

# UPC

Universitat  
Politécnica de Catalunya  
BarcelonaTech

The student,  
at the centre

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Much more  
than studying

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Excellent,  
cutting-edge  
research

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Innovation  
and knowledge  
transfer  
to companies

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2023-2024

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Innovation and  
knowledge transfer  
to companies

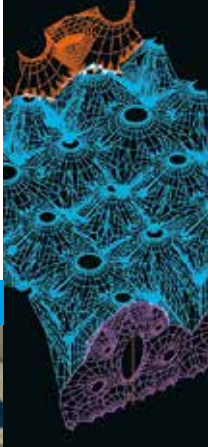
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- 1/ Logo of the Miquel Barceló UPC Science Fiction Award, which has been awarded to unpublished literary works by the Board of Trustees since 1991.
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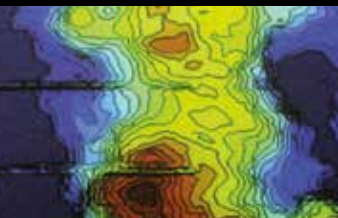
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**“We contribute to the construction of a sustainable, fair world, through research, technology transfer, knowledge dissemination and the training of professionals.”**

**W**ith over fifty years of history, the Universitat Politècnica de Catalunya - BarcelonaTech (UPC) is a key institution in the country. The UPC is a leader in knowledge creation and transfer, the promotion of entrepreneurship, the drive for innovation, and comprehensive technology training throughout life.

At the UPC we want to help develop talent and encourage ambitions. We work to expand the boundaries of learning and facilitate the development of academic skills associated with the challenges and opportunities of our society.

The future of the UPC is based on three main pillars. The first is the talent of the people who make up our academic community. Students, teaching and research staff, administrative staff and alumni make up the UPC community. They share a commitment to the UPC’s mission: to contribute to the construction of a sustainable, fair world through research, technology transfer, knowledge dissemination and the training of professionals. The second pillar is innovation and research. We are recognised for our excellence in engineering, architecture, sciences and technology, which keeps us at the cutting edge. We are also recognised for our international vocation, with active participation in the European university system and the establishment of strong academic ties with universities worldwide.

The third pillar is responsibility and social outreach. Our institution acts as an agent of social change that promotes sustainability, international cooperation and social justice. We want the UPC to contribute to promoting a fairer, more inclusive society, through a convergence of knowledge that gives impetus to a positive future. For this reason, we are a university that is committed to leading initiatives for gender equality and LGTBIQ+ policies, equal access and the fight against climate change.

These are the features of our university: a combination of strengths and challenges, with a vocation to serve society that motivates us to continue working.



Daniel Crespo Artiaga  
Rector



# The UPC in figures

30,437

BACHELOR'S AND MASTER'S  
DEGREE STUDENTS

The UPC is a public university that specialises in engineering, architecture, sciences and technology. The quality of its graduates' employment, its position in the main international rankings and its impact on the industrial fabric are some of its distinguishing features.

A knowledge institution that has a great impact on the country's productive sector, in 2019 the Universitat Politècnica de Catalunya - BarcelonaTech (UPC) contributed to generating 0.3% of Catalan GDP. It is calculated that, for every 100 euros of public funding it received, it returned 601.50 euros to society. That same year, the University contributed to the labour market by directly or indirectly creating or maintaining more than 10,000 full-time equivalent jobs.

The quality of its graduate employment is one of its strong points: a year after graduating, 95% of UPC graduates are in work.

Moreover, 88% take less than six months to find a job and most of them begin their careers on a work placement. In the UPC's case, 96% of these placements are paid placements.

## POSITION OF THE UPC IN THE MAIN INTERNATIONAL RANKINGS

 **QS World University Rankings  
by Subject, 2023**

	Architecture & Built Environment	Civil & Structural Engineering	Mineral & Mining Engineering	Telecommunication, Electrical and Electronic Engineering	Engineering & Technology	Mechanical, Aeronautical & Manufacturing Engineering	Computer Science & Information Systems	Mathematics	Art & Design	Statistics & Operational Research	Materials Science
World	22	35	51-70	58	65	81	82	100	101-150	51-100	101-150
Europe	9	9	11-15	23	25	33	27	38	42-62	19-32	35-54
Spain	1	1	2	1	2	2	1	2	1-3	1-2	1-3

2,104

DOCTORAL CANDIDATES



2,978

CONTINUING EDUCATION STUDENTS



294

DOCTORAL GRADUATES



5,936

BACHELOR'S AND MASTER'S DEGREE GRADUATES



3,629

TEACHING AND RESEARCH STAFF



65

BACHELOR'S DEGREES



84

MASTER'S DEGREES



45

DOCTORAL PROGRAMMES



1,989

ADMINISTRATIVE AND SERVICE STAFF



18

SCHOOLS



30

DEPARTMENTS



141

RESEARCH GROUPS



87,538

ALUMNI UPC



240

CONTINUING EDUCATION PROGRAMMES



€348.8 M

2023 BUDGET



€80.9 M

INCOME FROM R&D PROJECTS (2022)



Shanghai Global Ranking of Academic Subjects, 2022

	Instruments Science & Technology	Atmospheric Science	Mathematics	Civil Engineering	Water Resources	Transportation Science & Technology	Electrical & Electronic Engineering	Telecommunication Engineering	Metallurgical Engineering	Nanoscience & Nanotechnology	Automation & Control
World	51-75	76-100	76-100	76-100	101-150	101-150	101-150	151-200	151-200	151-200	151-200
Europe	5-8	28-42	31-46	17-20	32-48	19-34	27-47	39-52	44-56	24-37	38-49
Spain	3	1	1-2	2	1	1-2	2-3	1-2	2	2-3	3

# THE UPC WORLD



## Manresa

**EPSEM.** Manresa School of Engineering  
epsem.upc.edu

## Terrassa

**ESEIAAT.** Terrassa School of Industrial, Aerospace and Audiovisual Engineering  
eseiaat.upc.edu

**FOOT.** Terrassa School of Optics and Optometry  
foot.upc.edu

**CITM.** Image Processing and Multimedia Technology Centre  
citm.upc.edu

## Barcelona

**EPSEB.** Barcelona School of Building Construction  
epseb.upc.edu

**ETSAB.** Barcelona School of Architecture  
etsab.upc.edu

**ETSECCPB.** Barcelona School of Civil Engineering  
camins.upc.edu

**ETSEIB.** Barcelona School of Industrial Engineering  
etseib.upc.edu

**ETSETB.** Barcelona School of Telecommunications Engineering  
telecos.upc.edu

**FIB.** Barcelona School of Informatics  
fib.upc.edu

**FME.** School of Mathematics and Statistics  
fme.upc.edu

**FNB.** Barcelona School of Nautical Studies  
fnb.upc.edu

**CFIS.** Interdisciplinary Higher Education Centre  
cfis.upc.edu

## Sant Cugat del Vallès

**ETSAV.** Vallès School of Architecture  
etsav.upc.edu

## Castelldefels

**EEABB.** Barcelona School of Agri-Food and Biosystems Engineering  
eeabb.upc.edu

**EETAC.** Castelldefels School of Telecommunications and Aerospace Engineering  
eetac.upc.edu

## Sant Adrià de Besòs / Barcelona

**EEBE.** Barcelona East School of Engineering  
eebe.upc.edu

## Martorell

**CMS UPC.** FPCAT-UPC Sustainable Mobility Campus (Martorell)\*  
cms.upc.edu

## Vilanova i la Geltrú

**EPSEVG.** Vilanova i la Geltrú School of Engineering  
epsevg.upc.edu

\* Campus for initial vocational and continuing education in automotive engineering, sustainable mobility and advanced industry.





**EEABB**



**EEBE**



**EETAC**



**EPSEB**



**EPSEM**



**EPSEVG**



**ESEIAAT**



**ETSAB**



**ETSAV**



**ETSECCPB**



**ETSEIB**



**ETSETB**



**FIB**



**FME**



**FNB**



**FOOT**



**CFIS**



**CITM**





# The student, at the centre

**The UPC is a university that puts the student at the centre of the learning process. In this process, the University proposes solid theoretical training, as well as experiences and projects based on formulas such as hands-on learning, learning by doing and project-based learning. Internationalisation, which permeates the University's activity, is a key part of education that takes place on the world stage.**

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Around thirty students from the Vallès School of Architecture (ETSAV) design and construct social housing in the former Civil Guard barracks of Agramunt (Lleida). Service learning on the degree in Architecture Studies.

**P**lacements in companies, subjects taught by professors who are active in the professional world and the development of student projects are some key aspects of UPC curricula. Teaching methodologies that use formulas such as hands-on learning, learning by doing and project-based learning are distinguishing features of a university with a considerable practical component, in which the development of projects, often from a multidisciplinary perspective, is a constant feature.

The UPC teaching model combines solid theoretical training with the opportunity to participate in a large number of real projects that make the learning process unique. The aim is for students to gain the capacity to advance with knowledge independently, to develop creative thinking and to tackle the solution of interdisciplinary problems.

These objectives take shape in projects that are led and executed by the students. One example is Vibra, which is the subject of the main image on these pages and is promoted by the Vallès School of Architecture (ETSAV) as part of the subject Local Action.

