## Academic research in chemistry Grenoble



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#### A dynamic city in arts and sports amongst the best student cities in France!

Chemistry is not all there is: you will find many ways to spend your spare time in Grenoble. You will have the opportunity to discover the surrounding mountains, covered with snow all winter long (ski resorts are only thirty minutes away by bus!). Springtime and fall are perfect for long walks in the forests and mountain climbing. Summer is warm! Swimming pools and lakes are perfect for relaxing. Grenoble is a nice, human-sized town. You will

enjoy walks in the old city center. And don't forget our modern art museum.



#### Key figures

450 000 inhabitants 1 in 5 Grenoble residents works in research, technology, or higher education 60 000 students - 46 000 at UGA -9000 students from abroad

#### **Univ. Grenoble Alpes**

2nd university in France for Chemistry and Clinical medicine 7th place among French higher education institutions in the Shanghai global ranking 2018



Located on a self-contained, 175 hectare campus, the UGA offers a wide range of activities. Community members can volunteer, get involved in arts and culture, or participate in one of 35 different sports – there's something for everyone. International students can also join the university-sponsored, student-run international student association,IntEGre.

#### More information

About campus life: https://edu.univ-grenoble-alpes.fr/ campus-life/ https://international.univ-grenoblealpes.fr/en/

About Grenoble: https://www.grenoble-tourisme. com/en/



## Cermay Centre de Recherche sur les Macromolécules Végétales

Glycosciences - Glycopolymers - Glycobiology - Polysaccharides - Enzymes - Biotechnology

Synthesis, biosynthesis and mode of action of biologically active oligosaccharides. Biosynthesis, biodegradation, characterization and processing of plant biomass. Design of functional and smart glycan-based materials

**Chemistry and Biotechnology of Oligosaccharides - CBO -**Synthesis of oligo- and polysaccharides and glycoconjugates by chemical, enzymatic and microbial combined approaches

**Physico-chemistry and Auto-assembly of Glycopolymers** - **PAG** - Production of new functionalized glyco-nanoparticles and thin films or surfaces for a variety of applications

**Structural and Molecular Glycobiology** - **GMS** - Unraveling the structure/function relationships of enzyme and protein receptors with complex glycans

**Structure and Modification of Polysaccharides - SMP -** Characterisation and chemical modification of water-soluble polysaccharides for development of new materials

**Structure and Properties of Glycomaterials** - **SPG** - Analysis of polysaccharides in the solid state, their organization in natural structures and potential applications in new materials.







#### Key Figures

23 researchers 22 technical staff 80% CNRS, 20% UGA ~ 25 PhDs & post-docs

#### Contact

www.cermav.cnrs.fr

Domaine universitaire Saint Martin d'Hères







Health

## **The Pulp and Paper Research & Technical Centre**

Plant Chemistry - Lignocellulosic materials - Printing of the future - Packaging - Printed electronics

Sustainability of the paper industry production sites, development of new papers and boards, exploitation of new technological advances valuing lignocellulosic materials as raw materials

InTechFibres - Plant Chemistry - chemical and/or mechanical manufacturing of lignocellulosic fibres

entre technique: du **papier** 

**Recycling - Deinking -** eco-design approach, improve the quality of deinked pulps

Water - Energy - Environment - allow companies to ensure their sustainability

**Structuring of Materials** - fractionation, stratification, cellulose micro fibrils utilization...

**Functional Products & Surfaces** - functionalize the paper surfaces to develop their properties



Key Figures

More than 100 researchers and technical staff

Contact

http://www.webCTP.com/

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## Département de chimie moléculaire

Electrochemistry - Catalysis - Theoretical chemistry - Organic synthesis - Biomolecules - Photochemistry - Nanomaterials

# Research activities on Chemistry - Health - Physicochemistry interfaces, based on the design of molecules and molecular building blocks

**Biomolecular engineering and interactions - I2BM -** innovative developments of systems based on peptides, nucleic acids and oligosaccharides for diagnostic and therapeutic purposes

