University of Applied Sciences and Arts of Southern Switzerland
Department of Innovative Technologies

SUPSI

Department of Innovative Technologies

Facts and Figures 2021

Interview with the Director

Milena Properzi,
Director of the Department of Innovative Technologies

In December 2021, you were appointed Director of the Department of Innovative Technologies (DTI). What is your background and previous professional experience?
After working in education, research and knowledge transfer at several Swiss universities, such as the Berner Fachhochschule (BFH) and the Haute école spécialisée de Suisse occidentale (HES-SO), I assumed the role of Head of Research within the DTI in 2018.
On 16 December 2021, the SUPSI Board appointed me Director of the Department of Innovative Technologies, a position I will hold with commitment and dedication in the coming months and years.

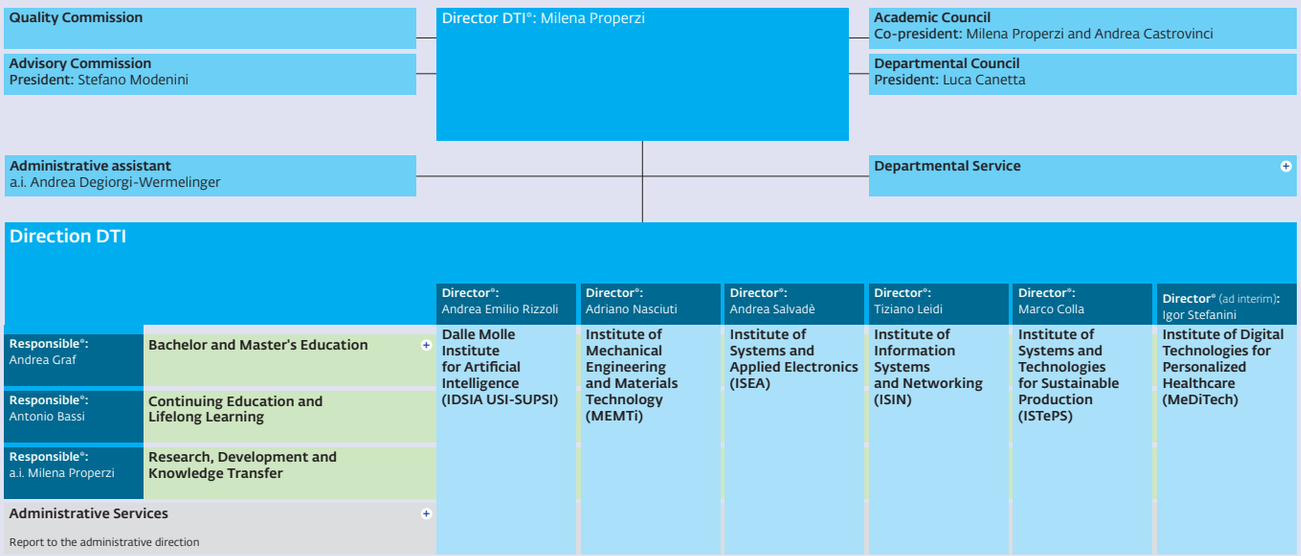
What are in your opinion the main challenges and strategic courses of action on which the Department should focus in the coming years?
The Department of Innovative Technologies is currently experiencing a phase of strong development and profound transformation. The relocation to the USI-SUPSI East Campus in Lugano-Viganello was the first step towards further growth and consolidation of all the Department's institutional mandates.
The strategic location in an innovative structure in the heart of the city of Lugano will also consolidate the bonds with the cantonal and Swiss social and economic fabric, strengthening the DTI's position as a leading player, recognised on a national and international scale, for training and applied research in the field of engineering and new technologies.

You were previously Head of DTI Research, a growing area with a new institute launched in 2021.
What results have been achieved and what are the future courses of action?
The DTI's research and knowledge transfer activities have undergone major developments in recent years, with important acknowledgements at local, federal and international level.
In 2021, in particular, the opening of the Institute of Digital Technologies for Personalised Healthcare (MeDiTech) completed a path of continuous growth of the Department's expertise in medical technologies and their applications.
For the future, the aim is to pursue the development of the Department's research activities, improving the focus of scientific competences and enhancing collaborations with the numerous institutional, academic and industrial partners that collaborate with the Department within the over 200 research projects active each year.

Bachelor's, Master's and continuing education courses are constantly developing in terms of enrolment and training offerings. What are the prospects for the coming years?
The educational programmes offered by the DTI are focused on the needs of the market, society and the students, providing them with a qualifying and tailor-made educational approach.
We will continue to work towards consolidating the Bachelor's, Master's and continuing education courses of the DTI, ensuring a high standard of quality and expanding the educational offerings in all areas of the Department's competence.

What are the key elements, in your view, for facing the current and future challenges of the Department?
Contemporary society and the world of work are changing so rapidly that we need to be increasingly flexible and adaptable. The expertise and collective effort of our collaborators, who are the true driving force of the DTI, will enable us to best handle current and future challenges and pursue the continuing growth of our institution.

Organization



* Members of the departmental direction

Organization Chart DTI, 1 may 2022.

881
Bachelor and Master's students

1'723
Participants (Advanced Studies and webinar)

361
Collaborators

6
Research institutes

+20
Specialised laboratories

+200
Ongoing research projects

22
Million CHF financial volume of research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BROWN
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A year of change and a shift towards new challenges

Emanuele Carpanzano,
Director of Research, Development and Knowledge Transfer SUPSI

2021 was a year marked by important changes for our Department, starting with the transfer from the historical headquarters of Manno to the new USI-SUPSI East Campus in Lugano-Viganello and Via Balestra.

This gradual transition began at the end of 2020 and was only partially realised in early 2021 with the relocation of the research institutes and administrative offices. Due to the resurgence of the Covid-19 pandemic, teaching activities at the East Campus started only in September, with the beginning of the academic year.

The move to an innovative campus, with new classrooms and laboratories, spaces for events and conferences, services (i.e. the cafeteria, bar, day-care centre, gym and BiblioAgorà), has had and will continue to have a positive and significant impact both on education and research activities. It will also impact on the quality of university life and work experience of students and employees.

The proximity with USI and the opportunities offered by a central building open to the public, will also enable the department to strengthen synergies and collaborations with the aim of boosting the activities of the Ticino university centre, in collaboration with local institutions and companies, thus generating positive effects for our region and society.

In addition to the drive associated with this important transition, during 2021 we were forced to keep living with the restrictions imposed by the pandemic, consolidating the processes related to the digitalisation of work and training that had already been introduced during the previous year. In the Bachelor and Master Courses, in particular, it was decided to maintain a full day of remote lectures for each course even after the resumption of in-person activities. Continuing Education has also chosen to permanently adopt the online formula, which is more flexible and able to meet the specific needs of professional workers. The number of students at the DTI has also increased significantly, in line with the continuous and significant growth of recent years.

The department's research during 2021 further consolidated its reputation and project capacity, launching 88 new projects during the year. In addition, in July 2021, the DTI introduced its sixth research institute, the Institute of Digital Technologies for Personalised Health Care (MeDiTech), which was created in the wake of a steady increase within the Department of biomedical research skills and applications.

The continuous growth in the number of students enrolled in Bachelor, Master and Continuing Education courses, as well as the progression in the volume of research even during such a period of uncertainty and change, demonstrate the potential of a Department always focused on emerging needs and committed to adapting its offerings to regional and social demands.

These results also reflect the important commitment and dedication of all the Department's employees to our institutional mandates.

Finally, the results highlight the Department's further potential for future development, which can be fully exploited in the coming years, including through the actions outlined in the '21-'24 strategy for the development of the DTI. Actions that look carefully at all the mandates, the organisation of the department, the regional, federal and international networks, and in particular the enhancement of human capital, the primary driver of the Department of Innovative Technologies.

2021 in a nutshell

JANUARY

Prof. Grandoni appointed member of the National Research Council at the SNF

Fabrizio Grandoni, Professor of Approximate Algorithms at the Dalle Molle Institute for Artificial Intelligence USI-SUPSI, has been appointed as a member of the National Research Council at the Swiss National Science Foundation (SNF), an institution that promotes scientific research in Switzerland and the country's competitiveness and international positioning.

"My main short-term goal is to perform my duties at the Swiss National Science Foundation to the best of my ability. I would like to strengthen my research group at IDSIA USI-SUPSI by seeking Swiss and European funding, as well as continuing to attract valuable members. Not least, I will do my best to offer my students courses of increasing quality and interest", said Grandoni.

FEBRUARY

Launch of the EIT Manufacturing Double Degree Master Programme

In 2021, the new EIT Manufacturing Double Degree Master Programme was launched as part of the SUPSI Master of Science in Engineering (MSE).

In 2020, the EIT Manufacturing network, the Innovation Community within the European Institute of Innovation and Technology (EIT), created the EIT Manufacturing Master School, a master's degree programme jointly developed by SUPSI and 8 other European partner universities.

EIT Manufacturing students have the opportunity to attend two semesters at SUPSI's Department of Innovative Technologies and two semesters at one of the partner universities, obtaining at the end of their studies a double Master's degree and an EIT Label Certificate.

