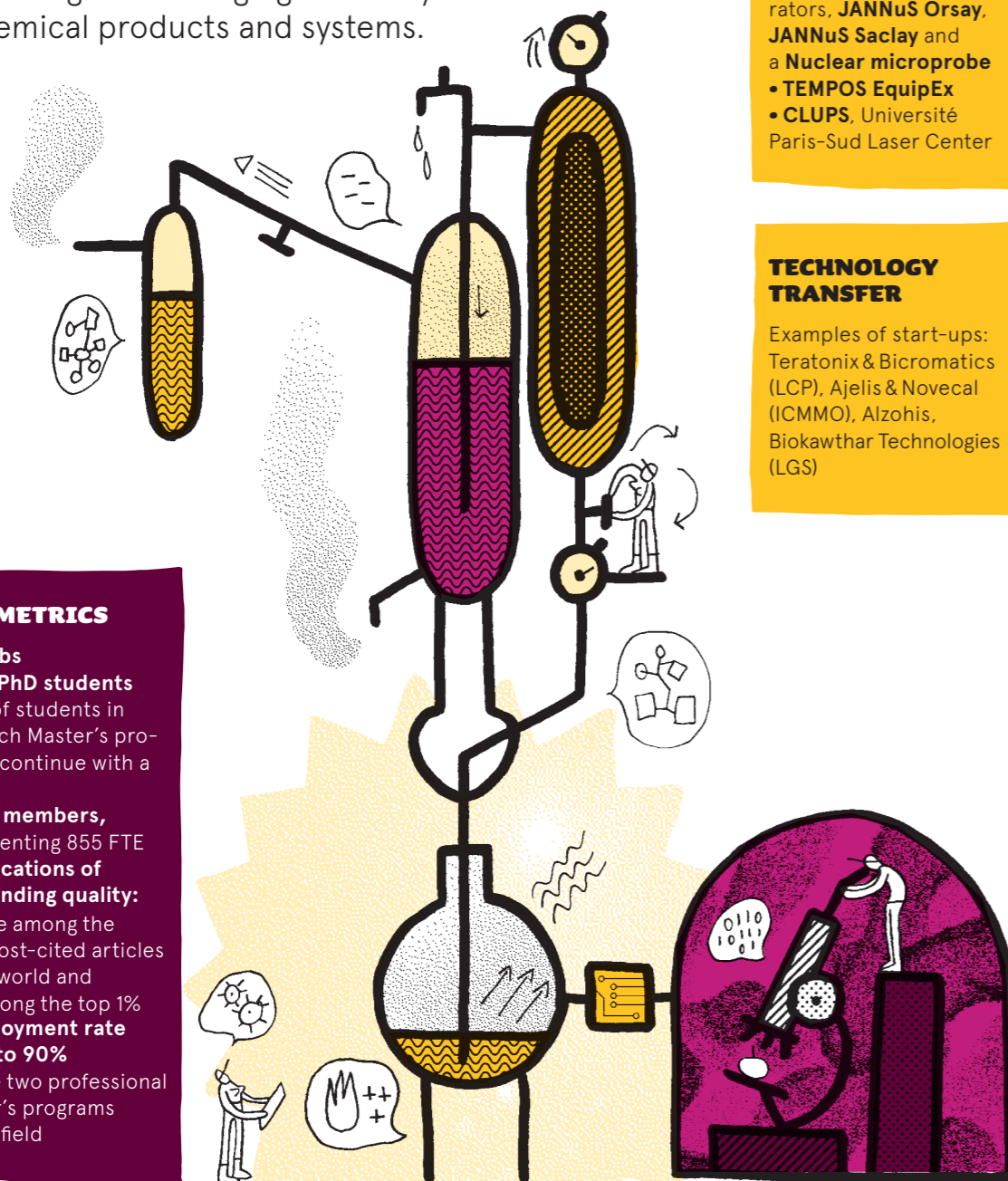


# CHEMISTRY

The Université Paris-Saclay Chemistry Department is fully equipped to meet all the challenges that chemistry will need to face in the future: making it sustainable and contributing to environmental protection. Key issues include:

- Achieving decreases in solvent and energy use and reducing atoms, by designing new concepts and systems to improve recycling, yield and selectivity.
- Predicting and managing the lifecycle of chemical products and systems.



