Research state Salzburg

Material research is a young, but strong field in Salzburg. Supported by the state’s scientific and innovation strategy and accompanied by ITG, it is steadily being expanded at the University and the University of Applied Sciences in Salzburg. New fields of application and competences are evolving there through research centres and modern equipment such as the transmission electron microscope (see page 2). This all promotes fundamental research (e.g. for lightweight construction) in the region and supports the research activities of local companies.

Other areas are also developing dynamically. An overview and a few examples can be found in this issue. We are also presenting one or two plans for the future, such as the establishment of the digital transfer centre (page 4).

Last but not least, we can introduce a large number of innovative companies that are revolutionising market niches or which have the potential to open up new markets for themselves. They regularly work together with research institutes during this process.

Material research is being developed further in Salzburg with strong support from the state. Since 2017, its home has been in the new Science and Technology Hub at the University of Salzburg in Itzling. “Specialist personnel and the latest technology are crucial in order to be able to operate in this focal area,” says Governor Wilfried Haslauer. “As part of the implementation of the WISS, the state has therefore not only supported the establishment of the laboratory facility but, in a first step, has also provided funding for scientific personnel. The technical equipment needed for such research was also purchased using EU funds from the Interreg Austria-Bavaria cooperation programme. For Salzburg, this means the region also benefits from the funds and can expand its research focus.”

Location-relevant projects are assisted by Salzburg’s innovation agency ITG on behalf of the state. “We support research institutes, but also companies, when they need help in applying for funding,” says ITG Managing Director, Walter Haas. “Assisting the project development and bringing the partners together are also part of our remit. In this way, we can make a significant contribution to honing the strengths of Salzburg, such as in the area of material research.”

Inter-regional cooperation: University of Salzburg and University of Landshut

The field of lightweight construction in material research is particularly important in these parts. The border region with Salzburg, but also Upper Austria and Southern Bavaria, has a strong economy in the sectors of manufacturing, supplies for the automotive industry, as well as machine engineering. The University of Landshut had therefore already established a Lightweight Construction competence centre and a Faculty of Lightweight Construction 14 years ago. The Chemistry and Physics of Materials faculty of the Paris Lodron University of Salzburg (PLUS), on the other hand, has proven expertise in the production and characterisation of (ultra) lightweight materials (”aerogels”), nano- and hybrid materials/composites. These two competences were merged with the support of EU funds to establish the joint cross-border Research and Development Centre for Lightweight Construction, “nano-to-macro” (n2m). The University of Salzburg provides know-how and infrastructure in the field of nano and micro-analysis and the targeted design and characterisation of surfaces and interfaces between different components in one material. The HAW Landshut expands this with its analysis and characterisation possibilities and its experience in the development, production and testing of new materials for lightweight construction. The multi-scale research project – from nanometre to metre – thus extends from the development of the starting materials to the study of the interfaces and volume properties, through to the process technology for designing efficient lightweight structures.

One example being covered as part of the Interreg project is the improvement in the material resistance of wrought magnesium alloys. As lightweight metals, they have huge application potential in automotive and aerospace technology. In medicine, they can be used for the production of biodegradable metal implants. A further sub-project focuses on the improvement of composites made from (biogenic) polymers, such as silk, and glass reinforcement elements. The ultimate goal is to enable predictions to be made as to when and under what loads a certain material will fail. In practice, that means greater safety, such as in the area of transport. In industry, such predictions can be used to prevent machine downtime due to material failures. Together, the University of Landshut and the University of Salzburg have exceptional strengths in this area and are pursuing a research project that is unique in the border region.
Changing materials at atom level

The new transmission electron microscope enables the University of Salzburg to analyse materials in their most minute structures.

In order to research relationships between production, structure and properties of a material, it is necessary to identify which elements are located at what point in the material. This is possible using a transmission electron microscope. As part of the cross-border partnership between the University of Salzburg and the University of Landshut, a transmission electron microscope costing EUR 1.2 million was therefore purchased in Salzburg. Here electrons pass through a material specimen just a few nanometres thick to image the arrangement and chemical nature of the individual atoms in the material.

But it was not only the equipment that was significantly upgraded in Salzburg: Experts in transmission electron microscopy who are familiar with the latest methods of specimen preparation, microscopic measurement and the associated analysis and interpretation of the data were also recruited for the faculty and the University of Salzburg. For material research in Salzburg, but also in the whole of Western Austria, the possibility of visualising structures in the atom and nano range is completely new. “The establishment of a high-tech electron microscopy laboratory is a great boost for Salzburg as a university location. In research, and also in research-related teaching, it was thus possible to make a huge step forward in quality,” says Nicola Hüsing, Head of the Chemistry and Physics of Materials faculty at the University of Salzburg. This was thanks to funding by the EU’s Interreg Austria-Bavaria support programme.

Minute material specimens for big equipment

The faculty investigates questions posed by lightweight construction, such as resource efficiency and availability of raw materials, but also production, structure and property correlations. One method used to find the answers is to bring material specimens to near-failure and then prepare them in this condition for examination. This means that they have to be brought to the required size and strength (no more than a few nanometres thick). To put this in perspective: A nanometre is a millionth of a millimetre. Microscopic analyses now allow researchers to determine how the material looks at the atomic level, or what defects have occurred during the process. This enables them to recognise which changes have taken place compared with the non-stressed material. Such findings form the basis for the further development of materials. The researchers at the joint research & development centre are convinced that the physical and chemical control over the material in the nanometre range will enable crucial improvements in the properties. That means, for example, fewer material fractures, less susceptibility to corrosion, and longer service life. Particularly with nano materials, the arrangement of the atoms and defects, the control of the size, geometry and function of the pore structure in the nanometre range dictate the visible properties. The chemical, electrical or optical functions of these “functional materials” are determined in this way.

