

RESEARCH & INNOVATE WITH



ÉCOLE
NORMALE
SUPÉRIEURE
DE LYON



RESEARCH & INNOVATE WITH ENS DE LYON

KEY FIGURES

2470 STUDENTS

550
teachers,
teacher-researchers
and researchers

450
PhD students
enrolled at
ENS de Lyon

590
administrative
and technical
staff

22
Joint Research
Units (UMR) and
Research Units (UR)

6
Research
Support Units
(UAR)

1
Center
for collaborative
research

5th
in the QS France ranking /
130th worldwide

8th
in the Times Higher Education
France ranking /
251-300th worldwide

3rd
in the Times Higher Education
ranking of French best small
universities / 9th worldwide

13-16th
in the Shanghai France ranking /
301-400th worldwide

12
departments

1
French Institute
of Education

200
partner universities

69
nationalities

FROM BASIC RESEARCH TO INVOLVED RESEARCH

If the quality of the research at École normale supérieure de Lyon and its laboratories is recognized at the highest level, both in the exact and experimental sciences and in the humanities and social sciences, it is the result of our high-standards in all fields, the attention paid to the recruitment of the best students and teacher-researchers, and our motivation to always push the boundaries of knowledge by making the most of the extensive benefits that result from working with a wealth of key players.

The major French research organizations trust us: 50% of the researchers in our laboratories are affiliated with these organizations. In addition, we are ranked each year in the international top 10 best small research universities (THE ranking) and have forged an important network with the best research universities in the world. These are all marks of the national and international visibility of our establishment.

If our primary vocation is the production of knowledge, developing "involved" rather than applied research is also at the heart of our concerns: this means being involved in the training of our students, involved in the resolution of issues with complex dimensions and in their specific applications, and involved in collaborative approaches with our partners.

Multi-disciplinary focus and innovation

Five profoundly multi-disciplinary objectives structure our research policy, which are strongly linked with the challenges that contemporary societies are facing right now. These objectives are the science of crises; science for resilience, based on the new relationship to resources in a fluctuating and threatened environment; data science and modelling, which is at the heart of a transdisciplinary, collaborative and open scientific approach; the science of public policy and decision-making efficiency; and scientific and cultural mediation open to the diversity of audiences. These objectives have an international outlook, as the challenges posed to research are now global.

This focus promotes our openness to stakeholders in the socio-economic world. We therefore invite you to discover the extensive added value that ENS de Lyon can provide to develop the research and innovation of the future.

Teua Vernoux
Vice-President for Research

- 1 A VERY HIGH LEVEL OF SCIENCE FOR YOUR PROJECTS**

ENS de Lyon develops leading research in the fields of exact and experimental sciences as well as the humanities and social sciences, which it wishes to promote to private and public partners. This active policy is based on 22 research units of excellence and services dedicated to setting up partnerships and development.
- 2 AN ENVIRONMENT FOR RESEARCH STAKEHOLDERS**

Committed to the European HR strategy for researchers, ENS de Lyon was awarded the HRS4R label in 2019. In its laboratories, the School hosts the activities of nearly 1 500 key players in research including 250 international researchers.
- 3 A RECOGNIZED SCIENTIFIC QUALITY**

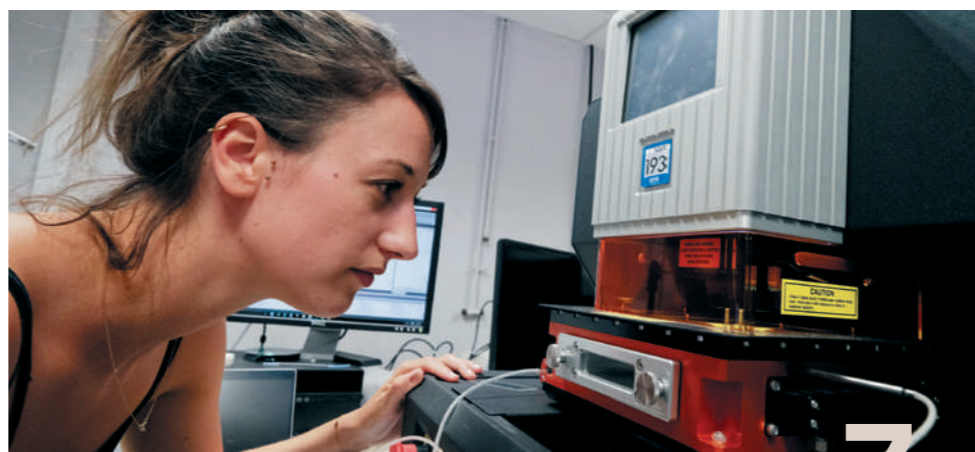
With, on average, 1 660 articles and 53 000 citations per year, ENS de Lyon is the 5th French player recognized worldwide (QS 2020). Its researchers and teacher-researchers are regularly distinguished by the French and international academic communities.
- 4 A MELTING POT OF STUDENTS AND YOUNG DOCTORAL STUDENTS**

ENS de Lyon students benefit from a personalized study program with exceptional supervision and numerous research internships. A new scheme offers them the opportunity to create their own junior laboratory to explore the field of research. In addition, doctoral students, through the CIFRE system, can work in collaboration with private companies.
- 5 STATE-OF-THE-ART EQUIPMENT AND RESOURCES FOR RESEARCH**

ENS de Lyon is one of the places in France that has very high-performance equipment, technological platforms, sometimes unique in the world, and the know-how that goes with them. It is therefore possible to design and produce off-the-market experimental devices on site – ranging from a single part or complete equipment.

