie Molecolari – Consiglio Nazionale delle Ricerche
LOCATION (postal address) via Camillo Golgi, 19 – 20133 Milano (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Ponti, Alessandro, Dr., Researcher ADDRESS (fax, e-mail) +39 02 5031 4300 alessandro.ponti@istm.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC:
Ph. D.:	STUDENTS:
TECHNICIANS:	OTHERS: 2

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Profunctionalization of metal calchogenide nanoparticles for chamical and biomedical applications
2. Structured magnetic nanoparticles for data storage materials
3. Metal and metal oxide nanoparticles as catalysts in advanced organic synthesis

RUNNING PROJECTS (official title is required):

REGIONAL:

Materiali magnetici a nanoparticelle con struttura "core-shell" (Fondazione CARIPLO 2004)

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Solvothermal synthesis of monolayer-stabilized metal and metal calchogenide nanoparticles
Analysis of TEM micrographies
Powder X-ray diffraction
Electron para- and ferro-magnetic resonance
Infrared spectroscopy

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION ISTITUTO DI SCIENZE E TECNOLOGIE MOLECOLARI (ISTM)
LOCATION (postal address) Via C. Golgi, 19- 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Dr Angelamaria Maia senior researcher ADDRESS (fax, e-mail) +39 02 50314159, angelamaria.maia@istm.cnr.it

HUMAN RESOURCES (number of people involved in the activity fields here above)	
RESEARCHERS:	POST-DOC:
Ph. D.: 1	STUDENTS: 1
TECHNICIANS:	OTHERS: 1 associate to ISTM (full professor)

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1.Ionic liquids as "green solvents": studies of anion nucleophilicity in anion-promoted S_N2 reactions and comparison with traditional molecular solvents of different polarity.

2. Phase -Transfer Catalysis (PTC) a powerful tool for anion activation: search for alternative organic solvents, even environmentally benign.

3.Use of ionic liquids and of the PTC technique in Industrial Organic Synthesis.

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

The main research interests of our group deal with Physical Organic and Supramolecular Chemistry, with particular attention to studies concerning the parameters that determine the reactivity of the anions in anion-promoted reactions.

At present, they are focused on:

3) Nucleophilicity studies in "greener environmentally benign" solvents to replace the common volatile compounds (VOC) in both homogeneous (ionic liquids) and heterogeneous (Phase Transfer Catalysis) systems;
4) "Metal ion assisted" S_N2 reactions (ring opening, dealkylations,..) in low polarity media and in ionic liquids;
5) Synthesis of new tailor-made ionic liquids and their use in Industrial Organic Synthesis.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION CNR-ISTITUTO DI SCIENZE E TECNOLOGIE MOLECOLARI
LOCATION (postal address) Via Golgi 19 20133 Milano (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) QUICI Silvio, Dr., Director of Research ADDRESS (fax, e-mail) 02 503 14159 silvio.quici@istm.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 3	POST-DOC: 1
Ph. D.: 2	STUDENTS: 2
TECHNICIANS: 0	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Fluorous catalysts and reagents for organic synthesis
2. Synthesis of molecular components for photonic and optoelectronic
3. Nano-organization of molecular components.

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL:
A) FIRB-MIUR (start 2001) "Nanometric machines through molecular manipulation";
B) FISR-MIUR (start 2003) "Molecular nanotechnologies for data storage and transmission";
C) FIRB-MIUR (start 2003) "Design, synthesis and high-throughput biological screening of combinatorial libraries of lead molecules for diagnostic and therapeutic applications";
D) FIRB-MIUR (start 2003) "Molecular compounds and hybrid nanostructured materials with resonant and non resonant optical properties for photonic devices"

EUROPEAN:
COST ACTION 29 (start 2004) "New fluorous media and processes for cleaner and safer chemistry"

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)
Organic/organometallic synthesis and development of novel catalytic methods for the synthesis of fine chemicals.
Organic chemistry in non-conventional reaction media.
Design and synthesis of organic , organometallic and metallorganic molecular components for second and third order NLO.
Design and synthesis of ligands for lanthanides sensitized light emission.
Synthesis of photophisically active polynuclear metal complexes for the preparation of electron and energy transfer based molecular devices.
Self-organization of molecular components for the preparation of nanostructured materials and devices.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION CNR Istituto Scienze e Teconologie Molecolari –Dipartimento di Chimica Organica e Industriale
LOCATION (postal address) Via Golgi 19, 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Michele Penso, Dr CNR Researcher ADDRESS (fax, e-mail) +39 02 50314159 e-mail: michele.penso@istm.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 4	POST-DOC:
Ph. D.: 2	STUDENTS: 4
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Synthesis of new polyfunctionalized benzosultams: studies of their application as biological active molecules and chiral auxiliaries.
2. Stereospecific synthesis under phase transfer catalysis (PTC) conditions of heterocyclic compounds (morpholines, benzoxazines, quinoxalines, etc.).
3. Application of PTC to the chemo- and stereoselective *C*-, *N*- and *O*-alkylation of α-amino acid. Preparation of pharmacologically interesting compounds.

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

Environmentally friendly synthesis under phase transfer catalysis of heterocyclic bioactive compounds (FIRB)

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

1. ACS-Dobfar SpA (Tribiano - MI)
2. Oxon SpA (Pero – MI)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Studies on the application of literature methods to the preparation of fine chemicals.
Application of phase transfer catalysis, an environmentally friendly technique, to the preparation of organic compounds of industrial relevance.
Preparation of new catalysts for stereoselective syntheses.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION ISTM-CNR (Institute of Molecular Science and Technology - National Research Council) Web page: http://www.istm.cnr.it/
LOCATION (postal address) c/o DCFE – Via C. Golgi 19 – 20133 Milano - ITALY
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Rinaldo Psaro, senior scientist ADDRESS (fax, e-mail) Fax: +39 02 50314405 e-mail: r.psaro@istm.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 3	POST-DOC:
Ph. D.: 2	STUDENTS: 1
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Hybrid supported catalysts (metal nanoparticle + SHB (supported by Hydrogen Bonding) metal complex). Preparation, characterization and catalytic test.
2. Rh based catalysts, prepared by OM-CVD, for hydrogen production by CH_4-CPO (Catalytic Partial Oxidation)
3. Advanced (EXAFS and DRIFTS-MS) characterization (operando, in-situ, ex-situ) of catalytic materials, development of home-made reaction chambers.
4. Characterization of platinum-free electrocatalyst for DEFC (Direct Ethanol Fuel Cells).

RUNNING PROJECTS (official title is required):

REGIONAL:.

NATIONAL:

COFIN 2003 (2004-2005)Project "Properties of functional supported single molecules and molecular architetectures: chemical-physical characterization, chemical synthesis and investigation systems development".Workpakage "Generation and dispersion of metallic nanoparticles on inorganic oxides surfaces".

FISR 2003 (2005-2007) "Inorganic and ibrid nanosistems for fuel cells development and innovation". Workpakage: "1st transition series metals based nanosistems and polymer electrolyte membranes for low temperature direct fuel cells."

CIMAINA (Nanostructured Materials and Interfaces Interdisciplinary Center)
Workpakage "Surfaces and interfaces nanomanipulation and nanofunctionalization"
Web page: http://users.unimi.it/cimaina/

EUROPEAN:
IDECAT (2005-2009) **(**Network of excellence) Integrated design of catalytic nanomaterials for a sustainable production

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
Enitecnologie, Snam Progetti

WITH SMALL OR MEDIUM ENTERPRISES

ACTA SpA.

EXPERTISE (100 words max.)
Preparation of mono-and bimetallic heterogeneous catalysts, which are typically composed of nanoparticles supported on inorganic oxides. Preparation of "hybrid catalysts" containing both metallic nanoparticles and molecular metallic complexes anchored via hydrogen bondings.
Advanced utilisation of operando and in/ex-situ spectroscopic and thermoanalytical techniques (DRIFTS-MS, EXAFS), temperature programmed decompositions (TPD) and pulsed chemisorption.
Development of new reaction chambers prototype such as a low volume DRIFTS cell and an EXAFS cell to be utilised on the ELETTRA EXAFS beamline.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION CNR-Istituto di Scienze e Tecnologie Molecolari (ISTM)
LOCATION (postal address) Via C. Golgi 19, 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) 1. Ferraccioli Raffaella, Dr, researcher ADDRESS (fax, e-mail) fax: +39 (0)2-50314139, e-mail: raffaella.ferraccioli@istm.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: Motti Elena	POST-DOC:
Ph. D.: Carenzi Davide	STUDENTS:
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) 1. Design of new catalytic systems for the selective synthesis of bio-active molecules.
RUNNING PROJECTS (official title is required): REGIONAL: NATIONAL: EUROPEAN:
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees)   WITH SMALL OR MEDIUM ENTERPRISES
EXPERTISE (100 words max.) Our current interest in synthetic organic chemistry is focused on: 1) developing new catalytic methods enabling to assemble simple molecules through multi-component processes. These methodologies consist of the use of ordered sequences of reactive steps which start from simple molecules and lead to complex structures. This organisation is effected by a metal center which works catalytically. 2) transferring these methodologies into synthetic procedures for preparing heterocycles of biological interest.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION CNR-ISTM
LOCATION (postal address) via Golgi 19, 20133 Milano (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Gatti Carlo, Dr. senior researcher CNR (National Research Council of Italy)
ADDRESS (fax, e-mail) via Golgi 19, 20133 Milano, Italy; fax : +39 02 50314300 ; e-mail: c.gatti@istm.cnr.it ; web page : http://www.istm.cnr.it/~gatti/more_file/frame.htm
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 1	POST-DOC: 1
Ph. D.:	STUDENTS:
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Selection and optimization of novel thermoelectric materials guided by the atomistic description of their electron transport properties and bonding interactions

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

EUROPEAN:

NANOENGINEERING OF HIGH PERFORMANCE THERMOELECTRICS (2001-2004) G5RD-CT2000-00292, VTH FRAMEWORK PROGRAM

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

It could be in the next future for phase-change memories (STM-Microelectronics)

WITH SMALL OR MEDIUM ENTERPRISES

Within the European Project :

CIDETE Ingenieros S.L. Barcelona, Spain http://www.arrakis.es/~cidete; LEGELAB, Termo-GEN AB, Lärbro, Sweden http://www.legelab.com; PANCO, Muhleim-Kaerlich, Germany, http://www.panco.de/

EXPERTISE (100 words max.) First principle modelling of the electronic structure and electron transport properties of novel thermoelectric materials TM, like skutterudites, inorganic type I clathrates, zinc antimonide, etc. Chemical interpretation of the electronic structure, using the Quantum Theory of Atoms in Molecules and Crystals and sofwtare packages (TOPOND-XX) developed by the group leader. Evaluation of best doping levels of structurally modified TMs (code ELTRAP). Structural and composition changes *vs* changes in the electronic transport properties (Seebeck coefficient. and electrical conductivity).

Several publications on scientific journals on this subject (J. Appl. Physics, J. Chem. Phys., Adv. Funct. Mater., Chemistry - A European Journal

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION CNR – Istituto di Scienze e Tecnologie Molecolari
LOCATION (postal address) c/o Dip. Chimica Fisica ed Elettrochimica dell' iversità di Milano Via C. Golgi, 19 20133 Milano (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) **X** - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Barzaghi, Mario, Dr., CNR senior researcher ADDRESS (fax, e-mail) e-mail: m.barzaghi@istm.cnr.it web-page: http://www.istm.cnr.it/~barz/
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 2	POST-DOC:
Ph. D.:	STUDENTS:
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Understanding molecules and crystals via X-ray diffraction (20-300 K) and the analysis of experimental and theoretical electron densities
2. Electrostatic and bonding interactions in molecular recognition, drug design, protein modeling, and crystal engineering.
3. Structural phase transitions and chemical reactions in solids.

