

LABOS ACCUEIL ITALIE
MILAN, BOLOGNE ET FLORENCE ANNÉE 2017-
2018



Università de Milan



Ilenia Rossetti
Alberto Villa



Renewable energy: H₂, Bio-fuels, Solar energy

Materials for Photovoltaic, Photosplit/Photoreforming, Solar Cells (Organic and Inorganic), Fuel Cells and Biofuels from Renewable Sources.

Domenico Albanese
Maurizio Benaglia
Emma Gallo
Cesare Gennari
Antonella Gervasini
Daniela Meroni
Ilenia Rossetti
Alberto Villa



Sustainable Chemistry

Catalysis (New Catalysts and New Materials for Catalysis, Clean and Efficient Processes, Biocatalysis), Environmental Control, Transformation of Renewable Materials (for Energy; for the Production of Molecules and Materials with High Added Value).

Maurizio Benaglia
Emma Gallo
Antonella Gervasini
Ilenia Rossetti



Optimization and Process Intensification

Development of Catalytic Processes with Low Environmental Impact, Development of Processes for the Efficient Conversion of Energy (from Renewable Sources) and Corrosion and Protection of Materials.

Elena Cariati
Emma Gallo
Antonella Gervasini
Daniela Meroni
Daniele Passarella
Ilenia Rossetti



Materials

Functional Materials of Biomedical Interest for Nanomedicine and Imaging, Sensors, New Materials for Energy (Low-Carbon Technologies, Carbon Dioxide Capture and Storage, H₂ Storage), Bioplastics from Renewable and/or Biodegradable Packaging Applications and Engineering, Synthesis and Development of Polymers for Applications in Advanced Materials (FR Materials, Shear Sensitive, Tailor-Made Nanocomposite Materials), Structural Studies by X-Ray and Neutron Diffraction, Materials with Nonlinear Optical Properties.

Domenico Albanese
Maurizio Benaglia
Cesare Gennari
Daniele Passarella



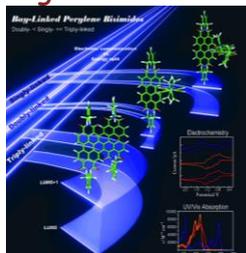
Chemistry for the Life-Sciences

Design and Synthesis of Bioactive Molecules, Carbohydrate Chemistry, Analytical Techniques and Chemical-Physical Investigation for Bio-Sciences, Bio-NMR

Université de Bologne



Negri Fabrizia



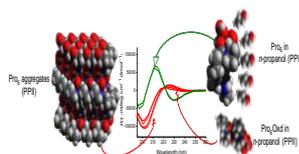
Research activity: use and development of molecular modeling tools

Modeling Functional Molecular Materials

Conjugated organic molecular materials

Our target systems are organic chromophores for applications in electronics and optoelectronics. The research activity involves the use and development of molecular modeling tools with the objective of deciphering electronic and optical properties as well as charge and energy transport phenomena in conjugated organic molecular materials. Systems investigated are models for graphene nanoribbons, n-type and p-type organic semiconductors, aggregates of extended conjugated molecules and other complex photoresponsive molecular architectures.

Claudia Tomasini



Synthesis and applications of pseudopeptides and foldamers in solution and in the solid state

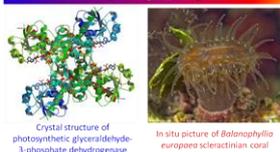
Pseudopeptide and Foldmers laboratory

Synthesis, conformational analysis and applications of pseudopeptides

- 1 Synthesis in solution and in the solid phase of pseudopeptide chains containing mimetics of amino acids
- 2 Conformational analysis of pseudopeptides by spectroscopic techniques (IR, NMR, ECD)
- 3 Preparation and biological evaluation of pseudopeptides
- 4 Preparation and applications of supramolecular materials: fibers, gels.