**Electrochemical and analytical biosystems - BEA -** conception of electrode materials for analytical chemistry (biological sensors & bioreactors) and energy conversion (bio & abiotic fuel cells)

**Spectrometry, interactions and theoretical chemistry - SITh** - improving theory and mass spectrometry for better understanding of chemistry: excited states, mechanisms, biochemistry and determination of thermodynamic quantities



**Enerav** 

#### **Key Figures**

Environment

58 researchers 27 technical staff 38% CNRS, 62% UGA ~ 40 PhDs & post-docs



#### Contact

dcm.univ-grenoble-alpes.fr

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**Redox Inorganic Chemistry** - **CIRe** - multidisciplinary approach to conceive metallo-organic compounds, reaching applications in bio-inspired catalysis & activation of small molecules, artificial photosynthesis, switchable devices, biomedical imaging and biomolecular interactions.



**Enerav** 

#### Key Figures

Environment

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**Synthesis and Reactivity in Organic Chemistry - SeRCO** - organic synthesis, ranging from the development of new synthesis methods, the understanding of mechanisms, to the multi-stage synthesis of complex bioactive molecules (anti-cancer, antibiotics, etc.).



#### Contact

dcm.univ-grenoble-alpes.fr

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moléculaire Département de Pharmacochimie Moléculaire

Aptamers - Biomolecules - Extraction - Drugs - Medicinal Plants - Oligonucleotides - Synthesis - Vectorization

Research activities at Chemistry - Health - Chemical Biology - Physico-Chemistry - Pharmaceutical Sciences

**Medecinal Chemistry - MedChem -** Synthesis and extraction of diverse and complex bioactive molecules for drug design and screening (chemical library). Main targets: membrane and nucleic acids. Tools for Chemical Biology: extraction of functional membrane proteins, membrane crossing agents, bio-conjugation

**New Tools for Vectorization and Analysis - NOVA -** Nucleic acids used as recognition elements for diagnosis, analysis, or vectorization of various molecules.

- Aptamers selection (SELEX)
- Biosensor design and nanoassembling of nucleic acids
- Nanovectorization of drugs
- Structural analysis, modelling and interaction studies



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#### Key Figures

21 researchers 10 technical staff 19% CNRS, 81% UGA ~ 11 PhDs & post-docs

#### Contact

http://dpm.ujf-grenoble.fr

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département

de pharmacochimie



**UGA**Grenoble

Environment

Health

Synthesis of materials - Sol gel chemistry - Functionalization - Crystallochemistry - Structure/properties relationship

Condensed matter physics: from fundamental issues to applications. Main topics: quantum electronics, magnetism, photonics, strongly correlated systems, materials, instrumentation

ntensity/arb. unit

**Materials Radiation Structure - MRS** - Elaboration of oxides and intermetallic compounds by solid state, sol-gel or high pressure reactions for magnetism, superconductivity, hydrogen storage, structure/ properties relationships

**Optics and Materials** - **OPTIMA** - Inorganic, organic and hybrid materials (crystals and nano-crystals, glassy powders, layers) synthesized from solutions, sol-gel, solvothermal and fluxes for the development of phosphors for lighting, tracers, sensors and photoconverters for bio and medical imaging

**Condensed Matter Theory** - **TMC** - *ab initio* calculations including wave function quantum chemical methods - effective model determination - electronic correlations (including strong correlation) - excited states - magnetism - multiferroics - photovoltaïcs - structure-properties relationships

**Bulk Crystals, X'Press, Epitaxy, TEMA -** Metallurgy chemistry, large crystal growth, High Pressure – High Temperature syntheses, syntheses of alloys in various shapes (bulk, powder or thin films), carbon–based thin films and 2D materials as well as microstructural characterizations



#### Key Figures

170 tenured scientists and faculty The 20 chemists are : 75% CNRS (sec 13,14,15,18), 25% UGA faculty (sec 32, 33) They supervise : ~ 10 PhDs & post-docs 127 technical staff (8 chemists)