MARCH

A milestone for the DTI: the inauguration of the East Campus in Lugano-Viganello

On Monday 22 March 2021, the USI-SUPSI East Campus in Lugano-Viganello, the new headquarters of SUPSI's Department of Innovative Technologies, was inaugurated.

The ceremony was attended by the Swiss President, Guy Parmelin.

Monica Duca Widmer, President of the USI Board, and Alberto Petruzzella, President of the SUPSI Board, opened the ceremony with their speeches, followed by the greetings of the Rector of USI Boas Erez and the General Director of SUPSI Franco Gervasoni.

Guy Parmelin, in particular, described the creation of the Ticino university hub and the emerging synergy between the two institutions as "an example of Swiss academic excellence".

APRIL

IDSIA USI-SUPSI takes part in the VIRTUOUS project to create a virtual tongue

Dario Piga, Senior Researcher at IDSIA USI-SUPSI, was interviewed by the magazine Oggi Scienza to talk about Marie Curie VIRTUOUS (Virtual tongue to predict the organoleptic profile of Mediterranean ingredients), a project to create an artificial tongue capable of understanding the organoleptic properties of foods from their molecular composition.

"On the one hand, we want to understand the taste of a wine or an oil from its chemical and molecular composition. On the other hand, we want to provide indications for designing new good and healthy foods that can be used in personalised diets", explained the researcher.

MAY

Visit the new SUPSI campuses and discover...YOUR education!

In May 2021, SUPSI's Department of Innovative Technologies opened its doors at the East Campus of Lugano-Viganello to everyone interested in discovering educational opportunities in the field of engineering.

Participants had the opportunity to visit the didactic spaces and the laboratories of the Department, meeting with the teachers and those responsible for the respective degree courses. They were also introduced to the services offered on the East Campus, such as the canteen, the gym and the BiblioAgorà.

JUNE

SAMT students at ISEA for practical activities

On 23 and 24 June 2021, the Institute for Systems and Applied Electronics (ISEA) of SUPSI's Department of Innovative Technologies hosted some students of the Scuola Arti e Mestieri di Trevano (SAMT) with the aim of introducing them to the various laboratory activities in the field of electronics.

The experience is part of a promotional path for engineering education in Ticino, jointly encouraged by SUPSI and SAMT.

The participants attended lectures and carried out practical activities in the laboratory relating to electronics and its many applications.

JULY

SUPSI presents MeDiTech

On 13 July 2021, SUPSI's Department of Innovative Technologies held a press conference to present its sixth research institute, the Institute of Digital Technologies for Personalized Healthcare (MeDiTech).

The Institute carries out training and research activities focused on the use of digital technologies to support new and personalised methods of diagnosis and treatment in the health field.
In particular, the Institute's activities are structured around three strongly interdependent research areas: Biomedical Signal Processing, Digital Health and Medical Devices.

AUGUST

Antonio Bassi nominated International Correspondent from Switzerland for PM World Journal

Antonio Bassi, Head of Continuing Education of SUPSI's Department of Innovative Technologies and President of the Association Project Management Ticino (APM Ticino), has been appointed International Correspondent from Switzerland for the American magazine Project Management World Journal.
The PM World Journal focuses on knowledge sharing and continuing education in program and project management.
Based in the United States, the journal is supported by a network of authors, consultants and organisations recognised worldwide as leaders in the field of project management.

SEPTEMBER

DTI welcomes more than 250 first-year Bachelor students in Engineering

On Friday 17 September 2021, the Sala Polivalente of the East Campus of Lugano-Viganello hosted the Welcome Day of more than 250 first-year students enrolled in the Bachelor courses of the Department of Innovative Technologies for the 2021-2022 academic year.

OCTOBER

FTAL Conference: the Swiss Universities of Applied Sciences meet in Lugano

On Thursday 28 and Friday 29 October 2021, SUPSI's Department of Innovative Technologies hosted the FTAL Conference 2021 on "Smart cities and regions".
FTAL is the Association of Swiss Schools of Engineering, Architecture and Life Sciences.
The two-day event, organised with the support of Lugano Living Lab and the Swiss Academy of Engineering Sciences (SATW), was an important opportunity for discussion and knowledge sharing among all Swiss UAS. The event was also attended by three international keynote speakers: Prof. Dr. Gesa Ziemer from Hafencity University Hamburg (GCU), Marco Zuniga, Associate Professor from Delft University of Technology (TU Delft) and Prof. Annemie Wyckmans from the Norwegian University of Science and Technologies (NTNU).

32 new MSE engineers at the DTI

On Saturday 9 October 2021, 32 engineers of the Master of Science in Engineering graduated at SUPSI's Department of Innovative Technologies.
Christoph Wild, CEO of Argor-Heraeus, a company supporting students of SUPSI's Innovative Technologies Department by awarding a prize for the best thesis on environmental sustainability, awarded the 2021 prize to Fabiana Cañipa Roque for her thesis entitled Models for River Flow Forecasting based on Artificial Intelligence.

NOVEMBER

SATW Technology Outlook 2021 presentation

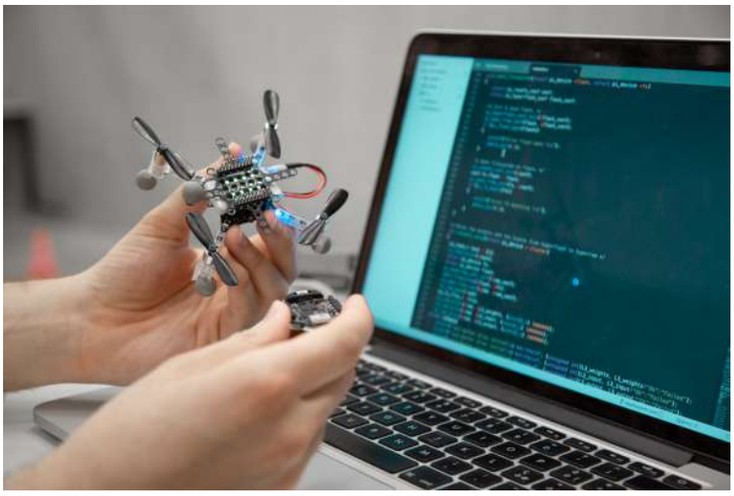
On Tuesday 16 November, the Technology Outlook 2021 took place, a biennial analysis published by the Swiss Academy of Engineering Sciences SATW to describe the most promising technologies and assess their specific relevance for Switzerland through an international comparison, was presented.
Prof. Anna Valente, Head of the Automation, Robots and Machine Laboratory at the Institute for Systems and Technologies for Sustainable Production (ISTePS) of the DTI, gave a talk entitled *Laser Technologies for New Products and Processes in the Manufacturing Supply Chain*. Alessandro Curioni, IBM Fellow, Vice President, Europe & Africa and Director, IBM Research - Zurich, proposed the speech *The perspectives of artificial intelligence in industry*.
The morning ended with a round table on the topic of Research and Innovation: *What Opportunities for Ticino Companies*.

DECEMBER

93 new DTI Bachelor engineers graduated

On Saturday 4 December, graduation ceremonies were held for 93 new Bachelor engineers of SUPSI's Department of Innovative Technologies.
For each Bachelor course, the diploma work of the winner of the Talenthesis 2021 award was also presented to the following: Fernando Capes (Eng. Electronics), Pietro Bettelini (Eng. Management), Alessandra Moretti (Eng. Informatics) and Alessandro Bianchi (Eng. Mechanics).

A glimpse of the DTI

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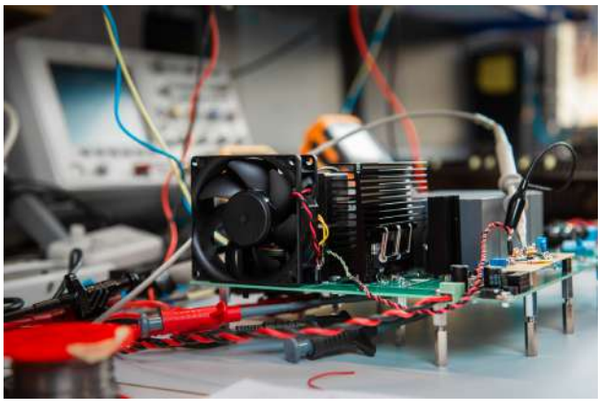
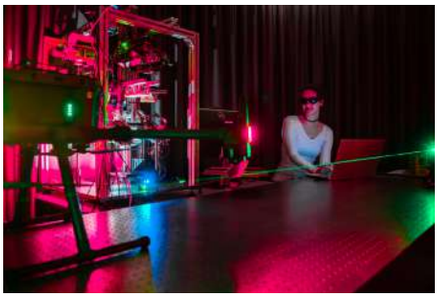




Bachelor and Master's Education

What impact has the transfer of the Department to the East Campus and the Balestra Building had on Bachelor's and Master's activities?