The accessibility of its resources in the humanities and social sciences is based on a policy of digitization and data improvement, within the framework of open science.
- 6 DIVERSE PERSPECTIVES FOR COMPLEX ISSUES**

Research moves more towards crossroads than the highways of knowledge. ENS de Lyon encourages the constitution of multidisciplinary and intersectoral teams to take up the same research topic. Transversal research contributes to increasing the potential for research and innovation and makes it possible to better respond to major societal challenges.



• Above: Geography class.
 • Top left: ESI NWR 193 laser ablation system.
 • Top right: Physics laboratory. Installation of instrumented pedals for the measurement of the forces developed by the legs of a cyclist, to quantify the effectiveness of muscle electrostimulation sequences applied to tetraplegic users.

- 7 RESEARCH IN CLOSE CONTACT WITH COMPANIES**

The valorization of the research work carried out at ENS de Lyon takes many forms: partnerships or joint laboratories with companies, patent and licensing applications, creation and hosting of start-ups.

ENS de Lyon is also associated with SATT Pulsalys, a key player in Deep Tech in Lyon and Saint-Étienne.
- 8 ACCESS TO NETWORKS OF EXCELLENCE**

The School's laboratories are involved in 9 of the 12 laboratories of excellence (LabEx) in Lyon, 7 EquipEx and 2 University Research Schools (EUR). These teams promote the emergence of ambitious scientific projects, visible on an international scale, by recruiting researchers and investing in innovative equipment.

On an international level, ENS de Lyon researchers regularly work on themes or projects with other research teams, in France and abroad. From this collaborative work started 5 International Research Project (IRP), "laboratories without walls".
- 9 OPENNESS TO GLOBAL RESEARCH AND RESEARCHERS FROM ALL WALKS OF LIFE**

ENS de Lyon's international commitment is manifested in partnership agreements with 200 foreign institutions in more than 50 countries and its integration into cooperation networks dedicated to teaching and research. It has forged privileged partnerships with China (ECNU in Shanghai), India (IISER network), French-speaking Africa, and of course the largest universities in Europe and North America.
- 10 DISCIPLINARY MEETINGS**

A veritable mix of scientific culture, ENS de Lyon offers each year more than three hundred scientific events – seminars, workshops or symposia. In connection with our laboratories, prestigious international conferences regularly choose ENS de Lyon.

HRS4R - HUMAN RESOURCES STRATEGY FOR RESEARCHERS

To obtain the HRS4R Label, ENS de Lyon is committed to the European human resources strategy for researchers.

It aims at improving the practices of organizations and institutions working in the field of research about the recruitment and working conditions of researchers. The management of its implementation is ensured by the Project engineering department.

PROJECT ENGINEERING DEPARTMENT

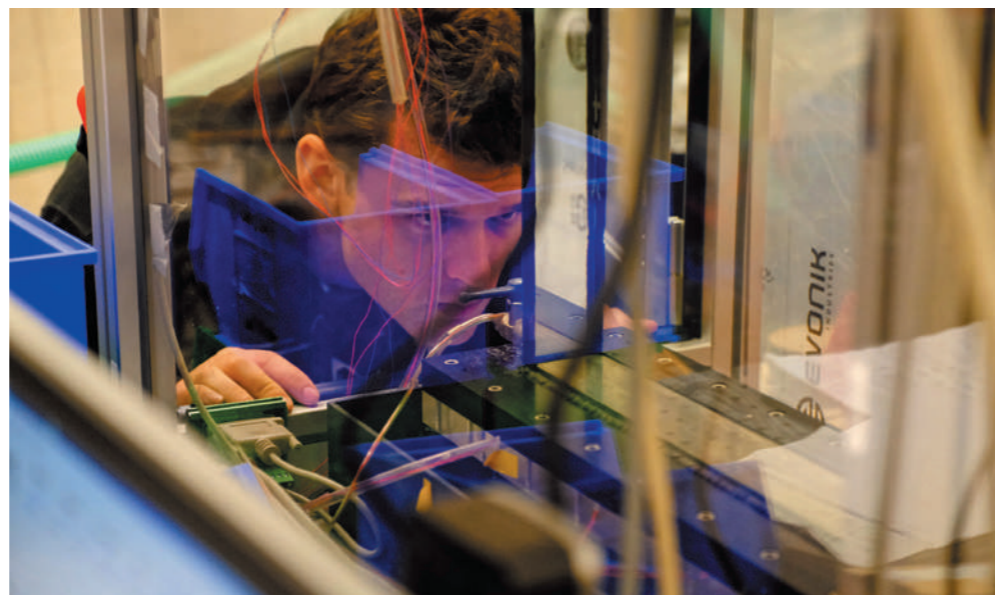
It guides researchers and teacher-researchers in our laboratories, in accordance with their needs, in search for public funding (local, national, European, international).