Another relevant initiative is the Talent programme of the inLab, an innovation and research laboratory of the

Barcelona School of Informatics (FIB). Here, students put their talent and energy into the creation of ICT innovations through curricular or extracurricular placements undertaken in a professional environment in which solutions are designed for companies. Students join a multidisciplinary team and learn the appropriate work methodology for the professional situation in which they will work so that they can test and apply their knowledge. In this way, they gain comprehensive training, which complements that obtained by following the regular courses at the School.

### **International competence**

The other key aspect is international competence, which goes beyond traditional mobility. A student could take a class with peers at KTH in Sweden or at a university in China. One example is blended intensive programmes (BIPs), which are worth 3 ECTS credits. These are short, intensive programmes that use innovative teaching methods such as online cooperation. In BIPs, short-term physical mobility (between 5 and 30 days) is combined with a virtual teaching component and an international context.



## HIGH ACADEMIC PERFORMANCE: STUDYING FOR TWO DEGREES AT THE SAME TIME

The Interdisciplinary Higher Education Centre (CFIS) is unique. Here, students with the capability, interest and motivation can undertake interdisciplinary studies by enrolling for two official degrees in the areas of mathematics, physics and engineering.

One of the attractions of the CFIS is the international mobility programme. This has a specific line of grants so that students can work on their bachelor's thesis in a prestigious international institution or a leading international company.

## AND IF YOUR DREAM IS TO START A COMPANY...

...Emprèn UPC facilities are the perfect setting for students to develop their innovative projects and new business ideas. They are located on most of the campuses and function as a pre-incubation programme for technology-based projects.

In the Emprèn facilities, young people have a place to work, share resources and services, receive training on starting a company and be mentored by specialists in the field.

## EDUCATION WITHOUT BORDERS

The UPC wants students to become global citizens who are able to understand and embrace the complexity of multiculturalism with a respectful, open and tolerant attitude.

Its commitment and responsibility towards global challenges involves internationalising its academic curriculum,

working in networks, building bridges and understanding different views of the world. In addition to exchange agreements on UPC degrees, the new Erasmus programme (2021-2027) promotes inclusivity, digitalisation and sustainability with other types of mobility, such as short stays and hybrid mobility, which make stays more flexible and grant more financial aid to vulnerable populations.

As a partner university in the Unite! alliance, the UPC offers students multiple options for international education and participation in projects and events with students from the most prominent technological universities in Europe.

Students at the Terrassa School of Optics and Optometry (FOOT) complete placements in which they care for real patients at the University Vision Centre (CUV). In addition to the clinic on the UPC Terrassa Campus, a new centre has been opened on the South Diagonal Campus, in Barcelona, which is specialised in contact lens practice and the control of myopia.



## PLACEMENTS TO EXPLORE THE JOB MARKET AND EXPAND COMPETENCIES

Placements in companies are a great option to experience the job market and complement the knowledge gained in the academic training provided by the UPC. Students gain new skills that prepare them for working in the most suitable environment. Education cooperation agreements

provide companies with staff in advanced training and help them to attract new talent.

At the UPC, placements are almost always paid. They increase graduate employability and promote innovative capacity. They are a defining element of the UPC and contribute to making the institution the best university in Spain in terms of graduate employment.

In the 2022-2023 academic year, 5,119 students participated in placement programmes.



## UPC ALUMNI, THE COMMUNITY OF RELATIONSHIPS

More than 87,000 people are part of the UPC Alumni network. The community is grouped by interests through clubs. An example is the UPC Seniors Club, which channels the interests of retired people from the University through social engagement and promotes university degrees for over 55s. At the other end of the life timeline are clubs such as Dones Politècniques, in which women active in an engineering profession accompany future female engineers in the first steps of their careers.

The goal is clear: to accompany people and create a great community. In the words of entrepreneur and alumni Isabel Garcia, "The aspiration is to have a university to which you can always return and find what you need at each moment: professional relationships, knowledge, lifelong learning, friends and so on."



The latest edition of Formula Student was held in 11 countries. The UPC was one of the universities that participated with the highest number of prototypes. BCN eMotorsport (ETSEIB-ETSETB), Dynamics UPC Manresa (EPSEM), e-Tech Racing (EEBE), Nova Racing Team (EPSEVG) and UPC ecoRacing (ESEIAAT) were the University teams that put their vehicles to the test.



# Much more than studying

*Festival of colours*, which won a prize in the Global South photography competition, is a photograph taken by the student Marc Molla Garcia in the port of Cape Coast, in Ghana. Like him, hundreds of students and other members of the UPC community work on the ground undertaking cooperation projects in countries around the world.



**Incessant activity, such as that camouflaged under the flags of the port of Ghana, accompanies academic life. In this setting, opportunities and experiences flourish, supported by a hundred student associations that enable students to experience their time at the University in a different way. Students can enjoy and have an impact in many areas, in line with the comprehensive training and social engagement that distinguish the University.**

Forming part of a human tower building team, to systematically try to touch the sky with your hands, is a firmly established Catalan tradition that you can practise at the UPC. University theatre, the organisation of hackathons and other events associated with a passion for space, robotics, mathematics, cinema or Japanese culture are activities that form an integral part of the hundred student associations.

Other associations are focused on participation in the University's governance to safeguard, along with the student delegations, the interests and training of students. In this respect, the Student Council is the highest body representing students at the University. It acts as a spokesperson for students and promotes cross-cutting initiatives.





UPC futsal team in the 2022-2023 Spanish University Championship. Women are ever more present, both in classrooms and in university life. Equality is the goal.



# The UPC experience

Sport is another cohesive element in university life. From elite competitive sport to regular sports practice and interuniversity competitions, the Sports Service organises and coordinates a wide range of activities.

The UPCArts programme promotes cultural offerings with advantageous conditions for the UPC community. It is another meeting point for those with shared interests. One of these interests is music, which brings together teaching staff, administrative staff and students through the UPC Orchestra and the Architecture (ETSAB), Mediterranean Technology Park (PMT) and Gaudeamus (EEBE) choirs. The UPC emphasises the relationship between technology and humanism. In this area, the Barcelona School of Telecommunications Engineering (ETSETB) has collaborated actively in the introduction of cutting-edge technology at the Sónar advanced music festival.

## Social engagement

A separate chapter could be given to initiatives that, rather than cultivating a hobby, try to provide a personal or collective response to the desire to improve the world; a desire that is in harmony with the University's commitment to this responsibility in all its areas of activity.

This engagement translates into cross-cutting actions, such as co-operation, mentoring and volunteering projects, and participation in sustainability projects and projects to improve energy efficiency, which can at the same time be the subject of academic and research assignments.

One of the units that contributes to changing the world is the Centre for Development Cooperation (CCD). Over 30 years, the CCD has supported around 2,300 projects worldwide, in collaboration with other entities and organisations. One of the most recent was the Do it Yourself project, which was undertaken by four students at the Terrassa School of Industrial, Aerospace and Audiovisual Engineering (ESEIAAT) in Tororo (Uganda). The aim was to build low-cost wheelchairs using PVC tubes, for students with a range of disabilities.

## The fight against climate change

The UPC has a programme to reduce energy consumption in its activities, with the involvement of the entire university community. Students participate in this programme, which is part of the strategy to reach net zero greenhouse gas emissions by 2030, in their bachelor's, master's and doctoral theses.



# A university aligned with the Sustainable Development Goals (SDGs)



**Committed to a better world**

Through the Centre for Development Cooperation (CCD), the community contributes to the global and local fight against poverty and trains future professionals who will be committed to and active in the construction of a fairer, more sustainable world.



**Robotics adapted to patients**

Students from the Barcelona School of Industrial Engineering (ETSEIB) have created a robotic arm that is cheaper, lighter and more customisable than traditional prostheses.



**More photovoltaic solar energy for self-supply**

With the launch of the photovoltaic solar plant at the School of Mathematics and Statistics (FME), the UPC now has an installed capacity of 687 kWp for self-supply of energy.



**Autonomous vehicles for a healthier city**

The Autonomous Delivery Device (ADD) automates last-mile logistics and helps to improve transport and air quality. It was developed by CARNET, the Institute of Robotics and Industrial Informatics (IRI) and industrial partners of the University.



**For real equality of opportunity**

Aquí STEAM UPC attracts female talent to technology and engineering courses, challenges stereotypes and gender roles and increases the visibility of new female role models. Female UPC researchers are presented to inspire girls and boys in primary and secondary school.



**Designing the cities of the future**

Teaching staff and students of the Barcelona School of Architecture (ETSAB) propose projects and urban planning with a human dimension.



**For responsible consumption**

The UPC-Mercabarna Chair works, from the Barcelona School of Agri-Food and Biosystems Engineering (EEABB), to avoid and reduce food waste.



**Climate action. Saving the Amazon**

The Laboratory of Applied Bioacoustics (LAB), along with scientists from Brazil and Austria, have installed sensors for real-time monitoring of biodiversity in the Amazon.



# EXCELLENT

# CUTTING-

# EDGE

# RESEARCH

**The research activity on UPC campuses is contributing to forging current and future technological progress. This knowledge is translated into real solutions to address social and economic challenges, such as the need for decarbonisation of industry and transport, or to progress in the generation of new materials, whether they are semiconductors to attain more precise devices or antibacterial materials to incorporate into cell tissues.**

**T**he UPC has become established as one of the leading European research universities. It has a good position in the main international rankings. It is the Spanish university that receives the most funds from the European research and innovation programme Horizon Europe, with 47 million euros obtained for 65 projects during 2022. As part of this programme, which ends in 2027, the UPC has 70 ongoing funded projects, which are of considerable importance in science of excellence and in areas associated with European industrial competitiveness, climate change resilience, energy transformation and energy efficiency, and sustainable mobility, among others. Through these projects, the UPC is helping to define what future telecommunications networks will be like, based on advanced 5G and 6G technologies, which will serve various needs. Several groups from the Barcelona School of Telecommunications Engineering (ETSETB) work in these areas. Considering Horizon Europe and other state and international research programmes, in 2022 the UPC participated in over 1,900 research projects, some in partnership with excellent organisations and institutions that are also technology leaders.