The impact is positive: we finally have a university campus with facilities such as a canteen, gym and BiblioAgorà, where students can develop contacts and relationships. The location in the centre of Lugano is also very favourable: the East Campus is easy to reach on foot and by public transport, ensuring a good connection with the surrounding socio-economic environment.
The relocation of the Department has provided an opportunity to equip our laboratories with many modern and innovative facilities where our students, but also our researchers, can carry out practical activities of education and research.
At the same time, however, we cannot stop there. We have to solve various logistical issues and make sure that the available space can satisfy current and future teaching needs.

2021 was still characterised by the Covid-19 pandemic: what strategies were adopted to ensure continuity of training and which elements will be maintained in the future?

If 2020 was the time of the first emergency where we tried to transfer all the lessons remotely during the lockdown, 2021 was the year of continuous adjustments to the protective measures. This also required a great deal of flexibility because we had to restructure the most complex parts of teaching, for example ensuring that students could continue their laboratory activities. Challenges to which we responded with originality, flexibility and commitment.
As time went by, a certain fatigue in the use of online tools and platforms also became evident. Our experience made it clear to us the difference between traditional lessons done on remote channels, a stopgap to respond to an emergency, and a true didactic innovation towards an integrated approach that could represent a real improvement over what was practised before the pandemic. We are therefore now aware of the range of digital tools that can be integrated into teaching and of the need for training and acquiring new skills for trainers as well.
In this context, a step further towards an integrated approach has already been made in our PAP (parallel to professional activity) courses, which have shifted from in-person to blended mode, a hybrid model that combines traditional face-to-face lectures with online-mediated activities. This allows us to tailor the courses more and more to the individual, enabling them to balance study and work commitments.

DTI training is constantly evolving. What are the objectives for the future?

The goals are the same as always: to meet the needs of our region and our economy by training talented, well-prepared engineers. Our objectives are not only quantitative, but above all qualitative. To achieve this, we must remain up-to-date in our disciplines, continuously develop our teaching skills, and have adequate equipment and space.
In 2020 we launched our first degree course taught predominantly in English, the Bachelor in Data Science and Artificial Intelligence. It is now in its second year of delivery, with a good response in terms of enrolment and growing interest from prospective students. The next goal will be for them to graduate and for placement in the professional world.
In the next few years, we can expect to further expansion of our training offerings, always observing the needs of the market and society, and responding promptly to emerging issues.

There is often talk about the shortage of qualified technical personnel. What are the interesting aspects of studying engineering?

We usually think of technical and engineering disciplines as boring and 'grey'. To see them that way, however, means not fully understanding their potential. In particular, the engineer's job is to solve problems and improve people's lives.
To do this, one needs to be properly prepared, have the right theoretical and practical tools and build bridges between these two aspects. In addition to the solid theoretical preparation, the DTI courses have a strong practical and professional orientation: our graduates are able to enter the working environment immediately, also thanks to the numerous laboratory experiences and the possibility of internships in external companies.
Today's society and the labour market demand more and more specialised technical figures. There is no shortage of employment opportunities for young engineers, often what is lacking is the time to be able to respond to all the demands.

Launch of the EIT Manufacturing Double Degree Master Programme

In 2020, EITM Manufacturing, the innovation community within the European Institute of Innovation and Technology (EIT) that unites the leading manufacturing players in Europe, launched the EIT Manufacturing Double Degree Master Programme. This programme is dedicated to training highly qualified young talents so that they can become the future innovators and leading entrepreneurs in the manufacturing sector.

SUPSI's Department of Innovative Technologies took part in the EIT-Manufacturing programme as the only Swiss partner together with eight other European universities: École Centrale de Nantes (France), Grenoble INP (France), Mondragon Unibersitatea (Spain), Politecnico di Milano (Italy), Technische Universität Wien (Austria), University College Dublin (Ireland) and University of Trento (Italy).

"The EIT- Manufacturing Master's programme is only in its infancy, but the benefits it can bring to the Department and its students are already clear. Starting with the content aspects, the students, while remaining focused on the engineering track of their interest, get in touch with the themes of innovation and entrepreneurship that prepare them to face as protagonists the challenges of an ever-changing professional environment," explains *Donatella Corti*, Professor at the DTI and Head of the EIT-Manufacturing Double Degree.

For DTI Master of Science in Engineering students joining the new pathway, another important benefit is to receive, in addition to the 90-credit MSE SUPSI degree, a 120-credit degree that provides direct access to the PhD pathway.

"Considering the range of opportunities to which it gives access, the double degree is an investment in one's future. Most importantly, the content acquired abroad enhances the professional profile, but the biggest benefit is the cultural and personal enrichment," she continues.

Students attending the EIT-Manufacturing Double Degree do in fact attend one year of courses at their own university and the other at one of the network partner universities. Besides obtaining a double degree, they also have the opportunity to get to know different educational and cultural environments, establishing an international network of contacts and developing their critical thinking skills and attitude to flexibility.

"This life experience has enormous value for students who, very often, find themselves away from their families for the first time and have to learn to deal with a number of practical aspects in a new country and with a different language. Although there is no shortage of difficulties, this makes it possible to establish new relationships that will continue to generate value well beyond the period of mobility. The fact that they are also confronted on a daily basis with classmates and friends from different parts of the world accustoms students to dealing with international and multicultural contexts in which great adaptability is required."

Within the EIT-Manufacturing Double Degree project, the advantages are not only for the students, but also for the Department of Innovative Technologies, which can consolidate and develop more relationships with other universities. A first practical result is the organisation of a Summer School in 2022 dedicated to the students of the first edition of the Master's course and which will see SUPSI coordinating a group of 10 academic and industrial partners participating in the project.

The testimony of a student

Ambrogio Croci, Bachelor in Engineering and management SUPSI and EIT Manufacturing Double Degree student

In 2021, I graduated with a Bachelor's degree in Engineering and management with the SPI (Integrated Study and Practice) track at SUPSI's Department of Innovative Technologies.

I always thought I would continue my studies after obtaining my Bachelor's degree to deepen my technical and theoretical knowledge. When the moment came to choose, I was presented with this programme which was very close to what I wanted. The possibility of gaining experience abroad was certainly a decisive factor in choosing to pursue this path.

I am currently enrolled in the "Platforms for Digitalized Value Networks" pathway of the EIT Manufacturing Double Degree, which includes the "Master of Business Engineering" at the DTI in Lugano and the "Master Industrial Engineering smart and connected Enterprise" at the University of Nantes in France.

I believe this opportunity can bring added value to my curriculum in terms of deepening topics and skills acquired, but not just that: by attending a year of study abroad, I will have the opportunity to experience a new environment and enrich my education both technically and personally.

The first year of the Master's programme was certainly positive. As is often the case when trying out something new: at the beginning we "took the measures" and refined the organisation, and in this regard all the professors and support staff of the Master's programme really got involved to help us. The direct involvement of us students in improving the experience for future participants is also greatly appreciated.

I have high expectations for next year: I hope to attend cutting-edge and interesting courses. I would also like to have time to fully enjoy the experience abroad by visiting Nantes and other French cities, making new friends and expanding my knowledge of the foreign language.

Continuing Education

A review of DTI Continuing Education in 2021: what difficulties and what opportunities?

Like 2020, 2021 was also characterised by the great challenge of Covid-19, which imposed significant restrictions on teaching activities and the need for major rethinking of teaching and learning methods.

In spite of this, we managed to turn an uncertain and constantly changing situation into a great opportunity for growth for the DTI Continuing Education path.

In particular, moving the teaching activities online allowed us to expand our student audience beyond the Italian-speaking part of Switzerland, with participants from outside the canton. Even in a non-pandemic situation, it would have been difficult to achieve this result by maintaining only face-to-face lectures.

DTI Continuing Education has decided to maintain the online formula, what are the benefits for participants?

To answer this question, we must first understand who the participants at the DTI Continuing Education courses are. These are professionals who are already active in the working world and who have an hourly availability mainly concentrated in the evening hours.

The possibility of using the online formula allows us to have a flexible offer, attentive to the needs of our students. Thanks to a mixed approach, in-presence and online, it is up to the individual student to decide how to follow the lessons according to his or her own schedule.

Further benefits of the online formula are linked to the multiplicity of teaching tools that can be used. Lecturing remotely does not simply mean migrating the classic frontal lecture onto some communication platform, but rather implies a rethinking of the way content is delivered and enjoyed. Thanks to these tools, we have experimented, for example, with lessons structured through video films followed by autonomous exercises or open discussions, because the attention threshold is more limited and it is important to maintain an approach that is as interactive as possible.

Finally, an important added value is given by the possibility of recording the lessons and making them available to the participants for further study, shaping the learning path in an increasingly individualised manner.

What will be the focus of the DTI continuing education development strategy in the coming years?

In the coming years, our intention will be to continue to consolidate and grow our educational offer and the good practices implemented so far.

The DTI's Continuing Education is characterised by a flexible approach, capable of responding to specific needs. This is why we intend to further consolidate our "tailor-made educational" packages that offer targeted and customised courses, working together with local companies and institutions.