ITS OBJECTIVES:

- Monitor and raise awareness of funding opportunities (calls for research projects)
- Support in setting up and submitting projects in response to calls for research projects (selection of calls for projects according to the needs of researchers, explanation of the evaluators' expectations, assistance in setting up the file)
- Contract financed projects

CONGRESSES AND EVENTS DEPARTMENT

For scientific events bringing together more than 150 participants, ENS de Lyon provides its researchers with a team dedicated to the organization of these events. To do this, it takes care of logistics in addition to administrative and financial management.



• Opposite: Physics laboratory. Experimental study of heat transfer in a Rayleigh-Bénard convection cell.
• Bottom left: The Diderot Library.
• Bottom right: Chemical laboratory. Sample preparation in glove box, in a controlled and inert atmosphere.



THE DIDEROT LIBRARY

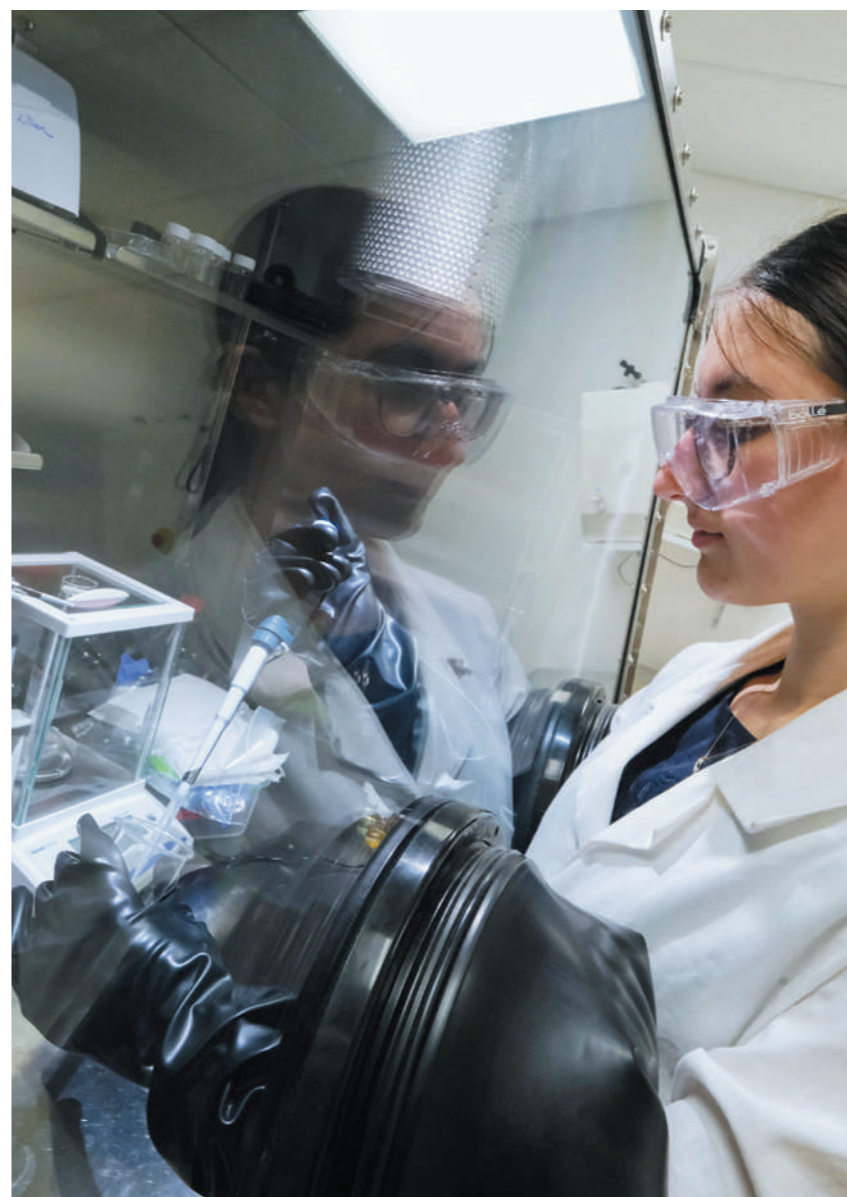
More than 1.2 million paper documents, thousands of books and articles in e-access and more than 500,000 digitized pages.

