

International Master's Degree in Planetary Geosciences (IMPG)



The spectacular progress of space exploration during the last 30 years has allowed the development of Planetary Geosciences, which are characterised by the involvement of specialists of the Earth (geologists, geophysicists, geochemists) in understanding evolutionary processes of other planets, at the international level. Space missions provide invaluable data for planetology studies but data relevant to Earth structure and evolution are also mandatory in the context of comparative planetology. Seismic, geodetic, magnetic, geomorphologic, geochemical and thermodynamical data are few examples that are used in comparative planetology to get a full understanding of Earth's and the Solar System evolution.

The aim of the IMPG programme, a specialization of the second year of the master's degree STPE (Terrestrial and Planetary Sciences and Environment), is to train future geoscientists to prepare them to integrate international planetary exploration programmes and, more generally, follow careers related to the exploration of the Solar System and beyond. Through comparative planetology, students will be competent to critically address fundamental issues related to the evolution of planets including the Earth. Throughout this programme, they will have a unique learning experience in planetary geosciences based on the strong expertise and collaboration inside an international research and training Consortium of about 20 partners worldwide.

Career Opportunities

Sectors

Planetology, Space missions, Earth Sciences.

Positions

- Academic researcher in laboratories in Earth and planetary Sciences.
- Research engineer in laboratories in Earth and planetary Sciences.
- Scientist in charge of studies and projects in engineering and technical departments of public and private companies, administrations and local authorities involved in spatial planning, development and environmental monitoring (seismic risks, landslides, floods, environmental diagnosis).

Syllabus

First Semester at Nantes Université (30 ECTS)

- Earth and Planetary Surface Processes (5 ECTS)
- Earth and Planetary Interiors (5 ECTS)
- Fluid Dynamics applied to transport processes (5 ECTS)
- Lab analyses and field geophysics (4 ECTS)
- Space Exploration Programmes (3 ECTS)
- Earth and Planetary Remote Sensing (3 ECTS)
- Geographic information system (2 ECTS)
- Data Analysis (2 ECTS)
- Science and Research communication (1 ECTS)

Second Semester (30 ECTS)

5-month internship within one of the 20 [GeoPlaNet consortium](#) members, among them:

- space agencies, for example :
 - > ESTEC: European Space Research and Technology Centre (ESA, NL)
 - > JPL-Nasa: Jet Propulsion Laboratory (USA, California)
- and academic research lab or private company



The 20 partners of the [GeoPlaNet consortium](#) worldwide.

Skills

General skills

- Analyse and model scientific or technical problems in Earth, Planetary and Environmental Sciences,
- Apply the scientific approach, develop innovative ideas and manage projects,
- Work in team and maintain sustainable interpersonal relationships.

Transversal skills

- Develop research skills at a top-level international environment in order to conduct and perform original research projects,
- Develop learning and self-study methods in a variety of socio-cultural and multidisciplinary environments, which will sustain life-long learning and professional development,
- Develop innovative skills through cutting-edge numerical tools,
- Lead a project from the description of its specifications to its fulfilment,
- Communicate orally and write the results of a methodological or technical study in a synthetic and pedagogical way,
- Work in teams to carry out projects in an international context,
- Construct, formalize and express rigorously (using written, oral, graphic or mathematical language) questions, hypotheses, reasoning, models, observations, protocols, results, interpretations and conclusions,
- Develop team projects to answer scientific questions.

Specific skills

- Acquire state-of-the-art knowledge and understanding of the formation, structure and evolution of planetary bodies in order to critically analyse and interpret space mission data.
- Plan, carry out, describe, analyse and interpret field observations, laboratory experiments and numerical or analogical modelling to answer scientific or technical questions, qualitatively and quantitatively (sampling, measurement, statistics).
- Combine qualitative and quantitative information, derived from the observation of natural systems, experimentation, modelling and consultation of the scientific and technical literature, to ask and answer new questions in Planetary Geosciences with a multidisciplinary approach,
- Include the notions of spatial variation, temporal evolution and interaction in natural systems using methods of data analysis and spatialization of information (Cartography, Geographic Information Systems).

Laboratoire de Planétologie
et Géosciences (LPG)
Nantes Université



LPG has gained a worldwide reputation in research in Earth and planetary sciences, thanks to its involvement in many space exploration missions, through collaborations over the past 20 years with international partners, including space agencies (NASA, ESA, JAXA, CNES) and industrial partners that provide space instrumentation. It is involved in 13 space missions investigating planetary bodies of the Solar System for at least the next 5 years.



Admission

To integrate this second year of master, applicants should hold a 4-year degree in higher education, equivalent to the first year of a master (a 3-year-bachelor is not acceptable). Applicants must demonstrate good bases in Earth and/or Planetary Sciences, and basic knowledge in data analyses.

The programme is completely delivered in English. Students whose first language is not English must provide a proof of a good knowledge in English. No requirements in French.

Application

Particular attention will be paid to applications from students who have completed their M1 or internship in one of the GeoPlaNet consortium partner universities/agencies, including Nantes.

- <https://english.univ-nantes.fr/education/application-procedures>
- <https://english.univ-nantes.fr/international-student/regular-admissions>

Academic Calendar

Start in early September and end in January. Internships from February to June. Thesis defences in June.

Why choose this programme ?

This programme has been developed by European universities and research laboratories from the GeoPlaNet Consortium jointly involved in ongoing and future space missions.



Contact



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