STUDY AT SWEDEN’S FIFTH LARGEST UNIVERSITY

SCIENCE & TECHNOLOGY
AT UMEÅ UNIVERSITY

MASTER’S PROGRAMMES
AND BACHELOR’S PROGRAMME
IN ENGLISH
Umeå University was founded in 1965 and is Sweden’s fifth oldest university. Today, we have a strong international and multicultural environment with students, teachers and researchers from all over the world. As one of Sweden’s leading comprehensive universities we are alive with enthusiasm, creativity and fresh ideas.

Umeå University offers a wide range of two-year master’s programmes – taught entirely in English – where you will study in an environment rich in opportunities for interdisciplinary research and instruction. Hundreds of international students from all over the world enrol in our programmes every year.

Umeå is Northern Sweden’s largest city. It is a vibrant city with a young population where culture, outdoor activities and sports are celebrated.

Umeå University has 32 000 students and over 4 000 employees. The Faculty of Science and Technology has around 3 200 students, 300 doctoral students and world class research in various disciplines, such as biotechnology, chemistry, environmental research, computing science and physics.

Eleven departments, eight research institutes and three schools bring together the faculty’s research and education in natural science, mathematics, engineering, teacher training as well as industrial design and architecture.

Our study programmes are characterized by proximity to research, excellent teachers and a relaxed atmosphere. We offer over 20 undergraduate programmes in Swedish for aspiring engineers, designers, architects, scientists and pharmacists. Those who wish to supplement their studies with a master’s degree can choose between 13 programmes in English.

The Faculty also offers a Bachelor of Science programme in Life Science where all tuition is in English.
Advanced Product Design
120 ECTS

The Master’s programme in Advanced Product Design will make you into a skilled industrial design consultant able to design products and technical solutions for industry, institutions and public authorities. The education is international and more than 80 per cent of the students come from abroad. The programme is project-based and a major part of the project work is done in collaboration with external partners.

The programme develops your design competence and provides professional tools, methods and a creative mindset. During your education individual work is mixed with group work and supervised practical exercises. The programme integrates advanced form treatment, problem identification, analysis, creative and visualisation techniques with business oriented subjects such as strategic design and professional practice.

The curriculum is project-based and projects are carried out in collaboration with industries, research institutions, organisations and public authorities. Most projects concern problems that the students identify themselves, not problems that have already been solved countless times by other designers. The projects can address anything from developing medical technology products and design for the disabled to design of public services and professional tools.

ELIGIBILITY & APPLICATION

• A Bachelor’s degree, in industrial design or equivalent subject area which should include at least 60 ECTS credits in the Design subject.
• Proficiency in English equivalent to Swedish upper secondary course English B/6.
• Application is made in two steps:
  1. Via the national online application service universityadmissions.se.
  2. Portfolio sent to Umeå Institute of Design. Information about application at www.uid.umu.se

Contact:
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Interaction Design
120 ECTS

The Master’s programme in Interaction Design deals with the relation between people and IT. Interaction design is about the ability to design both the cognitive and physical interface and integrate them into a successful whole. We aim to enable designers to create sustainable, comprehensible and pleasurable information based products, services and environments.

Applied design projects form the backbone of the study programme. Projects usually include lectures, field trips, site visits, group method work, user studies and studio work. The projects are carried out in collaboration with external partners and tutoring is given both by our own teachers and visiting professional designers. The projects you will work on are human-centered projects based on specific user groups rather than product categories.

The fourth and final term is devoted entirely to the examination project. You will carry out your exam project in cooperation with a corporate sponsor or other external partner. It is important that the project is seen as a collaboration and not a commission.

ELIGIBILITY & APPLICATION

- **A Bachelor’s degree**, in industrial design or equivalent subject area which should include at least 60 ECTS in the Design subject.
- **Proficiency in English** equivalent to Swedish upper secondary course English B/6.
- **Application** is made in two steps:
  1. Via the national online application service [universityadmissions.se](http://universityadmissions.se).
  2. Portfolio sent to Umeå Institute of Design. Information about application at [www.uid.umu.se](http://www.uid.umu.se)

Contact:
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Transportation Design

120 ECTS

Transportation is an essential and integral part of any society, with population growth and environmental problems creating challenges the transportation industry must address with new and innovative solutions. As a transportation designer you can influence this development by producing competent products that appeal to the hearts and minds of people. During your studies you learn how to work with conceptual ideas through projects in collaboration with external partners.