Almost 4,000 people make up the teaching and research staff and the staff who work exclusively in research.



## Antibacterial materials for the human body

The generation of new materials that can be used in implants, with antibacterial properties or that help bone regeneration, are some of the fields in which the UPC undertakes excellent research applied to medicine.

The lack of integration of prostheses with surrounding bone tissue and the emergence of symptoms of infection can lead to the formation of bacteria that are resistant to the defences of the immune system and antibiotics. These factors cause 10% of bone implants in Europe and the United States to fail. The Biomaterials, Biomechanics and Tissue Engineering (BBT) research group, linked to the Barcelona East School of Engineering (EEBE), leads the international project Bio-TUNE. This project is focused on the development of new multifunctional materials with high antibacterial potential that can be incorporated into cell tissues. These are innovative biomaterials that, when applied to prostheses, prevent bacteria from adhering and proliferating. In this way, they facilitate implants in the human body.

Advancing further, the same research group is studying other mechanisms of interaction between biomaterials and bacteria. The aim is to develop surfaces that can combat infections and simultaneously promote bone regeneration.

## A hub for hydrogen experimentation

Decarbonisation of industry and transport is one of the current challenges in industry. The UPC has two cutting-edge facilities to advance in hydrogen experimentation and provide sustainable alternatives.

The new UPC Hydrogen Laboratory, which is complemented by a pilot hydrogen production plant, constitutes both a living lab and a showcase of hydrogen technology for the business sector and the academic world. The facility, which is on the Diagonal-Besòs Campus, has funding of over a million euros from the European Regional Development Fund (ERDF) and is associated with the Specific Centre for Hydrogen Research (CER-H2), which brings together the activity of the groups that work in this field.

Experimenting with hydrogen technologies firsthand and producing hydrogen at the same time will help to explore new innovation paths more rapidly. These range from the production of renewable energies (green hydrogen) or production combined with absorption of emissions (blue hydrogen), to storage, distribution and final uses in industry and transport.



## Semiconductors, at the heart of technology

Semiconductors are essential components for the development of key technologies in a wide range of applications. They are at the heart of mobile telephony, computers, autonomous vehicles and artificial intelligence. Several research groups are working on the design of chips, microprocessors and other advanced systems.

Semiconductors are crystalline materials with electrical conductivity halfway between conductors and insulators. This characteristic make them very useful in the manufacture of precision electronic devices, such as diodes, transistors, solar cells and sensors, among others. Currently, the most advanced semiconductor companies are in Taiwan, South Korea and the United States, the leading countries in chip production. The dependence on these markets was clearly shown by the recent crisis in supply, which revealed the need to develop a semiconductor industry in Europe, based on research carried out in universities.

One of the areas of development are bioinspired chips, which could work like digital neurons, with a design based on neural networks and the brain's processing methods. For example, in biomedicine it will be possible to combine various treatments in one pill with artificial intelligence or to design biomedical prostheses that will replace damaged neural function. An example is the work of the research group Intelligent Sensors and Integrated Systems (IS2) at the UPC, which studies bioinspired and neuromorphic solutions to respond to machine learning problems. At the UPC, 150 researchers from 14 research groups are working on areas related to semiconductors, such as transport, energy, telecommunications networks and computing. They form an innovation ecosystem that has the collaboration of many companies from different sectors and has led to the creation of various spin-offs and deep tech companies. In this context, the UPC, along with the Barcelona Supercomputing Center-Centro Nacional de Supercomputación (BSC-CNS), the Institute of Photonic Sciences (ICFO) and other agents in the research system and companies, are part of the Semiconductor and Chip Alliance of Catalonia.

## Protection of coasts and marine ecosystems

Knowledge, tools and solutions to protect and regenerate coasts and marine ecosystems that have been diminished by the effects of climate change, pollution or human activity.

It is crucial to understand the impact of current and future storms on the coast in order to manage coastal risk. This is the aim of the MARLIT project, which won an award from the European Commission. Participants in this project include the Maritime Engineering Laboratory (LIM), located at the Barcelona School of Civil Engineering (ETSECCPB). As part of the project, surveillance systems have been created, as well as autonomous topographic observation and new videometric tools. In addition, last-generation modelling of wave propagation has been created and innovative systems have been assessed to mitigate the effects on the coast. The LIM is working on other projects to create underwater or surface structures that facilitate the natural accumulation of sand in coastal systems to protect them.

Other groups associated with the Vilanova i la Geltrú School of Engineering (EPSEVG) work on the protection of marine ecosystems: the Technological Development Centre for Remote Acquisition and Data Processing Systems (SARTI) has participated in the creation of an innovative biomaterial to regenerate marine ecosystems made from industrial byproducts such as slag.





## Taking a doctoral degree at the UPC: extending the frontiers of knowledge

Bachelor's, master's and doctoral degrees: three stages of education that culminate in the doctoral degree, the highest academic degree awarded by the University, which involves advanced training in research techniques. That is the first step on an exciting path that reaches its highest point in the defence of a doctoral thesis, an original piece of work in a cutting-edge field.

The UPC offers 45 doctoral programmes in architecture, urbanism and building construction, sciences, civil and environmental engineering, ICT engineering and industrial engineering. Currently, a total of 2,104 students are being trained to become future PhD holders. Around a hundred of these students are taking an industrial doctorate. In this case, the key element is a strategic research project for a company or institution in which the doctoral student undertakes research training and the project is the subject of their doctoral thesis.

In the last academic year, 294 doctoral theses were defended on subjects as diverse as the quality of groundwater and the impact on emissions of the meteorological optimisation of maritime routes and the reduction of navigation speed. The assessment of buildings' vulnerability to earthquakes in the Eixample neighbourhood of Barcelona and the use of virtual reality as an alternative rehabilitation therapy for chronic pain are other subjects of recent theses.

These are just some examples that show the talent of future PhD holders. All of this research has a high international component. Over half of Doctoral School students at the UPC come from other countries in Europe, Latin America and Asia. A third obtain an International Doctorate mention, which implies, alongside other requirements, that they have spent time at a foreign university and that part of the thesis has been written in a foreign language.

In this context, the Doctoral School works to ensure the academic quality of the doctoral programmes to attract the best national and international candidates and to offer a solid research and professional career programme, thus promoting international mobility. This education is rewarded at the end of the degree: almost all UPC PhD holders are in employment, generally in positions that correspond to their degree.



An image of load-bearing walls of the Casa Camino Luna (Chile). This technique is described in Fabio Gatti's doctoral thesis: "Marcelo Cortés Arquitecto. El desafío sísmico de las técnicas con tierra armada" [Marcelo Cortés, Architect. The seismic challenge of techniques with reinforced earth], defended at the Barcelona School of Building Construction (EPSEB). ©Gatti, F.

## When citizens get involved in research

Citizens can participate actively in university research and become a key element in many of the projects that are carried out at the UPC. This is known as citizen science. Participation, which can be undertaken in different ways, connects scientific challenges with society and its needs.

Citizen participation takes many forms and is an increasing trend worldwide. For example, citizens can help to design the ideal tomato as part of research at the Barcelona School of Agri-Food and Biosystems Engineering (EEABB) and the Miquel Agustí Foundation, or donate their old mobile phone to science so that, at the Manresa School of Engineering (EPSEM), cleaner, cheaper processes can be developed for companies.

Research projects empower citizens. They are another way of bringing the activity of the University's laboratories and research groups and centres closer to society. In turn, citizen science raises researchers' awareness of concerns in the surrounding environment and puts them in contact with different agents, such as entities from the third sector and social groups that have specific, real identified needs. Citizen science initiatives at the UPC are described in the Citizen Science Portal:

<https://cienciaciudadana.upc.edu/>

## Science with a conscience

Artificial intelligence, robotics and human-machine interactions, climate change and sustainability, and nanotechnology are all areas that are leading to major contemporary dilemmas. The UPC focuses on ethical aspects in the surrounding environment and especially in its own activity. It constantly examines its activities to look for answers and incorporates the ethical dimension into the training it provides, as a way to have an impact on the present and future of society. In this respect, advice on research and transfer that is carried out at the University is provided by the Ethics Committee, which ensures that the University's projects are undertaken according to ethical criteria and for the common good.