This is also a great advantage for us, allowing us to actually feel the 'pulse of the situation' and recalibrate our offer according to emerging needs. In order to overcome the classic barriers between theory and practice, moreover, the teachers of our MAS, DAS and CAS courses are often professionals with solid theoretical and technical expertise in their respective disciplines. This gives participants the opportunity to engage with concrete experiences, not just "case studies".

Looking ahead to further expanding our educational offerings, a team of contact persons from the research institutes of the Department is being set up. Together with this group, we will work to identify topics for further education in which the many skills and knowledge present in the DTI's research activities can also converge.

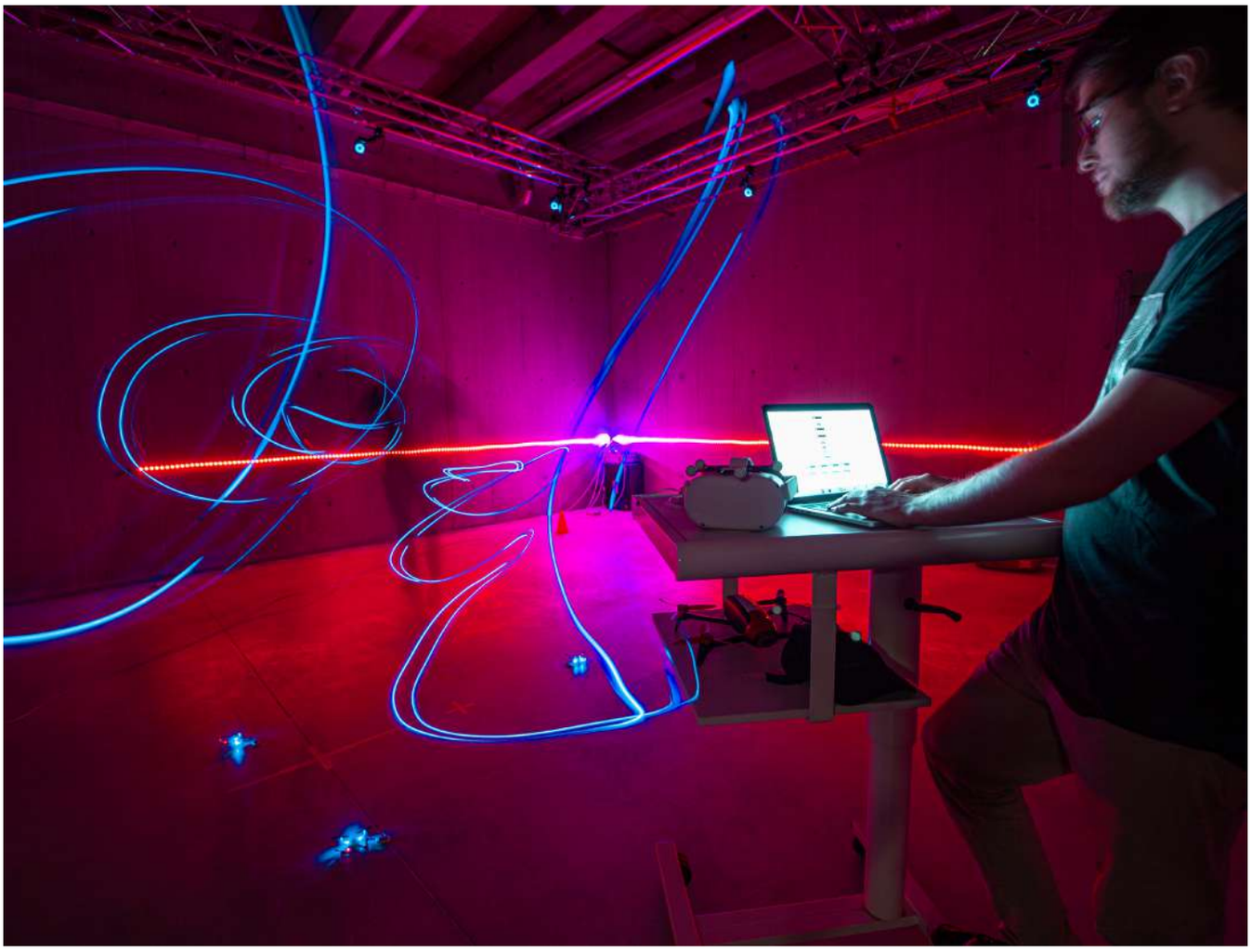
Finally, in the near future we will seek to develop new collaborations with cantonal and non-cantonal institutions, companies and universities, with the aim of establishing more and more networks and synergies in our areas of competence, generating positive spin-offs for the Department and the region.

Marian Duven's photo for Ticino Scienza

Applied Research

The Department of Innovative Technologies carries out qualified applied research activities in the field of engineering in multiple areas of its expertise, such as information technology, artificial intelligence, electronics, mechanics, industrial production and medical technologies.
In the wake of constant growth in terms of projects and financial volume, the applied research activities of the DTI consists of over 200 active projects annually, 88 of which were launched in 2021, developed in collaboration with companies and institutions at local, federal and international level.

Always attentive to the needs of the market and society, in 2021 the Department unveiled its sixth research institute, the Institute of Digital Technologies for Personalised Healthcare (MeDiTech) to bring together all the expertise already present and active in the field of medical technologies. In addition to MeDiTech, the Dalle Molle Institute for Artificial Intelligence (IDSIA USI-SUPSI), the Institute of Systems and Applied Electronics (ISEA), the Institute of Information Systems and Networking (ISIN), the Institute of Systems and Technologies for Sustainable Production (ISTePS) and the Institute of Mechanical Engineering and Materials Technology (MEMTi) are also active within the Department.



IDSIA joins SPEARHEAD, an Innosuisse project to fight antimicrobial resistance (AMR)

The Dalle Molle Institute for Artificial Intelligence (IDSIA USI-SUPSI) and the SUPSI Institute of Design (IDe) joined SPEARHEAD, an Innosuisse-funded consortium comprising 12 Swiss public and private partners, to fight antimicrobial resistance (AMR).

SPEARHEAD will contribute to optimise AMR management practices that may easily be harnessed to address future emerging infections, ultimately resulting in a more resilient healthcare system and society.

AMR is the ability of microorganisms (like bacteria, viruses, and some parasites) to prevent antimicrobials (such as antibiotics, antivirals and antimalarials) from working against them. As a result, many treatments are becoming ineffective against infections that were previously easily treatable.

The partnership, funded by the Swiss Innovation Agency (Innosuisse), was created to build a first-in-class, globally scalable, modular digital platform to improve antibiotic stewardship, with advanced patient stratification techniques and direct access to results from faster diagnostics. Direct citizen engagement will be used to raise awareness about the issue of AMR and pandemic preparedness.

The project has five main goals: real-time data flow to and from decision-makers; better use of big data for risk stratification; timely diagnostics that can leapfrog a centralized laboratory infrastructure; better and broader citizen and community engagement and early attention to the financial implications of the proposed innovations.

"Starting from January 2022, IDSIA will join the Innosuisse project SPEARHEAD, providing the consortium with its expertise in artificial intelligence and machine learning" stated *Laura Azzimonti*, Senior Lecturer and Researcher, leading the IDSIA research team involved in the project. "During the 4-year project, IDSIA will be involved in the development of a clinical decision support system based on machine learning models to provide data-driven insights for antibiotic prescriptions and to predict patient-specific clinical risk of antibiotics resistance. This would allow to direct the use of last-resort antibiotics towards patients at risk of resistant infections. The machine learning models will be trained by pooling together the information collected in different Swiss hospitals and properly taking into account the expected variability between the available datasets. Moreover, continuous updates of the models based on new available data will provide near real-time improvements in prediction."

Artificial intelligence to predict the taste of food

Often taken for granted, the sense of taste is one of the most fascinating: despite the possibility to agree on the taste of sweet, bitter or salty, there are different perceptions triggered by various foods and influenced by genetic, social and cultural variables. It is thanks to the complex mechanism of taste perception that nutrition becomes not only a necessity, but also a pleasure.

VIRTUOUS (Virtual tongue to predict the organoleptic profile of Mediterranean ingredients) is an international research project within the Marie Curie European program for the realization of an "artificial tongue" able to predict the organoleptic properties of foods starting from their molecular composition.

Launched in 2019 under the coordination of Politecnico di Torino, the four-year project involves 8 industrial and academic partners, from Italy, Greece, Spain and Switzerland, including the Dalle Molle Institute for Artificial Intelligence USI-SUPSI.

VIRTUOUS is a multidisciplinary project that combines different research areas such as chemistry, molecular modelling, neuroscience, artificial intelligence, biophysics and bioinformatics.

In this context, the contribution of the Dalle Molle Institute is twofold. "At the molecular level, we are concerned with the physico-chemical study of molecules, the mechanisms of reception by cellular targets located on the tongue and palate, and the processes of determination of the different taste sensations", explains *Gianvito Grasso*, Biomedical Engineer and Researcher at IDSIA. "We are also interested in understanding the pathway and interactions of these molecules within the human body".

From an AI perspective, IDSIA deals with the creation of models to predict the organoleptic properties of foods from their constituent molecules.