#### Contact

http://neel.cnrs.fr/

Site de la Presqu'île



## Laboratoire de Chimie et Biologie des Métaux

Bio-Inspired Chemistry - Inorganic catalysis - Biocatalysis - Homéostasis - Biosynthesis - Spectroscopies

The LCBM project focuses on deciphering molecular mechanisms of biological processes in order to develop: 1) chemistry from life (Energy, Environment) and 2) chemistry for life (Health)

**BioCatalyse - BioCat -** Enzymology, structure, maturation of iron containing proteins

**Amyloidic Fibers: from foldopathy to Nanodesign - AFFOND** - Mechanisms of amyloidosis and design of amyloid fibers based nanomaterials

**Biology of Metals - BioMet - Metal homeostasis and toxicology of metal nanoparticles** 

**Physical chemistry of Metals in Biology - PMB** - Biophysics of metals, diagnostic and therapeutic innovations, bioinspired catalysis



**Enerav** 



#### Key Figures

Environment

41 researchers (2018)21 technical staff37% CEA, 43% CNRS, 20% UGA~ 20 PhDs & post-docs

Contact

http://www.cbm-lab.fr

Site de la Presqu'île









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**Proteins, Metal and Differentiation - ProMD** - Cellular responses to metallic ions and nanoparticles; radiation induced inflammation

**Solar Fuels, Hydrogen and Catalysis - SolHyCat -** Bioinspired catalysis for artificial photosynthesis, multi electronic catalysis ( $H_2$  production and  $CO_2$  reduction) on nanohybrids

**Modelling and Theoretical Chemistry - MCT -** Modelisation and simulation methods for redox enzymatic processes

**Bioinorganic Catalysis and Environment - BioCE -** New bioinspired strategies for redox (photo)catalysis



**Enerav** 

#### Key Figures

Environment

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#### Meo Ton 28 000 O<sub>2</sub> / DTT Meo KHSO<sub>5</sub> / NaCl OH Cl OH Cl Ton 5 900

#### Contact

http://www.cbm-lab.fr

Site de la Presqu'île







#### PMI Laboratoire d'Electrochimie et de Physico-chimie des matériaux et des interfaces

Electrochemistry - Polymer - Electrocatalyst - Redox molecule - Ceramic - Multifunctional material - Spectrometry

Structure - activity - stability relationships for the design and synthesis of sustainable innovative functional and architectured material for energy conversion and storage devices

**Materials Interfaces Electrochemistry** - **MIEL** - multi-disciplinary approaches to conceive architectured electrolytes and electrodes for energy conversion and storage; determination of structure - electrochemical properties relationships by means of in situ and operando measurements

**Interfacial Electrochemistry and Processes - EIP -** conception and optimization of electrocatalysts materials and electrodes for electrochemical energy conversion and storage devices; determination of reaction mechanisms of activity and degradation; recycling/recovery of strategic materials (metals, rare earths)

Organic Materials with Specific Properties - LMOPS - architecturated materials and new molecular architectures for pho-

SAVOIE

ONT BLANC

tovoltaic application: Genesis and durability



Enerav



#### Key Figures

Environment

46 researchers 10 technical staff 30% USMB, 26% CNRS, 24% INPG, 19% UGA ~ 59 PhDs & post-docs

Contact

http://lepmi.grenoble-inp.fr/

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## Laboratoire de chimie, capteurs et biomatériaux

Surface chemistry - Electrochemistry - Biosensors - Silicon Technology - Biomaterials - Nanoparticules

Physico-Chemistry of Interfaces for Health: From surface chemistry to body monitoring and actuation

#### **Surface Chemistry**

leti

Ceatech

To integrate chemical processes in micro and nanosystems taking into account: fabrication constraints and applications requirements

#### (Bio)sensors and actuators

Innovative development of sensors : electrochemical sensors, micromechanical sensors (Suspended Nanochannel Resonator) and gaz sensors for monitoring (patient's physiological parameters, environmental and food) and diagnostic

