

XL-CHEM

GRADUATE SCHOOL OF RESEARCH



The “Ecoles Universitaires de Recherches” (University Graduate Schools of Research), funded within the framework of the third “Investing for the Future” Program (PIA 3 – French national program to promote excellency in French Universities), aim to structure and strengthen the impact and international attractiveness of training and research within French universities in one or more scientific fields, through a reinforced link between research and training.

XL-CHEM “synthesizing our future” graduate school of research aims at becoming a European-wide recognized training and research centre for molecular chemistry.

The ambition of XL-Chem Graduate School of Research (GS) is to become one of the leading European training and research centres in Organic synthesis, Polymer sciences, Spectroscopy and Cosmetics. The core driving force in research for this GS is the Norman research component of the Laboratory of Excellence LabEx SynOrg (COBRA and LCMT laboratories) and the I2C Carnot Institute, which is committed to develop research for companies' innovation. **The goal of XL-Chem GS is to train chemists who will be able to detect opportunities, dare, undertake, learn the concepts and tools of modern management: Agility, Disruption, Innovation, Change Management.** On graduation, the XL-Chem students will be well suited to integrate scientific industries, including research, as well as areas such as marketing, and project administration. Students will draw upon the expertise of academics in both the Department of Chemistry and the management formation, and could contribute to the world-leading research being carried out.

This programme is part of Normandy University “Chemistry, Biology, Health and Well-being” research and training centre, one of the distinctive areas of training and research in the Normandy region. It is granted a 4.1 M€ financing to achieve that goal in a 10 years' time frame (2019-2028). XL-Chem will benefit from:

- for its fundamental research, a strong support from **2 Internationally recognized research laboratories** involved in Labex SynOrg (renewed in 2019);
- for technology transfer to industry, the Carnot I2C institute (renewed in 2020), bringing together **8 research laboratories** in Normandy.

Aiming at the training of tomorrow's researchers and executive-researchers required in the health, cosmetics, specialty chemicals and sustainable development industrial sectors, the objectives of XL-Chem GS are to propose innovative, research-oriented master and doctorate degrees in chemistry, with a strong international dimension, with a specific formation in management and entrepreneurship.

The Graduate School of Research (XL-Chem) – Laboratory of excellence (LabEx SynOrg) – Technology Transfer (Carnot I2C Institute) triptych is part of a unique continuum Training - Research – Technology Transfer/Valorisation in the Normandy region and at the national level in the field of chemistry, and will strengthen links between Universities and companies.

TOPICS

- Organic Chemistry and synthetic methodology
- Pharmaceutical chemistry
- Chemical biology
- Cosmetics
- Analytical Chemistry
- Polymer chemistry

KEY NUMBERS

- 200 Researchers and lecturers
- 160 PhD students
- 8 Research laboratories
- 1 Laboratory of Excellence LabEx SynOrg (10.5 M €, PIA1)
- 1 Carnot Institute I2C (2.1 M€ turnover each year from technology transfer)
- 3 Interreg programmes (12 M €)
- 1 Research federation in chemistry
- 1 ERC STARTING GRANT
- 5 French Chemical Society awards
- 3 CNRS bronze medals
- 1 Erasmus programme
- 6 IUF (Institute Universitaire de France) excellence grants since 2010

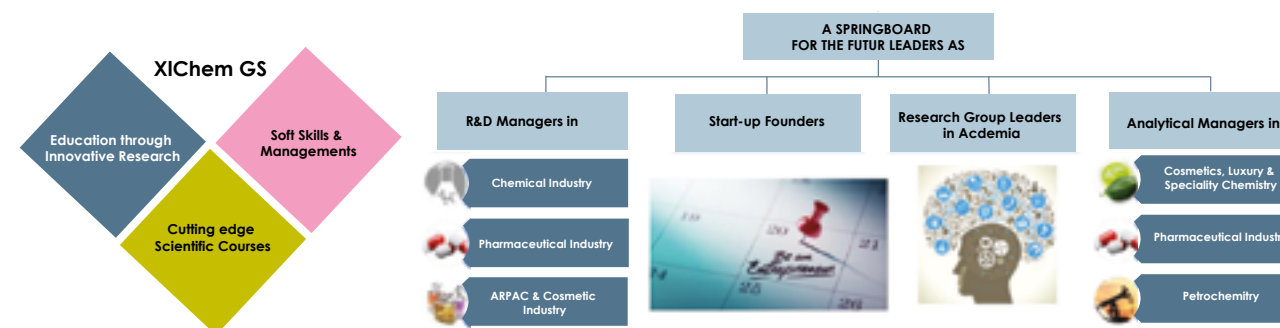
TRAINING

The objectives of XL-Chem, which embraces the perimeter of the Normand doctoral school of Chemistry (EDNC 508), are:

- To enhance the attractiveness of Normandy University;
- To make the Normandy Region a major European research and training centre for molecular chemistry.