Simona Fermari Giuseppe Falini

Biocrystallography and Biomineralization Group
simona.fermari@unibo.it - giuseppe.falini@unibo.it



Biocrystallography and Biomineralization

Use and development of molecular modeling tools. Structural characterization of proteins

Preparation and characterization in solution of protein samples to assess their purity and homogeneity. Structural study of protein in solution by scattering, spectroscopic and microscopy techniques. Crystallization through different methods (vapor diffusion in hanging or sitting drop, batch crystallization) of protein samples. X-ray diffraction experiments on protein single crystals. Computational analysis of diffraction data to determine the protein structure.

Bandini Marco

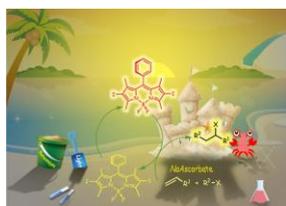


We are a young and dynamic research with many interests in catalysis

*LASC (Laboratory of Asymmetric Synthesis and Catalysis)....
Catalytic organic synthesis*

Design, synthesis and characterization of new metal-based (Au, Ni, Pd) catalytic systems for modern organic transformations. Applications in C-C and C-X bond forming reactions aiming at added value compounds in chemo-, regio- and stereoselective form.

Cozzi Pier Giorgio



*Back Cover Chem
Comm 2017 Inventing
new reactions and
methodologies with
light.*

*StereoCAT... (Laboratory of Stereoselective Metal Catalysis and
Photoredox Catalysis).*

In our laboratory we are developing stereoselective catalysis and new stereoselective reactions. We are exploring organocatalysis, organometallic chemistry, and earth abundant metals for found new reactivity. We are recently also studying new reactivities and opportunities offered by PHOToredox catalysis, with new photosensitizers, new reactions, and new concepts. We are doing these new researches in a Department dedicated to the father of Photochemistry, Giacomo Ciamician.

Università de Florence



Andrea Bencini,
Barbara Valtancoli

Molecular and nanostructured optical sensors.

Design and synthesis of luminescent molecular sensors for the optical detection of metal cations, inorganic anions and small metabolites, such as nucleotides, in solution, cells and tissues, with the purpose to develop new tools for the analysis of cellular metabolism. Decoration with fluorescent systems of polymeric and biocompatible nanoparticles for simultaneous drug delivery, optical detection of the nanoparticles and theranostic uses.

Debora Berti

Laboratory NaSA (Nanostructured Self-Assemblies)

Preparation and characterization of nanostructured and bioinspired materials designed for biomedical applications: lipid-based assemblies, liquid crystalline phases, inorganic nanoparticles, DNA-based assemblies, magneto-responsive nanodrugs/nanovectors. Design and preparation of reliable models of biological membranes. Investigation of their structure, morphology, stability, encapsulation efficiency, release pathway through scattering, spectroscopic, and microscopy techniques.

Alberto Brandi,
Franca Cordero

Organic Synthesis

Development and application of new synthetic methods and strategies for the synthesis of biologically active compounds. Stereoselective syntheses based on nitrones and strained spirocyclopropane fused heterocycles. One of the ongoing research is devoted to the synthesis and biological evaluation of hydroxylated indolizidines of natural and non-natural origin able of acting as glycosidase inhibitors and proapoptotic agents.

Martina Cacciarini

Molecular switches

The research topics focus on synthetic organic chemistry for the development of novel functional materials and are directed towards the synthesis of molecular switches able to perform a variety of fully reversible and specific functions by an external stimulus. Currently the main interest is the design of photo-thermo switches based on the dihydroazulene/vinylheptafulvene system for closed-cycle storage of solar energy, colorimetric sensors and fast-responsive materials.

**Andrea Caneschi,
Claudio Sangregorio**
Laboratory of
Magnetic Magnetism
(<https://www.lamm.uni-fi.it>)

Magnetic nanostructured materials.

This research line is focused on the synthesis by wet chemical methods, functionalization and characterization of magnetic nanoparticles. The main fields of research are the development of biocompatible magnetic nanomaterials for theranostic applications (MRI and magnetic fluid hyperthermia), magnetic-plasmonic nanostructures for high-sensitivity sensors and optimized ferrite nanoparticles for the realization of rare-earth free permanent magnet and high frequency low losses materials for advanced electronics.

