

# lumomat

molecular materials for electronics & photonics

ANGERS - NANTES - RENNES

## MASTER Chemistry LUMOMAT

Graduate School in molecular chemistry for electronics and photonics

Training the chemists of tomorrow

Master 1st year: University of Rennes or Nantes University

Master 2nd year: University of Angers

Master certified Graduate School of Research (EUR)

Areas of application and research in materials for:



Energy

Organic solar cells, artificial photosynthesis, Organic Light-Emitting Diodes - OLEDs



Environment and Health

Probes and sensors, imaging, phototherapy



Information Storage

Nanostructured systems for electronics and photonics

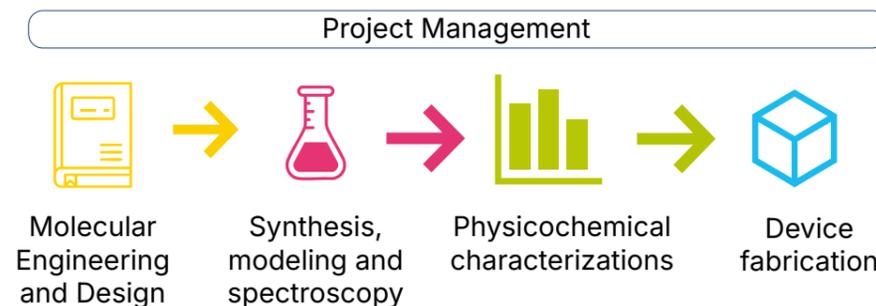
A project supported by



### A program of excellence in organic chemistry for over 10 years

A Master's degree taught in English, open to work-study opportunities and encouraging international experiences to train chemists in the field of functional molecular materials for electronics and photonics.

At the end of the program, you will possess the skills in:



### A program built on research, through research and open to industry



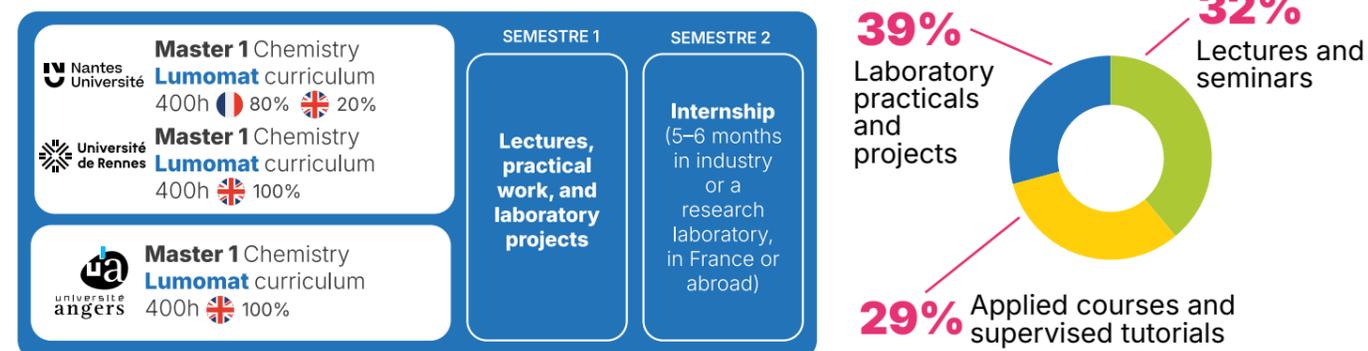
Student immersion in research laboratories (internships and supervised projects). Internships in 1st and 2nd year (4 to 6 months).



### An internationally oriented program

Access to an international network to encourage completing an internship abroad, along with financial support up to 2,000 euros to support mobility.

### Focus on the Lumomat Master's program



### A network of laboratories, alumni and companies for internships in France...



Institute of Materials of Nantes



Laboratory MOLTECH Anjou Angers



Rennes Institute of Chemical Sciences



Laboratory CEISAM Nantes

... and abroad : Brazil, Canada, United States, South Korea, Japan, Australia, Scotland, Spain, Sweden, Italy, the Netherlands, and the rest of Europe...



**Master 1** Chemistry  
**Lumomat** curriculum  
400h

80% 20%

**Semester 1 (Sept-Feb):** basic theoretical and practical competencies (30 ECTS)

**Semester 2 (March-June):** initiation to research in lab (27 ECTS) Soft skills and English (3 ECTS)

**Unit 1 - Common Core Chemistry (6 ECTS)**

- Molecular synthesis and modelling
- Physicochemical characterizations (Level 1)

**Unit 2 - Chemistry (9 ECTS)**

- From molecule to solid
- Molecular spectroscopy, crystallography and electrochemistry

**Unit 3 - Chemistry (14 ECTS)**

- Physicochemical chemistry (Level 2)
- Organic and organometallic chemistries
- Materials

**Unit 4 - Optical teaching (1 ECTS)**

- Thermal analysis or
- Methodologies for materials synthesis



**Master 1** Chemistry  
**Lumomat** curriculum  
400h

100%

**Semester 1 (Sept-Feb):** basic theoretical and practical competencies (36 ECTS)

**Semester 2 (March-June):** initiation to research in lab (24 ECTS)

**Unit 1 - Transferable skills (9 ECTS)**

- French course or English course
- MOOC communication
- Personal research project in lab – poster and oral presentations