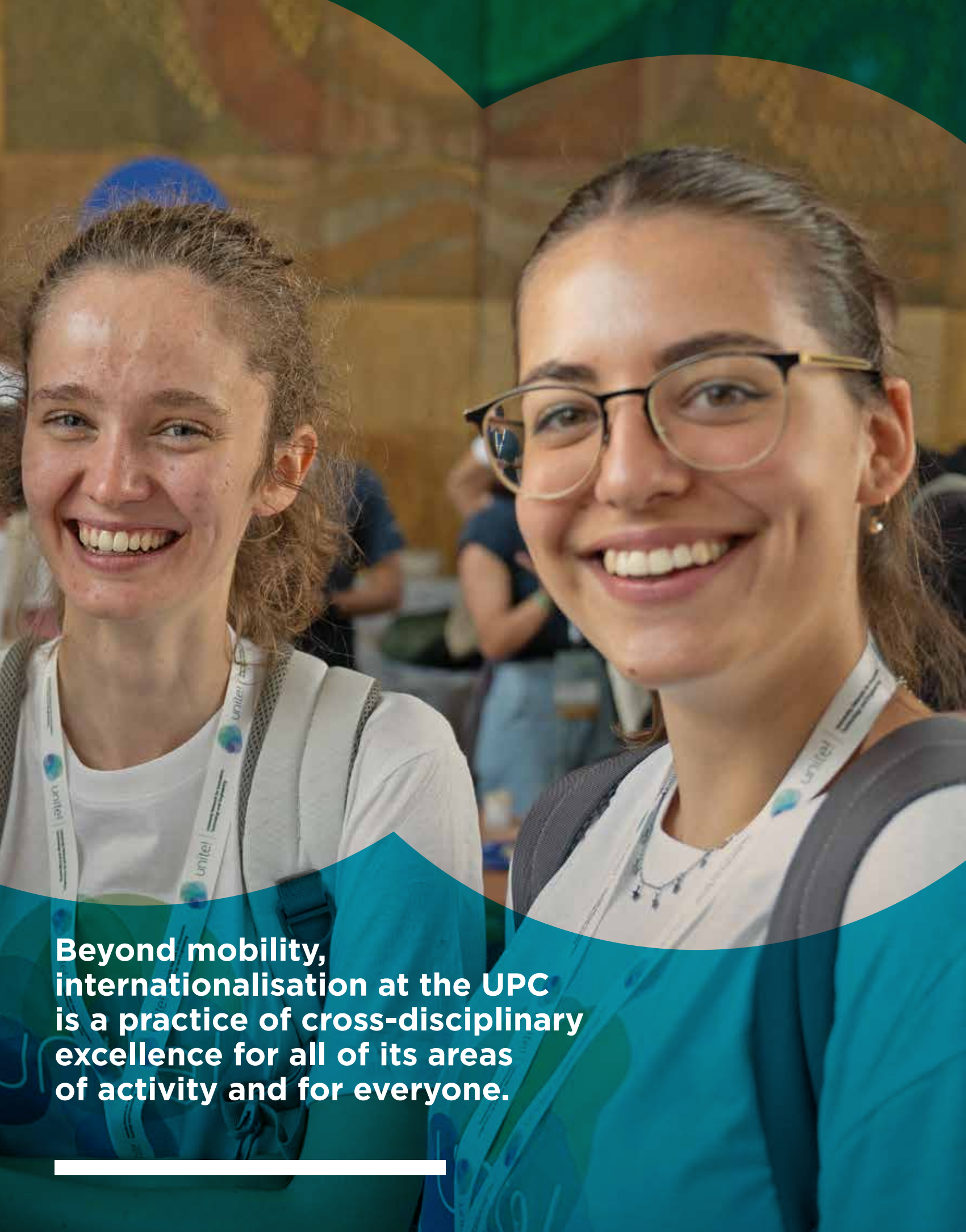
The compulsory subject Ethics on the bachelor's degree in Data Science and Engineering analyses how technology, and particularly AI, affects human and social relationships. An image of the workshops that are attended by UPC students and Philosophy students from the University of Barcelona.



A university with an international vocation that is more inclusive, digital and sustainable, that functions as part of a network and is based on long-term alliances with universities and other academic and scientific institutions in Europe and around the world. The UPC strives to be a community of citizens who have the ability to understand the world and contribute to it, a community of open, tolerant, empathetic and adaptable people who have the skills and knowledge they need to contribute to the great challenges of today's society.

# ON THE WORLD STAGE





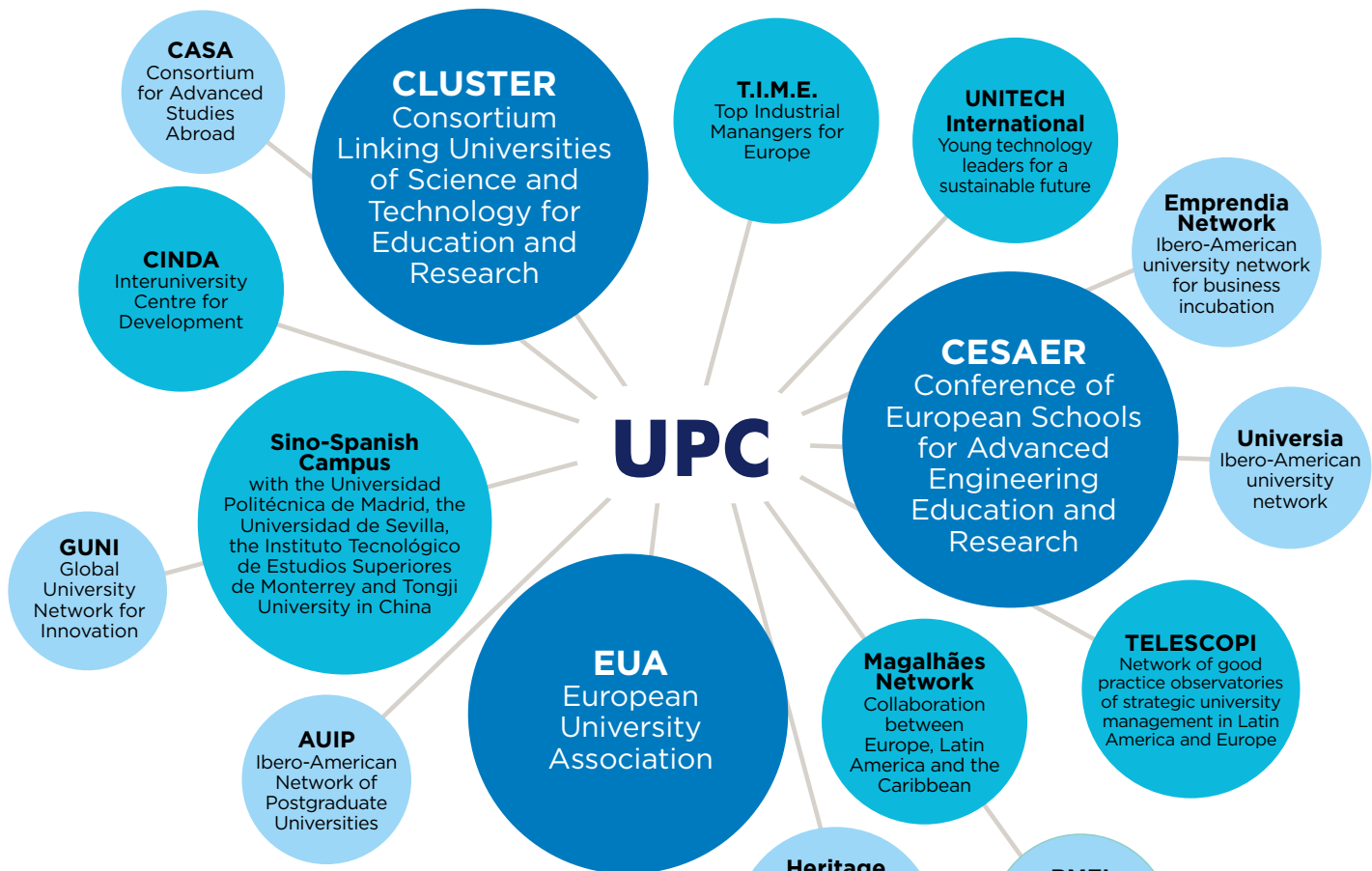
**Beyond mobility,  
internationalisation at the UPC  
is a practice of cross-disciplinary  
excellence for all of its areas  
of activity and for everyone.**

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# THE UPC IN INTERNATIONAL NETWORKS

In recent years, the University has forged collaborations worldwide. Today it plays an active role in an extensive, rich network of strategic international partnerships. These ecosystems of institutions facilitate the community's mobility, the development of international teaching and research projects, and the attraction of talent and opportunities. In this global context, only international cooperation can provide the response to shared challenges. Internationalisation of all of the activity, for everyone, that is digital, green and sustainable, marks the path towards a world of knowledge without borders, for a university that has the world as its stage. These are the main international networks that the UPC belongs to:



44  
INTERNATIONAL  
DOUBLE DEGREE  
PROGRAMMES WITH  
30  
UNIVERSITIES

55%  
OF DOCTORAL  
STUDENTS AND  
27%  
OF MASTER'S STUDENTS  
ARE INTERNATIONAL

1,414  
UPC STUDENTS ON  
MOBILITY PROGRAMMES

1,526  
INTERNATIONAL  
EXCHANGE STUDENTS  
AT THE UPC

1,551  
STUDENT EXCHANGE  
AGREEMENTS WITH  
716  
UNIVERSITIES

227  
EDUCATIONAL  
COOPERATION  
AGREEMENTS WITH  
INTERNATIONAL  
INSTITUTIONS

# UNITE!, BUILDING THE EUROPEAN UNIVERSITY OF THE FUTURE

The UPC is one of nine European universities that make up Unite!, the University Network for Innovation, Technology and Engineering. This alliance of European technological universities works with the support of the European Commission to promote the construction of the future European Higher Education Area. Unite! combines the talent of a community of more than 280,000 students and nearly 80,000 bachelor's, master's and doctoral degree graduates each year. With Unite!, the UPC works to design and consolidate a new European university model to provide education and research of excellence focusing on today's major social and technological challenges. The communities of the nine universities, comprising teaching and research staff, administrative staff and students, carry out and participate in projects on implementing future European bachelor's degrees and developing

a European Doctoral School around strategic areas such as sustainable energy, artificial intelligence, Industry 4.0 and entrepreneurship. The alliance is designing new learning models for digital, hybrid and face-to-face environments that will facilitate mobility, knowledge exchange and access to joint master's and doctoral programmes. Teaching innovation and professional development seminars are also offered to the academic and administrative staff of member universities. In the area of research, work is being done on establishing a common research agenda, promoting open science, sharing infrastructure and disseminating science to society. Unite! connects different European regions, facilitating the universities' collaboration with the production and innovation ecosystems around it within a wider multicultural, multilingual, digital and green framework.



