AEROSPACE @ UniTo

The Aerospace Scientific Hub of University of Turin







THE UNIVERSITY OF TURIN

Founded in 1404, the University of Turin (UniTo) is one of the oldest and most prestigious Italian universities. It has approximately 81,000 students and over 4,400 employees. Through its 27 departments, it offers 165 courses of study in every area: economics, law and political-social sciences, humanities, science and health.

THE AEROSPACE SCIENTIFIC HUB

AEROSPACE@UniTo is the University of Turin's hub dedicated to advancing aerospace research.

AEROSPACE@UniTo brings together more than one hundred researchers across ten working groups. Key areas of expertise are space exploration, involving astrophysics, celestial mechanics and innovative technologies for future mission; Earth observation for environmental monitoring and disaster risk reduction; space medicine and life sciences focusing on the effects of spaceflight and space hazards on human health; advanced materials for space and space materials; space farming and space law.

RESEARCH

The hub offers a multidisciplinary approach to several research topics, as, for instance:

- high energy astrophysics, astroparticle physics, celestial mechanics, relativistic theories of gravity and exoplanets, which provides a fundamental framework for both space missions and observations. (Space Exploration Working Group)
- design and characterization of innovative and sustainable organic, inorganic, polymeric and metallic materials, and the synthesis of superconducting materials (Materials in/for space Working Group)
- effects of geo- and hypomagnetic fields and microgravity on the neuronal responses of the model organism Caenorhabditis elegans, their effects on biomineralisation, multi-omics of model and crop plants, nematodes, Dictyostelium discoideum, and other organisms (Magnetic Fields and Microgravity Working Group)
- environmental applications of Earth observation with focus on agriculture (water demand, crop classification and CAP controls), forestry, ecology, entomology and veterinary (suitability, risk, etc.). Optical and active (SAR) remote sensing data and techniques are used to support spatial modeling, aiming at a more effective land management and planning. This results in the design and proposal of new downstream services to public and private users (Earth Observation Working Group)



RESEARCH

- human response to space conditions and hazards (e.g. cosmic radiation, altered gravity, magnetic fields, ICE environment) and possible countermeasures from different perspectives and disciplines, such as medicine, biology, neurophysiology, pharmacology, neuropsychology, and neuroscience (Space Medicine and Life Science Group)
- the characterization of physical and physicochemical properties of extraterrestrial materials, and development of soil simulants of different planets and related concrete (Planetary material characterization and exploitation)
- systemic research on international, European, and comparative law, intellectual property protection and public procurement in the aerospace sector (Space Law Working Group)
- design and implementation of advanced drone systems and development of innovative systems for crop and soil monitoring, based on high and ultra-high resolution data, both 2D and 3D (Uncrewed Aerial Vehicles - UAV Working Group)
- vertical farming and aeroponic cultivation for indoor space farming (Space Farming Working Group).





OUR PhDs

UniTo is an active partner in two national PhDs

Space Science and Technology

The National PhD Program in Space Science and Technology aims to train young PhD's in the field of science, engineering, technology and international relations in the space sector through the development of knowledge, skills and competencies in the research areas of interest of the twenty-seven participating Universities and Research Institutions.

Earth Observation

The national PhD trains professional figures with transversal and integrated skills of Earth observation, geomatics and geoinformation, specific applications, administrative and legal skills, able to effectively support the wider exploitation and use of the Copernicus program, making it an essential tool of the digital economy and soft power of the EU globally.

OUR MASTER

Master

The Master's in **Mathematical and Physical Methods for Space Sciences and Industrial Applications** is a one-year program designed to equip students with advanced knowledge for careers in the space sector, emphasizing the intersection of academic research and industry challenges. The primary goal is to introduce individuals with a solid foundation in mathematics and physics to the field of space sciences. The course offers both theoretical and applied training, enabling students to identify, integrate, and apply the most relevant and modern methods in mathematics and physics. A key strength of the program is its innovative teaching and assessment methods. Key private and public aerospace players are supporting the Master.





OUR COURSES

Courses

The course of **Astrobiology** (School of Biology, UniTo) offers a multidisciplinary approach to the study of life in the universe and provides students with the most updated research in Space Biology with the involvement of the Italian Space Agency (ASI), Thales-Alenia Space and the Turin Space Museum and Planetarium (<u>https://planetarioditorino.it</u>).

The course of **Space Neuroscience** (Biotechnology for Neuroscience, UniTo) provides an advanced overview of basic and applied space neuroscience research, offering complementary and converging perspectives from the scientific fields of neurobiology, neurophysiology and neuropsychology. The formal teaching is complemented by seminars taught by experts of the field coming from academia or the aerospace industry.

GET IN TOUCH

Easy and immediate access to UniTo expertise

The **Industrial Liaison Office** of the University of Turin is a team specialized in supporting companies to get in touch with the most promising researchers of UniTo, to learn about collaboration opportunities and to stay updated with the latest university research.

CONTACT US:

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