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)
X-ray diffraction experiments at very low temperatures (20 K) are routinely performed to map the electron density in a crystal and to shed new light on the chemical bonding in molecules and the properties of crystalline materials. Physical and chemical properties, such as molecular multipole moments, electric fields and electric field gradients at the nuclei, and even electrostatic intermolecular interaction energies, are derived directly from the X-ray data by means of a newly developed computer code (PAMoC: http://www.istm.cnr.it/~barz/pamoc). Tools and methods from computational chemistry are used to inform aspect of modern crystallography, especially crystal engineering.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION CNR - ISTITUTO DI SCIENZE E TECNOLOGIE MOLECOLARI
LOCATION (postal address) Via C. Golgi, 19 20133 Milano (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Dr. Anna Berlin, CNR Senior Researcher ADDRESS (fax, e-mail) CNR-Istituto di Scienze e Tecnologie Molecolari Via C. Golgi, 19 20133 Milano (Italy)
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS:	POST-DOC: 1
Ph. D.:	STUDENTS: 1
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) 1. The current research interest is on functional materials. These materials are organic electroconductive polymers for sensors, electronic devices, etc.
RUNNING PROJECTS (official title is required): REGIONAL: NATIONAL: MIUR-FIRB PROJECT "MOLECULAR MANIPOLATION FOR NANOMETRIC MACHINES" EUROPEAN:
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees) WITH SMALL OR MEDIUM ENTERPRISES
EXPERTISE (100 words max.) As an organic chemist, the research activity is mainly devoted to the design and synthesis of new monomers, which subsequently are polymerized by chemical or electrochemical way to the desired functional material. The research has an interdisciplinary character and is done in cooperation with other research groups.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION CNR-ISTM
LOCATION (postal address) Via Golgi 19, 20133 Milano (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Forni Alessandra, Dr., researcher ADDRESS (fax, e-mail) +39 02 50314300, a.forni@istm.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 3	POST-DOC: 1
Ph. D.:	STUDENTS:
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Experimental and theoretical study of optical properties of organic and organometallic molecular materials and metals
2. X-ray diffraction determination and analysis of the electron density in crystals

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL:
FIRB "Manipolazione molecolare per macchine nanometriche (coordinator Dr. S. Quici, CNR-ISTM)
FIRB "Piattaforme abilitanti per griglie computazionali ad elevate prestazioni orientate ad organizzazioni virtuali scalabili" (coordinator Prof. A. Laganà, Università degli studi di Perugia)
PRIN "Cluster metallici molecolari funzionali a nanomateriali" (coordinator Prof. Giuliano Longoni, Università degli studi di Bologna)

EUROPEAN:

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)
X-ray structural analysis, experimental and theoretical determination and topological analysis of electron density, molecular modelling, analysis and identification of mathematical models, development of software codes for applications in chemistry and physics.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Institute for Macromolecular Studies (ISMAC)
LOCATION (postal address) Via Bassini, 15 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Dott.ssa Incoronata Tritto, senior research ADDRESS (fax, e-mail) Fax + 39270636400 E-mail tritto@ismac.cnr.it

HUMAN RESOURCES (number of people involved in the activity fields here above)	
RESEARCHERS: 13	POST-DOC: 2
Ph. D.: 3	STUDENTS: 2
TECHNICIANS: 2	OTHERS: 2

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

The project focus on the:

1.Designs and synthesis of macromolecular architecture via transition metal catalysis: novel random and block copolymers (BCs) and polymer product compositions, including polar functionalities.

2. Nanocomposites' formation by in-situ polymerisation or during melt processing

3. Investigation of fundamental characteristics of the organic-inorganic interphase region by multi-scale analysis.

Targeted enhanced properties are: scratch resistance, modulus improvement without sacrificing stiffness, heat distortion temperature, flame retardancy, barrier properties (super hydrofobic/hydro philic, UV radiation, conductivity, antimicrobial, etc.).

The industrial sectors concerned are automotive, communication technology, MEMS, packaging, and textile.

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

EUROPEAN:

SPECIFIC TARGETED RESEARCH OR INNOVATION PROJECT (STREP)

"Designed Nanostructured Hybrid Polymers: Polymerisation Catalysis and Tecton Assembly" (NANOHYBRID) 2004/2008

NMP3-CT-2005-516972

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

SASOL, BASELL, CEBAL, CRF

WITH SMALL OR MEDIUM ENTERPRISES

NANOCYL

EXPERTISE (100 words max.)

Incoronata Tritto's current research interests include the design and development of nanostructured organic-inorganic hybrid polymer materials in order to obtain application oriented materials with optimal combination of improved properties such as mechanical, strength and gas barrier.

The main field of scientific activity is α-olefin and cycloolefin polymerization and the study of Ziegler-Natta homogeneous and heterogeneous catalytic systems. Particularly:

i) Relationships between ring-opening metathesis and Ziegler-Natta polymerizations;

ii) In situ study of activation and deactivation reactions of homogeneous catalytic systems by multinuclear NMR analysis

iii) Synthesis and stereospecific characterization of olefin and cyclic olefin homo- and copolymers by transition metal catalysts

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Institute for Macromolecular Studies (ISMAC)
LOCATION (postal address) Via Bassini, 15 20133 Milano
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GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Dott.ssa Maria Carmela Sacchi Senior Researcher ADDRESS (fax, e-mail) Fax + 39270636400 E-mail: sacchi@ismac.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 7	POST-DOC: 4
Ph. D.:	STUDENTS:
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Enlargement of the range of materials for ecosustainable packaging through the invention of new tailor structured olefin based copolymers

2. Production of materials with improved nanofiller dispersion degree in the matrix through optimization of melt-compounding procedure.

3. Study of a method for attaching anti-oxidant and lubrificant additives onto polyolefins aimed to minimizing their migration from plastic packaging.

4. Promotion of training activities for young researchers in the field of synthesis and characterization of polyolefin materials for flexible food packaging
.

RUNNING PROJECTS (official title is required):

REGIONAL:
1. "Azioni integrate di sviluppo tecnologico nell'utilizzo di materiali poliolefinici ad alta riciclabilità per imballaggio alimentare e farmaceutico-biomedicale" finanziato dalla Regione Lombardia e dal Fondo Sociale Europeo nell'ambito della misura D4 Obiettivo 3 – Progetto N° 199193 - anno2004/2005

2. "Plastic food packaging: macromolecular additives with low diffusion coefficient" (Fondazione Cariplo) anno 2005/2006

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)
ITP Industria Termoplastica Pavese

* WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Wide experience in:
i) homo- and copolymerization of alpha olefins with traditional Ziegler-Natta catalysts and new generation metallocene and post- metallocene single-site catalysts.
ii) studies of stereochemistry and polymerization mechanisms especially based on NMR spectroscopy (eventually by using selectively isotopically enriched monomers and cocatalysts).
iii) development of understanding of the correlations between catalyst structure and homo- and copolymer microstructure and between polymer microstructural and molecular characteristics and material final properties.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Institute for Macromolecular Studies (ISMAC)
LOCATION (postal address) Via Bassini 15 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Dr. Silvia Luzzati- CNR Researcher ADDRESS (fax, e-mail) e-mail: silvia.luzzati@ismac.cnr.it Fax + 39270636400
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 4	POST-DOC: 2
Ph. D.:	STUDENTS:
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Development of optimised material classes and composites for organic photovoltaics
2. Understanding of fundamental mechanisms of photoinduced charge transfer
3. Stable, low cost, efficient low bandgap polymer photovoltaic devices.

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

EUROPEAN: Photo-induced charge transfer in the novel low bandgap polymer semiconductors and their use in photovoltaic devices- HPRN-CT-2000-00127 (2000/2004)

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES : Konarka Technology

EXPERTISE (100 words max.)

Research activity on the synthesis and characterisation of polyconjugated systems for application in electrical and electronic devices.

Expertise on:

- design and synthesis of conjugated polymers with electrical, electronics and non-linear optical properties
- preparation of organic materials by chemical tailoring and supramolecular organisation
- structural and spectroscopic characterisation of the materials
- photoexcitation spectroscopy of conjugated polymers
- production of device prototypes: organic light emitting diodes, photodetectors and solar cells

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Institute for Macromolecular Studies (ISMAC)
LOCATION (postal address) Via Bassini, 15 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Claudio Tonin, Dr., Primo ricercatore ADDRESS (fax, e-mail) Fax + 390270636400; E-mail tonin@bi.smac.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 3	POST-DOC: 1
Ph. D.:	STUDENTS:
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Preparation of electrically conductive organic fibres by in situ synthesis of conjugated polymers (e.g. polypyrrole, polyaniline) on different fibre substrates.

RUNNING PROJECTS (official title is required):

REGIONAL:

Progetto: Multicomponent Tecnofibres from first matters: Fibres on demand – Financial supported Fondazione Cariplo 2004/2006

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Competence in organic chemistry, macromolecular chemistry, macromolecular characterisation, design and synthesis of conjugated polymers with electrical, electronics and non-linear optical properties,
preparation of organic materials by chemical tailoring and supramolecular organisation.
Experience in material science: polymeric materials for optoelectronic applications, structural and spectroscopic characterisation of the materials, production of prototypes of organic light emitting diodes, photodiodes (solar cells and photoreceptors).

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Institute for Macromolecular Studies (ISMAC)
LOCATION (postal address) Via Bassini, 15 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Dott.ssa Chiara Botta, CNR Researcher ADDRESS (fax, e-mail) Fax + 39270636400 Botta@ismac.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 3	POST-DOC: 3
Ph. D.:	STUDENTS:
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Development of improved organic and organic-inorganic host-guest materials for optoelectronic applications (photonic antennae, light emitting diodes, lasing microcavities).
2. Photophysical characterization of the host-guest systems to explore their technological potential for optoelectronic and photonic device elaboration.

RUNNING PROJECTS (official title is required):

REGIONAL:

NATIONAL:

EUROPEAN: RTN NANOCHANNEL HPRN-CT-2002-00323, Research Training Network. **2002-** 2006 "Molecules in nanochannels – Synthesis, spectroscopy and applications".

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees): CRF (Centro Ricerche FIAT, Torino, Italy)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Preparation and characterization of Host-Guest organic systems in perhydrotriphenylene. Guest molecules (oligomers of thiophene, phenylene and oligophenylenevinylene) are inserted in the PHTP parallel nanochannels. The photophysical studies evidences a very efficient energy transfer among different guests included in the host, since their intermolecular distance and relative orientations maximize long range resonant transfers processes.

Ordering, on a micrometric and sub-micrometric scale, of organic-inorganic Host-Guest systems, as dye loaded zeolites, is accomplished by using polymeric self-assembling techniques. Polystyrene and conjugated polymers self-organized in regular hexagonal patterns are used as ordering templates for efficiently emissive zeolites.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION ISMAC-CNR

LOCATION (postal address)
Via E.Bassini 15 20133 Milano

MAIN FIELD OF ACTIVITY (mark one or more boxes)
X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
❑ - Recent developments in nanoscience and nanotechnology
❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety)
❑ - Biotechnology
❑ - Conservation and restoration of Cultural Heritage
❑ - Environmental pollution monitoring

GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.))