**Stefano Cicchi,
Fabrizio Machetti,
Alberto Brandi**

Nanostructured Carbon Materials

The research group is involved in the functionalization of Nanostructured Carbon Materials (carbon nanotubes, graphene and fullerenes) for their applications in nanomedicine and in catalysis. The proper modification of nanotubes allowed the production of efficient drug delivery systems that are actually tested for the delivery of multiple drugs. As well, the modification of graphene and nanotubes with phosphinylated moieties produced efficient heterogeneous catalysts.

Sandra Furlanetto
Laboratory of quality
by design and quality
assurance

Quality by Design nello sviluppo farmaceutico

Strategie chemiometriche di disegno sperimentale per l'ottimizzazione di metodi analitici, forme farmaceutiche e processi industriali. Strategie chemiometriche per studi di classificazione e per analisi di regressione multivariata. Studio di nuove fasi pseudostazionarie per elettroforesi capillare con NMR e molecular modeling. Sviluppo di protocolli per studi di assicurazione di qualità in ambito farmaceutico.

Donatella Giomi

Heterocyclic chemistry

Synthesis of new hetero- and carbocyclic systems from electron-deficient nitrogen heterocycles. Application of pyridylpropenols as building blocks to access indolizidine derivatives, analogues of natural products. Study of variously substituted pyridyl methanols as Hantzsch ester mimics for metal-free reductions. Valorization of algal biomasses and food/agro-industrial wastes for the sustainable production of high value products in the fields of energy and biomaterials.

Ernesto G. Occhiato

Heterocyclic chemistry via catalysis

The scientific interests of this research group are focused on the development of new methodologies for the synthesis of chiral heterocyclic compounds through transition metal catalysis, in particular by exploiting gold(I)-catalyzed cascade reactions and various Pd-catalyzed processes. Current topics are the stereoselective synthesis of unnatural, conformationally constrained amino acids to be used in the generation of bioactive peptidomimetics and for tumor-targeted drug-delivery, as well as the synthesis of various natural compounds.

**Andrea Goti,
Francesca Cardona,
Camilla Parmeggiani**

Glycomimetics

The group develops innovative and efficient synthetic strategies to obtain nitrogen-containing glycomimetics (natural and non-natural compounds, in a mono- and multivalent fashion) behaving as glycosidase inhibitors, with therapeutic applications (e.g. as drugs for metabolic diseases). At the same time, it develops new environmentally friendly procedures for the oxidation of organic compounds. Recently, the study of light-sensitive elastomeric liquid crystal materials was initiated, with potential application in the preparation of micro-robots for the development of innovative prostheses.

**Stefano Menichetti,
Caterina Viglianisi**

Laboratory Smen Research Group

1) Design and synthesis of bioinspired chalcogen containing (poly)phenolic antioxidants able to exert a potent and multi-defense antiradical activity. 2) Synthesis and application of helical shaped hetero substituted derivative with a particular attention to the electronic and chiro optical properties. 3) Design and synthesis of innovative macromolecular additives suitable for the preparation of long lasting polyolefin materials with no risk of contamination in food, pharmaceutical and biomedical packaging applications.

**Maria Minunni, S.
Scarano, P.
Palladino, Emanuela
Pascale**

(Bio)sensori ottici

Chimica bioanalitica; Biosensori ottici (nanofotonica) e piezoelettrici per la diagnostica clinica, analisi anti-doping, alimentare, ambientale basati su Risonanza Plasmonica di Superficie (SPR), per immagini (SPR-i) e localizzata (LSPR) e microbilancia al Quarzo (QCM). Realizzazione di dispositivi analitici rapidi, a basso costo, selettivi con applicazioni alla diagnostica molecolare per una diagnosi clinica anticipata ed per una terapia personalizzata.

**Alessandro Mordini,
Gianna Reginato,
Lorenzo Zani,
Massimo Calamante.
Group CNR ICCOM-
Dipartimento di
Chimica**

Solar cells

Main current scientific interests include: development of sustainable synthetic methodologies and low environmental impact processes. Synthesis of new materials for organic electronics through cross-coupling reactions, in particular new dyes for third generation solar cells (dye sensitized and perovskite based solar cells), for hydrogen production through water splitting and for luminescent solar concentrators. Development of innovative methodologies for the preparation of homogeneous and heterogeneous catalysts for the pharmaceutical industry.