ENS EDITIONS

A state of the art of research in the humanities and social sciences. 14 book collections, 2 series dedicated to the publication of sources, 13 journals and a catalogue of 2000 titles.

PERSÉE

Free access to over 700,000 documents, combined with a complete range of research and exploitation tools.



KEY FIGURES

22

Joint Research
Units (UMR) and
Research Units (UR)

6

Research
Support
Units (UAR)

12

departments

5-YEAR RESEARCH RESULTS

346

research contracts signed between
ENS de Lyon and private partners,
including 39 CIFRE theses

18

incubated companies

79

patent families (291 patents) of which
33 are exploited (license/assignment)
by private partners

46

protected software and copyrights
(databases, images, etc.) of which
9 are exploited

18

protected secret know-how,
of which 9 are exploited

120

distinctions

9

LabEx

7

ÉquipEx

14

ERCs hosted by ENS de Lyon, including
5 headed by ENS de Lyon

10

projects funded as part of the AURA Region's
Research Ambition Pack

2

partnerships Innovative Training Networks
(ITN)

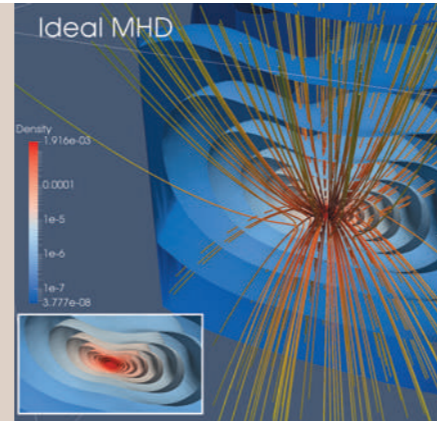
8 300

published articles and 265 000 quotations



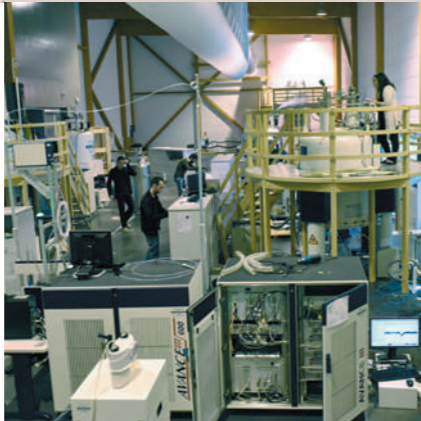
← **CIRI - Centre International de Recherche en Infectiologie**

"Understanding infectious diseases to better control them" through the center's specialties in bacteriology, virology and immunology.



↑ **CRAL - Lyon Astrophysics Research Center**

Fundamental research in astrophysics and development of instruments for large observatories.



→ **CRMN - Very High Field NMR Center of Lyon**

A scientific, attractive and agile environment – for research teams specialized in nuclear magnetic resonance – open to chemistry, biology and physics.

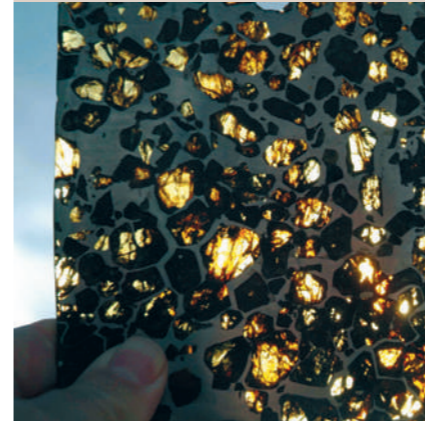


← **LIP - Parallel Computation Laboratory**

Creative interactions between long-term basic research, innovative software/hardware design and short-term projects/transfers through industrial collaborations.

↓ **LGL-TPE - Laboratory of Geology of Lyon: Earth, Planets, Environment**

Understanding the formation of the Earth and its evolution for a better comprehension of the beginning of life and its development.



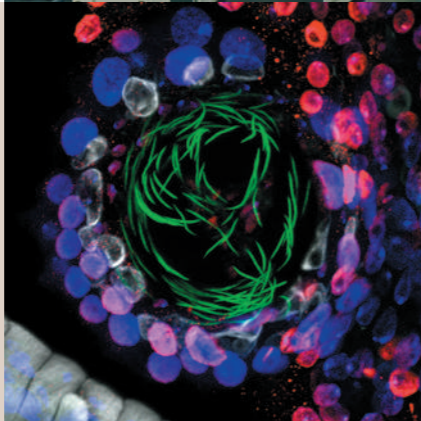
→ **RDP - Plant Reproduction and Development Laboratory**

Biology and evolution of the development of plants and their reproductive systems through experimental and predictive approaches; associated societal issues.



← **LPMC - Laboratory of Biology and Modelling of the Cell**

Characterization of the molecular basis of normal and pathological functioning of cells via genetics, modelling, quantitative and systemic biology approaches.

