

# RECRUIT OUR GRADUATE STUDENTS FOR RESEARCH PROJECTS

*École Polytechnique* is the leading French graduate institution which combines top-level research, academics and innovation. Its *Ingenieur Polytechnicien* multidisciplinary curriculum is highly selective and promotes a culture of excellence with a strong emphasis on science, anchored in humanist traditions.



The final year leading to the awarding of the *Diplôme d'ingénieur de l'École Polytechnique* (equivalent to a Master's degree) is composed of two terms of graduate-level courses in a given field of study<sup>1</sup> and a related research internship. Every year, **about 250 Polytechnicien graduate students are seeking opportunities abroad for their research internship.**

## Presentation of the research internship



As part of the requirements to complete the *Ingenieur Polytechnicien* Program, our students are required to perform an independent study in the form of a **4 to 6-month research internship.**

This research project takes place during the **spring semester** (starting mid-March) of the final year. It can either be performed at a university or a company, in France or abroad.

The purpose of the research internship is to embed our students in a high-level research department. During this internship, our students are expected to demonstrate the ability to carry out a research project consisting of **theoretical and/or experimental studies**, using the knowledge and skills obtained from the curriculum at École Polytechnique. The internship must always have a clear academic or practice-based research component.

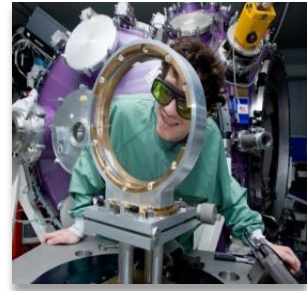
## Learning outcomes:

- To provide an opportunity for students to apply their scientific knowledge and abilities in the analysis of a research project, to master the different approaches to a given problem and to deepen their learning in a particular field of study;
- To expand the students' experience in the implementation of a scientific process through individual research;
- To give the students the opportunity to have a concrete working experience in an industrial or academic research team, to put them in contact with a professional environment;
- For students carrying out an internship abroad, to be immersed in a new culture and work environment.

<sup>1</sup> Biology, Bioinformatics, Chemistry, Solid-state chemistry, Economics, Electrical Engineering, Energy, Entrepreneurship and Innovation Technologies, Mathematics, Applied Mathematics, Computer Sciences, Fluid and Solid Mechanics, High Energy Physics, Physics, Complex Systems Science, Environment. For further information: <http://www.polytechnique.edu/en/year-3-of-the-ingenieur-polytechnicien-program>

Students are required to carry out their research work by attaching equal importance to the following:

- Reviewing the literature and bibliography on the given subject;
- Defining the objectives to be reached;
- Developing the most appropriate solution and the means to meet the objectives;
- Studying the subject itself;
- Analyzing and discussing the results obtained.



### Supervision and assessment

Throughout the internship, students must have **two scientific supervisors**, one faculty member from *École Polytechnique*, and one from the host institution in charge of advising and meeting with the students, checking progress and providing regular feedback on the student's work as well as encouraging them to publish their work, if appropriate.

At the end of the internship, students are required to present the achievements and results of their project and experience in both **a written report and an oral presentation** that are graded by a jury of professors. The completion of the research internship corresponds to 20 ECTS credits.

### Examples of research projects undertaken in 2013 by Polytechnicien students abroad

*“Brown Adipocyte differentiation of adult human Adipose Stem Cells from lipoaspirate and Hydrogel characterization and design for in vivo implants” Johns Hopkins University - Translational Tissue Engineering Center*

*“Bounds of incidences between points and algebraic curves” Massachusetts Institute of Technology – Department of Mathematics*

*“On the convergence of no-regret learning in selfish routing” UC Berkeley - Department of Civil and Environmental Engineering (Applied mathematics)*

*“Symmetry-adapted study of bar-and-joint structures and equiaxetic behaviour” University of Cambridge-Department of Engineering (Mechanics)*

### How to recruit our students?

If you are interested in recruiting *Polytechnicien* students for a research internship, we recommend the following procedure:

1-Please send a short description of the topic to the department coordinator for research internships (see table below) **between September and mid-December<sup>2</sup>**. Please indicate in your email what support may be available to the students (fee waiver, stipend, scholarship, accommodation, access to campus services and facilities, immigration and visa assistance, etc.)<sup>3</sup>.

2-The coordinators will forward the offer to the students enrolled in their field of study. Students who are interested in the topic will send their application directly to them.