Materials as sensors

Current project examples include the development of new electrode materials for lithium ion batteries, fuel cells and supercapacitors, new illuminants, photocatalysts and electrodes, but also innovative materials that themselves can act as sensors. The latter react to chemical or physical changes in their environment. “We are working here on the basics,” says Oliver Diwald, professor for material sciences. “In practice, at a much later stage, this could enable materials to be produced that react visibly to certain influences. For example, the sensor material could react to moisture and indicate this visually by a change in colour. That would be expedient where moisture is to be avoided and the change in colour thus acts as a warning.” Other measurable signals for a digitalised world could also be generated in this way. This creates a direct link between the physical world of material research and the digitally oriented university partners, such as computer sciences, geoinformatics and the Institute for Human-Computer Interaction in the Science and Technology Hub at the Itzling campus.

Students benefit from the possibilities

Nicola Hüsing sees the linking of teaching and research as an essential basis for academic training. The professors at the University of Salzburg and University of Landshut are recognised experts in their fields and supervise groundbreaking research projects. In many cases, this is conducted in close cooperation with industry. The latest results are fed back into the teaching. “Our students are thus able to share in the latest research results and to incorporate these into their own research work,” emphasises Hüsing.
Using physics to understand tissue growth

Since October 2017, the Material Research faculty at the University of Salzburg has been strengthened by the Australian-born biophysicist John Dunlop. Here the researcher is setting up the Morphophysics research group, which studies how physics and mathematics influence the development and growth of biological forms. One example of this is the work with living tissue. If part of the bone is missing due to bone cancer or an accident, this can be repaired using the body’s own cells. If the missing piece is large, a framework or lattice made of dispersable other bones, ceramics or biodegradable plastics is needed on which the cells can spread. “One of my questions is how these frameworks have to be geometrically structured to allow optimum cell growth,” explains Dunlop. “In order to do that, we have to understand how the physical processes of cell growth take place, and how cells react to different geometric surfaces.”

Interdisciplinarity is called for – from medicine through to IT

These questions demand great interdisciplinarity. Biology and medicine are needed to understand what happens in the cells, physics to describe the processes, and mathematics to develop the geometries. A further step then involves the production methods and IT. “At the moment, everything is still in the development phase – including the laboratories and associated microscopes. It should become possible with the right equipment to record the growth of the cells. We will then be able to see how they move in three-dimensional space. This gives us 3D films.” Computer sciences are then needed for processing this data and for further simulations. Dunlop also aims to optimise the production of the frameworks. “In the first step, it was sufficient to produce them using 3D printing. But because the structures are built up layer-by-layer using this process, small steps were created to which the cells oriented themselves and we were unable to see the effect of the underlying geometry. We are therefore looking for more precise methods.”

Mechanical behaviour of plants

Dunlop heads a research group at the Max Planck Institute in Potsdam. Together with his colleagues, he has also studied the seed distribution systems of plants here, in addition to the research into living tissue. The combination of two different substances enables a reaction of essentially dead tissue with the environment. This applies, for example, to pine cones that react to moisture due to the combination of swelling and non-swelling material. If it is dry, the cone opens and the seeds are scattered. If it is damp, the cone closes. Similar behaviour can also be observed in the bowels: The outside consists of a rigid material, whereas the inside comprises a softer and faster growing tissue. This creates a large number of creases on the inside, thereby increasing the surface for nutrient absorption. Research questions triggered by these observations also interest Dunlop: How must materials with different geometries be arranged in order to achieve certain effects? For example, how can a particular stimulus cause a change in the material into a spiral or spherical form?

Although Dunlop’s research is fundamental research, the results could be employed later for applications in medical technology and soft robotics. That was, in principle, the subject of his doctoral thesis, in which he studied the degradation of nuclear material in the fuel rods of nuclear power stations. Apart from family reasons, he came to Salzburg because the university offered him the unique opportunity to shape the still young Material Research faculty and to set up his group. “A big, but very exciting challenge,” says Dunlop optimistically.

Bionics as an innovation method

Over the 3.8 billion years of development, nature has optimised processes and materials through trial and error. In a pool of more than 2.5 million currently known species, there are organisms that have already solved some of our technical problems. When you look closely, you won’t find this many models for product development anywhere else. In the EU-funded Interreg project LLBIZ “Innovative solutions through bionics”, project partners from Salzburg, Upper Austria and Bavaria are making this know-how available to companies. They see bionics as a creativity and innovation method for developing specific new ideas for defined problems.

“We have already found the ideas for a huge number of products and product improvements in nature,” says Romana Schwab, innovation consultant at project partner ITG. These include industrial knives with self-sharpening properties copied from rats’ teeth. The structure of honeycombs, on the other hand, has proved effective in lightweight construction, combining minimum use of material with maximum stability. “Systematic thinking in terms of bionics helps us to break out of our set patterns of thought and create scope for new ideas,” says Schwab.

First questions answered using a database

In databases such as AskNature, a wide range of natural strategies can be found using simple searches, which simplifies the introduction to the topic. “Quickly finding the first results, interdisciplinarity and a new way of looking at things are just a few of the advantages of bionics as an innovation method,” says Kirsten Wommer, project partner and a member of the Bionics team at the Technical University of Deggendorf. Nevertheless, this method always involves two parts: biology and technology. One without the other prevents a deeper understanding of the particular challenge. Both the Bionics team at the Technical University of Deggendorf and the consultants at ITG – Innovation Service for Salzburg – provide assistance with finding the right partner.

The methods used by nature can also be copied to a certain extent. It optimises during the course of evolution, but never offers optimum solutions. The oesophagus and the trachea, for example, cross in the throat area. When eating, a flap covers the trachea, but may not always function correctly. Mistakes during swallowing are usually corrected by the fault mechanism of coughing. The few cases where people die due to mistakes in swallowing do not provide sufficient reason for nature to revise this fault in the design. It ensures the survival of the species, not of the individual. “Here you can consider whether one fault mechanism in your own processes is sufficient and whether it is really such a bad thing if it fails in a very small number of cases,” says Wommer. The procedure itself is also being transferred already to some extent, with a large number of trials as to how the best result could look. Using the example of nozzles, a computer calculated random variants of the nozzle design and simulated the effect. The result was a form that a human design engineer would never have thought of, but was more effective than the conventional form.
The vision of a thinking, feeling factory

Simon Hoher is head of the Faculty for Mechatronics and Robotics at the Salzburg University of Applied Sciences. His work in the Digital Transfer Centre (DTZ) takes him from digital twins through collaborative robotics up to the vision of a cognitive factory that can hear, see, speak, feel and think. The control system technician gives insights into his field of research and the possible future of automation engineering.