**Paola Mura,
Francesca Maestrelli,
Marzia Cirri
Research group of
Pharmaceutical
Technology**

Drug optimization

Drug optimization in pharmaceutical formulations for improving its efficacy and safety, by preparation, characterization and biopharmaceutical evaluation of cyclodextrin complexes, solid dispersions or mechano-chemically activated systems. Development of new dosage forms for drug delivery, including: liposomes or micro- or nanoparticles; drug-in cyclodextrin-in liposome or in nanoparticle; colon-targeted systems; bio-adhesive buccal or vaginal systems for local or systemic action.

Ilaria Palchetti

Biosensing

Research activity focuses on applications of analytical chemistry in the field of (bio)sensing. One major area of interest is the characterization of novel natural and synthetic biomolecular recognition systems. Another major focus is on the use of nanomaterials and nanocomposites for biosensor development. A further area of interest is the analytical approach to nanotoxicology. While most of the research activity employs electrochemical and photoelectrochemical techniques, the group is always exploring new technologies to answer pressing bioanalytical issues.

**Anna Maria Papini,
Claudia Bello,
Giuseppina Sabatino**
*Laboratory of Peptide
and Protein Chemistry
and Biology*
(www.peptlab.eu)

Peptide-based cosmetics, diagnostics, and drugs.

The students will acquire strong expertise in: a) synthesis of posttranslationally modified peptides, i.e., glycopeptides, lipopeptides, cyclopeptides also by bioorthogonal strategies (i.e., click chemistry); semi-synthesis and/or expression of proteins; b) immunochemical assays to detect antibodies, c) biophysical studies by SPR. Peptide/protein interaction studies are performed to understand the molecular mechanisms of immune-mediated diseases, i.e., allergies to drugs, autoimmunity, bacterial infections.

Antonella Salvini

Biomass valorization

Biomass valorization for develop high value products such as solvents, chemical industry intermediates, biopolymers, and biofuels. Studies in the field of the homogenous and biphasic catalysis. Synthesis and characterization of new polymers and biopolymers for their use as adhesives, as stone protective agents and for preservation of wood and cellulose-based artifacts.
Synthesis and characterization of "core-shell" polymer-based nanoparticles.

**Roberta Sessoli, Luca
Sorace, Matteo
Mannini**
*Laboratory of
Magnetic Magnetism*
(<https://www.lamm.uni-fi.it>)

Magnetic molecules and hybrid materials

Magnetic molecules and hybrid materials for spintronics and quantum information technology. This research line combines synthesis of molecules carrying unpaired to study their organization on surfaces and more complex nanoarchitectures for molecular spintronics and application as spin qubits in quantum information technology. The group is also active in magnetic and spectroscopic characterization, modelling of the magnetic properties. State-of-the-art instrumentation for magnetic and magneto-optic characterization, for magnetic resonance spectroscopy, and surfaces preparation and characterization, is available.

*Giulietta Smulevich
Laboratory of Raman
spectroscopy applied
to biological molecules*

Electronic and vibrational spectroscopic techniques

Biophysical chemistry by electronic and vibrational spectroscopic techniques (Raman and resonance Raman, SERS, and FTIR, UV-Vis) also integrated with the EPR technique to study the relationship between structure and function of heme proteins, i.e., those present in organisms living in the Antarctic Ocean to understand the molecular machine of bacterial hemoglobin, the effects of specific mutations on the interaction between cytochrome c and cardiolipin vesicles during the cell suicide process.

*Andrea Trabocchi,
Gloria Menchi*

*Diversity Oriented Synthesis of glyco- and peptidomimetics and
molecular imaging applications*

Synthetic organic chemistry and biomedical applications for the diagnosis and treatment of oncologic and CNS pathologies, within the CISPIM (www.cispim.unifi.it) of which we are members. The approach is the design and synthesis of 'glyco-' and 'peptidomimetic' molecules, applying the concepts of DOS (Diversity Oriented Synthesis) to obtain varying molecular diversity and complexity from amino acid and carbohydrate derivatives.