William Porzio Senior research scientist

ADDRESS (fax, e-mail)
Via E.Bassini 15 20133 Milano 02-2362946 w.porzio@ismac.cnr.it

HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 3	POST-DOC:
Ph. D.:	STUDENTS: 1
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic) 1. Design, synthesis and characterisation organometallic complexes based on rare-earth metals electro- and photo-emitters 2. Photophysical studies on the prepared molecules 3. Polymerisation of ligands to complex rare-earth metals with emission properties
RUNNING PROJECTS (official title is required): REGIONAL: NATIONAL: FIRB-RBNE019H9K "MANIPOLAZIONE MOLECOLARE PER MACCHINE NANOMETRICHE" (2003/2006) EUROPEAN:
COLLABORATIONS WITH COMPANIES WITH LARGE ENTERPRISES (more than 100 employees) WITH SMALL OR MEDIUM ENTERPRISES
EXPERTISE (100 words max.) - Design and Synthesis of conjugated molecules and polymers - Molecular, thermal, structural, spectroscopical characterizations - Electrical characterization - Thin film preparation - Device preparation and testing

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION ISTITUTO PER LO STUDIO DELLE MACROMOLECOLE - CNR
LOCATION (postal address) Via E.Bassini 15, 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Destri Silvia, Dr, senior researcher ADDRESS (fax, e-mail) 02 70636400 s.destri@ismac.cnr.it

HUMAN RESOURCES (number of people involved in the activity fields here above)	
RESEARCHERS:**4**	POST-DOC:
Ph. D.:	STUDENTS:1 PhD student
TECHNICIANS:	OTHERS: **2** Dottori magistrali

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Preparation of thin Films based on organic molecules suitable for Field Effect Transition fabrication
2. Preparation of polymers showing high third order susceptibility for telecommunication application
3. Synthesis of organic ligands and their complexation with lanthanide metals to be use for the preparation of optical amplifier with large bandwidth

RUNNING PROJECTS (official title is required):

NATIONAL: Progetto FIRB: Nanostrutture molecolari e ibride organiche/inorganiche per fotonica
Coordinatore Pagani Giorgio – Univ. MI. Bicocca (2004/2006)

EUROPEAN: RTN Project: Organised Molecular Films and Their Use for Organic Field-Effect Transistors and Related Opto-Electronic Devices (2004/2006)
Responsabile Progetto: Schrader

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES
Pirelli Labs

EXPERTISE (100 words max.
Silvia Destri's current research interests range from design, synthesis and characterisations of organic molecules, oligomers and polymers responsive in optoelectronics and photonics, to both the deposition of molecules and polymers by using different techniques: among them casting spin coating, Langmuir-Blodgett deposition, high and ultra high vacuum and the preparation of and the preparation of prototypes of devices for electronics.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Istituto per lo Studio delle Macromolecole (ISMAC) – CNR
LOCATION (postal address) Via E. Bassini 15 20133 Milano Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.) Bolognesi Alberto ADDRESS (fax, e-mail): +39 02 70636400 ; +39 02 23699373; bolognesi@ismac.cnr.it,

HUMAN RESOURCES (number of people involved in the activity fields here above)	
RESEARCHERS: 7	POST-DOC:
Ph. D.:	STUDENTS:
TECHNICIANS:	OTHERS: 4

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Synthesis: conjugated polymer for field effect transistors, light emitting diodes, solar cells
2. Devices: Devices are prepared
3. Characterization: Optical characterization is performed on devices

RUNNING PROJECTS (official title is required):

Regional: Progetto Cariplo " Sviluppo di tecnologie a Semiconduttori Organici per Applicazioni Optoelettroniche" TESEO 2004-2005

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Synthethis of conjugated polymers for the preparation of electronic devices. The polymers are synthesised and characterised in bulk and after deposition in the form of thin films suitable for the application.
The spectroscopical characterization of these materials is performed by means of UV-Vis spectroscopy and photo and electroluminescence spectroscopy. The electrical characterization of light emitting diode is also performed in our group.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Istituto di Chimica del Riconoscimento Molecolare, C.N.R.
LOCATION (postal address) Via Mario Bianco 9 20131 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Dr. Sergio RIVA Senior Research Scientist ADDRESS (fax, e-mail) Via Mario Bianco 9 20131 Milano
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: **7**	POST-DOC: **5**
Ph. D.: **2**	STUDENTS: **3**
TECHNICIANS: **3**	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. Exploitation of enzymes for the selective modification of indolic alkaloids
2. Exploitation of enzymes for the selective modification of bile acids
3. Exploitation of enzymes for the selective modification of oligo- and polysaccharides
4. Exploitation of enzymes for the kinetic resolution of pharmaceutical intermediates
5. Production, characterization and synthetic exploitation of new glycosidases
6. Production, via side-directed mutagenesis, and expression of new phospholipase D mutants
7. Exploitation of monooxygenases for regio- and stereoselective Baeyer-Villiger and heteroatom oxidations
8. Enzymes and polymers
9. Development of new nanobiosensors for the investigation of intermolecular interactions, particularly between proteins and ligands

RUNNING PROJECTS (official title is required):

REGIONAL:

1. "*Realizzazione e sviluppo di nanobiosensori di nuova concezione per lo studio delle interazioni intermolecolari*", PROGETTO FSE MISURA D4, ID 204321

NATIONAL:

1. "*Misura mediante diffusione di luce della interazione di proteine con monostrati auto-aggregati di glicolipidi adsorbiti su nanoparticelle idrofobiche*"
   PROGETTO FIRB, RBAU01ZJBC

EUROPEAN:

1. *"New enzymes and selective methods for glycosidase-catalysed synthesis of bioactive glycosides and glycomimetics"*
   COST D25, WG-1
2. *"Solving the problems enzymes encounter in organic solvents"*
   COST D25, WG-4
3. *"Biooxidation"*
   COST D25, WG-5
4. *Asymmetric oxidations using two-in-one - 2nd generation - biocatalysts*
   CERC3

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

1. Indena S.p.A.
2. Intercos S.p.A.
3. DiPharma S.p.A.
4. Prodotti Chimici Alimentari S.p.A.

WITH SMALL OR MEDIUM ENTERPRISES

EXPERTISE (100 words max.)

Isolation and characterization of enzymes belonging to different classes (hydrolases, dehydrogenases, oxynitrilases, laccases, glycosyltransferases, monooxygenases), and exploitation of these biocatalysts for the selective modification of different natural bioactive compounds (steroids, alkaloids, terpenes, sugars and natural glycosides) and for the preparation of chiral synthons of interest for the pharmaceutical and chemical industry.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Istituto di Chimica del Riconoscimento Molecolare (CNR-ICRM)
LOCATION (postal address) Via Mancinelli 7 20131 Milano Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) ❑ - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Zanda Matteo Ph.D. Senior researcher ADDRESS (fax, e-mail) Fax: 039 02 23993084 e-mail: matteo.zanda@polimi.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 3	POST-DOC: 1
Ph. D.: 5	STUDENTS: 2
TECHNICIANS: 1	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Small molecules for Targeting of Angiogenesis
2. Inhibitors of Matrix Metalloproteinases for Cancer and Heart failure therapy
3. Fluorinated peptides and mimics as proteinase inhibitors
4. Cationic lipids for gene transfection

RUNNING PROJECTS (official title is required):
REGIONAL:
-
NATIONAL:
-COFIN 2004 (Polipeptidi Bioattivi e Nanostrutturati)
EUROPEAN:
- Research Training Network "Selective Fluorinated Inhibitors of MMP-3 and MMP-9 (coordinator M. Zanda) (contract HPRN-CT-2002-00181)
- Integrated Project "Selective Targeting of Angiogenesis and of Tumor Stroma" (contract LSHC-CT-2003-503233)

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
- Actelion (Allschwil, Switzerland)

WITH SMALL OR MEDIUM ENTERPRISES
- Philogen S.p.A. (Siena, Italy)
- Neuroscienze-Pharmaness (Cagliari, Italy)

EXPERTISE (100 words max.)
Application of synthetic organic chemistry for the solution of biomedicinal and pharmacological issues.
More specifically:
- Solution and solid-phase synthesis of oligopeptides incorporating fluorinated amino acids as inhibitors of proteinases (HIV-protease, Plasmepsins, Matrix metalloproteinases, etc.).
- Synthesis of low molecular weight ligands of tumor antigens for the targeting of cancer.
- Synthesis of cationic lipids for gene transfection.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION CNR – IENI Sezione di Milano
LOCATION (postal address) Via Cozzi 53 20125 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) LUPINC Valentino, Dr – Head of CNR-IENI Sezione di Milano ADDRESS (fax, e-mail) FAX: 0266173320; e-mail: lupinc@ieni.cnr.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 21	POST-DOC:
Ph. D.: 1	STUDENTS: 10-15
TECHNICIANS: 20	OTHERS: GRANTS 2

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1: High temperature materials for aerospace and power generation
2: Combustion diagnostics
3: Solid rocket propellants
4: Clean sea technologies
5: Surface treatment of titanium for osteosynthesis

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL:
FIRB RBAU 01K749 – SINTESI AD ALTA TEMPERATURA DI PARTICELLE A SCALA NANOMETRICA PER APPLICAZIONI ENERGETICHE E SENSORISTICHE; FIRB RBAU 01JEJ3 – CARATTERIZZAZIONE OTTICA E MORFOLOGICA DEL PARTICOLATO CARBONIOSO IN FIAMME DI IDROCARBURI; FISR - MATRICI DI MICROCOMBUSTORI AD IDROGENO; FIT EO1/0214 – NUOVA GENERAZIONE DI FILI E PROCESSI INNOVATIVI PER LA LAVORAZIONE DI MATERIALI LAPIDEI (ARIANNA);

EUROPEAN:
IP IMPRESS – INTERMETALLIC MATERIALS PROCESSING IN RELATION TO EARTH AND SPACE SOLIDIFICATION (FP6 2002-NMP-1); G6RD-CT-2001-00526 TMF STANDARD: The Root To Standardisation; G5RD-2002-00819 Expanding the limits of single crystal superalloys through short crack fracture mechanics analysis (SOCRAX); STRP 001470 - PROCESSING OF NANOSTRUCTURED MATERIALS TROUGH METASTABLE TRANSFORMATIONS (NAMAMET); G7RT-CT-2001-05065 - THE EUROPEAN VIRTUAL INSTITUTE FOR JEWELLERY TECHNOLOGY (VI-JET); INTAS 03514736 – KINETICS AND MECHANISMS OF IGNITION/COMBUSTION INITIATED BY ELECTRONICALLY EXCITED SINGLET OXYGEN; COST538 HIGH TEMPERATURE LIFETIME EXTENSION.