You have been lecturing and researching at the Salzburg University of Applied Sciences since the end of 2017. What comparisons can you draw between your work in Stuttgart and in Salzburg?

First, I think that Salzburg is very well equipped to conduct applied research. The cooperation and the interaction with the companies in and outside of the region is excellent. At the beginning, I was concerned that it could be more difficult to win national, supraregional or EU projects for ourselves. Furthermore, the plans for the Digital Transfer Centre created an exciting research focus for me from the very beginning. That was an important argument for me. I never wanted to conduct research purely for the sake of research; I wanted to maintain the links between research and lecturing. I am able to do that at the Digital Transfer Centre.

What strategies are applied with the Digital Transfer Centre, and what goals are you pursuing?

We try to understand what the companies really need by means of feasibility studies and technology screenings. On-the-spot insights into how the state-of-the-art looks are important for this. On the basis of these findings, we aim to set up technology demonstrators. The idea is to build a model factory to show how companies can employ and benefit from digital transformation. A model factory is currently being built in our ITS laboratory. There we can also demonstrate collaborative robotics, for example – and always with an eye to the costs. A small or medium-sized enterprise naturally has to pay more attention to that than a large company. Our focus at the moment is to determine how digital transformation makes sense for the small and medium-sized enterprises in the region. A lot of this is currently being done in paper form and by hand. Here we have the opportunity to work on augmented reality displays, digital twins in the realisation and commissioning phase and collaborative robotics.

How do digital twins function?

The digital twin is the cyberphysical image of the real machine and allows a cross-sector data exchange. At the moment, the cloud is used predominantly for this, particularly for the intelligent evaluation of the data. This would enable, for example, a (3D) visualisation of the machine, documentation or process and operating data. The data also makes it possible to identify when maintenance is necessary. No one has to go down to the shop floor to check on that.

How does the future of the companies look when optimum use is made of digital transformation?

We are already thinking towards a cognitive factory: Data first needs to be aggregated, before patterns can be recognised and visualised in a second step. This is followed by extended data analysis that tends towards machine learning, contains optimisation algorithms and allows predictions to be made. In the fourth step, the smart factory becomes a cognitive factory, one that can hear, see, speak and feel. The goal is to further optimise production.

A classic example: A fault has occurred in a machine. The machine can call the service technician independently and tell him which component is defective. In addition, it can provide him with the necessary documentation out of the cloud. The service technician assesses the situation and reports this back to the machine. The machine plans that independently and “knows” that it will be functional again in two days, for example. On site, the cognitive factory guides the technician, such as with augmented reality glasses.

How much of that can already be implemented today?

We want to use the Digital Transfer Centre to take major steps in this direction. We want to read data out of our model factory and build a digital image of it. We want to recognise patterns and display them according to the needs. We then want to investigate the longer-term trends once we have implemented it well in the Digital Transfer Centre. There are already systems that “think” along the lines of the cognitive factory. A further step is then to test these systems. The idea here is to set up a competence centre at the ITS. My masters students are currently busy working on augmented reality displays, digital twins in the realisation and commissioning phase and collaborative robotics.

When we talk about the vision of a cognitive factory, shouldn’t we also include a humanities component?

Absolutely. Humanities are a very important aspect at this point. A philosopher from Stuttgart will be assisting us here in September. The main focus will be on collaborative robotics and the emotions it evokes in people. Until now, robots and people working in the same facility were separated by a protective device. As soon as a person came into contact with the robot, the protective device was triggered and the robot stopped reliably while it was being used to perform a task. Only after the person had left the protected area and enabled the robot again could it continue to work in its protected area. With collaborative robotics, there is no longer a protective device. The person can work directly with the robot. There will, of course, continue to be protective measures, but no longer in this original form. If we continue to work on the direct collaboration between man and machine, many more aspects will undoubtedly arise.

What new findings do you hope to gain?

My hope is that we get suggestions as to how a collaborative robot should be programmed – not only with respect to the technical functions, but also to the emotionality of the employees. That will become even more important in future, as will the cooperation between our study programme and the humanities. I think it is not only important to highlight the technical aspect, but also to understand what we are doing with our technology. After all, there is still a fear that automation, robotics and digital transformation will cost jobs. On the other hand, these things enable companies to remain competitive. After all, our prosperity derives from the added value generated by automation technology.

Are Austria and Salzburg in particular competitive by international standards?

From a control engineering point of view, we are very well positioned in Salzburg. There are a number of successful and internationally oriented companies in the region. One good example of this is the Salzburg-based automation engineering company SigmaTec, which dominates the injection moulding market with its controllers and supplies the drive engineering to one of Europe’s leading robot manufacturers. The automation specialists B&R and COPA-DATA are two further important development and innovation centres for control engineering in the Salzburg region. Salzburg is a real lighthouse in this area.
Artificial intelligence foresees user benefits

A satisfied customer is good for business. Customer satisfaction is still a success factor even in our digital age. The Salzburg-based company Findologic is a master in this respect.

Ten years ago, founder and managing director Matthias Heimbeck had the idea of developing innovative search and navigation solutions for online shops. Findologic was then established as a spin-off of the University of Salzburg. The motto from the very outset: “The competent salesperson for the stationary customer is the professional search function for the online shopper.” In this case, the helpful salesperson is the artificial intelligence. The programme learns with every customer and delivers the right products automatically depending on the shop, sector and customer needs. Thanks to the sophisticated software, maintenance and support are low at around two hours a month, giving Findologic a competitive advantage. “It is important to be able to react flexibly to customer requirements. If we recognise a new trend among the shop users, we can react to it with our software,” says Heimbeck. The crucial element is providing a satisfactory shopping experience for the user. If shop visitors arrive quickly and easily at the desired result, it is reasonable to expect that they will click on the shop again in the future.