"Our AI models are not black boxes, but rather are explainable and interpretable," underlines *Dario Piga*, Senior Researcher at IDSIA. "This means that they allow not only to predict the characteristics of the molecules that determine taste, but also to explain and interpret their functioning".

Together with IDSIA, in Switzerland VIRTUOUS also includes as industrial partner the Ticino-based company Missing Tech for the development of the software architecture that will host the molecular models and AI algorithms created within the project. "We're happy to bring our experience in building cloud-based software platforms to the project, as well as hosting researchers from the international working group. Working with IDSIA team quickly created good feeling among us. The technical integration between the purely scientific part and the software infrastructure we are developing looks very promising", says Emanuele Mottola, founder and CEO of Missing Tech.

Currently, the project has developed AI models for the prediction of the taste of molecules with reference to sweet and bitter tastes, while the molecular analysis also includes receptors for the perception of salty tastes.

At this stage, researchers are focusing on the study of oil and wine, typical products of the Mediterranean diet and susceptible to significant taste alterations if subjected to small molecular changes. In order to verify the accuracy of the algorithmic predictions and train the artificial intelligence, a group of experts also evaluates the real sensations perceived.

In the future, the project aims to extend the prediction capacity of AI algorithms to understand, for any given food molecule, whether it is sweet, bitter or salty. This could have significant spin-offs in various areas, such as health and wellness for the preparation of balanced and tasty diets, but also in neuroscience for the study of brain processing mechanisms of taste and related sensations.

An interesting field of application of the VIRTUOUS project concerns the possibility of developing new foods by combining the functionality of certain molecules with the taste of others, for example by joining the properties of milk and its high calcium content with the appetizing taste of junk food.

Last but not least, VIRTUOUS will help to establish a stronger relationship with the region: once identified the molecule responsible for a specific taste, it can be selected among local products generating positive effects on the local economy.

Solar research: scientific collaboration agreement signed between SUPSI and IRSOL

On 24 February 20221, the University of Applied Sciences and Arts of Southern Switzerland (SUPSI) and the USI-affiliated Istituto Ricerche Solari "Aldo e Cele Daccò" (formerly IRSOL) announced the signing of a collaboration agreement that will strengthen scientific research in Ticino relating to the development of spectro-polarimetric instrumentation for solar observations.

The aim of the collaboration agreement is to promote the realisation of innovative solutions in the field of solar research through the development of a new type of high precision polarimetric camera, and it will strengthen the applied research area of Applied Photonics and Optoelectronics at the Institute of Systems and Applied Electronics (ISEA) of SUPSI.

"This collaboration agreement marks SUPSI's many years of fruitful previous scientific activity with IRSOL and serves as an ideal prerequisite for future strategic scientific development activities in solar research in close collaboration with IRSOL and USI", says Prof. *Andrea Salvadè*, Director of ISEA.

With SUPSI and IRSOL's many years of experience in the field of high-resolution spectral polarimetry, the new collaboration aims to forge a technology that can also be applied in other fields with high market potential. In particular, an application in the biomedical field for real-time medical diagnostics, improving the quality of surgery, is considered of great interest.

IRSOL, which also boasts collaborations with, among others, the Swiss Centre for Scientific Computing (CSCS), is a research institute specialising in the observation and study of the sun using the ZIMPOL (Zürich IMaging POLarimeter) system based on a technology inherited from the Swiss Federal Institute of Technology in Zurich and perfected by IRSOL and SUPSI. The ZIMPOL system is internationally recognised for scientific observations of the sun. Today's technologies enable further development of the system by adapting it to the requirements of next-generation solar telescopes.

The cooperation agreement represents an important element in the consolidation process of the university system in Ticino and strengthens the scientific pole in the field of solar research, whose activities are to be considered extremely strategic and unique on an international level.

RIVERdepth 3000, ISEA project for hydrogeological risk prevention in Alpine areas

The increase in extreme weather conditions and the climatic changes taking place at all latitudes are also having a significant impact in the Alpine regions, causing a growing tendency towards the erosion of watercourse bottoms with consequent dangers for the safety of built-up areas and roadways.

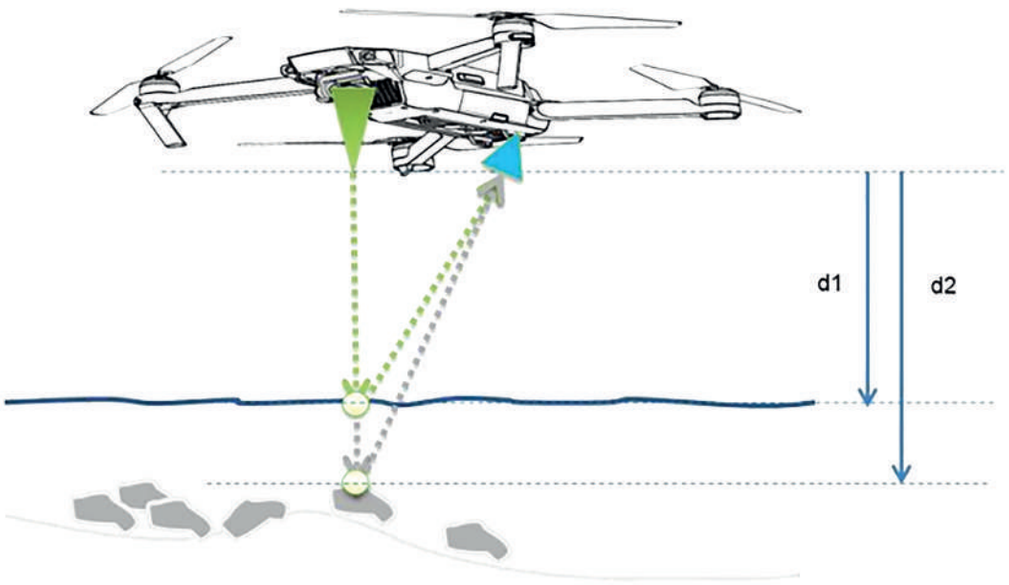
The Institute of Systems and Applied Electronics (ISEA) of SUPSI's Department of Innovative Technologies, in collaboration with the Ticino companies Lehmann-Visconti Sagl, Beffa e Tognacca Sagl, and Adolfo Juri Elettronica industriale SA, is participating in the RIVERdepth 3000 project for the development of an innovative system for bathymetric surveys of shallow riverbeds, such as Alpine watercourses.

The project, co-funded by Innosuisse, the Swiss Agency for the Promotion of Innovation, involves the construction of a lightweight drone equipped with a laser source and a special camera designed for mapping Alpine watercourses. The instrument will be equipped with a remote measurement technique based on a new green laser dual-target triangulation technology, featuring a spatial resolution of about 20 cm, depth accuracy of 3 cm and high-speed detection.

RIVERdepth 3000 will therefore allow continuous measurements to be performed using an instrument that is smaller in size, weight and cost than existing bathymetric drones, facilitating better management of Alpine watercourses. The drone will fly a few metres above the stretch of river to be surveyed, allowing the triangulation module to acquire the depth of the watercourse.

"This specific technology will make it possible to quantify the difference in altitude between the drone and the seabed, even in conditions where ordinary devices fail due mainly to shallow depths", explains engineer *Roberto Gardenghi*, project leader and head of the scientific area of 'Applied Photonics and Optoelectronics' at ISEA.

Dr. Ing. *Christian Tognacca* of Beffa Tognacca Sagl further states: "We intend to offer a solution that is very interesting both technologically and commercially, and which will be able to provide important support in the activities of analysing and monitoring over time the evolution of the riverbed. Reliable data is indeed central to the monitoring of natural phenomena as well as the development and analysis of redevelopment measures and the prevention and management of natural hazards".



Kitt4sme, a DTI-led European project to support digitisation in manufacturing

The KITT4SME project Platform-enabled kits of Artificial Intelligence for an easy uptake by SMEs) is part of the ICT Innovation for Manufacturing Smes (I4smes) programme launched by the European Commission in 2013 with the aim of supporting companies in the innovation of products, business processes and business models through digital technologies. In particular, it targets European small and medium-sized enterprises (SMEs) and midcaps with the aim of developing a modular and customisable platform to provide them with tailor-made, ready-to-use and affordable hardware, software and organisational kits for the application of AI in manufacturing processes.

The limits of applying artificial intelligence to industrial processes are in fact still substantial, especially for SMEs, which make up almost the entire entrepreneurial fabric and have limited investment capital.

"Small and medium-sized companies do not have the dedicated resources and specific AI skills required to develop practical solutions in-house, nor the basic knowledge to choose the most suitable proposals for their needs from those on the market", explains *Andrea Bettoni*, senior lecturer-researcher at the Institute of Systems and Technologies for Sustainable Production (ISTePS) of the DTI.