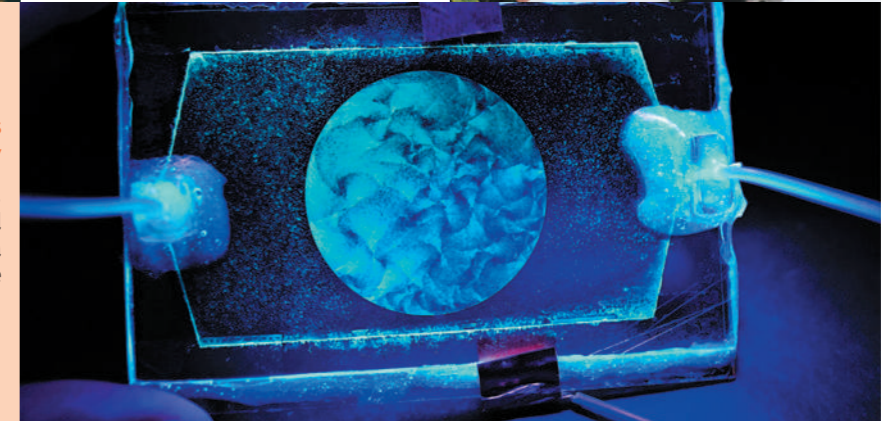


↓ **IGFL - Institute of Functional Genomics of Lyon**

Development of research in functional genomics through the gathering of high-level scientists from a wide variety of backgrounds.

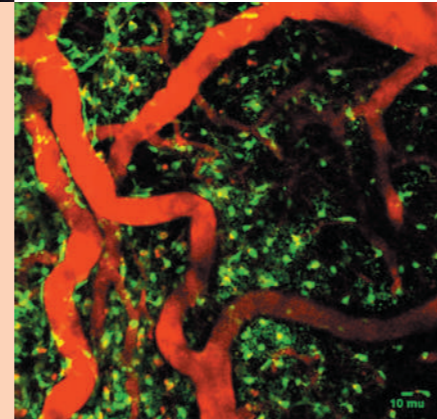
→ **LPENSL - Physics Laboratory**

Statistical, non-linear, mathematical physics; signal and images; turbulence; quantum physics; condensed, soft, active matter; biophysics.



→ **LCH - Chemistry Laboratory**

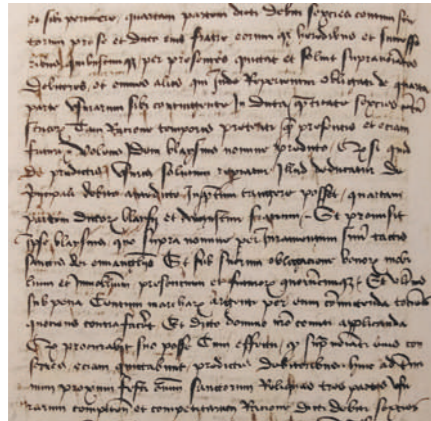
Interdisciplinary research at the frontier of biology, materials sciences and physics.



← **UMPA - Pure and Applied Mathematics Unit**

Research in fundamental mathematics and Interactions.





← **CIHAM - History, Archaeology, Literatures of the medieval Christian and Muslim worlds**

The specificity of its research: a spatial anchoring, interdisciplinarity and comparatist.



↑ **CMW - Max Weber Center**

Laboratory of general sociology. Its themes: forms of socialization, gender, education, work, kinship, knowledge, urban, culture, visual sociologies, etc.

→ **CERCC - Center for Comparative Studies and Research on the Creative Arts**

At the heart of the project of this interdisciplinary laboratory: analysis of language interplays, transfers and translations. Organization of programs to welcome creators in different fields of research on living art and the power of forms.



→ **IHRIM - Institute of History of Representations and Ideas in Modernities**

Trans-secular (16th-20th centuries) and multidisciplinary laboratory. The specificity of its research: a historicized approach to literary, symbolic, artistic and scientific ideas and representations.



↓ **GATE - Economic Analysis and Theory Group**

Description and analysis of individual and collective decisions with particular attention to the ethical, behavioural and spatial dimensions.



← **EVS - Laboratory Environment, City, Society**

The interactions between environment, city and society in their spatial and temporal dimensions analysed by an interdisciplinary laboratory.



→ **HISOMA - History and Sources of ancient worlds**

Research on ancient worlds, through the disciplines of the Sciences of Antiquity, from the Old Pharaonic Empire to the end of Late Antiquity, in an area corresponding mainly to the civilizations of the Ancient Mediterranean.