Recognition of individual user behaviour

The software achieves that through interpretations and predictions of the user behaviour. The user doesn’t always want a clearly defined product; sometimes it’s just a question of finding something similar or of needing help with a choice. “The reasons for the visit have to be identified,” says Heimbeck. “The more of these we can identify and satisfy, the better the shop can sell,” says Georg Sorst, Technical Director of Findologic, who is responsible for the technology. “It is important to predict what the visitor really wants. The software recognises these needs from the user behaviour; in other words, how the users express themselves or what they look for.” “We call that the knowledge layer,” says Sorst. “Our artificial intelligence is so advanced that preferences are automatically recognised.” By analysing the user behaviour, Findologic can then control and adapt features. These findings help shop operators to react to trends with optimally positioned campaigns and merchandising activities. While searching and browsing is made easier for the shop customers, the operators can position their products better. The field of application for Findologic is very broad and ranges from fashion outlets such as Adiowa and Amisu Dortmund, through to supermarkets such as Edeka. The different areas of application shape the software. With online fashion shops, for example, it is not so much a question of optimising the search function; rather, it is more the navigation and the “let yourself be inspired” that counts.

Leading through research

“Our work is also interesting for students of the new Data Science programme,” says Heimbeck. Findologic still sees itself closely linked to the University of Salzburg and the Salzburg University of Applied Sciences. Interns also find their way to Findologic time and again, not least as a result of the lecturing activities of Heimbeck and Sorst. This gives rise to new research projects and study courses, the results of which flow back into the Salzburg-based company’s software development. For us, that closes the circle to a certain extent back to the research. In the last few years, we have worked intensively on making the company the market leader. We now have the resources to work together with the university on new research projects and to continue to optimise and further develop the technology,” says Sorst. www.findologic.com

MINT Salzburg against the lack of specialist resources

At the HTL Salzburg, a group of school pupils has been working for several years on developing energy-efficient motor vehicles. It regularly takes part in the Shell Eco Marathon with its developments. Regina Schönerr, student at the Salzburg University of Applied Sciences, has built a reading lamp that directs the light to where it is needed. Together with her team, she had only 24 hours during the Roboton to invent and build the robot lamp – and to win a competition.

These and other stories can be found on the platform www.mint-salzburg.at. They show how exciting mathematics, IT, natural sciences and technology (MINT) are. The platform is directed at all children and young people who are interested in MINT, but also at parents, teachers and providers of MINT activities. The bundled offerings and initiatives of the network partners are aimed at arousing curiosity and interest in the MINT subjects. The network partners are 25 institutions from science and education, universities, research institutes and advocacy groups.

Activities organised by Salzburg-based companies, such as open days, can also be included. If interested, please contact the MINT coordination office at koordination@mint-salzburg.at

Vein recognition instead of PIN code

What makes us unique? Birthmarks? The tip of our nose? Apart from the obvious features, there are also those that are hidden under the skin. Our veins, for example. Vein biometry plays an important role in the security research by Andreas Uhl, deputy head of the Faculty for Computer Sciences and head of the Multimedia Signal Processing and Security Lab at the University of Salzburg. With his team and more than twelve partner institutions from Great Britain, Germany, Poland and France, he is working on modalities in biometric-based border checks as part of the EU project PROTECT. Uhl serves as head of the department of Vein and Security Technology and provides inputs in the field of iris biometry.

ATMs with vein recognition

Compared to a fingerprint, a biometric characteristic is less exposed to environmental influences and is therefore more robust and less easily forged. Tests showed that common fingerprint sensors of smartphones can be hacked within two weeks. The classic ATM PIN is also regarded as insecure. “Credit card institutes accept the poor security level as long as the damage does not become too high,” says Uhl. The new security technology is already being used for ATMs in Japan, and Barclays Bank in Great Britain employs it in its home banking. But the biometric security technology is still in its infancy. “We don’t know a lot yet. There are very few independent studies on the resistance to cold and other difficult scanning conditions,” says Uhl. The IT specialist is working together with social scientists on a project supported by KIRAS, the Austrian Security Research Programme, to look into how it would work in the Austrian banking world. “We are investigating how a biometric security function instead of a PIN code would be accepted by the population,” says the expert. ATMs would have to be equipped with the corresponding modules, and bank customers would have to allow their personal features to be stored. An important aspect is the protection of biometric characteristics against theft. “If a database with biometric characteristics is stolen, legitimate users cannot prevent their characteristics being misused.” In the case of loss, the characteristic would also be lost and could not be changed in the same way as a password. There are technologies, however, that allow changed characteristics to be stored. “In these systems, the characteristics are stored in combination with a key in the form of a PIN code. For me, that is the key to the secure use of biometrics.”

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Excellent cancer research through cooperation

By supporting the Cancer Cluster Salzburg, the federal state of Salzburg invests in public health and makes the location attractive to international researchers and companies.

In 2017 alone, the State of Salzburg undertook to invest more than EUR 4.5 million to promote life sciences (pharmaceuticals, biotechnology and medical technology) as part of the science and innovation strategy, in which the state government has formulated this sector as one of its key areas of focus. The supported projects include the further development of the Cancer Cluster Salzburg (CCS) in which the Salzburg state clinics (SALK), the Salzburg Cancer Research Institute (SCR) and the Paris Lodron University of Salzburg (PLUS) work closely together. This makes the joint development of technology, expertise and infrastructure possible across the institutions. ITG also supports the development of this project in its function as the state of Salzburg’s innovation agency.

“With the Cancer Cluster Salzburg headed by Professor Richard Greil, we have achieved an outstanding research quality and an improvement in the treatment of patients diagnosed with cancer,” says State Governor, Wilfried Haslauer. The state is also supporting the establishment of a “Smart Specialization Center” to focus on the personalized treatment of cancer patients. The Paracelsus Medical Private University (PMU) is also involved in this, together with the Cancer Cluster Salzburg, thus underlining the continued commitment to excellence research. “Although we are only a small state, the collaboration allows us to make the most of common strengths and short communication channels,” says State Secretary for Science, Andrea Klambauer. “This enables us to strengthen life science research and to make the location attractive to international researchers and companies.”