To reach its objectives, XL-Chem will associate “à la carte” high level courses and lectures in chemistry and chemical biology given by high level French and international academics and industrials, to a reinforced training through research in international laboratories and industries, and a dedicated innovative set of soft skills and management courses leading to an additional certification fitting with Candidate career project.

The purpose of XL-Chem is to prepare a new generation of researchers in molecular that will transform traditional chemical and pharmaceutical industries by adding considerable value to products and helping these industries to adapt to new environmental standards. XL-Chem training offer and the opportunities in term of employability are presented in the scheme below.



The key points of XL-Chem:

- **A dedicated mentor** for each master student. He will guide the student in the choice of “à la carte” scientific courses and lecture of excellence and provide an in-depth training through research in I2C Carnot Institute and SynOrg laboratories. This training will include a three-month research internship in Master 1 and a six-month research internship in Master 2, at least one of these research internships will be done in **an internationally recognized partner laboratory**;
- **An “À la carte” choice within** courses and conferences in chemistry provided in English by nationally (CNRS, etc.) and internationally renowned researchers, according to Candidate's Career project.,
- **Double degrees with renowned universities**;
- Master students will be trained to write research proposals. **Best projects will be granted with PhD funding opportunity**;
- **Training to soft skills** (management, entrepreneurship, IP, project management, EU funding etc....) leading to a **certification by a Business School**. The program has been built in order to address the needs expressed by professional branches (France Chimie Normandie, Cosmetic Valley, Polepharma, etc.) and companies (over twenty manufacturers of the chemistry sector support XL-Chem graduate school of research: Oril, Sanofi, Janssen, SGS, Total, Solvay, L'Oréal, Hermès etc.);
- In order to better address Industrial sector expectations in this domain, and to take advantage of the **up-to-date analytical platforms present in I2C laboratories**, opening the Analytical chemistry and Spectrochemistry curriculum to **apprenticeship program**;
- At the PhD level, XL-Chem will offer a differentiating “European label” PhD associating the traditional training through research in nationally and internationally recognized laboratories, with top level lectures made by academics and industrial partners of the sector, **with a 18-months experience in an international partner's university, and an “à la carte” soft skills formation.**

RESEARCH



2 of the 4 SynOrg laboratories (Cobra and Lcmt)



XL-Chem brings together all the Norman molecular, medicinal and macromolecular chemistry University research laboratories in the 2nd largest production area in Europe for medicines. It is backed by regional clusters (Polepharma, Cosmetic Valley...). It is based on the excellence of the research carried out within the Laboratory of Excellence LabEx SynOrg "Organic synthesis for the living", obtained within the framework of PIA 1, which is the **largest Network of French organic synthesis laboratories**. Its research is geared towards organic synthesis for applications in life sciences. It opens the door to the discovery and synthesis of new pharmacologically active compounds and to a better understanding of biological processes through innovative synthetic technologies for bioconjugate chemistry and molecular imaging.

LabEx Academic Excellence Chairs

- André CHARETTE (Montréal, Canada)
- Marc LAUTENS (Toronto, Canada)
- Yoschinori KONDO (Sendai, Japon)
- Paul WILLIARD (Brown University, Providence, USA)

PARTNERSHIPS



8 laboratories of I2C Carnot Institute



The XL-Chem actors work in close collaboration with the competitiveness clusters and are involved in the transfer of knowledge to the socio-economic environment, as part of the I2C Carnot Institute renewed in 2020 for partnership research. I2C Carnot Institute is positioned as a privileged partner to support innovation in the pharmaceutical, cosmetic, sustainable development, specialty chemicals and polymer materials sectors. XL-Chem can also rely on Normandie Valorisation for technology transfer. The laboratories involved in XL-Chem have lasting links with the industry through both joint laboratories (Total, Janssen, Servier), and start-ups, some of them being spin-offs of the research laboratories.

Partner organisations

- Cosmetic Valley
- Polepharma
- France Chimie Normandie...

Joint laboratories

- Janssen/COBRA
- Oril/COBRA
- Servier/CERMN
- Total/COBRA
- Hermès/PBS-COBRA

Start-ups: 10 Spin-offs over the past 10 years

- TFChem
- Aquistain
- VFP Therapies
- Kalain
- Polyintel
- Borochem
- Holodiag
- Holochem
- ChemForAse
- Holopharm

Industrial partnerships (2,1 M€ contracts/year)

- Servier
- Janssen
- Oril
- Total
- Arkéma
- Adisseo
- L'Oréal
- Hermès
- BioMérieux
- Sanofi

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