#### **Delivery systems**

Deliver active ingredients in a controlled and customised way. Degradable biomaterials now occupy an important place in the medical field, in particular for the development of resorbable implants, soluble delivery devices (micro-needles) and nanoparticles for the delivery of active ingredients (Lipidots®)



#### Key Figures

13 researchers8 technical staff100 % CEA,~ 15 PhDs & post-docs

Contact www.leti-cea.fr

Site de la Presqu'île





## Service des Technologies Batteries

Batteries - Lithium - Electrochemistry - Synthesis - Process - Modeling - Characterization - Recycling

200 people involved at LITEN on the battery platform, covering all the value-chain, from materials to system integration and evaluation. Half the people are strongly involved on chemical activities.

#### **Battery material synthesis**

- Organic and inorganic synthesis of new materials for anode, cathode and electrolyte for Li-ion and post Li-ion batteries (Li-metal, Na-ion, Mg-ion,...)
- Development of new synthesis methods, from grams to kilograms

#### Electrode formulation and processing

- Ink formulation & slurry preparation
- Wet and dry coating (slot-die, comma-bar, extrusion,...)

#### Characterization

- *In situ* and *in operando* methods (bulk and surface)
- Electrochemical characterization, instrumented cells (P, T, constraints...)
- Abuse testing with chemical analyses

#### Multiscale modeling

- Local scale to better understand elementary mechanisms
- Micro scale to simulate local conditions and performances
- Coupling with upper scales to simulate global behaviour

#### **Battery Recycling & Life Cycle Analysis**

- Analytical & separation chemistry (selective dissolution, separation by selective precipitation, ionic liquid media)
- High knowledge in materials science for the valorization of recovered materials (metallurgy, polymers, ceramics)



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#### Key Figures

Environment

CEA permanent staff on chemical activities: 60 researchers 20 technical staff 20 PhDs & post-docs

Contact

www-liten.cea.fr

Site de la Presqu'île



### liten Ceatech

## Service Chimie, Caractérisation et Environnement

Nanomaterials - Smart polymers - H<sub>2</sub> Storage Materials - Nanosafety - NanoCharacterization - Recycling

3 labs dedicated to the synthesis of (nano)materials, recycling of critical materials, green processes, nanosafety and nanocharacterization

Synthesis and integration of various nanoparticles (metallic nanowires, core-shell nanostructures, complex luminophores, etc) Critical metals recycling from end-of-life products **Key Figures** CVD processes for 3D catalyst impregnation 50 researchers Supercritical CO, technology 30 technical staff Metal and complex hydride synthesis for H2 storage ~ 10 PhDs & ~ 5 post-docs Catalysis and process for reversible H2 storage colating cluste Silver  $n = n_{c}$ Technologies for H2 generation on demand nanowires Synthesis of smart polymers Particle design Integration processes Characterization, **3 Platforms:** Safer-By-Design Detection, Methods Contact www-liten.cea.fr Nanowet: synthesis of nanomaterials LIFE CYCLE MANAGEMENT Lifecycle management Site de la Presqu'île Dissemination in the environment (Eco) Toxicology ndustrial Health or nano 4 risk prevention Nanosafetv Nanosafety platform Nano characterization platform



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Pôle CBS

Environment

Health

## Laboratoire de Génie des Procédés Papetiers

(Hémi)cellulose - Lignin - Biorefinery - Eco-processes - Nanocellulose - Biomaterial - Polymer Chemistry -Additive Technology

Processes for the conversion and valorization of plant biomass (biorefinery and manufacture of biobased materials), printing processes for surface functionalization (printed electronics and additive technology)

Biorefinery, Chemistry and Eco-processes - BioChip -

- Fractionation, characterization and valorization of lignocellulosic biomass to produce bioproducts, materials and biofuels, in line with societal and industrial expectations.
- Biorefiney: oxidation processes: delignification and bleaching of lignocellulosic biomass, using green bleaching agents / Chemical and enzymatic hydrolysis processes of lignocellulosic biomass / Purification processes and energy efficiency.
- Bioproducts: Cellulose for chemical and textile uses / Hemicelluloses: sugar platform, surfactants, medical application / Lignin: synthons for chemistry; biofuels; material.