**Aalto University**

**Graz University of Technology**

**Grenoble INP-UGA**

**KTH Royal Institute of Technology**

**Politecnico di Torino**

**Technical University of Darmstadt**

**Universidade de Lisboa**

**Universitat Politècnica de Catalunya - BarcelonaTech**

**Wrocław Tech**



Representatives of the nine communities in the alliance in Wrocław (Poland) during the Eighth Unite! Dialogue (September 2023)



# Innovation and knowledge transfer to companies



The UPC's connection with the business sector generates innovation environments that establish the basis for Industry 4.0 through the application of leading technologies. This knowledge transfer enables the industrial sector to adapt and address the challenges in current society, with the application of advanced manufacturing technologies, artificial intelligence, industrial robotics or nanotechnology, among many other topics. This collaboration materialises every year in over a thousand agreements and national and international projects, which transform into a production value the knowledge generated by research groups and centres. There is a focus on emerging sectors, without overlooking the needs of small and medium-sized companies for whom tailor-made solutions are designed. These synergies with the business sector promote the development

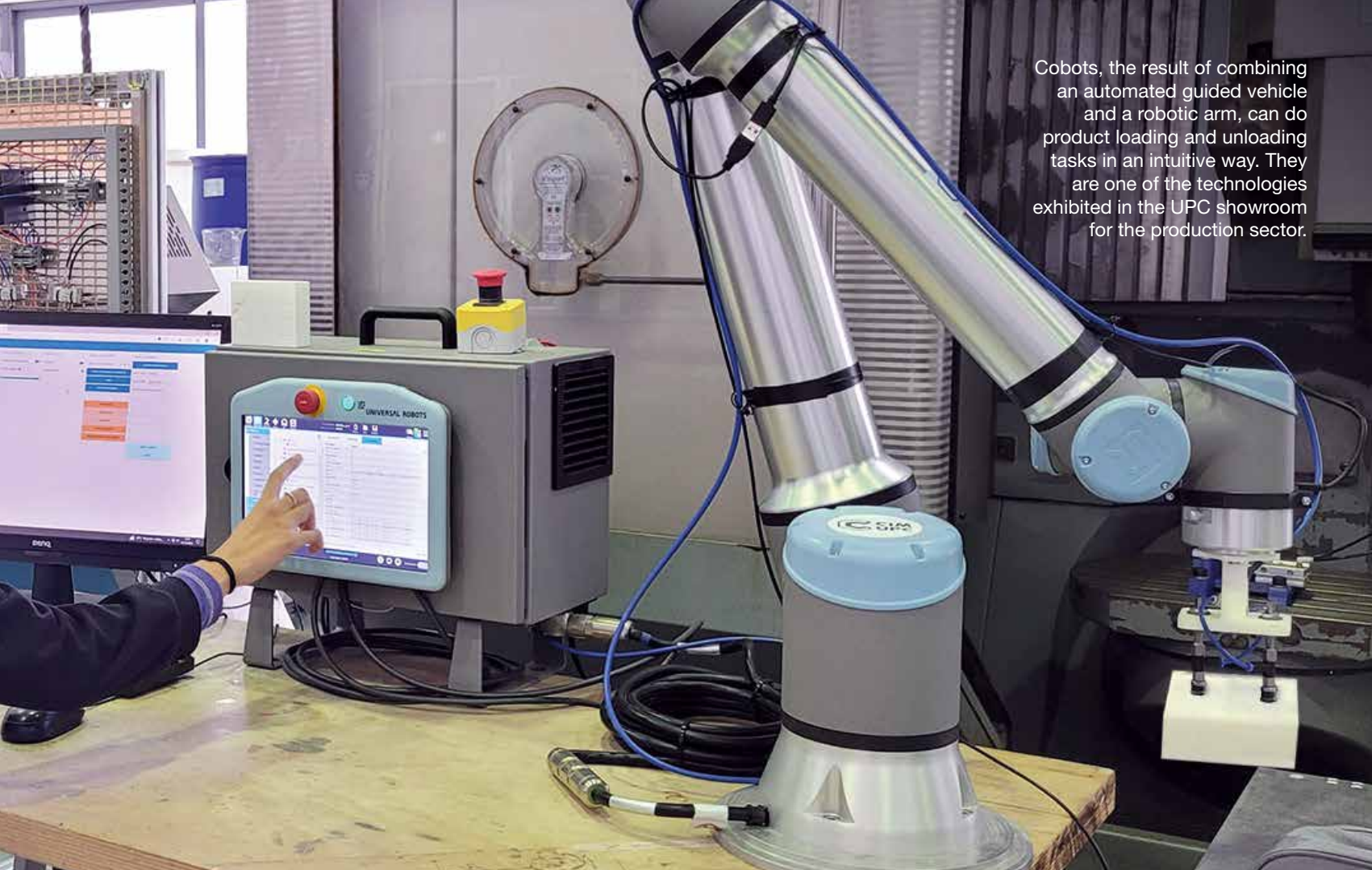
and advanced production of technologies, for example in the semiconductor industry, an area in which the research emerging from the UPC is highly relevant.

## Companies on campus

A successful case of how results are transferred from the University to the production sector is the collaboration with the US company Qorvo, which, after more than a decade of collaboration with the research group Components and Systems for Communications (CSC), associated with the Castelldefels School of Telecommunications and Aerospace Engineering (EETAC), has set up an office in the K2M building on the North Diagonal Campus. Knowledge transfer is also coordinated through groups with other universities and entities that try to converge on a common objective. This is

the case of Looming Factory, a project that provides consistency to Industry 4.0. It has focused on improving predictive design and operations, the connection of machines and smart automation, to attain 100% remote control capacity in industrial production. The results are exhibited in a showroom, located in the pilot plant of the CIM Foundation, in the form of solutions, technologies and use cases for companies that have decided to move towards full digitalisation.

In addition to Looming Factory, the University participates in a further five technological alliances with public and private entities to promote developments in areas such as 3D printing, the next generation of computers, the Internet of Things, low-power processors and fusion energy, and quantum computing: BASE3D, DRAC, FEM-IoT, FusionCAT and QuantumCAT, respectively.



Cobots, the result of combining an automated guided vehicle and a robotic arm, can do product loading and unloading tasks in an intuitive way. They are one of the technologies exhibited in the UPC showroom for the production sector.

The Scientific and Technical Services portal offers companies a one-stop shop to access the network of laboratories and facilities. [serveiscientificotecnic.upc.edu](http://serveiscientificotecnic.upc.edu)

## INNOVATION HUBS

Some of the synergies between the UPC and the business sector materialise in innovation hubs. These are an ideal framework for collaboration to develop new products and services, often in connection with student projects, spin-offs and start-ups that have emerged from the University and incubators of emerging companies. SEAT and Volkswagen Group Research, Huawei, Damm, Port

de Barcelona and Innomads are companies with which the University is working in a coordinated way to advance scientific knowledge in the fields of sustainable mobility, 5G, digital manufacturing and quantum technologies. In this ecosystem, incubators are also increasing innovation. One example is that promoted by the European Space Agency at the Baix Llobregat Campus: ESA BIC Barcelona. The facility will accelerate start-ups that base their business on the innovative use of space technologies.

## PATENTS

The UPC is a leading university in the generation of patents. Many patents form part of its portfolio of marketable technologies, including an electronic cardiac arteriogram. This is a simple, affordable device that measures various cardiovascular parameters based on unsupervised measurements that are obtained easily from hands and/or feet. Another patent in the portfolio is an information system to optimise the transport of people with reduced mobility in individual and collective public services, and a handover system to transfer the signal via 4G/5G networks, which makes transmission more efficient.

Another formula to concentrate knowledge and transfer it to the market is Agrotech, a research centre that is closely related to the >>



<< Barcelona School of Agri-Food and Biosystems Engineering (EEABB). It creates technology derived from robotics, digitalisation and communication to be adopted by the agri-food sector.

## AUTOMOTIVE ENGINEERING

The automotive industry is the second most important industry in Catalonia. It directly provides work for 56,000 people, a figure that increases to 143,000 if we include distribution and repair.

The industry is composed of 10,000 companies and generates over 10% of GDP. This is a strategic sector for Catalonia, to which the UPC contributes training, research, knowledge transfer and innovation. The commitment is to promote a model of sustainable mobility with low environmental impact that is efficient and fair. With this goal in mind, alliances have been formed with the main agents in the sector and technology transfer is carried out with companies.

The FPCAT-UPC Sustainable Mobility Campus (Martorell), which provides initial vocational and continuing education in this field, and CARNET, the hub created by SEAT and Volkswagen Group Research, are two examples.