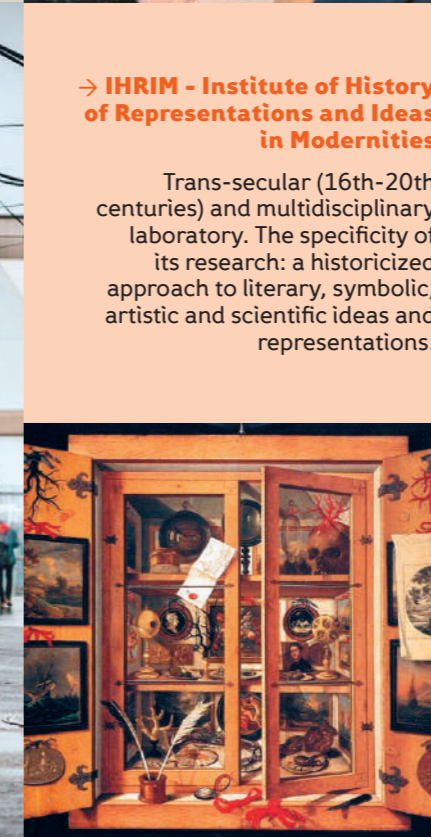
↓ **IAO - Lyon Institute of East Asian Studies**

Researchers specializing in anthropology, law, economics, geography, history, literature, philosophy and political science; research focusing on East and South-East Asia.



← **ICAR - Interactions, Corpus, Learning, Representations**

Multidisciplinary scientific activities in linguistics and didactics focused on the multidimensional analysis of the uses of language, in interaction and in the text, and apprehended in a toolled way on large corpora of interactive and textual oral data.



← **LARHRA - Rhône-Alpes Historical Research Laboratory**

Economic and social, religious, cultural histories; history of art, historical demography, gender history, modern and contemporary periods.

→ **Triangle - Action, discourse, political and economic thought**

Multidisciplinary laboratory addressing together the aspects of politics understood in the broad sense of the term: action, discourse, political and economic thought.



5 INTERNATIONAL RESEARCH PROJECTS (IRP), "LABORATORIES WITHOUT WALLS"

- **PHYCOMSYS**
(Non-Equilibrium Physics of Complex Systems) studies active and passive soft matter, fluid mechanics and turbulence.
- **D-FFRACT**
(Deformation, Flow and Fracture of Disordered Materials) studies the mechanical instabilities characterizing the physical properties of heterogeneous materials and in particular their consequences in terms of geophysical risks.
- **MSD**
(Matter: structure and dynamics) focuses on the physics of complex environments, with a fundamental approach developing opportunities in biophysics and geophysics.
- **COMPUMORPH**
(Computing Plant morphogenesis) focuses on understanding the dynamics of plant morphogenesis. This requires a modelling environment enabling explicit multi-scale representation of shapes and the consideration of complex data of various natures.
- **POSTWESTSOCIO**
(Post-Western Sociology in Europe and in China) aims to improve the collective understanding of how sociological knowledge is made by field sciences, in a Franco-Chinese comparative perspective.



1 INTERNATIONAL PLATFORM OF SCIENTIFIC RESEARCH

JORISS
(Joint Research Institute for Science and Society) is an international scientific research platform resulting from a partnership between ENS de Lyon, East China Normal University (ECNU) and CNRS.

1 COMMON RESEARCH LABORATORY

CARMEN
(Characterization of materials for new energies) aims to strengthen knowledge on molecular and/or colloidal transport in porous substrates and develop fine analysis methodologies to support innovations for the energy transition.

1 INTERNATIONAL RESEARCH LAB (IRL)

E2P2L
(Eco-Efficient Products and Processes Laboratory) is an IRL of CNRS, Rhodia, ENS de Lyon and ECNU dedicated to renewable and sustainable chemistry.

• Above: IAO - East Asia Institute.

• Opposite: Sediment coring assignment in Lake Ngaoundaba (Adamawa volcanic chain, Cameroon).

• Bottom left: Archaeological and paleo-environmental sediment sampling campaign from the Youmbidi rock shelter (Lastoursuille region, Gabon).



PARTNERSHIP AND VALORIZATION DEPARTMENT

ENS de Lyon brings its expertise and develops research programs with companies (large groups, middle-sized companies, and small-sized companies, start-ups) in line with their expectations. The service provides essential assistance in the development of products or services (removal of technological barriers, opening of new perspectives).

RESEARCH CONTRACTS WITH PRIVATE PARTNERS

- Identify researchers in the targeted field in relation with your project
- Define a program together and formalize the conditions of the research contract
- You benefit from:
 - tailor-made contracts
 - our efficiency and responsiveness: a dedicated contact person negotiates and signs on behalf of the various laboratory supervisory bodies. A human-sized institution for rapid decision-making

INTELLECTUAL PROPERTY

- Identify and protect research results
- Transfer results and manage transfer contracts either directly or via SATT PULSALYS or other partners

SPONSORSHIP AND PATRONAGE

- An opportunity for our partners to get involved with the projects of our laboratories and departments



START-UP INCUBATOR

Our incubator hosts an average of ten start-ups per year on various themes: biotechnology, computer science, chemistry, geography, etc.