3-In January, the candidates will be selected and shortlisted by the department based on their grades and motivation. The selected students (if any) will then get in touch with you. The internship usually starts in March.

<sup>2</sup> Students start looking for internships from mid-October to mid-December. If possible, please send your topic preferably in October.

<sup>3</sup> Although most students of *École Polytechnique* receive a government stipend, this amount is sometimes too low to cover all living expenses and travel costs.

Most students choose research projects related to Applied Mathematics, Mechanical Engineering and Physics. However, the *Ingenieur Polytechnicien* multidisciplinary curriculum includes a **wide spectrum of fields of study**.

Department	Major fields of study	Coordinator for research internships - contact information
Applied Mathematics	Image and Signal, Modelling and Scientific Computing, Automatic Control and Operations Research, Probabilistic and Statistical Modelisation, Financial Mathematics, etc.	Prof. François Alouges ( <a href="#">web page</a> ) <a href="mailto:francois.alouges@polytechnique.edu">francois.alouges@polytechnique.edu</a>
Mechanical Engineering	Mechanics of materials and structures, Soft matter, complex fluids, biomechanics & MEMS, Aerodynamics & Hydrodynamics, Civil engineering, Petroleum engineering, Geophysics & planetary environment, Energy, etc.	Prof. Antoine Sellier <a href="mailto:sellier@ladhyx.polytechnique.fr">sellier@ladhyx.polytechnique.fr</a>
Physics	Fields, particles and matter, Astrophysics and cosmology, Semiconductors and Microelectronics, Lasers, quantum optics, plasma physics, Solid state physics, Geophysics and planetary environment, Energy, etc.	Prof. Henri-Jean Drouhin <a href="mailto:hj.drouhin@polytechnique.edu">hj.drouhin@polytechnique.edu</a>
Informatics	Computer Science	Prof. Olivier Bournez ( <a href="#">web page</a> ) ( <a href="#">submission form for informatics</a> ) <a href="mailto:olivier.bournez@polytechnique.edu">olivier.bournez@polytechnique.edu</a>
Economics	Microeconomics, Business Strategies, Macroeconomics and Political Economy, Bank and Finance, etc.	Prof. Yukio Koriyama ( <a href="#">web page</a> ) <a href="mailto:yukio.koriyama@polytechnique.org">yukio.koriyama@polytechnique.org</a> Prof. Isabelle Méjean ( <a href="#">web page</a> ) <a href="mailto:isabelle.mejean@polytechnique.edu">isabelle.mejean@polytechnique.edu</a>
Humanities and Social Sciences	Economic systems and sustainable development, Strategic approach and competitive intelligence within the firm, Strategy of innovation and Conception, Digital innovation and regulation, Entrepreneurship, Cognitive Science, Complex systems, Urban planning, architecture and construction, etc.	Prof. Anne Dulphy <a href="mailto:anne.dulphy@orange.fr">anne.dulphy@orange.fr</a>
Biology	Biology and Ecology	Prof. Yves Mechulam <a href="mailto:yves.mechulam@polytechnique.edu">yves.mechulam@polytechnique.edu</a>
Mathematics	Analysis and Applications, Geometry and Dynamical Systems, Number Theory, Groups and Representation Theory, etc.	Prof. Anna Cadoret ( <a href="#">web page</a> ) <a href="mailto:anna.cadoret@math.polytechnique.fr">anna.cadoret@math.polytechnique.fr</a>
Chemistry	New Reactions and Natural Products Synthesis, Organometallic Chemistry and Catalysis, Analytical methods; molecular modelling, Solid State and Material Chemistry, etc.	Prof. Samir Zard <a href="mailto:zard@dcso.polytechnique.fr">zard@dcso.polytechnique.fr</a> Prof. Fabien Gagoz <a href="mailto:gagosz@dcso.polytechnique.fr">gagosz@dcso.polytechnique.fr</a>

**For general information about research internships, please contact:**

- [laura.fioni@polytechnique.edu](mailto:laura.fioni@polytechnique.edu) (Head of Internships, Orientation, Career Counseling and Business Relations office)
- [danielle.chavanne-lancelot@polytechnique.edu](mailto:danielle.chavanne-lancelot@polytechnique.edu) (Research Internship Administrative Coordinator, incl. internship agreements)
- [coline.briquet@polytechnique.edu](mailto:coline.briquet@polytechnique.edu) (Head of outgoing student mobility, Vice-Presidency for International Affairs)