The Master’s programme in Transportation Design at Umeå Institute of Design is unique in covering general transportation problem areas and their relation to the transport industry worldwide. The study programme is based on the Scandinavian design tradition, which emphasises the understanding of the users’ interests and needs as a key to successful products. The studies convey the ability to work with conceptual ideas, genuine knowledge of work development in the automotive industry, and a good comprehension of the use of modern methods and aids in transportation design. During your studies you develop specific knowledge in areas like presentation techniques, strategic design, visual storytelling, physical and digital development. A great deal of time is devoted to project work in collaboration with external partners like research institutions or design department from different companies.

ELIGIBILITY & APPLICATION

- **A Bachelor’s degree**, in industrial design or equivalent subject area which should include at least 60 ECTS credits in the Design subject.
- **Proficiency in English** equivalent to Swedish upper secondary course English B/6.
- **Application** is made in two steps:
  1. Via the national online application service universityadmissions.se.
  2. Portfolio sent to Umeå Institute of Design. Information about application at www.uid.umu.se

**Contact:**
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**Skills and Techniques**

- 7.5 ECTS

**Computer Aided Ind. Design**

- 7.5 ECTS

**Vehicle Design**

- 15 ECTS

**Vehicle Design Theory**

- 7.5 ECTS

**Strategic Design**

- 15 ECTS

**Storytelling in Design**

- 7.5 ECTS

**Form Workshop**

- 7.5 ECTS

**Vehicle Interior Design**

- 15 ECTS

**Future Mobility**

- 7.5 ECTS

**Thesis Project**

- 30 ECTS

**Master’s degree**
Architecture and Urban Design
120 ECTS

Do you want to take part in designing sustainable architecture and developing socially just cities for the future? The Master’s Programme in Architecture and Urban Design is operating in-between the artistic and the scientific field of knowledge. The programme is characterized by a consistent focus on sustainability and has an exploratory and experimental profile with teachers from all over the world. Ecological challenges such as climate change and social crises such as unequal local and global development and migration places raise a strong demand on architecture to develop new solutions based on broad interdisciplinary perspectives. In the Master’s Programme in Architecture and Urban Design these complex issues are dealt with in various design studios. Departing from your own experience and ethical position the program wants to challenge the conventional contemporary architectural practice and the future of the profession.

The School of Architecture is situated on the Arts Campus – a creative environment with workshops and infrastructure for production and making, together with the Art- and Design School, the incubator Sliperiet and Bildmuseet.

ELIGIBILITY & APPLICATION

- **A Bachelor’s degree**, in Architecture, at least 180 ECTS or its equivalent international education of similar length and portfolio.
- **Proficiency in English** equivalent to Swedish upper secondary course English A/5.
- **Application** is made in two steps:
  1. Via the national online application service universityadmissions.se.
  2. Portfolio sent to Umeå School of Architecture. More information about application and portfolio can be found at www.arch.umu.se.

**Contact:**
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Life Science – Bachelor’s programme
180 ECTS

As a chemist and molecular biologist you may for example work with development of pharmaceuticals, vaccines and forensic techniques or the refinement of plants. The Bachelor of Science programme in Life Science covers a broad spectrum of chemistry and molecular biology and your teachers have a close link to leading research in fields such as microbiology, medicinal, biological and environmental chemistry, infection medicine and plant- and forest biotechnology.

The first and second year gives you basic knowledge of chemistry and molecular biology. You will study for example bioorganic chemistry, biochemistry, cell biology and molecular genetics. During the third year you may choose to specialize in these fields by taking advanced courses or broaden your knowledge in other subjects. The programme ends with a thesis project. The teaching consists of lectures, lessons, group work, seminars and laboratory work with a strong focus on problem solving. During laboratory exercises you use modern techniques to study chemical and molecular biological processes. All course literature and instruction is in English and you have the possibility to study one or two semesters abroad at one of our partner universities.