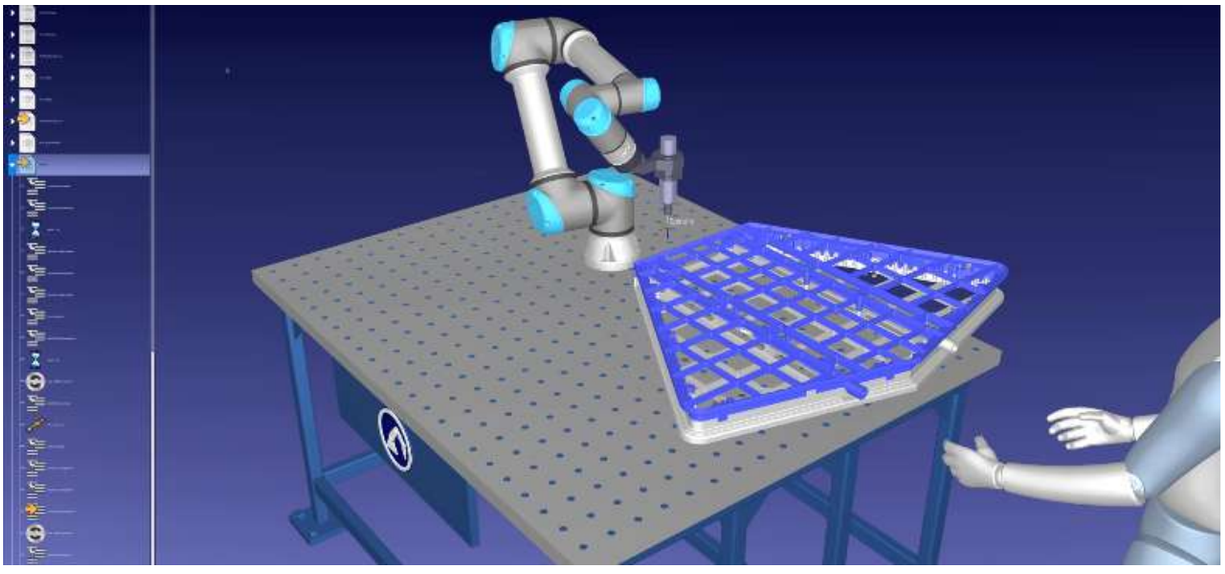
"In order to address this situation, which risks causing the manufacturing industry to lag behind in the race towards digitisation, the European KITT4SME project aims to build a bridge between those who develop this type of application and the manufacturing companies interested in introducing artificial intelligence into their systems".

The application axes of artificial intelligence in companies are threefold: improving the quality of production systems, simplifying the interaction between man and machine, and facilitating the reconfiguration of production systems, which is crucial for SMEs that often work on small batches with very frequent changes of production type.

"A decisive advantage for users of the platform is that they can draw on solutions tailored to their needs and focused on the problems that the individual company is really facing", continues Bettoni.

The project also sees the involvement of the Dalle Molle Institute for Artificial Intelligence Studies USI-SUPSI for the creation of a questionnaire with adaptive answers proposed by an AI engine to qualify the needs of companies operating in different sectors.

In this way, unresolved issues are identified on the basis of which a customised kit of artificial intelligence systems and sensors can be put together to provide them with data.



The Automation, Robotics and Machine Lab (ARM) works on the European project AVANGARD

The Automation, Robotics and Machine Lab (ARM) of the Institute of Systems and Technologies for Sustainable Production (ISTePS) is collaborating on the European project AVANGARD (Advanced manufacturing solutions tightly aligned with business needs) for the design of robotic systems capable of operating in hostile environments for humans.

The European project AVANGARD (Advanced manufacturing solutions tightly aligned with business needs), financed by the Horizon2020 Research and Innovation Fund, was launched as a response to the demands of the "inspection and repair" industrial sector for the design of robotic systems capable of operating in hostile environments and conditions.

The project, implemented by the Institute of Systems and Technologies for Sustainable Production (ISTePS) of SUPSI's Department of Innovative Technologies in collaboration with 22 international industrial and academic partners, aims to achieve two main objectives: to speed up maintenance operations, ensuring 24/7 operation, and to reduce the risk of injury for operators.

As part of the project, the Automation, Robotics and Machine Lab (ARM) has developed UMA (Universal Maintenance Automata), a completely innovative robotic platform capable of moving and operating on vertical surfaces by being equipped with different tools and processing technologies.

"The UMA platform represents the first mobile robotic solution designed and built entirely within the ARM Lab. In particular, we have developed the mechanical architecture of UMA, enriching it with sensors capable of reconstructing the environment and operating in particularly hostile surroundings to undertake complex decision-making processes", says Prof. Dr. *Anna Valente*, Head of the Automation, Robotics and Machine Laboratory.

The development and testing phase of the platform is currently underway at the ARM Laboratory.

"Thanks to replication of various application contexts, such as vertical surfaces with variable geometry in metal or concrete, both smooth and shaped, we are able to test the performance of UMA and assess its reliability", explains *Ivan Brugnetti*, ARM Researcher. "Looking forward, the goal is to estimate the scalability potential of this application in new industrial contexts and in an increasing number of use-cases".

"Compared to the state of the art of current platforms whose use is limited to inspection operations, UMA can also carry out measurement and maintenance work (e.g. rust removal, sandblasting, brushing, spraying of protective coatings and painting)", concludes ARM Researcher *Diego Gitardi*.

During 2021, the UMA platform won numerous industrial and scientific awards, including the Swiss DINNO Award, an annual prize granted to the best Swiss projects for the digital modernisation of products, services or processes.

V-MACHINA, personnel training in manufacturing through Virtual Reality

In manufacturing, staff training often requires interaction with expensive, cumbersome and potentially dangerous machines and robots (M&R). In addition, the successful implementation of M&R applications often represents a major challenge in terms of efficiency, diversity and impact on employee health.

Through the V-MACHINA project, developed by the Institute of Information Systems and Networking (ISIN) of SUPSI's Department of Innovative Technologies within the European EIT Manufacturing programme, these interactions are being mitigated by providing sustainable, accessible and safe simulations through virtual reality applied to manufacturing environments.

In particular, the research team led by *Silvia Giordano* and *Achille Peternier*, respectively Professor and Adjunct Professor at ISIN, aims to achieve a human-centric perspective through the promotion of three paradigm shifts in education. LEARNING4ALL, providing everyone with access to easy M&R modelling in virtual reality; ACCESS4ALL, offering everyone a tailor-made experience, without gender and diversity discrimination; FEELING4ALL, including emotions in human-machine interaction that are collected from the virtual environment and used to adapt the parameters of the simulation being performed.

"Through the Virtual Machinery Environment platform, we are able to create virtual laboratories where we can simulate the operation of different machines and robots," explains Prof. Giordano. "These experiences can be done anywhere, even at home, with simple virtual reality equipment in a very safe and inexpensive environment".

Preliminary results from the project led to V-MACHINA being awarded the EIT-M Success Story Award 2020.

By transposing real-world experiences with M&R into virtual reality-based educational modules with visual, auditory and haptic feedback, through V-MACHINA any user can learn how to deal with M&R safely and with less impact in terms of infrastructure, energy, logistics and costs.

Virtual reality simulations can also be customised to include users' specific health and diversity needs. Similarly, they also act as mentors by including automatic performance monitoring and feedback (with gamification strategies) on tasks and exercises, guiding the user through the proposed activities and monitoring their progress. Thanks to virtualisation, V-Machina reduces distances and creates a true collaborative environment between remote sites. The recent Covid-19 pandemic has further increased the need for such virtual spaces to be more versatile than simple audio/video conferencing and data sharing: emotion-based technology can be disruptive.

"We are now pursuing work on this project by taking the experience we have developed to classrooms, thus including a large number of people in real time", Prof. Peternier remarks. "Next year, we expect to be able to introduce new aspects such as privacy and security, which are especially crucial during the stages of collecting personal data from users and recording emotions".

ISIN participates in the READ project for digitisation in the real estate sector

Funded by Innosuisse, the Swiss Agency for the Promotion of Innovation, the project aims to introduce new tools for carrying out real estate appraisals, guaranteeing greater flexibility in the execution and accuracy in the results.

"At present, real estate appraisals are carried out by an expert who goes on site with the cadastral map and uses tools such as laser pointers to survey the property and check its consistency with the map. In this way, however, only measurements whose accuracy is influenced by the manual skill and experience of the surveyor are obtained", explains *Andrea Quattrini*, Researcher at ISIN and project leader. "Through READ, we intend to free these operations from the role of the surveyor. To do this, we have developed a mobile device equipped with specific sensors that can be sent directly to the site of the expert's report, allowing anyone to collect the data".

The solution developed as part of the project is based on the SLAM (Simultaneous Localisation and Mapping) technique, which makes it possible to exploit LiDAR-type sensors and cameras to obtain a 3D reconstruction of the property. By moving a tablet around the environment, the operator can obtain a real-time visualisation of what he is measuring on the device's screen, making the operation intuitive and executable by anyone.

"Operationally, the device can only frame, moment by moment, a narrow field: it is therefore necessary to move the device and combine the various local measurements in order to obtain as complete a global reconstruction as possible," Quattrini continues. "Even in this case, the accuracy of the measurement and 3D rendering depends on many factors, such as the proximity of the partial shots or the material of the framed objects, but the reconstruction error of our device is within the centimetre range, which is perfectly acceptable for the application in question".