**Unit 2 - Basics in molecular, organometallic chemistry (8 ECTS)**

- Advanced molecular synthesis
- Advanced organometallic chemistry

**Unit 3 - Characterization techniques (10 ECTS)**

- Spectroscopies : NMR, IR, UV-Vis, MS, HR-MS, fluorescence

- Crystallography and X-ray diffraction
- Electrochemistry
- Electronic Imagery

**Unit 4 - Coordination chemistry and theoretical chemistry (6 ECTS)**

- Coordination chemistry
- Modelling and theoretical chemistry

**Unit 5 - Materials: structure - properties (3 ECTS)**

- Switchable molecular systems
- Liquid crystals



**Master 2** Chemistry  
**Lumomat** curriculum  
400h

100%

**Semester 3 (Sept-Feb):** theoretical courses and experimental student project in lab - 1 month (30 ECTS)

**Semester 3 (March-June or August):** research in laboratory or industry (30 ECTS)

**Unit 1 - Transverse training (4 ECTS)**

- English
- Professional training
- Student experimental project

**Unit 2 - Design (5 ECTS)**

- Introduction to design of experiments
- Molecular modelling
- Formulation

**Unit 3 - Synthesis (6 ECTS)**

- Molecular engineering of pi-conjugated systems
- Supramolecular chemistry

**Unit 4 - Characterizations and organic photonics (7 ECTS)**

- Photophysics and photochemistry
- Techniques of spectroscopies and microscopies
- Light-Matter interactions for Biology
- Electrochemistry of modified surfaces

**Unit 5 - Materials and organic electronics (8 ECTS)**

- Molecular materials, hybrids and nanomaterials
- Organic electronics

## Students trained for research and industry

**65%** pursue an academic or CIFRE PhD

At one of our four partner laboratories, at other French or international universities, or in conjunction with industry as part of a CIFRE PhD

**35%** join the industrial sector after completing the Master's program

Examples of jobs: materials engineer, forensic science technician, technical sales engineer, research and development engineer, production chemist...

## They graduated from the LUMOMAT program



**Fabien Lucas**  
Class of 2016

**CNRS Researcher in Rennes - Institut d'Electronique et des Technologies du Numérique**

M1 - internship at Uppsala University (Sweden)  
M2 - internship at University of Strathclyde (Scotland)  
PhD at the Institute of Chemical Sciences of Rennes



**Nathan Plassais**  
Class of 2022

**PhD student at the ECMLaboratory University of Seoul (South Korea)**

M1 - internship at Moltech-Anjou in Angers  
M2 - internship HNI Laboratory Yonsei University (South Korea)  
CDD 1 year - CNRS Study Engineer - Yonsei



**Louise (Colin) Rönisch**  
Class of 2020

**Technical sales engineer Microlight 3D**

M1 & M2 - internship at University of Strathclyde (Scotland)  
M2 - internship the Institute of Materials of Nantes



**Violette Gousseau**  
Class of 2025

**PhD student Feringa Group (Chemistry Nobel Prize 2016) - University of Groningen (Netherlands)**

M1 - internship at the Institute of Chemical Sciences of Rennes  
M2 - internship Feringa Group - Groningen



**Bruce Mioko Deme**  
Class of 2022

**Printed electronics engineer Arc en Ciel Sérigraphie**

M1 - internship at CEISAM Nantes  
M2 - internship in industry CRM Group in R&D - Liège - Belgium



**Justin Cado**  
Class of 2024

**PhD student at Moltech Anjou University of Angers**

M1 - internship at the Institute of Chemical Sciences of Rennes  
M2 - internship at Moltech Anjou - Angers

## Lumomat's curriculums



## Advantages of the LUMOMAT Master's program



International environment



Access to the Lumomat international network: through partner universities (Spain, Poland, Scotland, Italy, Sweden, Canada, Australia, Ukraine, Lebanon...) or through the network of partner laboratories and alumni



Courses taught in English and a free TOEIC test



Financial support for international mobility up to 2000 euros



Excellence scholarships based on academic criteria



Interaction with the industrial sector



Expertise and access to equipment from four CNRS excellence laboratories



Student immersion in research laboratories (projects)



Support for students, event organization, access to the alumni network and to a dedicated Discord server



## Join the LUMOMAT Master's program

Any questions? Please contact us!  
[eur-lumomat@univ-angers.fr](mailto:eur-lumomat@univ-angers.fr)



**Recommended background:**  
a degree in Chemistry or  
Physics-Chemistry

**1st year Master's program director - Rennes**  
Christophe Darcel  
[christophe.darcel@univ-rennes.fr](mailto:christophe.darcel@univ-rennes.fr)

### Application procedures:

- Go to the Mon Master platform and search for "Lumomat" in the search bar.
- Applications run from February to March (phase 1) and again in June (phase 2).
- **International applicants should complete their application on the Campus France online portal.**

**1st year Master's program director - Nantes**  
Clémence Queffélec  
[clemence.queffelec@univ-nantes.fr](mailto:clemence.queffelec@univ-nantes.fr)

**2nd year Master's program director - Angers**  
Thomas CAUCHY  
[thomas.cauchy@univ-angers.fr](mailto:thomas.cauchy@univ-angers.fr)



Find us on  
**lumomat.fr**  
and on our social  
networks