IT OFFERS:

- Premises (460 m², 16 offices, 6 laboratories, 1 meeting room)
- Privileged access to laboratories, researchers and resources
- Personalized support before creating a start-up for the project leader

CONTINUING EDUCATION

An original and specific offer to strengthen the skills of your employees in their core business or enable them to acquire new knowledge to evolve personally and professionally.

SCIENCE AND TECHNOLOGY:

- Geographic information systems and computer-aided mapping
- Nuclear magnetic resonance applied to liquids and solids
- Numerical modelling, machine learning, data processing
- Inductively coupled plasma mass spectrometry
- High-throughput sequencing
- Quantitative PCR...

LANGUAGES AND COMMUNICATION:

- Develop skills in more than ten foreign languages
- Prepare for Bright, Cambridge and Linguaskill certifications
- Make a successful oral presentation in English
- Improve your scientific writing in English
- Public speaking...

Training that can be financed by continuing education programmes.

REFERENCES:

Large companies:
EDF, TOTAL, Fagor-Brandt, Gilead Sciences, Renault Trucks, Sanofi Pasteur, Merial.

Public bodies:
CNRS, INSERM, Opéra de Lyon, AURA Region, Pôle Emploi.

More information
www.ens-lyon.fr/en/studies/academic-programs/continuing-education



THE ENS DE LYON RENTS FUNCTIONAL AND EQUIPPED ROOMS

2 AUDITORIUMS:

- **Mérieux** with 491 seats, 750 m² atrium and 2 annex rooms with 48 and 36 seats, private parking facilities

- **Descartes** with 187 seats

CONDORCET ROOM:
with 100 seats

THESIS ROOM:
with 100 seats

Contact: coordination.manifestations@ens-lyon.fr

EXCEPTIONAL EQUIPMENT

This equipment can be used for academic and/or industrial laboratories. To have access to it – as well as obtaining the terms of loan or rental – a request needs to be placed to the platform managers.

More info: www.ens-lyon.fr/en/research/research-units/equipment

X-RAY IRRADIATOR

Model X-RAD 320 (PXi)



MASS SPECTROMETER

Model MC-ICP-MS Nu Instruments



P3 LABORATORY

High-Security Level 3 Laboratory



RAMAN

Micro-Raman spectrometry platform



HIGH-FIELD NMR

NMR spectrometers from 400 MHz (9.4 T) to 1000 MHz (23.5 T)



MASS SPECTROMETER

Model MC-ICP-MS Neoma (2nd in the world, installed in March 2021)



PSI

Sequencing Platform



DATACENTER

"New generation information technology" datacenter (known as SING)



SEM

Scanning Electron Microscope



THEY WORK WITH ENS DE LYON

14 • 15

We appreciate our collaboration with ENS de Lyon in the context of research work, requiring very specific knowledge and instruments. Working with them has brought a very solid industrial focus to the results.

BIOMÉRIEUX

Working with ENS de Lyon helped us to carry out our editorial project and offer a tool in line with our ambitions.

ÉDITIONS RETZ

Through its expertise in many scientific fields, ENS de Lyon has helped us to screen and analyze the nuclear genes involved in the reproduction of certain species we work. A great experience for our scientific teams and a real step forward in our research projects in varietal creation.

ENZA ZADEN

ENS de Lyon has supported the first developments of our company, both materially and legally. This caring environment has enabled us to mature serenely and consolidate our links with partner laboratories.

GEOPEKA

We have a very rich and fruitful long-standing scientific partnership with ENS de Lyon on important projects. We have created strong links, especially in computational chemistry, which are strengthening in the emerging fields of New Energy Technologies.

IFP ÉNERGIES NOUVELLES

Mathym comes from the chemistry laboratory of ENS de Lyon and exploits several patents developed by its teams. Our company has benefited from strong structural support that has played an essential role in its development and growth.

MATHYM

Our collaboration with ENS de Lyon has been very appreciable for its contribution of very specialized resources invested, its high-performance material environment and its densely local industrial base, which makes it possible to make the most of the technology.

SAFRAN ELECTRONICS & DEFENSE

We are proud to have been collaborating for more than 10 years with the scientific experts of ENS de Lyon, at the forefront of innovation, to better understand and respond to human health issues, but also to contribute to the development, the attractiveness of the Lyon conurbation and its visibility on the international scene.

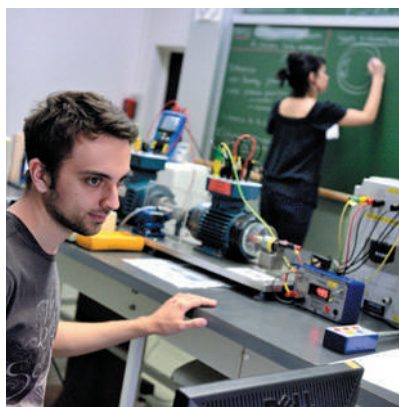
SANOPI PASTEUR

This collaboration is rich both scientifically and humanly. The result of the partnership is a particularly innovative solution that is unrivalled on the market, and a valorization of the know-how of researchers, at the service of societal and economic issues.