## KEY METRICS

- 28 labs
- 400 PhD students (50% of students in research Master's programs continue with a PhD)
- 1150 members, representing 855 FTE
- Publications of outstanding quality: 17% are among the 10% most-cited articles in the world and 2% among the top 1%
- Employment rate close to 90% for the two professional Master's programs in this field

## PLATFORMS

- Decentralized Very Large Instrument: very high frequency NMR
- Research grouping in high-resolution mass spectrometry
- SOLEIL synchrotron facility
- Léon Brillouin laboratory
- Seven irradiation platforms (two pulsed electron accelerators, ELYSE and ALIENOR; two continuous beam accelerators, SIRIUS and HVTEM KRATOS; and three ion accelerators, JANNuS Orsay, JANNuS Saclay and a Nuclear microprobe)
- TEMPOS EquipEx
- CLUPS, Université Paris-Sud Laser Center

## TECHNOLOGY TRANSFER

Examples of start-ups: Teratonix & Bicromatics (LCP), Ajelis & Novocal (ICMMO), Alzohis, Biokawthar Technologies (LGS)

# KEY FOCUS

## Physical chemistry, covering the study of elementary acts and analytical methods

- Elementary physical-chemical processes
- Radiation chemistry and biochemistry
- Analytical chemistry, including methods, instruments and applications

## Chemistry for materials, interfaces and nano-objects

- Materials chemistry, chemistry of solids, hybrid systems
- Nanochemistry and its development, properties and functionalities
- Interface reactivity, including chemisorption, heterogenous catalysis, electrochemistry

## Shared platforms and large instruments

## Molecular structure

- Synthesis methodology and concepts
- Reactivity and mechanisms
- Organometallic chemistry and catalysis
- Structural analysis and identification

## Chemistry and physical chemistry of and for living organisms

- Design, synthesis and properties of biologically interesting molecules
- Isolating natural substances, biomimetic synthesis, hemisynthesis, biological screening
- Reactivity and dynamics of biologically and/or therapeutically interesting molecules
- Innovative instruments and methods adapted to biomolecules and biological environments

## Multi-scale theory and simulations, development and applications

# INTER-DEPARTMENTAL PROJECTS

## Creation of a virtual "Paris-Saclay Institute for Healthcare and Therapeutic Innovation", a joint initiative from the Chemistry and Life Sciences departments.

126 teams in 62 different labs, totaling more than 2500 people, of whom 1500 are permanent members.

Strong emphasis on interdisciplinarity makes it possible to cover all the stages of therapeutic product development, from basic research to clinical practice, including understanding molecular processes, rational design, implementation, evaluation and technological or clinical application.

## Creation of the Natural Substances and Interfaces network at Paris-Saclay

Implementation of an inter-departmental project on materials, with the Physics of Light and Matter Department.

## ORGANIZATIONS

• 4 Laboratories for Excellence (LERMIT LabEx, NanoSaclay, PALM and CHARM3AT)

## • 8 Strategic Research Initiatives BIOPROBE:

Innovative reporters in cellular chemistry and signaling, ranging from new probes to clinics.

**BME:** Biomedical engineering.

**ISC2D:** Paris-Saclay Catalysis Science Institute for Sustainable Chemistry.

**MOMENTOM:** Molecules and materials for the energy of the future.

**Nan'eau:** Studying the dynamic behavior of nano-objects in situ and in operando in their liquid state, in both electrochemistry and correlative imaging.

**NanoTheRad:** Innovative therapeutic strategies using new radiation sources, nano-objects and radio-sensitizing agents.

**PhyChiM3:** Multi-scale, temporal, spectral and spatial physical chemistry.

**SysABCD:** Analytical systems for biomarkers and sustainable chemistry.

# MAJOR THEMES

## From basic chemistry to green chemistry

- Reduced wastage (energy, solvents) and atom economy
- Lifecycle (degradation, design, development, recycling, usage)

## Chemistry interfaces

- Interfaces with life sciences and physics

## Chemistry in society

- Energy (new conversion and storage methods)
- Environment
- Information
- Innovation
- Scientific mediation
- Healthcare (diagnostics and therapy)