Cancer is one of the most frequent causes of death

Cancer is one of the three most frequent causes of death in all the decades of life, and it causes the largest premature loss of life among all diseases. Among the under 65-year-olds, cancer is even the most frequent cause of death in Europe, before cardiovascular disorders. The high demand for improved therapies is further underlined by the fact that both the number of new cases of cancer and the number of deaths due to the illness are increasing at an alarming rate. In 2012 alone, some 14 million people worldwide received the diagnosis “cancer.” More than eight million people died from the consequences of the disease. A global annual cancer burden of more than 21 million new cases and 13 million deaths is forecast by the year 2030.

Making the immune system fit to fight cancer again

An important approach in the Cancer Cluster is immunotherapy. This form of therapy aims to reactivate the immune system again, which had previously been paralyzed by cancer cells or had even been reprogrammed to support the cancer cells. “Pioneering successes have been achieved here globally and show an effect in between ten and forty percent of the patients,” says Fritz Aberger, deputy director of the Cancer Cluster and bioscientist at the University of Salzburg. Nevertheless, the number of patients that respond to immunotherapies is still modest. The number who had a lasting therapeutic benefit – in other words, could be regarded as cured after withdrawal of the medication – still lies in the order of ten to twenty percent. Still, the road to further developing immunotherapy looks very promising.

Training for the immune system in the Cancer Cluster Salzburg

In the Cancer Cluster, the focus of the research is on the interaction between the tumour cells and directly neighbouring cells: How does this communication promote metastasis? How is the immune system paralyzed? How does medication influence these processes? A major role in the fundamental research here is played by biology at the molecular and cell level. Through the close cooperation with the clinical side, the research is nevertheless close to clinically relevant questions. Linked to this is also the question of indicators for the effectiveness of certain therapies. Here, “biomarkers” have to be found as indicative signs. They may take the form of an increase in a certain protein level, for example. “In the research cooperation, we want to find out whether there are biomarkers by means of which we can distinguish between patients with a high, low or no benefit from a certain therapy,” says Aberger. This would also help to avoid the side-effects of potentially unnecessary therapies.

Austria’s lowest cancer death rate in Salzburg

The support for science and for the work of the Cancer Cluster Salzburg is already having an impact in the state: Some 10,000 patients have been treated in almost 500 clinical studies over the past 14 years. This led to a significantly lower cancer death rate compared with the average in Austria. Austria is overall one of the five countries in Europe with the highest survival rate in the event of tumour illnesses.

With its internationally visible and recognised excellence research, the Cancer Cluster is demonstrating the qualities of Salzburg as a life science centre: high competence, training and research possibilities and close cooperation between experts from several institutions. Internationally acknowledged science journals confirm the outstanding work of the Cancer Cluster Salzburg: The work of the researchers has already been published several times and cited more than 32,000 times to date. “This success shows that the sustained support from the state is a good investment in our health,” says Andrea Klambauer.

www.cancercluster-salzburg.at

Education

With its targeted and profile-enhancing approach, the goal in Salzburg is to train bioscientists for medically relevant research, both at the University and the University of Applied Sciences, and later in the Cancer Cluster Salzburg.

In 2016, the masters programme “Medical Biology” was established at the University of Salzburg in cooperation with the Salzburg University of Applied Sciences. The course is held in English and has therefore attracted great international interest.
Salzburg-based companies working on the future of diagnostics

The containment of dangerous hospital pathogens, medical check-ups, the right dosage of medicines, the avoidance of side-effects or immediate test results in emergency rooms: Analysis and test methods in medical diagnostics are wide-ranging and essential for laboratories, doctors and clinics. Here in Salzburg, products are being created that are in demand worldwide. Companies such as STRATEC Consumables, Tecan, Eurolyser and Molecular Devices are developing important components here for the national and, in particular, the international market.

Diagnostics companies place their faith in Salzburg

World market leader in laboratory automation is the Swiss laboratory technology company Tecan, which develops and manufactures highly specialised analysis instruments for research and applied diagnostics in Grödig. “The technology of the microplate reader allows thousands of samples to be analysed with the highest precision within minutes, and thus makes it possible for complex biological relationships and disease factors to be decoded,” explains site manager Helmut Wurm. Using integrated microscopes, the devices enable living cells to be monitored fully automatically for days and their response to therapeutic substances to be studied. STRATEC Biomedical AG is also represented at the Anif campus with its subsidiary STRATEC Consumables GmbH. In Anif, the company has specialised in the development and production of consumables for life sciences and in-vitro diagnostics. “This niche is our breeding ground, the medium for growth and a good basis for the coming years,” says Georg Bauer, Head of Product Development and Production.

Preparedness and prevention becoming ever more important

“In future, work will be carried out more and more at the molecular diagnostic level based on the DNA,” says Bauer. One advantage of DNA-based analysis techniques can be that biopsies no longer have to be invasive. For example, it should soon be possible for prostate check-ups to be analysed using blood samples, in order to determine the risk of the cancer recurring. STRATEC manufactures specimen holders for this new blood analysis. The analysis chips are roughly the size of a credit card and are made of transparent plastics. Although the process is still in the approval phase, Bauer is optimistic that tests based on blood, urine or saliva will become the norm in the long term.

Personalised medicine

Fast analyses as close as possible to the patient are also being developed by Eurolyser. The Salzburg-based company produces equipment and test kits for instant diagnostics in the human and veterinary medicine and foodstuffs sector. The rapid tests are used, for example, in general medical emergency care at the AKH Vienna and in a large number of doctors’ surgeries and outpatient departments worldwide. The personalised medicine in particular is an important future aspect for Eurolyser. “The quantity of the active ingredient is usually dosed only in relation to the patient’s size. But every patient absorbs the active ingredients of a medicine differently. An initial dose is administered using ‘therapeutic drug monitoring’, and we then measure how much of the active ingredient of a medicine is found in the patient’s blood stream,” explains managing director Michael Gruber. These measurements are important in the treatment of mental illness in particular, as they allow the doctor to set the correct dose. But they are also essential in oncology, so that the patients receive the right dose of active ingredients and, in turn, the effectiveness can be increased and the risk of a negative effect minimised. Using the new analysis tools from Eurolyser, the level of medication in a patient’s body can be measured within minutes.