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees).
AVIO SpA Rivalta e Pomigliano d'Arco, CSM Roma, CESI Milano, ANSALDO Genova

WITH SMALL OR MEDIUM ENTERPRISES
COFIPLAST, WIRES Ivrea (Italy)

EXPERTISE (100 words max.)
High Temperature Mechanical Testing; Optical Microscopy, SEM and TEM Electron Microscopy, Microanalysis; X-Ray Diffraction; Wet Corrosion Studies; Combustion Synthesis (SHS); Combustion Studies; Nano-particles formation; Testing in natural sea-water.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION: CONSIGLIO NAZIONALE DELLE RICERCHE ISTITUTO PER L'ENERGETICA E LE INTERFASI, SEZIONE DI PAVIA
LOCATION (postal address): c/o Dipartimento di Chimica Fisica, viale Taramelli 16 – I27100 Pavia (Italy)
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) X - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology X - Conservation and restoration of Cultural Heritage X - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Dr. Gaetano Chiodelli, senior researcher ADDRESS Fax: +39.0382.987910 E-mail: g.chiodelli@ieni.cnr.it http://chifis.unipv.it/ieni

HUMAN RESOURCES (number of people involved in the activity fields here above)	
RESEARCHERS: 20	POST-DOC: 4
Ph. D.: 4	STUDENTS: 10
TECHNICIANS: 10	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS:

1. Preparation and characterization of ceramic and polymer materials for Fuel Cells (SOFCs, PEMFCs) and batteries, in the Energy field
2. Preparation and characterization of functional materials: ionic and optoelectronic glasses, superconductors, supercapacitors, magnetoresistors, for sensors and electronic applications
3. Preparation and characterization of structural materials: borides, carbides, intermetallics, composites, cermets, functional gradient materials, for aerospace, mechanical and high temperature applications
4. Preparation and characterization of thin films by RF Sputtering
5. Preparation and characterization of ceramic materials by Combustion Synthesis (SHS)
6. Preparation and characterization of nanostructured ceramics by Spark Plasma Synthesis (SPS)
7. Preparation of modified polymers by thermal reticulation or gamma irradiation (cross-link, grafting, induced polimerization)
8. Provenance studies of archaeological artefacts
9. Preparation and characterization of new materials as specific ion adsorbers

RUNNING NATIONAL PROJECTS:

MIUR-FISR "Sviluppo di celle a combustibile ad ossido solido planari con elettrodo supportante ad elevata area geometrica". Inizio 14/04/2003 - Fine 13/04/2005

MIUR-FISR "Celle a combustibile ad elettroliti polimerici e ceramici: dimostrazione di sistemi e sviluppo di nuovi materiali". Approvato e rimodulato: inizio presumibile 29/03/2005

MIUR-FIRB "Sintesi ad alta temperatura di particelle a scala nanometrica per applicazioni energetiche e sensoristiche". Inizio 30/03/2004 - Fine 29/03/2007

IENI Project "Trace element characterization and provenance assignment of obsidian, white marble and ceramic artefacts". Attivita' interna 2005

IENI Project "Distribution of radionuclides in the environment". Attivita' interna 2005

COLLABORATIONS WITH COMPANIES (LARGE ENTERPRISES):

CESI (Milano), ENEA (Roma), ENIRicerche (Roma, Milano), INFM (Genova), INSTM (Firenze), Agenzia Spaziale Italiana, INPG (Grenoble), NCR (Cairo), University of California Davis, Solvay Solexis (Milano), Agusta (Varese), Pirelli (Milano), FN (Alessandria), ST Microelectronics (Agrate)

EXPERTISE:

a) Thermal measurements: DSC, DTA, TGA, TMA, DMA, DEA
b) Electrochemical characterizations by high impedance spectroscopy (max 10^{12} ohm) as a function of temperature (10-1200 K), oxygen partial pressure (1-10^{-20} atm), gas (N_2, H_2, CO_x, NO_x, H_2O)
c) Four Probes DC measurements of superconductors (10-1300 K)
d) Thermoelectric power and ionic transport number on ceramic oxides
e) XRD on powders, grazing incident angle and reflectivity XRD on thin films
f) SEM, AFM, EPR, solid state NMR, EXAFS
g) Neutron Activation Analysis of trace elements using the TRIGA Mark II nuclear reactor at the Pavia University
h) Gamma-ray spectrometry
i) Dating of archaeological materials and artefacts by fission track
j) Trace element certification in Standard or Certified Reference Materials

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION: STAZIONE SPERIMENTALE PER I COMBUSTIBILI	
LOCATION: VIALE A. DE GASPERI 3 - 20097 SAN DONATO MILANESE ITALY	
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage X- Environmental pollution monitoring	
GROUP LEADER CARDILLO PAOLO, DEGREE IN CHEMISTRY, SCIENTIFIC DIRECTOR ADDRESS (fax, e-mail) +39 02 514286 CARDILLO@SSC.IT	
HUMAN RESOURCES: 55	
RESEARCHERS:15	POST-DOC: 0
Ph. D.: 3	STUDENTS: 5
TECHNICIANS: 27	OTHERS: 5

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)

1. PROCESSING, UTILISATION AND EVALUATION OF FUELS
2. ENERGY CONSERVATION IN PROCESSING AND UTILISATION OF CONVENTIONAL AND ALTERNATIVE FUELS
3. SAFETY AND LOSS PREVENTION IN PROCESS INDUSTRY

RUNNING PROJECTS (official title is required):

REGIONAL:

1. COMPARATIVE ANALYSIS OF FUEL FOR CIVIL UTILISATION

NATIONAL:

1. TOXIC RELEASE DURING A CHEMICAL ACCIDENT: PREVISION, PREVENTION AND HUMAN HEALTH CONTROL
2. DEVELOPMENT OF A DATABASE ON THE THERMOCHEMICAL PROPERTIES OF SUBSTANCES
3. DEVELOPMENT OF A SOFTWARE FOR NEAR-MISS ANALYSIS

EUROPEAN:

1. INNOVATIVE COMBINED FLUE GAS TREATMENT FOR REFUSE URBAN WASTE (CRAFT)
2. S2S A GATEWAY FOR PLANT AND PROCESS SAFETY

COLLABORATIONS WITH COMPANIES

WITH LARGE ENTERPRISES (more than 100 employees)

DOW
Kuwait Petroleum Italiana
ESSO Italiana
ITALCEMENTI
TOTAL
ENEL POWER
ENI

WITH SMALL OR MEDIUM ENTERPRISES

More than 100

EXPERTISE (100 words max.)

STAZIONE SPERIMENTALE PER I COMBUSTIBILI (FUELS EXPERIMENTAL STATION - SSC) IS AN EXPERIMENTAL INSTITUTE THAT OPERATES WITHIN THE FRAMEWORK OF THE ITALIAN MINISTRY FOR PRODUCTIVE ACTIVITIES. SSC IS INVOLVED IN ACTIVITIES CONNECTED WITH FOSSIL FUELS AND DERIVED PRODUCTS AND FINANCIAL SUPPORT IS ALSO OBTAINED FROM FUEL IMPORTING COMPANIES (GAS, PETROLEUM, COAL), FROM THE ANALYTICAL WORK, RESEARCH AND CONSULTANCY. THE ACTIVITY OF SSC CONCERNS PROCESSING, UTILISATION AND EVALUATION OF FUELS, COMBUSTION TECHNOLOGY, ENERGY CONSERVATION IN PROCESSING AND UTILISATION OF CONVENTIONAL AND ALTERNATIVE FUELS, COMBUSTION-GENERATED AIR POLLUTION, APPLIED CATALYSIS, SAFETY AND LOSS PREVENTION, INSTRUMENTAL ANALYTICAL TECHNIQUES.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION Stazione Sperimentale Oli e Grassi
LOCATION (postal address) Via Giuseppe Colombo, 79 – 20133 Milano, Italy
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology X - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) ❑ - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Dr. Paolo Bondioli, Senior Scientist, Head of Technology Departnment ADDRESS (fax, e-mail) +39 02 2363 953, bondioli@ssog.it

HUMAN RESOURCES (number of people involved in the activity fields here above)	
RESEARCHERS: 2	POST-DOC:
Ph. D.:	STUDENTS:
TECHNICIANS:	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Biodiesel: production technologies, process control and handling
2. Biolubricants: production technologies, quality control and applications

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL:

EUROPEAN:

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)

WITH SMALL OR MEDIUM ENTERPRISES
The typical field of SSOG activity is directed towards SME. In the particular sector of biodiesel all Italian biodiesel manufacturers use SSOG as a reference laboratory for analytical and processing problems as well as for the product certification in view of legal authorisation.

EXPERTISE (100 words max.)
SSOG Technology Dept., has developed during the last 15 years a strong skill in chemistry of renewable product obtainable from oils and fats. SSOG participated with success at several EU funded projects on this item, such as GEIE-EUROBIODIESEL, ULTRAHYDROPHYTO-SQUALENE, CTVO-net, BIOSTAB. The Dept. Leader is also member of some European standardisation Committees on these subjects.

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION STAZIONE SPERIMENTALE PER LA SETA
LOCATION (postal address) Via Giuseppe Colombo 83 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology X - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Marcandalli Bruno Director ADDRESS (fax, e-mail) Fax: 02 2362788 e-mail: marcandalli@ssiseta.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 6	POST-DOC: 2
Ph. D.:1	STUDENTS: 1
TECHNICIANS: 3	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Surface treatments of textile materials
2. Advanced oxidation processes for textile wastewater recycling
3. Photochemistry of dyes and polymers
4. Biotechnologies for textile processes

RUNNING PROJECTS (official title is required):
REGIONAL:
- Trattamento al plasma di materiali tessili: sviluppo di un processo e di un impianto per il trattamento al plasma di materiali tessili"

- NEODETERGO: Reingegnerizzazione e sperimentazione di nuovi modelli per la manutenzione dei prodotti tessili

NATIONAL:

EUROPEAN:
- ADOPBIO – Advanced Oxidation processes and Biotreatments for Water Recycling in the Textile Industry (Progetto CRAFT)
- HIPERMAX – High Performance Industrial Protein Matrices through Bioprocessing (Progetto STREP)

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
1

WITH SMALL OR MEDIUM ENTERPRISES
9

EXPERTISE (100 words max.)
Stazione sperimentale per la Seta is a textile/apparel research centre.
Equipment:
- Physical, mechanical and technological testing of textile materials (fibres, yarns, fabrics, clothing)
Scanning Electron Microscopy and Optical microscopy
- UV-VIS-NIR spectrophotometry (transmission and reflection)
- FTIR
- GC-MS, GLC, GPC
- AA – ICP
- Spectrofluorimetry
- Water analyses (all official methods)
- TGA - DSC

Census of the "Chemistry and Chemical Engineering" Research in Lombardy

GENERAL INFORMATION

INSTITUTION STAZIONE SPERIMENTALE CARTA, CARTONE E PASTE PER CARTA
LOCATION (postal address) Piazza Leonardo da Vinci 16 20133 Milano
MAIN FIELD OF ACTIVITY (mark one or more boxes) X - Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization) ❑ - Recent developments in nanoscience and nanotechnology ❑ - Reaction and Process design (optimization of production processes for basic chemicals, intermediates and fine chemicals; catalysis; synthetic organic chemistry, chemical safety) X - Biotechnology ❑ - Conservation and restoration of Cultural Heritage ❑ - Environmental pollution monitoring
GROUP LEADER (surname, name, title, role (*e.g.* full professor, senior researcher, etc.)) Marcandalli Bruno Director ADDRESS (fax, e-mail) Fax: 02 2362788 e-mail: marcandalli@ssiseta.it
HUMAN RESOURCES (number of people involved in the activity fields here above)

RESEARCHERS: 5	POST-DOC: 2
Ph. D.:1	STUDENTS: 1
TECHNICIANS:10	OTHERS:

TOP-LEVEL RUNNING PROJECTS and COLLABORATIONS

TOPICS (20 words max. for each topic)
1. Enzyme modification of lignocellulosic fibres
2. Plasma treatments of paper products
3. Development of new techniques for paper surface characterization
4. Biotechnologies for textile processes

RUNNING PROJECTS (official title is required):
REGIONAL:

NATIONAL:
- Trattamenti al Plasma della Carta

EUROPEAN:
- SUSTAINPACK _ Innovation and Sustainable Developmnet in the Fibre Based Packaging Value Chain (Integrated Project)

COLLABORATIONS WITH COMPANIES
WITH LARGE ENTERPRISES (more than 100 employees)
5

WITH SMALL OR MEDIUM ENTERPRISES
4

EXPERTISE (100 words max.)
Stazione sperimentale Carta, Cartoni e Paste per Carta is the only italian research centre completely devoted to the pulp and paper sector.
Equipment:
- Physical, mechanical and technological testing of paper materials
- Physical, mechanical and technological testing of packages
- Scanning Electron Microscopy and Optical microscopy
- UV-VIS-NIR spectrophotometry (transmission and reflection)
- FTIR – Raman spectrophotometry
- X-Ray diffractometry (WAXD)
- GC-MS, GLC, GPC
- AA – ICP
- Water analyses (all official methods)
- TGA – DSC - DMTA

CENSUS OF THE "CHEMISTRY" RESEARCH IN PRINCIPALITY OF ASTURIAS

University of Oviedo - Department of Organic and Inorganic Chemistry

Research Group: Biorganics

Group Leader		Title	Role
Gotor	Vicente	Dr.	Senior Professor

Address
Avda. Julián de Clavería, 8
33006 Oviedo
Telephone (+34) 985 103448 **Fax** (+34) 985 103448
E-mail VGS@fq.uniovi.es

Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☑ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Novel biocatalytic processes for the preparation of compounds of biological interest.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	27	**Ph. D.:**	4	**Technicians:**	1
Post-Doc:	12	**Students:**	4	**Others:**	6

Running Projects (official title, co-financing source: regional, national or european)

Regional
Preparation of enantipure drugs by biocatalytic methods

National
Preparation of high added-value products by chemoenzymatic methods
Low ambient impact processes
Biotransformations applied to the synthesis of products of pharmaceutical and industrial interest

European
Post - genomic datamining of enzimes for the synthesis of chiral pharmaceutical intermediates

Collaborations with Companies

With large enterprises

With small or medium enterprises
Rasayan (San Diego, California, EE.UU)
Asturpharma (Llanera, Asturias)

Expertise

Enzymatic synthesis of Chiral Drugs. Synthesis of Nucleosides and Nucleotides and Antisense cligonucleotides.
Preparation of: vitamin D3 analogues, high added-value products by chemoenzymatic, oxa- and aza-macrocycles.