ELIGIBILITY & APPLICATION

- Biology 2, Physics 1a/1b+1b2, Chemistry 2, Mathematics 4, or Biology B, Physics A, Chemistry B, Mathematics D
- Proficiency in English equivalent to Swedish upper secondary course English B/6.
- Application is made via the national online application service universityadmissions.se.

Contact:
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Jan Larsson, Programme coordinator, +46907866785, jan.larsson@molbiol.umu.se
Chemistry
120 ECTS

The Master’s programme in Chemistry deepens your knowledge of proteins’ function in the body, chemicals’ effect in the environment, and of the development of new pharmaceuticals. The education has close proximity to three strong research areas at Umeå University – medicinal chemistry, environmental chemistry and protein chemistry. Your future career is as a scientist, in the industry or with public authorities.

The programme provides you with knowledge for solving and critically assessing chemistry-related problems. You will learn how to compile, analyze, critically review, and present scientific texts and your own data. The first year includes four in-depth courses that cover tools and theories in modern chemistry and brings you to a level required for the following profile courses. The training provided in these courses focuses primarily on advanced instrumental methodologies for chemical analysis, and modelling and interpretation of physico-chemical and biochemical phenomena. These courses also offer intense laboratory training to prepare you well for more advanced courses and work towards your Master’s thesis in the second year.

ELIGIBILITY & APPLICATION

• **A Bachelor’s degree** (equivalent to a Swedish Kandidatexamen, 180 ECTS) from an internationally recognised university. Special requirements: 60 ECTS in Chemistry.

• **Proficiency in English** equivalent to Swedish upper secondary course English A/S.

• **Application** is made via the national online application service universityadmissions.se

Contact:
Patrik Andersson, Programme coordinator
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Molecular Biology
120 ECTS

In the Master’s programme in Molecular Biology you acquire an extensive toolbox for investigating all kinds of biological problems with advanced molecular methods. Your teachers are internationally renowned scientists and you will carry out your thesis project within a research group. You will get a good basis for further doctoral studies and work with research and development, either at a university or in a biotech or pharmaceutical company. The autumn admission to The Master of Science Programme in Molecular Biology begins with a course in Advanced Molecular Biology. If you choose to start in the spring semester you begin with Molecular Genetics and take Advanced Molecular Biology during your second term. Apart from this, you are free to select from a number of different courses in Molecular Biology or in other subjects as long as they fulfil the requirements to obtain The Master of Science Degree in Molecular Biology. For example, you can take courses in Biochemistry, Infection Biology or Plant Molecular Biology. The programme finishes with a thesis project in Molecular Biology.

ELIGIBILITY & APPLICATION

- **A Bachelor’s degree**, or **Bachelor of Engineering degree** (equivalent to a Swedish Kandidatexamen, 180 ECTS) from an internationally recognised university. Additional requirements are 60 ECTS in Bioscience (including Genetics, Microbiology, Cell biology, Molecular biology, Animal- and Plant physiology) with a minimum of 7,5 ECTS Genetics, 7,5 ECTS Microbiology, 30 ECTS Chemistry (with a minimum of 7,5 ECTS Biochemistry) and 30 ECTS practical experience of laboratory work.

- **Proficiency in English** equivalent to Swedish upper secondary course English B/6.

- **Application** is made via the national online application service universityadmissions.se.

Contact:
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Computational Science & Engineering
120 ECTS

Computational Science and Engineering is a field of knowledge aiming at the development of methods that rely on computers and mathematics to model, simulate and visualize various kinds of systems, in nature and society. You typically deal with complex systems and large data sets. The methods can be applied to everything from making risk analyses to exploring ecological systems or making computer games and special effects in movies. Computational Science and Engineering often combines several different disciplines including computer science, numerical analysis, applied mathematics, physics, biology and economy. During your education you learn to deal with complex systems and large data sets. The programme begins with four compulsory courses in modelling, simulation and numeric methods. During the second and third terms you choose between several eligible courses. You can for example choose to specialise in parallel programming, financial mathematics and advanced computer graphics. The programme closes with a thesis project.