#### Multi-Scale Bio-based Materials - MatBio -

- Elementary building blocks made from plant biomass: Chemical modification of nanopolysaccharides and nanocellulose / Valorisation of annual plants and agro-waste.
- Surface functionalization of cellulosic materials: mainly via green chemistry on nanocellulose for new functional properties (resistance to wet state, hydrophobicity, antimicrobial, drugs release ...)



#### Key Figures

21 researchers 8 technical staff (FTE) 57% G INP, 12% CNRS, 31% Agefpi ~ 36 PhDs & post-docs

#### Contact

http://pagora.grenoble-inp.fr/recherche/

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## Laboratoire Interdisciplinaire de PHYsique

**Biomolecules reactivity – Polymer brushes – 3D microfabrication** 

(1)

Grafted-from PNIPAM

brush

Soft matter studied at the crossroad of physics, biology, mechanics and chemistry

**Microbiology and Molecular biology Platform - M2BIO** phage display technology to select «nano-fragments» of antibodies or peptides as biological sensors or molecular tools for use in the environment or in vivo in cells for diagnostic and therapeutic purposes

**Smart polymer brushes -** functionalization by surface-initiated polymerization of stimuli-responsive macromolecules (for actuation & control/patterning of cell adhesion)

**2-photon microfabrication -** 3D fabrication of polymeric micro-objects by 2-photon initiated polymerization/crosslinking



PNIPAM

Patterned brus

#### sélection amplification Key Figures 75 researchers 40 technical staff 57% CNRS, 43% UGA ~ 60 PhDs & post-docs

**Enerav** 

#### Contact

Environment

https://www-liphy.ujf-grenoble.fr/

liphy-contact@univ-grenoblealpes.fr

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Chemical synthesis and deposition methods - Inorganic Chemistry - Surface reactivity - Bioactivity

LMGP research field is materials science and materials for biomedical engineering developed by chemical methods

**Nanomat** - Chemical synthesis and crystal growth of low-dimensional materials. Growth mechanisms and relationship with properties on the nanometric and macroscopic scales. In situ growth studies. Thermodynamic approaches and modeling. Advanced structural, chemical, electrical characterizations

**FunSurf** - Chemical synthesis of functional materials engineered at different dimensions (i.e. thin films, nanostructures, nanowire networks) to realize innovative devices or to develop advanced surface functionalities

**IMBM** - Control of Interfaces between materials/biomolecules and cells, to optimize drug stability and human tissue formation. Research applications range from drug formulation and delivery, to biomaterials and tissue engineering



SEMAN



#### Growth axis atic or pH=8.5 Growth axis atic ati

**Enerav** 

#### **Key Figures**

Environment

Health

24 researchers13 technical staff46% CNRS, 54% Grenoble INP40 PhDs & post-docs

#### Contact

http://www.lmgp.grenoble-inp.fr/

Lmgp.direction@grenoble-inp.fr

Site de la Presqu'île







## Laboratoire National des Champs Magnétiques Intenses

High magnetic field - Coordination chemistry - Supramolecular chemistry - EPR - Magnetoscience

High continuous (Grenoble – 37T) and pulsed (Toulouse – 99T) magnetic field facilities for elaboration and study of matter

#### Molecular Magnetism – MolMag

- Synthesis and studies of molecular magnetic systems for ultimate data storage and (quantum) computing
- Experimental determination of the magnetic anisotropy by HF-EPR and infra-red magnetospectroscopy



#### Key Figures

39 researchers
57 technical staff
82% CNRS,
6% UGA, 6% UPS, 6% INSA
~ 40 PhDs & post-docs