University of Oviedo - Department of Organic and Inorganic Chemistry

Research Group: Organometallic Clusters

Group Leader		Title	Role
Cabeza de Marco	Javier A.	Dr.	Full Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Organometallic chemistry and homogeneous ctalysis.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	7	**Ph. D.:**	4	**Technicians:**	0
Post-Doc:	3	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Ruthenium and osmium carbonylic clusters with ligands derived from N-heterocyclic carbenes

National

Benzodiazepines functionalization through metallic complexes

Synthesis, reactivity and catalytic activity of transition metal polynuclear carbonylic compounds

Síntesis, caracterización estructural y actividad catalítica de compuestos polinucleares de rutenio

Synthesis and reactivity of ruthenium and osmium carbonilyc clusters with more than three metallic atoms

European

Síntesis, reactividad y actividad catalítica de compuestos carbonílicos polinucleares de metales de transición

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Synthesis, reactivity, structural characterization and catalytic activity of transition metal polynuclear carbonylic compounds.

University of Oviedo - Department of Organic and Inorganic Chemistry

Research Group: Organometallic Compounds and Catalysis

Group Leader		Title	Role
Gimeno Heredia	José	Dr.	Full Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Applications in synthesis, reactivity and asymmetric catalysis.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	17	**Ph. D.:**	8	**Technicians:**	0
Post-Doc:	9	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Alkines activation

National

Molecular design of useful group 8 metals complexes with utility on the C-C bonds formation through stechiometric and catalytic selective processes.

Synthesis and reactivity of unsaturated carbenic system containing ruthenium complexes; utility in synthesis and non linear optic.

European

Industrial study and application of a complex tandem system of ruthenium-enzyme for the catalytic resolution of racemic resolution of chiral alcohols

Ruthenium catalyst for fine chemistry

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Synthesis and reactivity of alkenyl, akinyl, carbene and carbine complexes.
Akines activation by transition metals complexes.
Synthesis and reactivity of transition metals complexes with chiral ligands.
Applications in synthesis and asymmetric catalysis.

University of Oviedo - Department of Organic and Inorganic Chemistry

Research Group: Inorganic Polymers

Group Leader		Title	Role
Carriedo Ule	Gabino A.	Dr.	Senior Professor

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Synthesis of novel polymeric materials with predetermined properties.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	4	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional
Preparation of chiral polyphosphazene designed for processes of synthesis and enantioselective catalysis on solid supports

National
Chiral polyphosphazene preparation for supported catalysts

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Laboratory for design, synthesis and characterisation of polymers.
Obtention of polymeric systems useful in synthesis asymmetric catalysis.

University of Oviedo - Department of Organic and Inorganic Chemistry

Research Group: Metallic Carbonyls Chemistry

Group Leader		Title	Role
Riera González	Víctor	Dr.	Senior Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Reactivity of carbonylic complexes with p-donors ligands versus organic molecules and molecular recognition using carbonylic complexes.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	4	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Organometallic chemistry of metal transitions carbonyls

National

Benzodiazepine fictionalisation by metallic complexes

Novel synthetic applications of metallic carbonyls: A) Functionalised diphosphines. B) Alkyl and alkynyl complexes

Reactivity of organometallic complexes. Applications to organic synthesis

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Application of the organometallic complexes to the organic synthesis: stechiometric and catalytic reactions.

University of Oviedo - Department of Organic and Inorganic Chemistry

Research Group: Solid State Chemistry

Group Leader		Title	Role
García Menéndez	Jose Rubén	Dr.	Full Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☑ Nanoscience and nanotechnology
- ☐ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Environmental impact of soils.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	6	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Grupo de Excelencia: Rayos X. Síntesis, estructura y aplicación tecnológica de materiales

Novel fertilizer obtention and evaluation of its interaction with agricultural soils

National

Synthesis of novel nanomaterials: evaluation of its potential as catalysts, ceramic pigments, fertilizers, magnetic systems and ionic conductors

Biodiversity and sustainable development: obtention of novel fertilizers and evaluation of its interaction with brasilian and spanish soils in the presence of herbicides

Hydrothermal synthesis of novel materials: evaluation of its behaviour in catalysis, ceramic serigraphy and advance operations of separation

European

Collaborations with Companies

With large entreprises

DuPont
Magnesium Elektron
Calcodecor
Kenogard

With small or medium enterprises

Asociación de Investigación de Industrias Cárnicas del Principado de Asturias

Expertise

Hydrothermal synthesis, laminar materials behaviour. Behaviour of intra crystalline prous materials, structural characterisation techniques, termocalorimetry techniques.

University of Oviedo - Department of Organic and Inorganic Chemistry

Research Group: Inorganic Chemistry of Organometallic Compounds

Group Leader		Title	Role
Ruiz Álvarez	Miguel Ángel	Dr.	Full Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Reactivity of: Transition metals carbonylic and binuclear cyclopentadienylic compounds, Metal-metal multiple bonds stabilised by phosphorus ligands bridge donors, anions, cations and unsaturated binuclear radicals.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	9	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Study of metal transition binuclear molecular compounds as catalyst in the elimination of nitrogen oxides

Organometallic chemistry of transition metals carbonyls

National

Properties and emissions optimisation on the detonation of ANFO explosives

Metal transition binuclear carbonyls with high reactivity: cations and radicals with meta-metal multiple bonds

High reactivity metal-metal multiple bonds: Unsaturated binuclear carbonyls of molybdenum and tungsten stabilised by phosphidde bridges and phosphinidene

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Nitrosyl complexes and elimination of nitrogen oxides.
Textural studies, crystalochemical and of crystalline growth of the ammonium nitrate.
Synthesis and reactivity of transition metals carbonylic and binuclear cyclopentadienylic compounds.

MentorChem
Census of the "Chemistry and Chemical Engineering" Research in Asturias

University of Oviedo - Department of Organic and Inorganic Chemistry

Research Group:

Group Leader		Title	Role
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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Carbocyclation and enantioselective heterocyclation reactions. Design of novel synthetic methodologies based on organometallic agents of transition metals. Stoichiometric and catalytic processes.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	2	**Ph. D.:**	18	**Technicians:**	2
Post-Doc:	20	**Students:**	1	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Novel synthetic methodologies with transition metals and iodine. Development of carbon-carbon carbon-heteroatom bonds

National

Organometallic agents of iodine:strategies for the future in the synthesis of simple molecules of interest, of high structural complexity and molecules with pontential biological activity.

European

Collaborations with Companies

With large entreprises

Eli Lilly and Company
Aventis Pharma Deutschland GMBH
Merk Sharp & Dohme

With small or medium enterprises

Expertise

Structural modifications and selective functionalization of terpenes and natural alcaloides: Study of the utility as chiral auxiliars in organic synthesis and as ligands in asymmetric catalysis.
Enantioselctive synthesis of biologically active compounds: polyamines and related compounds, Nikomicins and alcaloids
Carbocyclation reactions and enantioselective heterocyclation

University of Oviedo - Department of Organic and Inorganic Chemistry

Research Group: Organometallic Chemistry with Diphosphines

Group Leader		Title	Role
Ruiz Pastor	Francisco Javier	Dr.	Full Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Synthesis oh diphosphines, heterometallic and phosphaheterocycles complexes.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	6	**Ph. D.:**	3	**Technicians:**	0
Post-Doc:	2	**Students:**	1	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Organometallic chemistry of the transition metals carbonyls

National

Novel reactivity models of diphosfine and metanide functionalised ligands

Novel synthetic applications of metallic carbonyls: A) Functionalised diphosphines, B) Alkyl and

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Transitory diphosphine carbenes study.
Synthesis and reactivity of functionalised diphosphines in organometallic complexes.

University of Oviedo - Department of Organic and Inorganic Chemistry

Research Group: Organic Synthesis

Group Leader		Title	Role
Concellón Gracia	Jose Manuel		Full Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

High selective reactions promoted by samarium diiodide. Synthesis of polyfunctionalised molecules using functionalised organometallic compounds.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	5	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	6	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Diastereoselectives reactions of b-elimination and creation of c-c bounds using organometallic compounds of Sm and Li.

Synthesis of chiral amino compounds using SmI2/compounds a-difunctionalised or a- halogen chiral aminoketones.

Síntesis de aminocompuestos quirales utilizando SmI2/compuestos a-difuncionalizados o a-aminocetonas quirales halogenadas

Diastereoselective synthesis of organic compounds with synthetic and applied interest.

National

High selective reactions of elimination and creation of c-c bounds using SmI2. Preparation of enantipure compounds.

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Preparation of enantiomerically-pure aziridines and azetidines.
Isotopic labeling of organic molecules with deuterium.
Elimination reactions with total or high diastereoselectivity.
Stereospecific reactions of cyclopropanation of a,b-unsatured acid derivatives.
Preparation and synthetic application of functionalised organometallic compounds.
Applications in organic synthesis of Cr (II) chloride.
Synthesis of enantiopure di- tri amines.

MentorChem
Census of the "Chemistry and Chemical Engineering" Research in Asturias

University of Oviedo - Department of Physical and Analytical Chemistry

Research Group: Mathematical Algorithms for the Structural Determination in Sciencies of Life

Group Leader		Title	Role
Borge Álvarez	José Javier		Full Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☑ Nanoscience and nanotechnology
- ☐ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☑ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Development of mathematical algorithms for the structural determination in life sciencies: novel strategies for the structural resolution of macromolecules and macromolecular aggregates.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	2	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National
Novel methodological developments and research of molecular properties using diffraction

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Structural resolution of proteins by molecular replacement from experimental data of monocrystal X-ray diffractometry.

MentorChem
Census of the "Chemistry and Chemical Engineering" Research in Asturias

University of Oviedo - Department of Physical and Analytical Chemistry

Research Group: Electrochemical Kinetics

Group Leader		Title	Role
López Fonseca	Juan Miguel		Full Professor

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Organic molecular sorption on metal/solution interfaces. Electrocatalysis by sorption. Auto-assembled mono-layers on metallic surfaces.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	4	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Auto-assembled mono-layers of thiol derivatives of monomer nucleotides and oligonucleotides on metal/sollution interfaces

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Auto-assembled mono-layers on metallic surfaces.