The cooperation between the University of Applied Sciences and the University is an important aspect for the medical technicians. “We work regularly with the Salzburg University of Applied Sciences,” says Gruber. For example, students can help to examine sample material as part of their research work. “I believe that it is essential for research institutions or training facilities in the life sciences sector to be linked to the clinical operation,” emphasises Gruber.

Innovative research for the preservation of acoustic nerves

Preventing rejection of hearing implants

Cochlea implants are fitted to the ear when the transmission of electrical stimuli to the brain no longer functions. A microphone fitted to the outside of the ear receives the sound waves, converts them into electrical stimuli and transmits these to the implant. The acoustic nerve is then activated by the electrode in the inner ear. That only functions, however, if the electric current can flow unhindered from the electrode to the nerve cells. If an implant is fitted, injuries occur to which the body may react with scarring; this can cause the transmission of the information to deteriorate and hearing is lost again after a certain length of time. “It is exactly here that we can help with our stem cell nanovesicles,” explains Rohde. “They should mitigate the reaction of the tissue to the resultant injuries so that no scarring occurs and hearing is retained.” Together with institutions in Hanover and the USA, this method has already been successfully tested in the laboratory, but the safety and feasibility still has to be confirmed in clinical studies, says Rohde.

A new aspect is the connection of Cochlea implants to the inner ear. In this combination, clients from Singapore have placed an order for the site and training.

The added-value that Salzburg offers lies in innovative cell therapy research with a perfect clean room technology based on GMP-validated processes and the proximity to the clinics. And because not many institutions can offer this combination, clients from Singapore have placed an order for a development with the research team from Salzburg.

www.pmu.ac.at
Modern techniques for old cultural heritages

With 30 employees, the Linsinger ZT surveying company that specialises in cultural heritages is one of the largest in Austria. All the major cathedrals in Europe have been surveyed by them. What sounds simple, however, involves a great deal of innovation. Managing director Stefan Linsinger spoke to us about damage analysis, technical challenges and the search for employees in Pongau.

Why do clients come to you?

Almost all of them come to us about pending building measures for which they need the basic data. Analysis of damage areas is important for churches, bridges, stone walls, cathedrals – anything historical. It could also be used for new buildings suffering from structural damage. We have a broad field of activities, but we concentrate predominantly on the surveying of cultural heritages.

How does surveying function today?

We employ 3D scanners and drones to obtain high-resolution images. These result in 3D models on the basis of which we can draw plans – ground plans, sections and views. Architects receive interactive models with which they can work directly. In this way, individual roof slabs or whole floors, for example, can be easily removed.

They recently received the WIKARUS – the Business Award for Innovation. What is the innovation?

3D scanners and drones can be bought on the market – that is state-of-the-art. Our new development is a method by which we combine the data from drone and scanner images to produce models with millimetre precision. But builders want even more: We have prepared façade plans for cathedrals, but it wasn’t possible to see where there were problems with the façade. Such as where stones fall down or where there are cracks. So we set to work and programmed an algorithm that enables us to determine where there are cracks or movements.

How does that work?

We need at least two aerial views. We do that roughly once a year, but at different temperatures. We need that in order to be able to calibrate the images, because the whole building moves and this overall movement is eliminated by the calibration. We can in effect place the different images over one another. Thanks to overlapping images, we recognise movements in the object. We have developed the process so far that we can now say precisely to the millimetre where which stone has moved and how. We call that deformation analysis.

Do customer requirements also trigger innovations at Linsinger?

Yes, the idea generally evolves out of the discussions with clients. Plans are handed over and we discuss what could still be needed.

Did you implement all this alone, or did you bring in external support?

We always work together with research institutions on such developments. We want something that doesn’t exist yet, and the research institution does that for us.

What else is needed to drive innovation?

Surveying technology is developing so rapidly that a lot of money has to be invested in order to stay ahead. That makes the business so exciting. The machines cost on average between EUR 30,000 and EUR 50,000 and become twice as good every year. We also have very powerful PCs – we need them to be able to handle the huge amounts of data. For one model, we often have to compute 30,000 photos of 200 megabytes at a time. For the last project, we were able to obtain a large AWS grant thanks to the support of ITG – that took some of the sting out of the cost. Apart from money, we also need a driving force – and that’s me. And, of course, the innovative staff.

What role do the staff play in innovations?

They are the most important thing in my company. We are a service company that is absolutely high-tech, but my staff are the backbone. Not one or two, but a huge team that supports me as their boss – even when innovation ties up resources that are then missing elsewhere. We are booked out for a whole year with our orders, so branching off these resources is a great challenge. An award like this confirms the value of the work being done by myself and my team.

Your company headquarters is in St. Johann im Pongau – is it easy to find personnel here?

There is no chance of finding qualified staff – there is no graduate course for surveying engineers at the university. Unfortunately, surveying does not appear to be very interesting even for those at the HTL, even though we are globally active and work with the latest technologies. We therefore train the people we need ourselves – even if they come from a totally different field. We have taken on a painter who was unable to find work again after an accident, and a former waitress. We train the people ourselves, even if they have absolutely no prior knowledge or experience. They undergo an apprenticeship with us, supported by training grants. That helps the people, us and the region.

www.linsinger.at
Small cause, big effect: 
Revolution for the hydraulics industry

The largest field of activity of the Russbach-based company RWT, founded in 1999, is motor sports. Up to 300 parts of an engine, from the engine block, to the cylinder heads, through to the fuel pumps, are finish-machined here. As contract manufacturers, RWT works together with the big names in racing sport. The managing directors, Reinhard Thor and Hannes Homegger, are aiming to expand their portfolio with two new in-house developments: An innovative engine for any type of vehicle is intended to revolutionise the market. “This engine, of which we have already built a prototype, has no change of direction where it loses energy,” explains Thor. “The up-and-down movement of the pistons no longer takes place, so the efficiency should be quite a lot higher.” Normally around 40 percent of the admitted energy is lost in an engine due to the combustion. In the new engine, this loss is significantly reduced, meaning a saving in fuel consumption for the driver.