#### MagnetoSciences

- Elaboration of molecular and metallic compounds under high magnetic fields
- Chemical and photochemical reactions under high magnetic fields
- Change of water properties after magnetic treatment
- Influence of magnetic field on chiral systems



#### Contact

http://lncmi.cnrs.fr/

#### Site de la Presqu'île





Energy	Environment	Health
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**Rheology - Fluid Mechanics - Chemical and Process Engineering - Soft Condensed Matter** 

Rheology, Process Engineering and Intensification in Complex Fluids. Control of the bulk and interfacial properties by multi-scales and multi-physics approaches in the areas of nano-composites, food, environment or health.

Production, structuration and development of biobased cellulosic materials by extrusion, electrospinning or 3D - printing processes for fuel cells, packaging or medical applications

Intensification of processes by ultrasound (heat and mass transfer, ultrafiltration). Control of structural organization by in-situ characterization from nano-scale to microscale

Structure / flow properties relationships of complex fluids. Control of the bulk and interfacial properties of heterogeneous fluid or pasty media subjected to external conditions



#### Key Figures

20 researchers 8 technical staff 30 % CNRS, 70 % UGA ~ 28 PhDs & post-docs

#### Contact

http://www.laboratoire-rheologie-et- procedes.fr/

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**Modélisation et Exploration des Matériaux** 

X-ray - Neutron - Synchrotron - Electron microscopy - Nuclear Magnetic Resonance - Ab-initio modelling - DFT - DNP

Development of advanced techniques for material characterisation and simulation

**Laboratory for advanced microscopies - LEMMA -** Operating of state of art electron microscopies (TEM, STEM, SEM, EDX, ...) at the nanocharacterization platform

**Nanostructure and synchrotron radiation - NRS** - Development of advanced techniques for nanostructure determination using synchrotron radiation. Operation of French CRG beamlines at ESRF (Surface scattering, Laue microdiffraction)

**Magnetism and Neutron scattering - MDN -** Study of magnetic structure and excitations using neutron scattering (elastic and inelastic) Operation of French CRG instruments @ ILL

**NMR laboratory - RM -** NMR spectroscopy study – Development of low temperature DNP MAS-NMR

**Simulation lab** - LSim - Development of ab-initio codes 'DFT, Tight Binding') for HPC computing

**X-ray laboratory** - **SGX** - General purpose X-ray scattering: Small angle scattering, High resolution, powder diffraction...



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#### Key Figures

Environment

Health

36 researchers
7 technical staff
93 % CEA, 2% CNRS, 5% UGA
~ 19 PhDs & post-docs



#### Contact

www.mem-lab.fr

Site de la Presqu'île





## Science et Ingénierie des Matériaux et Procédés

Thermodynamics - CVD-ALD - High temperature oxidation – Purification - Metallic alloys - Ceramics

Materials chemistry for the design of metallic alloys and ceramics, sustainability through experimental and simulation / modelling approaches. Physical metallurgy, mechanical properties, processing, fabrication of architectured materials.

**Thermodynamics, Modelling, Process Optimisation - TOP -**Thermodynamics of precursors for Chemical Vapor and Atomic Layer Deposition. Properties of thin films. Modelling of liquid structuration in supercooled domain. Modelling of electrocatalysis

**Surface, Interface, Reactivity - SIR -** High temperature oxidation of metals and alloys. Mechanism analyses using photo-electro-chemistry. Surface functionalization and analysis

**Electromagnetic Processing of Materials - EPM -** Reactive purification and recycling of photovoltaic Si

**Physics of Metals - PM -** Microstructure, precipitation in metallic alloys. Complex materials, nanostructures and nano-objects. MOF structure, properties and gas  $(CO_2)$  interactions

**Materials and Mechanical Engineering - GPM2 -** Metallic glasses forming. Powders sintering. Surface treatment and etching



#### **Key Figures**

62 researchers - 48% section 33 / 15 36 technical staff 48% CNRS, 42% G-INP, 10% UGA ~ 70 PhDs & post-docs





#### Contact

http://simap.grenoble-inp.fr

secr.dir@simap.grenoble-inp.fr

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Molecular architectures - Biomolecules reactivity - Photochemistry - Bioinspired nanosystems - Electrochemistry -Spectroscopy

Design, synthesis, study of innovative and original architectures and functional materials. Interests in reactivity and properties of biomolecules, bringing an original approach to biological questions.