University of Oviedo - Department of Physical and Analytical Chemistry

Research Group: Electroanalysis

Group Leader		Title	Role
Tuñón Blanco	Paulino	Prof. Dr.	Senior Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☐ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☑ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Electrochemical genosensors. Biomimetic electrochemical and piezoelectric sensors. Modified electrodes and electrocatalysis. Electrochemical analysis of biomolecules and drugs.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	14	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Electrocatalitic sensors of DNA for detection of specific sequences of pathogens

National

Amperometric biosensors based on modified carbon electrodes. Applications in clinical chemistry and food technology

Conductor polymers as electrodic materials for biosensors

Electrochemical sensors based on molecular recognicement by printed polymers

Sensores voltamperométricos y piezoeléctricos basados en reconocimiento molecular por polímeros impresos

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Design of biomimetic sensor phases based on molecular printed polymer technologies.
Preparation surfaces modified by immobilization of DNA, enzymes and other bioreactives.
Electrosynthesis of electronic conductor polymers.
Development of analytical strategies in static and flow systems, based on electrochemical, piezoelectric and surface plasmon resonace detection techniques.

University of Oviedo - Department of Physical and Analytical Chemistry

Research Group: Analytical Espectrometry

Group Leader		Title	Role
Sanz-Medel	Alfredo		Senior Professor

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [x] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [x] Environmental pollution monitoring

Research Topics

Novel atomic detectors and molecular sensors. Development of hybrid techniques for the speciation of essential and toxic elements.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	34	**Ph. D.:**	14	**Technicians:**	0
Post-Doc:	20	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Excellence Groups of Asturias.

Evaluation of the trace element content in biological fluids as prognostic factor of the loosening of orthopedic and odontological implants.

Novel analytical methodologies for the control and speciation of essential and/or toxic metals in human milk, formula and parental nutrition.

National

Instrumentation and innovative strategies for the total analysis and speciation of metallic ultratrace in environment, bioinorganic and medicine.

European

Screening methods for Waer data information in support of the implementation of the Water Framework Directive.

Collaborations with Companies

With large entreprises

Applera (Applied Biosystems)
Horiba jovin-Yvon

With small or medium enterprises

Expertise

New molecular sensors based on luminiscence techniques and fber optics for biomedical and environmental applications.
Novel atomic detectors and methodologies for multielemental analysis of ultratrace in particular spectrochemical plasmas.
Innovative methodologies for the analitycal control of organic and inorganic pollution of the environment through chemical, biochemical and biological markers.
Development of hybrid techniques for the analysis and speciation of toxic metals in samples with biological and environmental interest.
Proteomics via isotopic and elemental speciation.

MentorChem
Census of the "Chemistry and Chemical Engineering" Research in Asturias

University of Oviedo - Department of Physical and Analytical Chemistry

Research Group: Immuno-electroanalysis

Group Leader		Title	Role
Costa García	Agustín		Senior Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☑ Nanoscience and nanotechnology
- ☐ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☑ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Nanosensors and nanostructured surfaces.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	4	**Ph. D.:**	2	**Technicians:**	0
Post-Doc:	2	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Design, construction and application of nanoelectrodes in array disposition.

Design, construction and application of nanoelectrodes in array disposition

National

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Vitro S.A

Expertise

Combination of the specificity of the immunological reactions and hybridization of DNA fibers with the sensivity of electroanalytical techniques.
Development and use of nanostructured surfaces.

Research Topics

Immuno and genosensors.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	8	**Ph. D.:**	3	**Technicians:**	0
Post-Doc:	4	**Students:**	0	**Others:**	1

Running Projects (official title, co-financing source: regional, national or european)

Regional

Synthesis of indolic derivatives as enzymatic substracts and their application in elisas and immunosensors

National

Development of immunosensors of neumosiline and albumin on serigraphied electrodes

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

VITRO, S.A

Expertise

Combination of the specificity of immunological reactions with the sensitivity of electroanalytical techniques.
Use of serigraphied electrodes and the use of gold layers with microvolumes.

Research Topics

Automatic systems and microchips.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	5	**Ph. D.:**	3	**Technicians:**	0
Post-Doc:	2	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Synthesis of indolic derivatives asenzimatic substracts and their application in ELISAs and immunosensors

National

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Vitro S.A

Expertise

Design and set up of automatic methods of analysis.
Use of serigraphied carbon electrodes in flow systems and the use of microchips.

University of Oviedo - Department of Physical and Analytical Chemistry

Research Group: Modeling of Chemical Reactions

Group Leader		Title	Role
Sordo Gonzalo	Tomás L.		Full Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Theoretical Study of constructive processes of small and medium rings assisted by metals and organometallic compounds.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	3	**Ph. D.:**	2	**Technicians:**	0
Post-Doc:	1	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Estudio teórico ab initio de especies precursoras del hollín y de la formación y reducción de NOx

Computational modelling of metal, organometallic compounds, and metaloenzymes behaviour in the beta-lactams chemistry

National

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Ion-molecule and radical reactions involved in the combustion and interstellar chemistry.
Study of molecular gears.

University of Oviedo - Department of Physical and Analytical Chemistry

Research Group: X-Ray

Group Leader		Title	Role
García Granda	Santiago		Full Professor

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [x] Nanoscience and nanotechnology
- [x] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [x] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Development of novel crystallographic methods.Improvement of the structural determination process.Crystallization and structural research of crystallized proteins and drugs.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	15	**Ph. D.:**	14	**Technicians:**	1
Post-Doc:	5	**Students:**	10	**Others:**	5

Running Projects (official title, co-financing source: regional, national or european)

Regional

Development of a quantification method of polymorphous of azitromicina by means of X-ray powder difraction

Desarrollo de un método de cuantificación de polimorfos de azitromicina mediante difracción de rayos-X de polvo.

X-ray, synthesis, structure, properties and tecnologic application of materials.

National

Innovation and application of diffraction methods.

Development of a method for automatic formulation of colour and its application to the industrial serigraphy.

European

Collaborations with Companies

With large entreprises

AsturPharma S.A
Calcodecor S.A.

With small or medium enterprises

Lab. Dr. Esteve
Cementos Tudela Veguín

Expertise

X-ray diffraction, neutrons, synchrotron.
Crystallization of proteins.
Computation.
Strctural analysis of drugs.
Colour formulation in industrial serigraphy.
Theoric calculations of the structure and molecular reactivity.
Introduction to the procedures for the automatic formulation of colour and for the drying in serigraphy.
Colaboration in industry with Calcodecor SA.

MentorChem
Census of the "Chemistry and Chemical Engineering" Research in Asturias

University of Oviedo - Department of Physics

Research Group: Theoretical Condensed Matter Physics

Group Leader		Title	Role
Ferrer Rodríguez	Jaime		

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [x] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Computational materials science. Nanoelectronic and molecular electronic.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	3	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Radiation level in carriages due to mobile phones emission

National

Development of novel techniques for determination of mesoscopic superconductivity

National network of nanoscience researchers

Study of the magnetic and transport properties of magnetic materials and magnetic multilayer systems.

European

Nanoscale Dynamics, Coherence and Computation.

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Simulation of novel materials and nanometric devices.

University of Oviedo - Department of Physics

Research Group: Intermetallic Compounds Magnetism

Group Leader		Title	Role
Blanco Rodríguez	Jesús Angel		Full Professor

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [x] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Application of neutron beam and synchrotron radiation techniques. Analysis and modeling of the physical properties of the intermetallic compounds.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	7	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Study of the correlation between structure and magnetic interactions in multiphase nanostructured systems by Mosbauer spectroscopy and neutron beam

National

Advance magnetic materials: synthesis, characterisation and application

Characterization and applications of novel magnetic nanostructured materials

European

Novel probes for magnetic materials and magnetic phenomena: linear and circular x-ray dichoism

Prevalent Condensed-Matter research using x-ray and neutron beam techniques

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

X-ray diffraction measurements.
Consultancy for the experiment execution in big instalations.
Transport measurements(electric resistance and magnetoresistance, 2.5K-300K, 3T) and calorific capacity (2.5K-300K).
Interchange if interactions and crystalline field in intermetallic compounds.
Relationship between structure and magnetism in prepared materials by mechanical alloy.

University of Oviedo - Department of Physics

Research Group: Thin Layers Magnetism and Nanostructured Anysotrop

Group Leader		Title	Role
Tejedor Gancedo	Marcos		Senior Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☑ Nanoscience and nanotechnology
- ☐ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Obtention and study of magnetic thin layers. Magnetic properties of anysotropic and nanocrystalline films.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	3	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Magnetic and mechanical properties in metallic glass and nanocrystalline materials.

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

System for the obtention of thin layers by high vacuum evaporation procedure.
Installation for the obtention of hysteresis cycle by the transversal magneto-optical Kerr effect.
Torque magnetometer for measurements of the high-field anisotropy of thin layers.
Oven for the film preparation under inert atmosphere.
Installation for the obtention of hysteresis cycle by inductive method.
Magnetic balance and oven under inert atmosphere for thermomagnetic studies.

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Census of the "Chemistry and Chemical Engineering" Research in Asturias

University of Oviedo - Department of Physics

Research Group: Anisotropic and Nanostructured Magnetic Materials

Group Leader		Title	Role
Hernando Grande	Blanca		Full Professor

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [x] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Anisotropic and nanostructured materials magnetotransport.Manufacture of nano-porous membranes from Al and Ti oxides. Structure and behaviour of multiphase nanostructured systems.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	4	**Ph. D.:**	4	**Technicians:**	0
Post-Doc:	2	**Students:**	3	**Others:**	3

Running Projects (official title, co-financing source: regional, national or european)

Regional
Correlation study between structure and magnetic interactions in multiphase nanostructured materials by Mossbauer spectroscopy and neutron beam techniques.

National
Magnetoimpedamce and magnetotransport properties in nanostructured materials.

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Transport properties: giant magnetoimpedance.
Magnetic characterization of ferromagnetic alloys.

MentorChem
Census of the "Chemistry and Chemical Engineering" Research in Asturias

University of Oviedo - Department of Chemical Engineering and Enviromental Technology

Research Group: Catalysis, Reactors and Control

Group Leader		Title	Role
Díez Sanz	Fernando V.		Full Professor

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [x] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [x] Environmental pollution monitoring

Research Topics

Catalytic processes. Innovative chemical reactors. Simulation and control of chemical and environmental processes.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	4	**Ph. D.:**	2	**Technicians:**	0
Post-Doc:	5	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Design of reverse flow catalytic reactors for depuration of gas emissions

National

Development of a process for the aqueous effluent treatment by catalytic hydrochloration

Catalytic destruction of maleic anhydride in a novel designed reactor

European

Catalytic abatement of fugitive gaseous pollutants from iron-making processes

Collaborations with Companies

With large entreprises

Haldor-Topsoe
Atofina
A.G.R.

With small or medium enterprises

Expertise

Application study of catalytic products in environment and industry.
Characterization of catalysts and porous solids.
Modelling and design of chemical reactors.
Design, installation and running of automatic control systems in chemical processes.
Assessment for the application of security and environmental rules.

University of Oviedo - Department of Chemical Engineering and Enviromental Technology

Research Group: Emulsions and Interfacial Phenomena

Group Leader		Title	Role
Pazos Medina	Mª del Carmen	Dra.	Full Professor

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [x] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Design parameters, modelation and pass from scale in processes with membranes and sorption processes.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	7	**Ph. D.:**	3	**Technicians:**	0
Post-Doc:	4	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Integral treatment of emulsified oils containing wastewaters

Improvement of the treatment and recovery of waste oil emulsions in the steel industry

Treatment of runoff effluents containing hydrocarbons, oils and tensioactives by a ssedimentation and fixed bed sorption process

European

Design and construction pilot plant. Treatment of oil/water residual emulsions in the siderurgic and mechanised of metals by coagulation/saparation processes with membrane/sorption

Collaborations with Companies

With large entreprises

Atlantic Cooper S.A

With small or medium enterprises

Fuchs lubricantes S.A
Condoechem Ibérica S.L
Tecnomet S.L
S.A de Investigaciones Metalúrgicas (SADIM)

Expertise

Modular plant for the oily wastewater and worn out taladrrins treatment.
Formulation of oil/water emulsions capable of reuse and/or elimination by means of the use of clean ambient technologies.
Research in the hydrometallurgic area: recovery and/or elimination mercury.
Solvent extraction of metals and organic compounds of process effluent.