The second project aims to open up a completely new field of business: The innovative valve that the investor and consultant at ITG, a lot of things wouldn’t have turned out as they have,” says Thor. “He not only established the contact with Mr Kosean for me, but also supported us through the whole project handling and funding strategy. The innovation funding for which we have now received the go-ahead is of great help to us in the development. The valve still has to be thoroughly tested and, in particular, configured with all the digital functions and a practicable software.” r-w-l.com

Biologists, pharmacologists and doctors examine the genetic material using the latest technologies in order to determine how patients react to medication, and whether the desired effect can be achieved and what dosage is necessary for this. “One test is sufficient to determine the patients’ life-long individual medication tolerance,” says Paulmichl. The company was founded in 2014 together with Walter Scherlter and now has ten employees in Anif and Vienna. The blood sample for the analysis is taken by a doctor, but the analysis set can also be ordered directly by the patient. “We frequently receive direct requests from patients. The number of well-informed and responsible patients is growing in the meantime,” says Paulmichl. The main target group, however, is predominantly doctors who ultimately prescribe the medication.

Despite the possibilities offered by pharmacogenetics, there is still no dedicated course of training in Austria. “We are in the process of drawing up a diploma course for pharmacogenetics and believe that this represents an important step forward in the field of personalised medicine as well,” says Paulmichl. “The broad penetration of pharmacogenetics will undoubtedly also be simplified by its anchoring in the latest programme of the Federal government.” www.pharmgenetix.com

The right medication prescription with pharmacogenetics

The prescriptions and therapies are just as varied as the reasons for going to the doctor. Here again, every organism, every person is different and reacts differently to the prescribed active ingredients. In order to clarify this in advance, PharmGenetix has developed a pharmacogenetic analysis based on DNA tests. This allows the individual drug tolerance to be determined. As a result, side-effects can be better avoided and therapies optimised. The most frequent fields of application for the PharmGenetix analysis can be found in the cardiovascular, polypharmacological (taking of three or more medicines) and oncology sectors, but they are also very suitable for use in the area of psychotherapeutic drugs and anti-depressants. Particularly here, determination of the right dosage of active ingredients is enormously important for the patient’s quality of life. “The right setting of the dosage used to take six to eight months on average. With the PharmGenetix analysis, it only takes around ten days now,” says the founder of PharmGenetix, Markus Paulmichl.

Excavators, lifting platforms, etc. currently use mechanical valves that require various supply and return lines, depending on the function. “The new digitally controlled valve will allow manufacturers to save up to 70 percent of the lines,” says Thor. “That also significantly reduces leaks. As the valve is controlled digitally, the preconditions have already been established for various Industry 4.0 applications.” The interest in this valve is already very high, reports Thor. “Without the support of our innovation consultant at ITG, a lot of things wouldn’t have turned out as they have.”

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Bonus for researching companies

Salzburg’s innovation agency ITG provides some 300 companies a year with free advice on issues relating to innovation projects. Roughly one-third of them are accompanied individually throughout their projects. One of the most frequently overlooked yet easy to obtain forms of support is the research premium.

Since 2017, 14 percent (previously 12 percent) of the costs for research activities can be recovered from the tax authorities. Crucial for this is a short presentation of the research activity, which has to be assessed free of charge by the Austrian Research Promotion Agency (FFG). “In practice, however, problems repeatedly occur in the communication,” says Pfarrkirchner, speaking from experience. “Accounting and tax advice make the application, but the qualitative information has to come from the researchers of the R&D department. The whole thing then has to be packed into 3,000 characters in such a way that it is clearly seen by the promotion agency as real research in the company.” That is also why the Salzburg-based company Findologic takes advantage of the support provided by ITG. Search technologies for all types of online shops are developed here. “One in every three searches in an online shop produces the wrong results,” explains managing director and founder Matthias Heimbeck. “Either it fails to find any results, supplies the wrong results or not enough results. With our product, we offer 30 million online shoppers better search results and the online shops 30 percent more turnover every month.” But that also means constant improvement and research into new methods. “Research in a high-wage country costs a lot of money and involves great risks – that is why the research premium is a great thing for a company like ours. And because we want to be sure in what we are doing, we are more than happy to work with the innovation experts from ITG.”
How a waste product became a new material

The founders of Barkinsulation are breathing new life into tree bark using an innovative press process. With the support of the Startup Salzburg Factory, a market-ready company has been created and an exciting cooperation established between the startup and the Stainer printing company, which prints an individual design on the innovative material.

The Salzburg-based startup company has been working on its wood products with Stainer since the end of 2017. The idea of the young entrepreneurs: to breathe new life into the tree bark, the waste product of the sawmill industry. They developed a new type of press technology in order to be able to process the bark. At the end of 2016, this led to the formation of the startup company Barkinsulation, with products such as drinks coolers and coasters.

Sixty employees across more than 5,000 square metres of production space. The Pinzgau-based company Stainer has been operating successfully in the screen and digital printing business and advertising technology for more than 45 years and is regarded as one of the largest companies in the industry in the German-speaking region. The startup company Barkinsulation has two employees - its founders Marco Morandini and Bernhard Lienbacher, both graduates of the Salzburg University of Applied Sciences. As different as the two companies are, their cooperation benefits from just that.

The two researchers were particularly impressed by the possibilities of the tree bark to maintain a constant drink temperature, says Morandini. With Barkinsulation, the two researchers are particularly impressed by the properties of the tree bark, the waste product of the sawmill industry. They developed a new type of press technology in order to be able to process the bark. At the end of 2016, this led to the formation of the startup company Barkinsulation, with products such as drinks coolers and coasters.

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The startup is already marketing its Patronus product series, comprising wine and beer coolers, in the gastronomy sector. Enquiries were also frequently received for individually designed products. “We wanted to be more flexible in the design of our bark products.” That is where the leading Stainer printing company came in to adapt the design of the coolers and coasters more specifically to the customers’ wishes. Barkinsulation is first and foremost a startup: “We often work together with startups or young companies. When a new product is developed or invented, it generally needs branding or a logo,” says Morandini. The work with the tree bark was a première, however, and proved to be a challenge for the printers. What’s possible, what’s not? What looks good? “The material is very unusual. We had to pay attention in particular to the uneven surface that we hadn’t been faced with in this form in the past,” says Lohfeyer. “We had to invest a few hours in the optimum setting of our machines and in tests. Only when we had produced a good specimen did we show it to Barkinsulation.”