**Chemistry at the interface of biology for environment, health and toxicology - CIBEST -** multidisciplinary approaches to evaluate the deleterious effects of ionizing or UV radiation, environmental pollutants, metals and nanoparticles

**Design of molecular architectures and electronic processes** - **CAMPE** - complementary methodologies for applications in photochemistry, catalysis and carbon materials for electrodes

**Recognition and study of biological assemblies - CREAB** biosensors & biochips, biopolymers for analysis of interactions in health technology, self-assembled (bio)architectures

Synthesis, structure and properties of functional materials - STEP - materials as active layers, electrodes or electrolytes in electronic devices for energy conversion and storage



#### Key Figures

47 researchers17 technical staff64% CEA, 21% CNRS, 15% UGA~ 60 PhDs & post-docs







# Master's degrees and doctoral school

UFR de Chimie et de Biologie

UNIVERSITÉ Grenoble Alpes

## **Master Chimie**

#### **Chemistry - Biology Interface - Polymers - Organic Synthesis - Commercial**

A multidisciplinary master's degree in Chemistry, 4 courses with professionalization or research options, a progressive specialization over 3 semesters, two internships of 2 and 6 months









Chimie et Techniques de Commercialisation (ChemTechCo)

M2 in alternance



Key Figures

100 students + than 60 interveners Taught in english + than 1500 teaching hours

Organic Synthesis (SOIPA) **≋** 



#### Contact

https://master-chimie.univ-grenoble-alpes.fr/en/





## Master Génie des Procédés et des Bio-procédés

#### **Processes - Energy - Environment - Formulation - Flows**

Professional training in Process Engineering offering 4 specialty areas: Energy, Environment, Formulation or Flow

The Master's degree in Process and Bio-process Engineering trains managers and multi-tasked company executives capable of leading projects and taking on responsibilities in four specialty fields corresponding to the 4 courses offered to students.



The training provides:

general scientific skills in process engineering

■ technical, technological and scientific skills specific to each course.

The targeted professions are those of design engineer, production engineer, quality engineer, HQSE manager, business engineer, technical manager, R&D engineer, project engineer, whether within a large company or SMI/SME.



#### **Key Figures**

148 Master students32 weeks of internship25% teaching by industrialists





#### Contact

https://gdp.univ-grenoble-alpes.fr/

nicolas.gondrexon@univ-grenoble-alpes.fr



#### MASTER N<sup>2</sup> Nanosciences Nanotechnologies Master Nanosciences Nanotechnologies (N2)

#### Molecular Materials - Nanoparticles - Local probes - Optics, Electronics - Photovoltaics - Drug delivery

This taught-in-english master program proposes an interdisciplinary approach of nanosciences and nanotechnologies **₩** 

**O** *nano* SCIENCES

#### International

Part of the Erasmus Mundus Master in Nanosciences Double Diploma with Tomsk Polytechnic Institute and Tsukuba University

50% of foreign students in the program

#### **Nanochemistry and Nanoobjects**

Dedicated to physico-chemists, chemists and biochemists willing to explore the chemical side of nanosciences.

The two-year program provides a complete overview from the elaboration to the applications of a large variety of nanoobjects (molecular, polymeric, biomaterials, semi-conducting...)