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Census of the "Chemistry and Chemical Engineering" Research in Asturias

University of Oviedo - Department of Chemical Engineering and Enviromental Technology

Research Group: Environmental Engineering (GIA)

Group Leader		Título	Role
Marañón Maison	Elena		Full Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☐ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☑ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☑ Environmental pollution monitoring

Research Topics

Management and treatment of residues. Design of wastewater and residues treatment plants. Production and exploitation of biogas in municipal solid waste dumping sites.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	10	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Ionic exchange regeneration plant of acid pickling baths.

Composting of organic residual mixtures: Viability study for the obtention of quality compost and its use as fertilizer

National

Integral treatment of bovine purines: optimisation of the process and obtention of design parameters.

European

Advanced Process Control for Biological Water Treatment Plants in Steelworks

Membrane-bioreactor system for treatment of nitrate in pickling process wastewater

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Composting processes and biomethanization of municipal solid wastes, cattle manure and mud waste.
Characterization of industrial residues: Leaching and ecotoxicity.
Biological and physicochemical treatment of industrial residues.
Aerobic and anaerobic biological treatments of wastewaters. Nitrification and denitrification processes.
Physicochemical treatments of wastewaters (sorption, ionic exchange, coagulation/flocculation).
Assessment in the residual management and wastewater purification. Assessment in the environmental management of the companies.
Accomplishment of the life cycle analysis.

University of Oviedo - Department of Chemical Engineering and Enviromental Technology

Research Group: Polymers and Composite Materials

Group Leader		Title	Role
González Sánchez	Carlos		Full Professor

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [x] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Polymers, composite materials of plastic matrix, adhesive, latex, rubber and other elastomers. Environmental impact, separation and plastic residues recycling.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	5	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Development of novel formulations of adhesives for structural applications.

Development of industrial prototypes using novel recycled materials and thermoplastic matrix.

Improvement of the properties and recyclability of cellulose fiber reinforced propylene novel materials.

European

Industrial production of High-performance Ecological Polymeric Composites based on Residual/Renewable Cellulose fibres and Post-consumer Thermoplastics"(ECOSITES)

Industrial production of high-performance ecological polymeric composites based on residual/renewable cellulose fibers and post-consumer thermoplastic (ECOSITES)

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Accomplishment of R&D projects in the mentioned lines of investigation: CICYT, FICYT and European Union financed projects. Projects with enterprises. Research contracts with enterprises.
Planning, application and control of the quality control system implantation of the process and product in the polymeric area.
Training courses of polymer processing and transformation.

University of Oviedo - Department of Chemical Engineering and Enviromental Technology

Research Group: Bioprocessing Technology and Reactors

Group Leader		Title	Role
Díaz Fernández	Jose Mario		Senior Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☑ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☑ Environmental pollution monitoring

Research Topics

Bioreactions and food safety.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	4	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National
Modeling and analysis of microorganisms growth for industrial and products control

European

Collaborations with Companies

With large entreprises
ILAS

With small or medium enterprises

Expertise

Enzymesproduction using milky substracts.
Ethanol production using milky whey.
Evaluation of the contamination and its development in food products.
Development models of microorganisms in solid food substracts. Effects in food processing.

Research Topics

Design and assessment in the water treatment process.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	5	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Biological treatment of coking plants wastewaters in industrial pilot plant

National

Transport and degradation of organic contaminants in soils

European

Collaborations with Companies

With large entreprises

DuPont
Bayer
Arcelor
ILAS
CAPSA

With small or medium enterprises

Ingemás

Expertise

Biological treatment of instalations of industrial waters, SBR.
Chemical elimination of contaminants. Use of high temperatures and pressures.
Particle elimination by flotation and filtration.
Analysis of water consumption in industrial installations. Economy and recycling alternatives.
Interactions of contaminants in soil and its biodegradation.

Research Topics

Alcoholic drinks, cider, beer, etc elaboration.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	4	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Transformation of milk whey in valuable products: enzymes (proteases and lipases) and ethanol

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Escanciador
El Águila Negra
LILA

Expertise

Quality, design and control in fermentation processes.
Global process of alcoholic drinks manufacture.

Research Topics

Ionic exchange separation in food and chemical industry.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	5	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Recovery and separation of valorizabled compounds from residual currents from food industries

European

Collaborations with Companies

With large entreprises

Rio Narcea Gold Mines
Matadero Central de Asturias
ARIAS
Minera Santa Marta

With small or medium enterprises

Expertise

Protein separation from food industry residues by on column processes.
Novel food products obtention. Characterisation of food properties.
Na/K separations for cyanate complex fertilizers.

University of Oviedo - Department of Energy

Research Group: Thermal Engineering

Group Leader		Title	Role
Pistono	Jorge		

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☐ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☑ Biotechnology
- ☑ Conservation and restoration of Cultural Heritage
- ☑ Environmental pollution monitoring

Research Topics

Energetic eficiency in construction. Solar cold. Bioenergy. On-line analysis of brown coals.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	13	**Ph. D.:**	7	**Technicians:**	0
Post-Doc:	3	**Students:**	1	**Others:**	2

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

DECASE (Dry electric heater prototype development)

Simulation of the cement manufacture procedure in rotative oven under wet operating conditions

European

On-line coal flow and chemical composition measurement and control

So cold (development and implementation of a cost effective adsorption refrigeration system utilising high temperature (120ºC) solar Compound Parabolic Collectors (CPC)

Collaborations with Companies

With large entreprises

IMASA
Asociación de Industrias Cárnicas del Principado de Asturias

With small or medium enterprises

Natec Ingenieros
Normalux

Expertise

Chromatography.
Atomic absorption spectrometer.
Testing bench for refrigerants and freezers.
Determination by conventional methods of the humidity and ashes in brown coals.
Emission analysis in boilers, furnaces and engines.
Energetic audit of industrial installations and buildings.
Studies and projects in Thermal engineering: cooling, combustion, heating, ACS, air-conditioning, heat transmission and intercooler.

MentorChem
Census of the "Chemistry and Chemical Engineering" Research in Asturias

University of Oviedo - Department of Energy

Research Group: Modeling of Equipments and Thermal Processes

Group Leader		Title	Role
Prieto González	Mª Manuela		

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [x] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Assessment of thermal properties of fatty acids. Modeling of industrial processes: furnaces, boiler and systems of exchangers.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	4	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

System for signal processing and modeling of industrial processes of central thermal power plants

Applications of neuronal nets to the prediction of operation and condenser soiling variables on central thermal power plants

National

Design and set up of a methodology for the design and control of carcass freezers and tubes for effluents mixtures from deodorization of various oils at high vacumm

European

New method for contacless measurement of true temperature of hot steel strips and control of the total thermal process by in situ spectroscopy

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Electric energy generation enterprises.
Industrial furnaces and metallurgic process.
Manufacturers of equipment goods.
Development of software for control of thermal equipments.

University of Oviedo - Department of Energy

Research Group: Development Biological Processes

Group Leader		Title	Role
Garzón Ruipérez	León		Full Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☐ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☑ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Quantification of the embrionary development.Allometric laws of live matter. Application to microbiology.Prebiotic synthesis.Application to life origin.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	0	**Ph. D.:**	2	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional
National
European Three on going projects.

Collaborations with Companies

With large entreprises

Expertise

Prebiotic synthesis.
Microbian life and temperature.
Physico-chemical aspects of biological processes of development.

University of Oviedo - Department of Materials Science and Metallurgical Engineering

Research Group: Behaviour in Service of Metallic Materials

Group Leader		Title	Role
Belzunce Varela	Francisco Javier		Senior Professor

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Analysis of the processes of deterioration, weakening, tension and deformation in structural elements.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	4	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Development of thermal and anticorrosive barriers under service conditions of high temperature in gas turbines which operate in combined cycle power plants.

Development of rapid steel working rolls used in the finishing mills of hot strip mill facilities.

National

Development of microalloyed steel for service in the presence of acid gas.

Effect of the dissimilarity of mechanical characteristics and geometry in the tenacity at the breaking of weld joints in high resistance steels.

Development of duplex stainless steel corrugated bars with nitrogen for its use in construction

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Manufacturing of transforming enterprises of metallic products.
Manufacture of goods equipment.
Control of weld joints.
Maintenance and quality control services of the product.
Microstructural studies.
Optimisation of thermal treatments.
Protection against wearing, oxidation and corrosion.
Protective covering.

University of Oviedo - Department of Materials Science and Metallurgical Engineering

Research Group: Siderurgy, Metallurgy and Materials

Group Leader		Title	Role
Verdeja González	Luis Felipe		Senior Professor

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [x] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Simulación de Procesos Metalúrgicos, Siderúrgicos y de Transformación de Materiales.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	9	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Nodal weakening model on high temperature corrosion of materials

Weakening of refractory materials by corrosive fluids: Nodal weakening model

Interaction of materials with liquid metals: structural analysis and corrosion mechanisms

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Simulation and design of production-transformation processes in high temperature materials.
Steel and smelting.
Refractory and ceramics.
Material selection criteria.
Non-ferrous materials: Al, Cu and Zn.

INCAR - Department of Science and Technology of Coal and Coal Products

Research Group: Carbonization

Group Leader		Title	Role
Álvarez García	Ramón		Researcher

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [x] Environmental pollution monitoring

Research Topics

Coking process and environment

Human Resources (Number of people involved in the activity fields here above)

Researchers:	3	**Ph. D.:**	2	**Technicians:**	1
Post-Doc:	2	**Students:**	0	**Others:**	6

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Coal carbonization process as a method for recycling plastic and industrial wastes for a sustainable growth

European

Laboratory and pilot scale test to assess coke quality and coking pressure. Comparison with industrial test

Coking pressure generation and moderation

Possibilities of the carbonization process for the reciclying of carbon containing materials. The coking process as an alternative for recycling plastic waste

Collaborations with Companies

With large entreprises

Aceralia
Compañía Siderúrgica de Tubarao (Brasil)

With small or medium enterprises

Industrial Química del Nalón
Doy

Expertise

Optimization of the quality of siderurgic coke.
Increase of the useful life of the siderurgic coke.
Use of industrial residues and plastics in the production of siderurgic coke.

INCAR - Department ot Materials Chemistry

Research Group: Nanostructured Materials Group

Group Leader		Title	Role
Torrecillas San Millán	Ramón		Researcher

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [x] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Nanoestructured materials for structural and functional applications.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	75	**Ph. D.:**	50	**Technicians:**	40
Post-Doc:	50	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Mechanic fatigue of ceramic materials of alumina-zircon

Nanostructured materials: monolithics and ceramic metal compounds

European

Development of High Temperature Fatigue, Creep and Thermal Shock Resistant Zircon and Mullite-zirconia Ceramics

Development of Spinel and Calcium Hexa-aluminate Bonded High Alumina Refractories

Collaborations with Companies

With large entreprises

Alcatel Space
Avio Spa
Ceramica Industrial Montgatina
Novel Biocare AB
SGL Carbon
Piaggio Aero Industries Spa
Wright Medical Italy

With small or medium enterprises

DGTec
FCT Systeme GmbH
Asursinter S.L
Tespint S.A

Expertise

Synthesis of nanostructured powder.
Processing of nanostructured materials for biomedical applications.
Nanostructured materials biocompatible for its use as implants.