## INNOVATION HUBS

The University participates in major international knowledge transfer projects, such as EIT Urban Mobility, a European consortium that promotes innovation and entrepreneurship to attain more efficient, smart, decarbonised cities. The main European automotive companies are involved in this project. The UPC is also part



## THE VALUE OF THE 360° PARTNERSHIP

The Connèxia UPC programme offers the establishment of a strategic partnership with the University to companies, to provide them with high-value services. It is conceived as an exceptional framework and based on a method that generates an environment of trust. In it, an expert with a high degree of knowledge of the University's capabilities explores the needs of a company, works on its demands and identifies new opportunities for collaboration. The starting point then becomes a global project, tailored to the company, in which talent, research, innovation and corporate social responsibility

are brought together in a wide range of services.

Joining Connèxia UPC means establishing a link to gain access to the initiatives that only a technical university that is a leader in knowledge transfer can offer with an all-round, 360° vision. This is an entry point for new ideas and new companies, for patents, the recruitment of the most suitable talent, connection with leading research, and training.

Further information: [programa.connexia@upc.edu](mailto:programa.connexia@upc.edu)

of other European communities promoted by the European Institute of Innovation and Technology (EIT) that focus on innovation. In addition to EIT Urban Mobility, these include EIT Innoenergy, EIT Raw Materials and EIT Health. These are all partnerships that bring together companies, research centres and universities to find solutions to a specific global challenge.

2,834

ASSOCIATED COMPANIES

## ENTERPRISE CHAIRS

Enterprise chairs are an instrument to establish long-term collaboration between companies and the University. They offer a wide range of advantages, as they are tailor-made and promote training, research and knowledge and technology transfer projects that are of interest to companies and to the UPC.

The chairs promote student placements in companies and bachelor's, master's and doctoral theses.

**Girbau Group-UPC Chair** of Research and Innovation in Industrial Laundry Technology

**SEAT-UPC Chair** in Automotive Excellence and Innovation for Sustainable Mobility

**AMES Group-UPC Chair** in Design and Innovation of New Biomaterials

**Barcelona Chair of Housing Studies**

**Batlleiroig Chair**

Telefónica Móviles España **Cognitive IoT Chair**, Universitat Politècnica de Catalunya, Universitat Pompeu Fabra

**Urban Regeneration Chair**

**EIC-UPC Engineering and Business Chair**

**Endesa Red-UPC Chair** in Energy Innovation

**Estabanell-UPC Chair**

**UPC Galimplant Chair**

**UPC-Construc a Group Chair**, circular economy hub for construction and industry

**JG Ingenieros Group-UPC Chair** for Sustainability Studies of Buildings

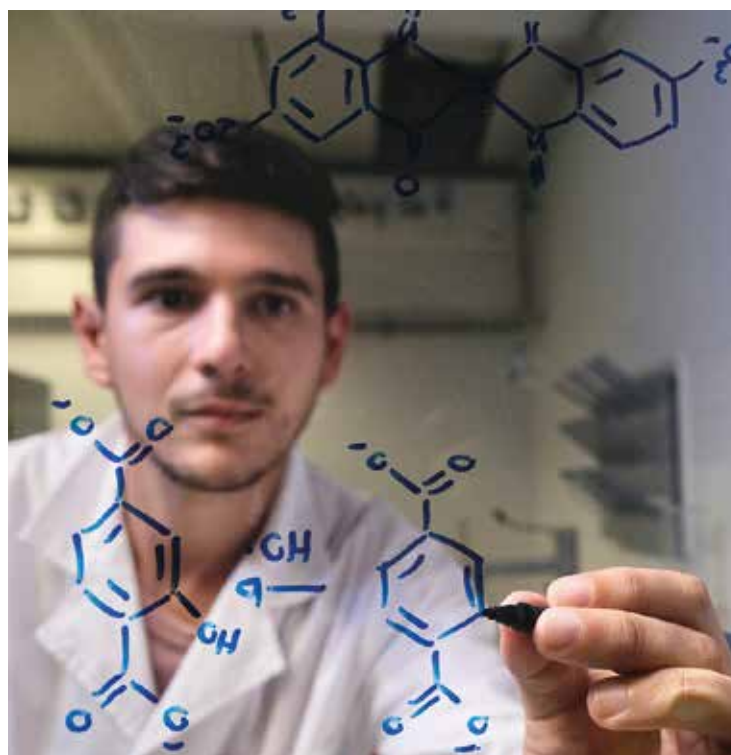
HP-UPC Digital Manufacturing **Innovation Hub Chair**

**Jujol Chair**

**Klockner-UPC Chair** in Dental Implants and Prostheses

**UPC-Mercabarna Chair** for Tackling Food Waste

**Vanderlande Industries Spain Chair**



## INDUSTRIAL DOCTORATES, ATTRACTING THE RIGHT TALENT

Industrial doctorates are a formula to increase the competitiveness and internationalisation of the Catalan industrial fabric and promote the recruitment of university talent by businesses. They are based on agreements with the UPC and last for about three years, during which doctoral candidates carry out a research project that is the object of a doctoral thesis at a company. The programme fosters industrial doctoral degree holders acting as bridges for knowledge transfer and also create highly qualified jobs in the country's industrial fabric. The UPC has established itself as a leading university in industrial doctorate projects in Catalonia, and in the last academic year 99 students took this programme, which is promoted by the Government of Catalonia.

# 1,924

ACTIVE RESEARCH AGREEMENTS AND PROJECTS

# 41

TECHNOLOGY-BASED COMPANIES IN WHICH THE UNIVERSITY HAS SHARES

# 13

PATENTS (2022)

# 13

TECHNOLOGY-BASED COMPANIES (2022)



# UPC STRUCTURE

## DEPARTMENTS

**CEM.** Materials Science and Engineering

**CEN.** Nautical Science and Engineering

**CS.** Computer Science

**DAC.** Computer Architecture

**DEAB.** Agri-Food Engineering and Biotechnology

**DECA.** Civil and Environmental Engineering

**DEE.** Electrical Engineering

**EEL.** Electronic Engineering

**EGD.** Engineering Graphics and Design

**EIO.** Statistics and Operations Research

**EM.** Mechanical Engineering

**EMIT.** Mining, Industrial and ICT Engineering

**ENTEL.** Network Engineering

**EPC.** Project and Construction Engineering

**EQ.** Chemical Engineering

**ESAIL.** Automatic Control

**ESSI.** Service and Information System Engineering

**FIS.** Physics

**MAT.** Mathematics

**MF.** Fluid Mechanics

**MMT.** Heat Engines

**OE.** Management

**OO.** Optics and Optometry

**PA.** Architectural Design

**RA.** Architectural Representation

**RMEE.** Strength of Materials and Structural Engineering

**TA.** Architectural Technology

**THATC.** Theory and History of Architecture and Communication Techniques

**TSC.** Signal Theory and Communications

**UTP.** Urbanism, Territory and Landscape

## TECNIO RESEARCH CENTRES\*

**CATMech.** Centre for Advanced Technologies in Mechanics

**CCP.** Catalan Plastics Centre

**CD6.** Centre for Sensor, Instrument and Systems Development

**CITCEA-UPC.** Centre for Technological Innovation in Static Converters and Actuators

**CREB.** Biomedical Engineering Research Centre

**CTTC.** Heat and Mass Transfer Technological Centre

**DigiFACT.** Centres for Advanced Digital Factories

**GCEM.** Electromagnetic Compatibility Group

**IMEM CIEFMA-UPC.** Innovation in Materials and Molecular Engineering. Centre for Structural Integrity, Micromechanics and Reliability of Materials

**inLab FIB**

**INTEXTER.** Terrassa Institute of Textile Research and Industrial Cooperation

**IRI.** Institute of Robotics and Industrial Informatics. CSIC-UPC

**MCIA.** Motion Control and Industrial Applications Research Group

**SARTI.** Technological Development Centre for Remote Acquisition and Data Processing Systems

**SEER.** Renewable Electrical Energy Systems

**SSR-UPC.** Smart Sustainable Resources

\* Research centres that belong to the Network of Technological Innovation Support Centres (TECNIO)

## INSTITUTES

**FLUMEN.** River Dynamics and Hydrological Engineering Institute (UPC-CIME-owned)

**IBEI.** Barcelona Institute of International Studies (interuniversity)

**ICE.** Institute of Education Sciences

**ICFO.** Institute of Photonic Sciences (associated entity and affiliated institute)

**IIEDG.** Interuniversity Women's and Gender Studies Institute (interuniversity)

**IMTech.** Institute of Mathematics of the UPC - BarcelonaTech

**INTE.** Institute of Energy Technologies

**INTEXTER.** Terrassa Institute of Textile Research and Industrial Cooperation

**IOC.** Institute of Industrial and Control Engineering

**IRI.** Institute of Robotics and Industrial Informatics (UPC-CSIC joint ownership)

**ISUPC.** University Research Institute for Sustainability Science and Technology

## SPECIFIC RESEARCH CENTRES

<b>AGROTECH-UPC.</b> Agri-Food Technology Specific Research Centre
<b>CER-H2.</b> Specific Centre for Hydrogen Research
<b>CATMech.</b> Centre for Advanced Technologies in Mechanics
<b>CCABA.</b> Centre for Advanced Broadband Communications
<b>CD6.</b> Centre for Sensor, Instrument and Systems Development
<b>CDPAC.</b> Architectural Design Documentation Centre of Catalonia
<b>CEBIM.</b> Molecular Biotechnology Centre
<b>CERpIE.</b> Research and Development Centre for Business Improvement and Innovation
<b>CETpD.</b> Technical Research Centre for Dependency Care and Autonomous Living
<b>CommSensLab-UPC.</b> Remote Sensing, Antennas, Microwaves and Superconductivity Group
<b>CPSV.</b> Centre for Land Valuation Policy (CER)
<b>CRAL.</b> Centre for Research and Services for the Local Administration
<b>CREB.</b> Biomedical Engineering Research Centre
<b>CREMIT.</b> Center for Engines and Heat Installations
<b>BRCMSE.</b> Barcelona Research Center in Multiscale Science and Engineering
<b>CS2 AC-UPC.</b> Supervision, Safety and Automatic Control
<b>IDEAI-UPC.</b> Intelligent Data Science and Artificial Intelligence Research Center
<b>LaCàN.</b> Numerical Methods for Applied Sciences and Engineering
<b>LIM/UPC.</b> Maritime Engineering Laboratory
<b>(MC)2-UPC.</b> Continuum and Computational Mechanics
<b>PERC-UPC.</b> Power Electronics Research Centre
<b>SSR-UPC.</b> Smart Sustainable Resources
<b>TALP.</b> Centre for Language and Speech Technologies and Applications