#### **Perspectives**

33 laboratories with the Nanosciences fondation PhD in chemistry, biochemistry, materials in Grenoble, France and Worldwide

Grenoble

Integration in academic and industrial worlds



#### **Key Figures**

~97 (25) students (nanochemistry) in 2018-2019 ~90 (28) Teachers (nanochemistry) 45% UGA, 30% CEA, 10% CNRS, 15% G-INP



#### Contact

https://master-nanosciences.univgrenoble-alpes.fr/

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**Pôles CBS & PEM** 



#### POLYTECH Polytech Grenoble Matériaux(grade Master2)

#### Engineering degree - physico-chemistry of materials - from elaboration to devices

Polytech Grenoble delivers a master's degree in Materials Engineering. The courses are organized around 3 pillars : physico-chemistry, physics and mechanical behavior, all 3 applied to materials

#### Chemistry of materials at Polytech Grenoble:

BRENOBLE

- Physico-chemistry and multi-scale cha-• racterizations : to explore matter at different scales, to understand structure - microstructure - properties interplay and to optimize devices
- The skills developed cover the following fields: electrochemistry, polymer chemistry, metallurgy, inorganic chemistry, powder and sintered (ceramic) materials' processing, semiconductor manufacturing process (plasma).

Muti-scale characterizations







**Key Figures** 

2018-2019 : 54 students in MAT5 (M2) 80 Lecturers (20 related to Chemistry) 45% UGA. 10% G-INP. 5% CNRS 40 % Industries

#### Internship / International:

12 weeks of internship in M1 22 weeks of internship in M2 Double degree with Brazil, Japan, Canada

#### **Perspectives:**

most students join a career in the industrial sector, some continue with a PhD in laboratories in Grenoble or abroad

#### Contact

https://www.polytech-grenoble.fr/





## Master Science & Génie des Matériaux Parcours Electrochimie & Procédés

#### Electrochemistry - Process engineering - Physical-chemistry of materials - Alternative energies - Environment

This master is the only one in Europe that focuses entirely on Electrochemistry and processes, with special emphasis on alternative energies and green process engineding

Organization of the Master

#### M1:

- · basic engineering and numerical tools
- materials sciences
- physical chemistry
- chemical engineering
- electrochemistry

20% practical work 3-4-month internship

#### M2:

- advanced classes in electrochemical engineering
- advanced classes in electrochemistry
- process modelling
- industrial safety

20% practical work 5-6-month internship

- electrocatalysis
- green process engineering
- recycling and valorization of wastes
- batteries and supercapacitors
- hydrogen vector: fuel cells and electrolyzers



#### Key Figures

- Master program based on the courses of Phelma – EPEE engineer school
- A unique formation in Electrochemistry and processes in Europe
- Strong industrial recognition

#### Contact

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http://phelma.grenoble-inp.fr/fr/formation/master-sgm-parcours-electrochimie-et-procedes#page-presentation









## **Ecole Doctorale Chimie et Sciences du vivant**

#### Cell and molecular biology - Structural biology - Molecular chemistry - Physical chemistry

Strong emphasis on interdisciplinary research. Several research topics being situated at the interface between biology, chemistry, physics, medical, pharmaceutical and environmental sciences

- One of the thirteen Doctoral Schools of the Grenoble site Students presently registered with the school receive financial supports from various sources : French ministry of research, Region Rhône-Alpes, French public research organizations, European community, charity foundations, industries and Université Grenoble Alpes
- Training of doctoral students (mandatory)

A doctoral student defines his/her professional project while preparing the doctoral dissertation. Numerous training courses are available to help doctoral students enrich, develop and valorize their skills. At least 120 hours of training during the dissertation preparation period should be followed.

• Doctoral training labels (optional)

Four training programs are proposed targeting clearly identified employment sectors:

- Public institutions and international organizations
- Starting a business
- Research, Business and Innovation
- Research, and higher education



#### Key Figures

340 PhD students 130 research teams hosted by 25 research institutes

#### **Specialities**

Organic and inorganic chemistry | Chemical biology | Physical chemistry | Structural biology | Cell biology | Ontogenesis and oncogenesis | Neurosciences | Physiology | Virology | Microbiology | Immunology | Ecology | Plant biology

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