INCAR - Department ot Materials Chemistry

Research Group: Functional Porous Materials

Group Leader		Title	Role
Fuertes Arias	Antonio B.		Senior Researcher

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [x] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Preparation, characterization and application of porous materials.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	6	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Preparation of carbon molecular sieve membranes for the separation of mixtures of hydrocarbons

National

Preparation of mesoporous carbon materials from meso-structured silica materials

European

Coal combustion in CO2 rich flue gas; an approach to industrial application in power stations

the abatement of environmentally unfriendly species in combustion and gasification processes

development of catalysts supported on activated carbon fibres-based monoliths for low temperature reduction of NO

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Preparation of mesoporous carbon materials from meso-structured silica materials with controlled size and porosity.
Preparation of mesoporous carbons by replica of silica meso-structured materials.
Preparation of metallic and mixed oxides (spinels, perovskita, etc) by impregnation/elimination of meso-structured silica particles, mesoporous carbons and microporous carbons.
Preparation of metallic oxides (mixed) by conventional techniques (citrates, precipitation, etc). / Preparation of monoliths of active carbon fibers. / Preparation of metallic oxides (mixed) carbon supported.
Development of catalysts in processes related to fuel piles.
Development of sorbents based in monolithic carbonous materials for the elimination of organic volatile compounds in gaseous phase.
Use of mesoporous carbon materials as electrodes of electric double layer condensors (EDLC) or super condensors.

SERIDA - Research Department

Research Group: Nutrition, Pasture and Fodder

Group Leader		Title	Role
Argamentería Gutiérrez	Alejandro		Senior Researcher

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☑ Environmental pollution monitoring

Research Topics

Production of pastures and fodders. Conservation of fodders. Assessment of food by humid via, microscopy, reflectance in the near infrarred. Nutrition of milky bovine in humid areas.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	3	**Ph. D.:**	3	**Technicians:**	5
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Characterisation of symple ingredients and piensos compuestos for the control of " Carne de Asturias Calidad Controlada"

National

Conventional and ecologics fodder rotations in the humid Spain

Control of effluents stored in a silo grass and response in milk production against aditives use

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Production technology of pastures and fodders.
Vegetal evaluation of species, varieties and mixtures of pastures and fodders.
Conservation techniques of fodders.
Storage in silos. Aditives and doses.
Reduction of environmental risks.
Food assessment for laboratory analysis by traditional techniques and reflectance in the near infrared.
Food assessment in vivo.
Use and suplementation of fodders for milk production.

SERIDA - Research Department

Research Group: Animal Health

Group Leader		Title	Role
Prieto Martín	José Miguel		Senior Researcher

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☑ Nanoscience and nanotechnology
- ☐ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☑ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Animal health.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	3	**Ph. D.:**	0	**Technicians:**	2
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Bovine paratuberculosis in Asturias: prevalence and evaluation of the interference with the tuberculin test

Influence of the leptospiral infections in the reproduction in the bovine cattle with special attention to the Hardjo and Bratislava Serovars

Elaboration of biologically active concentrates of proteins from cow milk by immunization and membrane fractioning techniques

Collaborations with Companies

With large entreprises

Alimentaria Peñasanta (CAPSA)

With small or medium enterprises

Expertise

Health in domestic, wild, lagomorphs and salmonids ruminants. Epidemiologic alert and prevalence studies. Set-up of diagnostic systems in animal health.

Health in domestic, wild, lagomorphs and salmonids rumiants. Epidemiologic alert and prevalence studies. Set-up of diagnostic systems in animal health.

MentorChem
Census of the "Chemistry and Chemical Engineering" Research in Asturias

SERIDA - Research Department

Research Group: Food Technology

Group Leader		Title	Role
Suárez Valles	Belén		Senior Researcher

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☑ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Food technology.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	6	**Ph. D.:**	4	**Technicians:**	2
Post-Doc:	1	**Students:**	0	**Others:**	1

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Selection of native yeasts for the manufacture of sparkling cider

Cider liquor elaboration. Influence of the raw material in the analytical and organoleptical characteristics

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

Asociación Vino de la Tierra de Cangas

Expertise

Elaboration technologies improvement.
Chemical and microbiological analysis.
Organoleptic analysis.
Official and certified laboratory of beverages.

University of Oviedo - Department of Exploitation and Mining Prospecting

Research Group: Subsoil and Enviromental Research

Group Leader		Title	Role
Loredo	Jorge		Senior Professor

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☐ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☑ Environmental pollution monitoring

Research Topics

Subsoil and environment study.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	10	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Study of the alternatives to mitigate the mining residues impact from the mercury mining industry in Asturias

Research of the possibilities of cbm and cmm exploitation and CO2 sequester in the asturian central deep valley

National

European

Environmental regulation of mine waters in the european union.

Passive in situ remediation of acidic mine / industrial drainage.

Enhanced reclamation of brownfield sites using natural biology.

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Water drainage to facilitate opencast and subterranean exploitation with minimal ambient impact.
Mine water and leachate treatments by passive methods.
Prospection and evaluation of ground and water pollution. Risk assessment.
Subsoil and environment research.
Mining prospection and research.
Methane exploitation and exploration of coal layers.
Geoenviroment technical auditories.
Hydrogeological studies.

MentorChem
Census of the "Chemistry and Chemical Engineering" Research in Asturias

ITMA

Research Group:

Group Leader		Título	Role
Conejero	Olga		Senior Researcher

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Corrosion of metallic materials

Human Resources (Number of people involved in the activity fields here above)

Researchers:	0	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Metallic materials in extreme conditions

Quick manufacturing of prototipes of metallic sheet

European

Local heat treatment of ultra-high strengh steel

Self healing at cut-egde of coil coated galvanized steel

Collaborations with Companies

With large entreprises

With small or medium enterprises

Expertise

Corrosion, protection systems.
Durability and materials behaviour.

University of Oviedo - Department of Physical and Analytical Chemistry

Research Group: Mass Spectrometry

Group Leader		Title	Role
García Alonso	José Ignacio		

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Juan Clavería, 8
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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☐ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

The use of stable isotopes in chemical metrology.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	3	**Ph. D.:**	3	**Technicians:**	0
Post-Doc:	5	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional
Study of metallic pollution of water from the Principado de Asturias by means of Inductively Coupled Plasma Mass Spectrometry.

National
Isotope ratio measurement by ICP-MS: biomedical and enviromental applications.

European
Development of haigh precission Isotope Ratio Measurement Methods using Multi-Collector ICP-MS.

Collaborations with Companies

With large entreprises
Agilent Technologies
Thermo Instruments
Derivados del Flúor S.A
ISC-Sciences
Globachem
Rivendell

Expertise

Use and preparation of isotopically labelled compounds.
Validation of analytical methodologies Certification of laboratories.
Atomic Mass Spectrometry (ICP-MS).

LILA

Research Group:

Group Leader		Title	Role
Montes Alonso	Prudencio		Senior Researcher

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☑ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☑ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Implementation of novel analytical techniques.Detection of hormones in meat by immunoassays and application of chromatographic techniques for the analysis of dairy products.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	10	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Use of ecological milk from Asturias for the elaboration of probiotic dairy products.
Influence on the security, organoleptic quality and nutritional value
Application of economic efficiency model for the analysis of the quality of milk.

National

European

Collaborations with Companies

With large entreprises

With small or medium enterprises

I.P.L.A.

Expertise

Microbiological analysis of food by techniques certified by ENAC such as listeria, salmonella and escherichia Coli…investigation.
Physicochemical analysis of food by instrumental and conventional techniques in milk and dairy products, fat, proteins etc.
Cider analysis by novel techniques.
Novel instrumental analysis

University of Oviedo - Department of Functional Biology

Research Group: Lactic Acid Bacteria

Group Leader		Title	Role
Suárez Fernández	Juan Evaristo	Dr.	

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Main Field of Activity (mark one or more boxes)

- ☐ Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- ☐ Nanoscience and nanotechnology
- ☐ Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- ☑ Biotechnology
- ☐ Conservation and restoration of Cultural Heritage
- ☐ Environmental pollution monitoring

Research Topics

Any aspect that implies the bacteria of the lactic acid, from the basic (genetics, physiology) to the applied ones (generation, typificacion and control activators of industrial fermentations, etc)

Human Resources (Number of people involved in the activity fields here above)

Researchers:	8	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

Incidence and effects of viral infections in the manufacturing of Afuega´l Pitu cheese

National

Characterization of genomic region of late expression bacteriofag A2

Detection of bacteriofags in lacteal products and development of activating stocks of Lactococcus lactis resistant to viral infection

Development of systems of gene stabilisation and of resistance to the infection of bacteriofags applicable to activators of the lacteal fermentation

European

Collaborations with Companies

Expertise

All related to the development and technological activity of lacteal bacterias.

MentorChem
Census of the "Chemistry and Chemical Engineering" Research in Asturias

ITMA

Research Group:

Group Leader		Title	Role
Andrés	Luis José	Dr.	Senior Researcher

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Surface covering

Human Resources (Number of people involved in the activity fields here above)

Researchers:	4	**Ph. D.:**	1	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

European

Collaborations with Companies

With large entreprises

Grupo Arcelor
Ferroatlántica
Mivisa

With small or medium enterprises

Expertise

Simulation of siderurgic processes (smelting, laminated, covering, etc)
Galvanized phosphatation and cataforesis
Organic coverings

ITMA

Research Group:

Group Leader		Title	Role
Lausin	Cristina		Senior Researcher

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Refractory ceramic materials

Human Resources (Number of people involved in the activity fields here above)

Researchers:	2	**Ph. D.:**	0	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional

National

Study of the rheological behaviour of fluids at high temperature and its dynamic interaction with refractory crucibles in contact with them.

Development of geopolymeric material obtained by GEOMUD-red muds.

European

Collaborations with Companies

With large entreprises

Eika
El Caleyo Nuevas Tecnologías

With small or medium enterprises

Refractarios David Solis

Expertise

Mechanical characterization of refractory materials
Simulation of abrasion processes and behaviour of refractory materials

MentorChem
Census of the "Chemistry and Chemical Engineering" Research in Asturias

ITMA

Research Group:

Group Leader		Título	Role
Marina	María Antonia		Senior Researcher

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Characterization of raw materials and refractory materials.

Human Resources (Number of people involved in the activity fields here above)

Researchers:	2	**Ph. D.:**	2	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional
National
European

Collaborations with Companies

With large entreprises
With small or medium enterprises

Expertise

Chemical characterization of inorganic materials
Set up and improvement of analytical determination methods.

MentorChem
Census of the "Chemistry and Chemical Engineering" Research in Asturias

ITMA

Research Group:

Group Leader		Título	Role
Bonhomme	Jorge		Senior Researcher

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Main Field of Activity (mark one or more boxes)

- [x] Materials Technology (functional materials, intelligent materials, sustainable technologies in the areas of energy and environment, new methods of polymerization)
- [ ] Nanoscience and nanotechnology
- [ ] Reaction and Process design (optimization of production processes for basic chemicals; intermediates and fine chemicals; catalysis; synthetic organic chemistry; chemical safety)
- [ ] Biotechnology
- [ ] Conservation and restoration of Cultural Heritage
- [ ] Environmental pollution monitoring

Research Topics

Plastic materials and composites

Human Resources (Number of people involved in the activity fields here above)

Researchers:	4	**Ph. D.:**	1	**Technicians:**	0
Post-Doc:	0	**Students:**	0	**Others:**	0

Running Projects (official title, co-financing source: regional, national or european)

Regional
National
European

Collaborations with Companies

With large entreprises

Linpac Plastic Pravia
Dupont Agro
Thyssen Norte

With small or medium enterprises

Crady Eléctrica

Expertise

Mechanic characterization and plastic materials chemistry-composites
Industrial applications of plastic products
Packaging technology.