SKILDER

A NETWORK OF STUDENTS AND ALUMNI FORMED THROUGH RESEARCH

16



RECRUIT A PHD STUDENT VIA THE CIFRE SYSTEM

The Industrial Agreements for Training through Research (CIFRE) system enables the company to benefit from financial aid to recruit a young doctoral student whose research work, supervised by a public research laboratory, will lead to the defense of a thesis.

- **Contact:**
ualorisation@ens-lyon.fr

SEND YOUR INTERNSHIP OFFERS TO OUR STUDENTS AND DOCTORAL STUDENTS.

All normalien pupils and students, as well as auditors of M1 and M2, have at least one compulsory internship to carry out during their training at ENS de Lyon.

Hiring a student from ENS de Lyon to do an internship in your company is the guarantee of having an intern trained by research, who is curious to learn, who strives towards high standards and has an appetite for complex issues. Click here to discover the 61 training courses of ENS de Lyon: <http://www.ens-lyon.fr/en/studies/academic-programs/bachelor-masters>

WHO TO CONTACT?

Send your internship offers to the internship office, which can also assist you in defining your needs and the profile you are looking for:

- **Exact and experimental sciences:**
bureauesstages.monod@ens-lyon.fr
- **Humanities and social sciences:**
bureauesstages.descartes@ens-lyon.fr

PRACTICAL ARRANGEMENTS

- **Duration of the internship:** from 22 days to 6 months, 924 hours of internship maximum, 132 days maximum, part-time or alternating work and study periods
- **Gratuity:** according to the laws in force for auditors and normalien students, there is no gratuity for normalien pupils*.

DISCOVER THE ALUMNI NETWORK OF ENS DE LYON

Our alumni work in public and private research, secondary and higher education, senior civil service, publishing and media. Do not hesitate to get in touch with the community of our former students.

- **Alumni website:** www.alumni.ens-lyon.fr

**Normalien pupils have the status of trainee civil servants and, as such, cannot receive a traineeship allowance.*

PHOTO CREDITS:

Pages 2-3 : Vincent Moncorgé - **Pages 4-5 :** Vincent Moncorgé - **Page 6 :** CIRI ; CRAL - N. Vaytet, B. Commerçon, J. Masson, M. González, G. Chabrier, Astronomy & Astrophysics, 615, 5, 2018 ; CRMN ; LBMC ; IGFL - Vincent Moncorgé ; LCH - **Page 7 :** LIP ; LGL-TPE - Pierre Thomas ; RDP - Mohammed Bendahmane ; LPENSL - Amélie Chardac ; UMPA - Vincent Moncorgé - **Page 8 :** Ciham - Archives d'État de Turin, avec l'autorisation du ministère de la Culture (Italie) ; CERCC - Eric Dayre ; CMW - Unsplash @Ryoji_Iwata ; EVS - @Mathieu Cassel ; Ihrim - Gallica @Florence Poncet ; Gate - Istock @sharply_done - **Page 9 :** IAO - Pixabay @thepoorphotographer ; Larhra - Domenico Remps, Cabinet de curiosités, c. 1690, huile sur toile. Florence, Museo dell' Opificio delle Pietre Dure. Source : Wikimedia Commons ; Triangle - Istock @Ridofranz ; Hisoma - @Dorothee Elwart ; ICAR - @Rémi Léger - **Pages 10-11 :** IAO - Vincent Moncorgé ; LGL-TPE - Guillemette Ménot - **Page 12 :** ENS de Lyon - **Page 13 :** Vincent Moncorgé - **Page 14 :** Vincent Moncorgé ; sauf CRMN - **Page 16 :** Vincent Moncorgé - **4th cover:** Nil Hoppenot

ENS de Lyon

• **Descartes campus**

15, parvis René Descartes - BP 7000
69342 Lyon Cedex 07 - France

• **Monod campus**

46, allée d'Italie
69364 Lyon Cedex 07 - France

Research administration

Email: administration.recherche@ens-lyon.fr
Phone: +33 (0) 4 26 23 38 35

Partnership and valorization department

Email: valorisation@ens-lyon.fr
Phone: +33 (0)4 26 23 38 33

Project engineering department

Email: ingenierie.projets@ens-lyon.fr
Phone: +33 (0)4 72 72 81 80

Congress and events department

Email: cellule.congres@ens-lyon.fr
Phone: +33 (0)4 72 72 80 75

Apprenticeship tax

Email: taxe.apprentissage@ens-lyon.fr
Phone: +33 (0)4 37 37 60 00

Continuing education

Email: formation.continue@ens-lyon.fr
Phone: + 33 (0)4 37 37 60 00