The READ system was used inside the Vittoriale degli Italiani, the house-monument of the poet Gabriele D'Annunzio on Lake Garda. The objective is twofold: on the one hand to map the interiors three-dimensionally for the development of interactive tours and technical real estate analyses, and on the other hand to facilitate the correct positioning of objects after moving.

The Institute of Systems and Technologies for Sustainable Production (ISTePS) of the DTI is also involved in the READ project, as well as the industrial partners QBT Sagl and Science Adventures Sagl.

"The READ project exploits the potential of a tracking camera to estimate the position of the operator moment by moment and a time-of-flight sensor to measure the spatial coordinates of thousands of sampled points in the scene", continues *Ambra Vandone*, researcher at ISTePS. "These instruments work very well in enclosed spaces where lighting conditions can be controlled. In the future, we plan to extend the measurements outdoors by changing the type of sensors and using techniques such as photogrammetry, for which longer processing times may be required, however".

"The READ project represents an evolutionary leap forward in the approach to real estate surveying. Reconstructing three-dimensional rooms in a few minutes with a tablet, transforming 3D maps into cadastral plans with the possibility of taking measurements on them, and the automatic recognition of rooms, objects and construction imperfections represent a great leap forward for a sector such as real estate, which generates significant financial numbers", concludes *Alessandro Barazzetti*, founder and R&D manager of QBT Sagl.

SUPSI Swiss lead partner in the Innosuisse CO2NVERT project

CO2NVERT - C-Atoms for Circular Chemistry is a project funded by the Swiss Agency for the Promotion of Innovation (Innosuisse) as part of the Flagship programme, an initiative launched in January 2021 aimed at fostering systemic innovation and interdisciplinary collaboration to find solutions to current or future challenges of relevance to a large part of the economy or society.

The project, led by the Institute of Mechanical Engineering and Materials Technology (MEMTi) of SUPSI's Department of Innovative Technologies, aims to contribute to decarbonisation on a global scale through the development of a technology based on the so-called "circular carbon economy".

By realising new catalytic processes, the CO2 emitted into the atmosphere will be exploited for the production of substances widely used in the chemical industry, such as higher alcohols (isopropanol and 2-butanol), replacing current processes based on constituents of fossil origin. Starting with a case study involving the chemical industry and the fragrance and flavouring sector, the project has the ambition of developing a technology whose application can be extended to an increasing number of areas, with the overall aim of contributing to the reduction of CO2 emissions in the future.

The first phase of the project involves the development of new catalytic technologies to support the circular carbon economy approach, followed by the construction of a pilot plant to be tested by the project partners. Two phases that will see the direct contribution of MEMTi through the consolidated skills of the teams led by Prof. Giovanni Maria Pavan, Head of the Computational Materials Science Laboratory, and Prof. Maurizio Barbato, Head of the Thermo-fluid dynamics Laboratory.

"Sustainability is an issue to which SUPSI is increasingly committed. With this project, MEMTi wants to make its own contribution, participating in the realisation of real solutions developed through scientific research activities in collaboration with academic and industrial partners. Digitalisation is increasingly impacting the technological and industrial world, including the world of the chemical industry: the investigation through computational models of new approaches to control chemical reactions and processes is becoming increasingly important, opening up new opportunities with a view to improving and controlling efficiency, energy saving and sustainability. This is an area in which the institute is emerging as a centre of competence at national and international level", explains *Dr. Adriano Nasciuti*, Director of the Institute.

In addition to SUPSI, the four-year project (January 2022 - December 2025) involves several academic partners, such as the Swiss Federal Institute of Technology Zurich (ETHZ), ZHAW School of Engineering, Paul Scherrer Institut, Eastern Switzerland University of Applied Sciences (OST) and University of Basel. They will also be joined by industrial partners including Casale SA (Lugano), Firmenich SA (Satigny), JURA-Cement-Fabriken AG (Wildegg), CIMO Compagnie Industrielle de Monthey SA (Monthey) and others.

MEMTi joins the new NTN Innovation Booster "Plastic for Zero Emission

The Polymer Materials Engineering Laboratory led by Prof. *Andrea Castrovinci* will participate in the activities of the NTN Innovation Booster "Plastics for Zero Emission" aimed at researching and promoting innovative ideas for reducing CO2 emissions and developing new negative emission technologies.

The NTN Innovation Boosters, supported by the Swiss Innovation Agency (Innosuisse), are four-year programmes on specific innovation topics developed by interdisciplinary teams.

The NTN Innovation Boosters aim to stimulate innovation activities through the development and testing of concrete ideas, promoting the transfer of knowledge between research, business and society and contributing to value creation.

In this context, the NTN Innovation Booster 'Plastic for Zero Emissions' is part of the programmes launched for the four-year period 2022-2025 to respond to the global challenge of climate change by achieving carbon neutrality, a goal that Switzerland also intends to achieve by reducing net emissions to zero by 2050.

"Our contribution to the NTN "Plastic for Zero Emission" concerns the expertise we have developed on plastics", says Prof. Castrovinci. "In particular, we will bring the knowledge derived from 20 years of experience in R&D in this sector, as well as our proximity and well-established relationship with industry".

Presentation of the Institute of Digital Technologies for Personalised Healthcare (MeDiTech)

After ten years of growing expertise in the field of medical technology, on 13 July 2021 the Institute of Digital Technologies for Personalised Healthcare (MeDiTech) was presented.

The Institute is involved in education and research activities focused on the use of digital technologies and development of medical devices to support new and personalised methods of diagnosis, treatment, therapy and prevention in the medical field.

These activities find application in the development of "digital healthcare" platforms, the design of diagnostic systems and management information systems. Thanks to the optimisation and application of artificial intelligence algorithms, the institute deals with the implementation of new solutions for the benefit of both doctor and patient. In this respect, MeDiTech is organised around three distinct but strongly interdependent research areas: Biomedical Signal Processing, Medical Devices and Digital Health.

"Despite the fact that the Institute has only just been established, the activity balance is certainly positive, with a growth in both personnel and research volume", explains *Alessandro Puiatti*, Head of Research in Digital Health.

The research activities of MeDiTech are carried out in collaboration with local companies and clinics (e.g. the Ente Ospedaliero Cantonale, the Istituto Oncologico di Ricerca, the Clinica Luganese Moncucco, the Ospedale Malcantonese), national (e.g. Inselspital in Berne, Chuv in Lausanne) and international (L.I.F.E., Relitech, ABAMOBILE, ...).

"In particular, in the near future we intend to consolidate the role of MeDiTech as a regionally and federally recognised centre for the design and development of digital solutions and medical, diagnostic and therapeutic devices based on innovative technologies", continues *Francesca Faraci*, Head of the Biomedical Signal Processing research area.

Finally, from a didactic point of view, the Institute is involved as the head of the Medical Engineering profile of the Master of Science in Engineering, as well as in several courses delivered as part of the Department's Bachelor's degree and continuing education programmes.

"Being able to contribute to enriching the education of the students in the department with our expertise in the field of medical technology is an important stimulus for us. We hope that more and more young people will become interested in the world of medical technology, a fast-growing field in which more and more professionals are required to meet emerging challenges", concludes *Igor Stefanini*, Head of the Medical Devices research area.

E!Cuorema – Biomedical Signal Processing

The European Cuorema project aims to develop a mobile application to increase adherence to cardio-rehabilitation by reducing the risk of cardiovascular disease-related mortality by 20%.
Co-funded by the State Secretariat for Education, Research and Innovation (SERI) and the European Community, the project is being carried out in collaboration with the Malcantone Hospital (OSCAM), the English IT company my-mhealth and the company Game Solutions Lab, which is part of Games for Health Europe, Europe's leading professional community in the field of gamification in health and healthcare.
Project sponsors are also the companies AlfaGamma and L.I.F.E., which are active in the field of research and application in the medical device sector.
Starting from an existing app, the Cuorema project envisages the development of a system that increases adherence to cardiac rehabilitation by means of biobehavioural feedback, such as physical activity, heart rate variability, healthy nutrition, etc.
In this way, patients have the opportunity to interact with the entire rehabilitation team and the gamification approach increases motivation and socialisation.