## ASSOCIATED RESEARCH ENTITIES

<b>BSC-CNS.</b> Barcelona Supercomputing Center - Centro Nacional de Supercomputación (MareNostrum)
<b>CIIRC.</b> International Centre for Coastal Resources Research*
<b>CIMNE.</b> International Centre for Numerical Methods in Engineering*
<b>CREDA.</b> Centre for Agrifood Economics and Development
<b>CTTC.</b> Telecommunications Technology Centre of Catalonia*
<b>EURECAT.</b> Technology Centre of Catalonia
<b>FMA.</b> Miquel Agustí Foundation
<b>i2CAT.</b> i2Cat Foundation*
<b>IBEC.</b> Institute for Bioengineering of Catalonia*
<b>ICFO.</b> Institute of Photonic Sciences*
<b>IEEC.</b> Institute of Space Studies of Catalonia*
<b>IREC.</b> Catalonia Institute for Energy Research*

\* Entity that is a member of the Research Centres of Catalonia (CERCA) programme

The MareNostrum supercomputer at the Barcelona Supercomputing Center-Centro Nacional de Supercomputación (BSC-CNS).





# UPC GROUP

The UPC Group consists of entities in which the UPC has a direct or indirect controlling interest. All of them aim to make the University's mission a reality by making a variety of contributions.



## FPCAT-UPC SUSTAINABLE MOBILITY CAMPUS (MARTORELL)

This is a new hub for training, in this case initial vocational and continuing education, in the areas of automotive engineering, sustainable mobility and advanced industry.

## CIM UPC

CIM UPC is an innovation and technology centre specialised in advanced production technologies. It helps companies and professionals to increase technological capacity and innovation by offering technology services in the industrial sector and specific training programmes.

## ITHINKUPC

IThinkUPC is the consultancy and advanced software services company of the Universitat Politècnica de Catalunya. It helps companies by creating solutions and advanced services.

## B\_TEC FOUNDATION

The b\_TEC Foundation promotes the UPC's Diagonal-Besòs Campus, contributes to connecting the public administration, the University and the business world, and drives territorial transformation.



## FUNDACIÓ POLITÈCNICA DE CATALUNYA (FPC)

The Fundació Politècnica de Catalunya (FPC) is an institution created by the UPC to foster and promote continuing education activities. The UPC School coordinates this offering.

## INNOVATION AND TECHNOLOGY CENTRE FOUNDATION (CIT UPC)

CIT UPC puts the University's research capacity at the service of business innovation. The knowledge and results of the UPC's research and technology transfer centres are the tools it works with.

## MEDITERRANEAN TECHNOLOGY PARK (PMT)

A science and technology park promoted by the Government of Catalonia, the Baix Llobregat Provincial Council, Castelldefels City Council and the UPC. It promotes a multidisciplinary space in which research, innovation and knowledge transfer are a driver of development.

## UPCNET

UPCnet is a UPC Group company created to provide services in the areas of information and communication technologies. These services are designed for the units of the UPC and other companies in the Group.

# COLLABORATING COMPANIES AND ORGANISATIONS AND SPONSORS

Almost 3,000 companies have some kind of link with the University. The most common form university corporate relations take is knowledge and technology transfer agreements and work placement programmes that allow corporations to recruit new talent from the UPC, including through industrial doctorates. Every day, more large, medium-sized and small

companies establish institutional ties with the UPC that make projects with shared interests possible. Enterprise chairs, sponsorship and patronage provide solutions to challenges and enable projects, which are often complex and ambitious, to be carried out. Without the trust of collaborating companies, these could never be undertaken.

## SPONSORS OF EXCELLENCE



## SPONSORS

Accenture, S.L.

ADEVINTA SPAIN, S.L.U.

AMES

Batlle i Roig Arquitectura SLP

CIMSA Cementos de España, S.A.U.

Col·legi Oficial d'Enginyers

Industrials de Catalunya

Construció

ENDESA, S.A.

ESTABANELL Y PAHISA, S.A.

Fundació Caixa d'Enginyers

Fundación ONCE

HP Printing and Computing

Solutions S.L.U. (HP)

JG Ingenieros

LG ELECTRONICS ESPAÑA, S.A.U.

Mercados de abastecimientos

de Barcelona, S.A. (MERCABARNA)

NTT DATA

NUEVA GALIMPLANT, S.L.U.

SOADCO (Klockner Implant System)

Sociedad General de Aguas de Barcelona S.A. (AGBAR)

Telefónica

Vanderlande

## COLLABORATORS

Between Technology

College of Engineering Graduates and Industrial Engineers of Barcelona

College of Industrial Engineers of Manresa

DENSO

DOW CHEMICAL

Spanish Federation of Optical Sector Associations (FEDAO)

Ficosa internacional S.A.

GE Renewable Energy

Gestión Natural Optics, S.L.

GRADHERMETIC

National Association and Mutual Benefit Society of Architects, Technical Architects and Chemists

Ineco S.A.

LAMP S.A.

Òptica Salas, S.L.

Schneider Electric España SAU

SHAEFFLER IBERIA S.L.U.

Siresa Campus S.L.

Spirax-Sarco Engineering

URBIDERMIS, S.L.



# 2023-2024 BACHELOR'S DEGREES

[www.upc.edu/en/bachelors](http://www.upc.edu/en/bachelors)

## ARCHITECTURE, URBANISM AND BUILDING CONSTRUCTION

Architectural Technology and Building Construction. EPSEB  
Architecture Studies. ETSAB, ETSAV  
Landscape Architecture. EEABB-ETSAB

## APPLIED SCIENCES

Data Science and Engineering. ETSETB-FIB-FME  
Marine Sciences and Technologies, majors in: Marine Sciences and Engineering / Marine Technologies. ETSECCPB-EPSEVG-EEABB  
Engineering Physics. ETSETB  
Mathematics. FME  
Statistics. FME (interuniversity UB-UPC degree)  
Economics and Statistics. FME (interuniversity UB-UPC double degree)

## HEALTH SCIENCES AND TECHNOLOGY

Biomedical Engineering. EEBE  
Optics and Optometry. FOOT

## DESIGN AND MULTIMEDIA TECHNOLOGY

Design, Animation and Digital Art. CITM  
Video Game Design and Development. CITM  
Multimedia Studies. CITM  
Digital Design and Multimedia Technologies. CITM

## AEROSPACE ENGINEERING

Aerospace Systems Engineering, majors in: Air Navigation / Airports. EETAC  
Aerospace Systems Engineering + Telecommunications Systems Engineering / Network Engineering. EETAC (double degree)  
Aerospace Technology Engineering. ESEIAAT  
Aerospace Vehicle Engineering. ESEIAAT

## BIOSYSTEMS AND AGRI-FOOD ENGINEERING

Food Engineering. EEABB  
Agronomic Science Engineering, majors in: Horticulture and Gardening / Crop and Livestock Production. EEABB  
Biosystems Engineering. EEABB  
Landscape Architecture. EEABB-ETSAB  
Culinary and Gastronomic Sciences. EEABB (interuniversity UB-UPC degree)

## CIVIL ENGINEERING

Environmental Engineering. ETSECCPB-EEABB  
Civil Engineering. ETSECCPB  
Geoinformation and Geomatics Engineering. EPSEB  
Mineral Resource Engineering and Mineral Recycling. EPSEM



## INDUSTRIAL ENGINEERING

Automotive Engineering. EPSEM  
Biomedical Engineering. EEBE  
Industrial Design and Product Development Engineering. EPSEVG, ESEIAAT  
Electrical Engineering. EEBE, EPSEVG, ESEIAAT  
Industrial Electronics and Automatic Control Engineering. EEBE, EPSEM, EPSEVG, ESEIAAT  
Energy Engineering. EEBE  
Materials Engineering. EEBE  
Mechanical Engineering. EEBE, EPSEM, EPSEVG, ESEIAAT  
Chemical Engineering. EEBE, EPSEM, ESEIAAT  
Textile Technology and Design Engineering. ESEIAAT  
Industrial Technology Engineering. ESEIAAT, ETSEIB  
Industrial Technologies and Economic Analysis. ETSEIB (interuniversity UPC-UPF degree)