ELIGIBILITY & APPLICATION

• A Bachelor’s or Bachelor of Engineering degree (equivalent to a Swedish Kandidatexamen or Högskoleingenjörsexamen, 180 ECTS) from an internationally recognised university. Special requirements are 15 ECTS in Computing science, with a minimum of 7,5 ECTS in Programming and 7,5 ECTS in numerical methods. 30 ECTS in Mathematics including single- and multivariable analysis and linear algebra, 7,5 ECTS in Mathematical statistics. For individual courses within the program additional courses may be required.
• Proficiency in English equivalent to Swedish upper secondary course English A/5.
• Application is made via the national online application service universityadmissions.se

Contact:
Eddie Wadbro, Programme coordinator
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Computing Science

120 ECTS

Do you want to expand your knowledge in problem solving and programming? The Master’s programme in Computing Science is directed towards students who want to achieve further understanding of the field and develop a scientific attitude characterized by logical reasoning and critical analysis. Following your degree you can enter PhD studies or development work in computing science in a company.

During the first semester of the programme you will take four courses of which two are mandatory: Computer Organization and Architecture and Efficient Algorithms. The two remaining courses are Distributed Systems and Artificial Intelligence – Methods and Applications. The latter two are not mandatory, but are pre-selected and highly recommended. Towards the end of the programme, after taking a number of elective courses, you will take the course Student Conference in Computing Science that gives a hands-on introduction to scientific writing. This course will prepare you for your master thesis comprising 30 ECTS credits, which completes your studies.

ELIGIBILITY & APPLICATION

• **A Bachelor’s or Bachelor of Engineering degree** (equivalent to a Swedish Kandidatexamen or Högskoleingenjörsexamen, 180 ECTS) from an internationally recognised university. Special requirements are: a) A minimum of 75 ECTS-credits in Computer Science and of 22.5 ECTS-credits in Mathematics. b) Good theoretical and practical knowledge and skills regarding algorithms and data structures, programming in at least two programming languages such as Java and C++, and software engineering, and 7,5 ECTS credits in the Theory of Computation.

• **Proficiency in English** equivalent to Swedish upper secondary course English A/5.

• **Application** is made via the national online application service universityadmissions.se

Contact:
Frank Drewes, Programme coordinator,
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Physics
120 ECTS

The Master’s programme in Physics gives you the opportunity to acquire wider and deeper knowledge and abilities within one or several subareas in physics. You are free to choose courses according to your own interests and ambitions, but we also offer three special profiles: Computational Physics, Advanced Materials and Atomic, Molecular and Optical Physics. The study atmosphere is international and you can choose to study part of the programme in another country.

Each term comprises two study periods and you will usually take two parallel courses for each study period. You are free to choose courses according to your own interests. Many courses include laboratory exercises or computer based projects. For every course you get three examination opportunities per year, the first directly after the course finishes. The programme ends with an exam project comprising a minimum of 30 ECTS. You will work independently with your project supervised by one of our scientists. You can do your project in one of the research fields of the Department of Physics. We have research in Condensed Matter Physics, Organic Electronics, Nanophysics, Photonics, Optical/Laser Physics, Biological Physics, Plasma Physics, Flame Dynamics, General Relativity, Statistical Physics, Quantum Physics, Computational Physics, Complex Networks, Space Physics and Physics Education.

ELIGIBILITY & APPLICATION

- **A Bachelor's degree** in Physics or a **Bachelor of Engineering** Physics degree (equivalent to a Swedish Kandidatexamen, 180 ECTS) from an internationally recognised university, including at least 60 ECTS in physics.
- **Proficiency in English** equivalent to Swedish upper secondary course English A/S.
- **Application** is made via the national online application service universityadmissions.se.

Contact:
Jens Zamanian, Programme coordinator,
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Robotics and Control
120 ECTS

The Master’s programme in Robotics and Control is interdisciplinary with courses that cover important aspects of modern robotics, such as autonomous systems, field robotics, artificial intelligence, computer vision, mobile robots, embedded systems, modeling and control systems. Lectures, lab work, projects and assignments are closely connected to ongoing research at Umeå University.