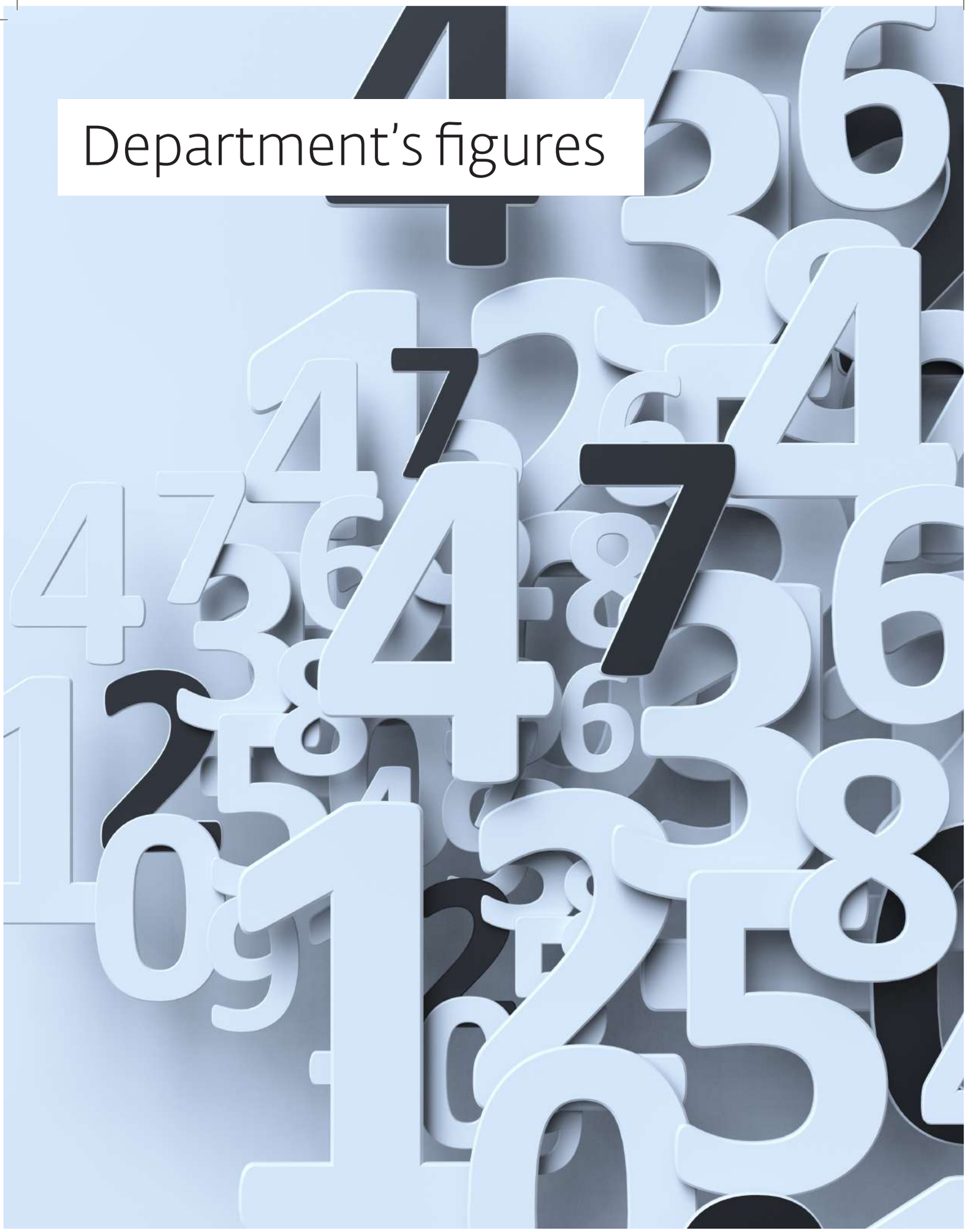
Decoding neural signatures of gait deficits – Digital Health

By analysing the electroencephalographic signals of patients suffering from Parkinson's disease, the Decoding neural signatures of gait deficits project aims to identify and recognise movement intentions in walking and the different phases of walking in order to improve motor skills.
By using sensors inserted into the brain, the system developed makes it possible to recognise the movement intentions of patients and then go on to regulate the stimulation (deep brain stimulation). At present, the algorithm developed recognises three phases: preparation for movement, walking and stopping. A broadening of the spectrum of detectable intentions is planned for the future.
The project, funded by the Swiss National Science Foundation (SNSF), is being carried out in collaboration with Neurorestore, a research centre of the University of Lausanne and the University Hospital of Vaud (CHUV).

MicroCovSens – Medical Devices

The MicroCovSens project, funded by the Swiss National Science Foundation (SNSF), deals with the development of a portable microfluidic device for the real-time detection of the SARS-Cov-2 virus, responsible for Covid-19 disease.
The developed device, which is inexpensive and usable for real-time pathogen detection via RNA screening, does not require sample preparation and involves minimal reagent consumption, making it suitable for use even by non-specialists.
In addition to the Institute of Digital Technologies for Personalised Healthcare (MeDiTech), the Swiss Federal Institute of Technology in Lausanne (EPFL) and the Oncology Research Institute (IOR) in Bellinzona are also participating in the MicroCovSens project.

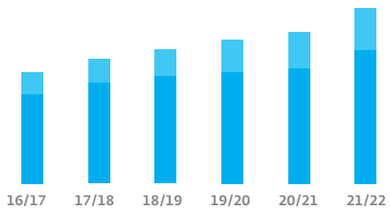
Department's figures



Bachelor and Master's Education

Evolution of student number

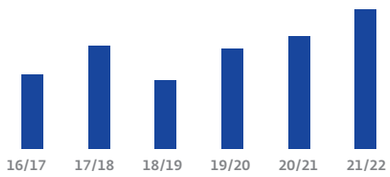
	16/17	17/18	18/19	19/20	20/21	21/22
Bachelor	453	508	542	563	583	666
Master	109	126	137	166	180	215



Continuing Education

Evolution of student number

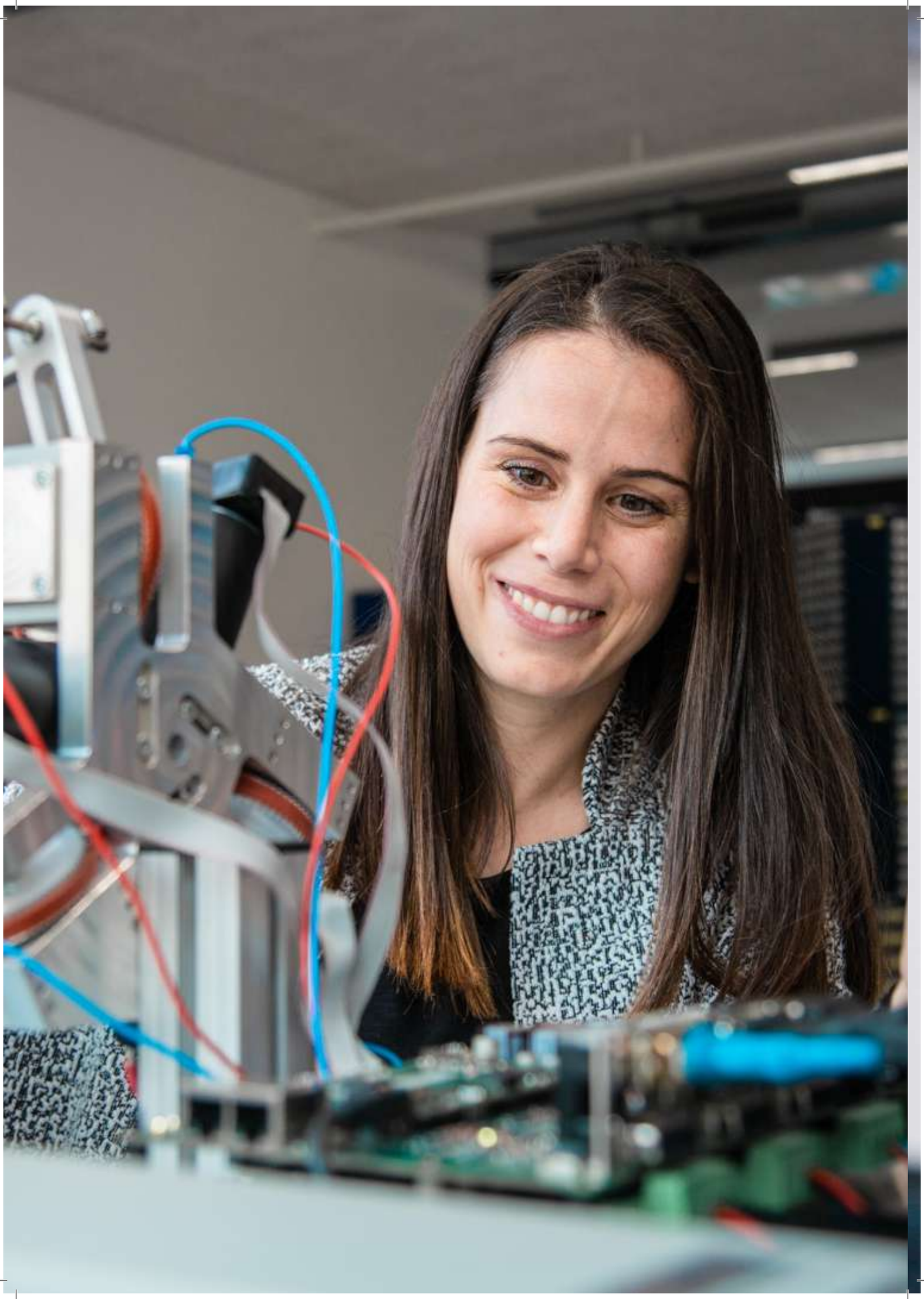
	16/17	17/18	18/19	19/20	20/21	21/22
Advanced Studies	206	286	190	278	313	501



Applied Research

Research project launched

	2016	2017	2018	2019	2020	2021
Total	61	55	65	68	82	88



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