## INFORMATICS ENGINEERING

Data Science and Engineering. FIB-ETSETB-FME  
Geoinformation and Geomatics Engineering. EPSEB  
Informatics Engineering, majors in: Computing / Computer Engineering / Software Engineering / Information Systems. FIB / Information Technologies. EPSEVG, FIB  
ICT Systems Engineering. EPSEM  
Artificial Intelligence. FIB  
Bioinformatics Engineering. FIB (interuniversity UPF-UPC-UB degree)



## NAVAL, MARITIME AND NAUTICAL ENGINEERING

Naval Systems and Technology Engineering. FNB  
Nautical Engineering and Sea Transport. FNB  
Marine Technologies. FNB

## TELECOMMUNICATIONS ENGINEERING

Data Science and Engineering. FIB-ETSETB-FME  
Electronic Engineering and Telecommunications. ETSETB  
Geoinformation and Geomatics Engineering. EPSEB  
Audiovisual Systems Engineering. ESEIAAT  
Telecommunications Systems Engineering. EETAC  
Telecommunications Systems Engineering / Network Engineering + Aerospace Systems Engineering. EETAC (double degree)  
ICT Systems Engineering. EPSEM  
Telecommunications Technologies and Services Engineering, majors in: Audiovisual Systems / Telecommunications Systems / Network Systems. ETSETB  
Network Engineering. EETAC



# 2023-2024 MASTER'S DEGREES

[www.upc.edu/en/masters](http://www.upc.edu/en/masters)

## ARCHITECTURE, URBANISM AND BUILDING CONSTRUCTION

Architecture

---

Advanced Building  
Construction

---

Diagnosis and Intervention  
Techniques in Building  
Construction

---

Advanced Studies  
in Architecture-Barcelona  
(MBArch)

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Advanced Studies in Design-  
Barcelona (MBDesign)

---

Building Construction  
Management

---

Sustainable Intervention in the  
Built Environment (MISMec)

---

Landscape Architecture  
(MBLandArch)

## APPLIED SCIENCES

Advanced Mathematics and  
Mathematical Engineering  
(MAMME)

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Computer Vision

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Engineering Physics

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Statistics and Operations  
Research

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Atomistic and Multiscale  
Computational Modelling  
in Physics, Chemistry  
and Biochemistry

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Photonics

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Pure and Applied Logic

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Quantum Science  
and Technology

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Occupational Health  
and Safety

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Erasmus Mundus / Bio  
and Pharmaceutical Materials  
Science (BIOPHAM)

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Erasmus Mundus / Photonics  
Engineering, Nanophotonics  
and Biophotonics  
(Europhotonics)

## HEALTH SCIENCES AND TECHNOLOGY

Biomedical Data Science

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Biomedical Engineering

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Neuroengineering  
and Rehabilitation

---

Optometry and Vision Sciences

---

Erasmus Mundus / Bio  
and Pharmaceutical Materials  
Science (BIOPHAM)

## AEROSPACE ENGINEERING

Aerospace Science  
and Technology (MAST)

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Applications and Technologies  
for Unmanned Aircraft  
Systems (Drones)

---

Aerospace Engineering

---

Space and Aeronautical  
Engineering

## BIOSYSTEMS AND AGRI-FOOD ENGINEERING

Aquaculture

---

Agronomic Engineering

---

Key Enabling Technologies  
for the Food and  
Bioprocessing Industry  
(TECH4AGRI+FOOD)

## CIVIL ENGINEERING

Civil Engineering

---

Structural and Construction  
Engineering

---

Mining Engineering

---

Geotechnical Engineering

---

Numerical Methods  
in Engineering

---

Oceanography and Marine  
Management

---

Structural Analysis  
of Monuments and Historical  
Constructions (SAHC)

---

Urban Mobility

---

Erasmus Mundus / Coastal  
and Marine Engineering  
and Management (CoMEM)

## INDUSTRIAL ENGINEERING

Automatic Control  
and Robotics

---

Chemical Engineering

---

Advanced Materials Science  
and Engineering

---

Textile Design and Technology

---

Electric Power Systems  
and Drives

---

Automotive Engineering

---

Biomedical Engineering

---

Energy Engineering (linked to  
the InnoEnergy programme)

---

Industrial Engineering

---

Management Engineering

---

Automatic Systems

---

Engineering and Industrial  
Electronics

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Advanced Studies in Design-  
Barcelona (MBDesign)

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Interdisciplinary and  
Innovative Engineering

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Neuroengineering and  
Rehabilitation

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Nuclear Engineering (linked to  
the InnoEnergy programme)

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Research in Mechanical  
Engineering

---

Technology and Engineering  
Management

---

Paper and Graphics  
Technology

---

Thermal Engineering

---

Urban Mobility

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Erasmus Mundus / Advanced  
Materials Science and  
Engineering (AMASE)

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Erasmus Mundus /  
Decentralised Smart Energy  
Systems

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Erasmus Mundus / Dynamics  
of Renewables-based Power  
Systems

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Erasmus Mundus / Hydrogen  
Systems and Enabling  
Technologies (HySET)

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Erasmus Mundus / Science  
in Fire Safety Engineering  
(IMFSE)

## INFORMATICS ENGINEERING

Artificial Intelligence

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Cybersecurity

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Data Science

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Informatics Engineering

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Innovation and Research  
in Informatics (MIRI)

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Erasmus Mundus / Big Data  
Management and Analytics  
(BDMA)

## NAVAL, MARITIME AND NAUTICAL ENGINEERING

Naval and Ocean Engineering

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Management and Operation  
of Marine Energy Facilities

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Nautical Science and Maritime  
Transport Management

## TELECOMMUNICATIONS ENGINEERING

Advanced Telecommunication  
Technologies

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Applications and Technologies  
for Unmanned Aircraft  
Systems (Drones)

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Applied Telecommunications  
and Engineering Management  
(MASTEAM)

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Cybersecurity

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Electronic Engineering (MEE)

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Quantum Science  
and Technology

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Telecommunications  
Engineering (MET)

## TEACHER TRAINING AND GENDER STUDIES

Women, Gender  
and Citizenship Studies

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Secondary and Upper  
Secondary Education,  
Vocational Training and  
Foreign Language Teaching.  
Specialisations: Technology  
/ Industrial Technologies /  
Mathematics

## ENVIRONMENT, SUSTAINABILITY AND NATURAL RESOURCES

Sustainability Science  
and Technology

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Environmental Engineering

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Natural Resource Engineering

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Sustainable Intervention in the  
Built Environment (MISMec)





# 2023-2024 DOCTORAL PROGRAMMES

[doctorat.upc.edu/en/programmes](http://doctorat.upc.edu/en/programmes)

## ARCHITECTURE, URBANISM AND BUILDING CONSTRUCTION

Architecture, Energy  
and Environment

Urban and Architectural  
Management and Valuation

Architectural, Civil and Urban  
Heritage and Refurbishment  
of Existing Buildings

Architectural Design

Architectural, Building  
Construction and Urbanism  
Technology

Theory and History  
of Architecture

Urbanism

## SCIENCES

Aerospace Science  
and Technology

Engineering, Sciences  
and Technology Education

Optical Engineering

Statistics and Operations  
Research

Computational and Applied  
Physics

Photonics

Applied Mathematics

Agri-Food Technology  
and Biotechnology

## CIVIL AND ENVIRONMENTAL ENGINEERING

Structural Analysis

Marine Sciences

Environmental Engineering

Civil Engineering

Construction Engineering

Nautical and Marine  
Engineering and Naval Radio-  
Electronics

Earthquake Engineering  
and Structural Dynamics

Geotechnical Engineering

Sustainability

## INDUSTRIAL ENGINEERING

Business Administration and  
Management (interuniversity  
degree)

Automatic Control, Robotics  
and Vision

Supply Chain and Operations  
Management

Materials Science  
and Engineering

Biomedical Engineering

Electrical Engineering

Mechanical, Fluids  
and Aerospace Engineering

Nuclear and Ionising Radiation  
Engineering

Chemical Process Engineering

Thermal Engineering

Textile and Paper Engineering  
Polymers and Biopolymers

Natural Resources  
and Environment

Electric Energy Systems

## ICT ENGINEERING

Computer Architecture

Bioinformatics

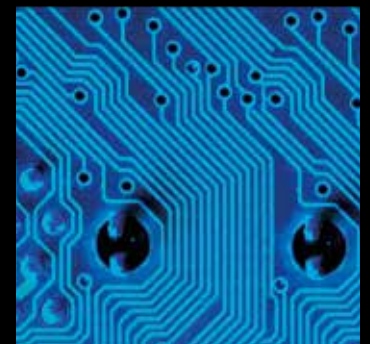
Computing

Electronic Engineering

Network Engineering

Artificial Intelligence

Signal Theory  
and Communications



# UPC



1 2  
3 4



- 1/ A rose for Sant Jordi generated by artificial intelligence, a project by UPCArts and the inLab at the Barcelona School of Informatics (FIB).
- 2/ UPC rector Daniel Crespo embraces oceanographer Sylvia A. Earle, who was awarded an honorary doctoral degree as proposed by the Laboratory of Applied Bioacoustics (LAB).
- 3/ Eva Miranda, a researcher at the School of Mathematics and Statistics (FME), and Josep Fontana, a student at the same school, are behind the *Algorritmes* podcast, which is devoted to the dissemination of mathematics.
- 4/ The UPC, Fundesplai and El Periódico organise technology summer camps for young people between 12 and 17 years old. Other collaborators are the Intelligent Data Science and Artificial Intelligence (IDEAI-UPC) research centre and the Drone Research Laboratory (DroneLab).



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