The education consists of lectures, group exercises, seminars, laboratory work, assignments, and projects. Many courses contain a large portion of laboratory work to provide hands-on experience using the state of the art software and hardware. Your study focus may be put on artificial intelligence, related robotics or control related robotics, depending on your interests. It is also possible and encouraged to personalize the program by selecting additional courses according to own interests and including them in the diploma. Typically the students study two courses in parallel for a period that is a half of a semester. Each study period ends with an exam period. Every course has three written examination opportunities each year. The programme also includes a one-semester project work of 30 ECTS.

Eligibility & Application

- A Bachelor’s degree or Bachelor of Engineering degree (equivalent to a Swedish Kandidatexamen or Högskoleingenjörsexamen, 180 ECTS) from an internationally recognised university. Special requirements are 15 ECTS in Computing Science, 7.5 ECTS in Electronics, 30 ECTS in Mathematics and 7.5 ECTS in Mathematical Statistics.
- Proficiency in English equivalent to Swedish upper secondary course English A/S.
- Application is made via the national online application service universityadmissions.se.

Contact:
Sven Rönnbäck, Programme coordinator,
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Ecology
120 ECTS

The Master’s programme in Ecology gives you a deeper knowledge of how fishing, forestry, river regulations, pollution and climate changes affect biodiversity and ecosystem function in forests, lakes, mountains and sea. You learn how to identify and characterize ecological problems, plan and execute research and analysis. The programme has a special profile in nature conservation.

As a master student in ecology in Umeå, you will develop your skills for individual integration and application of knowledge, and the ability to handle complex phenomena, problems and situations, as a preparation for research practice or other jobs that have high demands of self dependence.

The education is closely linked to the research conducted at the department of Ecology and Environmental Science. Most of the practical exercises have their focus on northern ecosystems. The education received the highest ratings in the latest evaluation by the Swedish Higher Education Authority.

ELIGIBILITY & APPLICATION

- **A Bachelor’s degree** (equivalent to a Swedish Kandidatexamen, 180 ECTS) from an internationally recognised university with a major in Biology, including at least 90 ECTS in Biology, of which 30 ECTS in Ecology.
- **Proficiency in English** equivalent to Swedish upper secondary course English A/5.
- **Application** is made via the national online application service [universityadmissions.se](http://universityadmissions.se)

**Contact:**
Johan Olofsson, Programme coordinator
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Geoecology

120 ECTS

Geoecology integrates the fields of Geosciences and Ecology and you will study natural earth processes, climate change and the impact of human influences such as natural resources and environmental disruption. Impact on geo-ecological processes leads to substantial changes in the environment. You will develop awareness and in-depth knowledge of environmental changes over years to millennia in different types of environments.

Theoretical studies of important earth processes are consolidated via experiments and field studies in the Northern landscape, including a variety of boreal and arctic habitats. As a master student in geoecology in Umeå, you will develop your skills for individual integration and application of knowledge, and the ability to handle complex phenomena, problems and situations, as a preparation for research practice or other jobs that have high demands of self-dependence.

The teaching is conducted in close collaboration with on-going research at our department. The programme received the highest score in the Swedish Higher Education Authority recent quality review.

ELIGIBILITY & APPLICATION

- **A Bachelor’s degree**, (equivalent to a Swedish Kandidatexamen, 180 ECTS) from an internationally recognised university with a major in Earth science or a Bachelor’s degree with 60 ECTS in Biology, Chemistry or Environmental science and 30 ECTS in Earth science.
- **Proficiency in English** equivalent to Swedish upper secondary course English A/5.
- **Application** is made via the national online application service universityadmissions.se.

Contact:
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Plant and Forest Biotechnology
120 ECTS

Plant biotechnology is an important tool to solve global problems. How do we produce enough food in the world? How do we develop renewable fuels and manage ecosystems in an environmentally friendly and sustainable manner? The Master’s programme in Plant and Forest Biotechnology gives you specialized competence and skills to recognize, understand and find solutions to these challenges.

The programme provides you with theoretical and practical knowledge about plant physiology, molecular biology, biotechnology and functional genomics; together with an understanding of the ethical, ecological and legal aspects of plant biotechnology. Advanced knowledge is given in plant cell and molecular biology as well as plant growth and development. This knowledge is then applied in the fields of plant breeding, biotechnology and functional genomics.

The programme is organized by the Department of Plant Physiology (Umeå University) and the Department of Forest Genetics and Plant Physiology (Swedish University of Agricultural Sciences). Together they form the Umeå Plant Science Centre, UPSC, where world leading research in plant and forest biotechnology is being conducted. Many of your teachers are active scientists and the education is anchored around the various research topics of UPSC.

ELIGIBILITY & APPLICATION

• **A Bachelor’s degree**, from an internationally recognised university containing 60 ECTS biology, 30 of which should be plant biology and cell and molecular biology and 15 ECTS in chemistry.

• **Proficiency in English** equivalent to Swedish upper secondary course English A/5.

• **Application** is made via the national online application service universityadmissions.se.

Contact:
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Eligibility & Application

- **Plant Cell and Molecular Biology** 15 ECTS
- **Plant Growth and Development** 15 ECTS
- **Plant Biotechnology and Molecular Breeding** 15 ECTS
- **Biology and Biotechnology in Forest Production Systems** 15 ECTS
- **Computational and Systems Biology** 15 ECTS
- **Functional Plant Genomics** 15 ECTS
- **Thesis Project** 30 ECTS

Master’s degree
Top 10 reasons to choose Umeå University

1. **Satisfied students.** 1st in both Sweden and Europe for overall student satisfaction rating according to the International Student Barometer.

2. **Academic excellence.** Well-trained and dedicated teachers along with first-class research.

3. **First-class facilities and modern campus.** Featuring the stunning new Umeå Arts Campus, IKSU Sport centre, University Library and high speed WiFi.

4. **Breathtaking nature.** Experience the northern lights, arctic landscape, endless summer nights and beautiful open countryside.

5. **Highly international.** Students, faculty and staff from all corners of the globe. Over 52 languages are spoken in Umeå.

6. **City of culture.** Music festivals, theatre, opera and more. Umeå was the 2014 European Capital of Culture and is still vibrant with culture.

7. **Support services.** Our International office, Service centre and study advisors are dedicated to help you.

8. **Accommodation.** Guaranteed for exchange and tuition fee paying students.

9. **Sports minded.** Home of Europe’s largest training and fitness facility, IKSU Sport, and many elite local sports teams.

10. **Wide selection.** Over 500 courses and 30 degree programs available with English as the language of instruction.

More information at www.teknat.umu.se
THIS IS UMEÅ

Umeå is a city of contrasts. From snowy winters to sunny summer days, from the coast and sea to the deep forests; from the vibrant city life to quiet auroral nights. More than 120,000 people live here, adding life and colour to the city.

FIND YOUR WAY

All roads may not lead to Umeå, but it’s easy to get here anyway – by plane, train, bus or car. Umeå Airport is one of Sweden’s busiest, and is so close downtown Umeå that you can actually go there by bicycle. If you want to choose something more climate friendly than air travel, you can catch a train – from Stockholm it’s only a 6 hour trip. By car you hit the E4 or E12 and have the chance to discover other nice spots on your way to, and around, Umeå.

In Umeå you’re never really far from anything. Walking distance to most things - entertainment, leisure, culture, nature and studies - makes it easy to take part of what the city has to offer. But the typical thing to do in Umeå is not to walk, but to bike, always and everywhere, summer and winter. 180 km of paved bicycle paths will guide you right.

A GROWING CITY

When Umeå University was inaugurated in 1965 the city had only 40 000 residents. Today, 50 years later, more than 120 000 people live here. The university is pushing the development, and thanks to our students, Umeå is a young and energetic city. The city’s youth and growth is evident in several ways, including in entrepreneurship and new businesses. Here you find several innovative ventures within medicine, biotechnology, IT, environment and energy.
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