Apart from the surface, the fairly unusual material presented another challenge. “The bark has an individual design on the innovative material. “The exceptional properties of the tree bark make it possible, for example, to maintain a constant drink temperature,” says Marco Morandini. With Barkinsulation, the Salzburg-based founders aim to establish the tree bark as a high-tech material on the market. The incubation programme, Startup Salzburg Factory, also helped here. “The Factory was very important for us on the road to market maturity, particularly in making important contacts, such as with Stainer,” says Morandini. barkinsulation.com, www.getraenkekuehler.at www.stainer.co.at

New field of business for Stainer

For Stainer, this is not the first cooperation with a startup. “We often work together with startups or young companies. When a new product is developed or invented, it generally needs branding or a logo,” says Christian Lohfeyer, client advisor in digital printing and advertising. “The work with the tree bark was a premiere, however, and proved to be a challenge for the printers.”

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With the support of the Startup Salzburg Factory, a market-ready company has been created and an exciting cooperation established between the startup and Stainer. “Barkinsulation is not a major order for us at the moment, but we believe there is great potential. For example, a brewery that wants a few thousand beer mats printed. We can definitely build up business here together,” says Lohfeyer confidently. “We never have any objection to producing a sample series for young companies. Something good has come out of it more than once.”


Incubation programme

Startup Salzburg Factory

The Factory participants receive essential training courses in the fields of business plan, idea presentation, sales development, networking with business and with relevant stakeholders. In addition, there is funding from the state with a maximum subsidy of EUR 25,000 per startup. Each team is assigned a coach from the Startup Salzburg network and a mentor from the business sector. The programme runs over a period of several months.

Applications will be possible again in spring 2019.

All information and details of the Factory startups to date can be found at www.startup-salzburg.at/factory.
An angel for founders: Hansi Hansmann

The fear of boredom was one of the main reasons why Johann “Hansi” Hansmann is today one of Austria’s most successful business angels. The former manager and entrepreneur in the pharmaceuticals industry took this decision in his early 60s after an acquaintance told him that he was looking for money for his company. The investment in busuu was sealed with a handshake – and is still one of Hansmann’s most successful investments even today. That is due among other things to the fact that he not only invests money, but also puts all his know-how at the disposal of his founder team. At the last Startup Salzburg DemoDay, Hansmann was in Salzburg and passed on his know-how to both future investors and startups.

Team beats business model

Unlike “normal” companies that bank on proven offers, startup founders invest all their efforts in something completely new. In Hansmann’s experience, that can also mean a great deal of frustration. That is why the most important thing is that the team gets on well together in order to also overcome frustration together: “Only ten percent of all the teams are good teams, and of a hundred ideas only five are worthy of investment for me,” says Hansmann. The business model is therefore not completely unimportant to him, but “it’s easier to implement a modified or totally new business idea with a good team. On the other hand, it’s almost impossible to implement a good idea with a poor team.” That is why it is extremely important for Hansmann to get to know the people well in whom he is going to invest.

Business angels aren’t called angels for nothing

A business angel like Hansi Hansmann offers much more than money. He provides support as a coach and with his network, in contract negotiations and sometimes also with psychological tips. After all, the team has to be motivated again when the frustration gets too much. “A business angel needs to have business experience and experience of dealing with people. Common sense is helpful to be able to understand business models. An understanding of figures and how to draft contracts is also important. All things that you learn as an entrepreneur or manager during the course of your working life. At the same time, I still believe that the best business angels are successful founders. We’ve got quite a few of those in Austria: Runtastic, MySugr and Shpock (note: all accompanied by Hansi) are already investing. They know from their own experience what they need to know. They are still young and have the energy to give the necessary support. Furthermore, their own exits have also given them the necessary small change.”

Why exits benefit everyone…

That is exactly how the success story of Silicon Valley started, says Hansmann: “When Paypal was sold, that was a huge exit. Peter Thiel, Elon Musk and a few others took the money earned there, founded new companies and invested in other startups. They kicked off an avalanche. That’s why the most successful founders, the most exits and the most money are today to be found in Silicon Valley. We won’t be able to achieve exactly that in Austria, but we can head in that direction. To do so, we need frequent and spectacular exits that arouse the public’s interest in entrepreneurship, and which lead to the exiting founders wanting to invest again.”

… and why they are often the logical consequence

Hansmann answers the question of whether exits are important with a clear “Yes”. “Exits have been necessary for most of my investments. In the digital sector in particular, practically everything is geared to exit. The reason is that very many things that are developed by startups are not business models in their own right, but features. Large corporations can make great use of these and incorporate them into their own business model. They can use the feature much better than the startup proper. The moment I can sell a startup with a profit that I could never earn, then I have to do it.”

The new Startup Salzburg Prefounding Programme

To help innovative founders do as much as possible correctly before the actual formation, a new Startup Salzburg offering has been launched: The Prefounding Programme. In recurring individual coaching sessions, the potential startups receive support on a wide variety of topics along the business model canvas. These may include the identification of target groups, sales channels or the analysis of the competition. The needs determine the content in each case. Furthermore, contact is established to consultants that provide support with legal, tax, commercial or financial questions. Rooms for meetings or work sessions of the founding team are also made available. The question of whether founders can be considered for these services and which of them will be addressed first in detail is determined during an initial consultancy meeting. These and all the other services of Startup Salzburg are free of charge. Interested persons or groups can make an appointment at welcome@startup-salzburg.at.

Startup Salzburg blog and newsletter

Stories from life as a startup. The Startup Salzburg blog is a melting pot for inspiration, guidelines and local heroes. Experts such as Günter Faltin, Christine Bauer-Jelink and Hansi Hansmann have already shared their know-how with startup-oriented readers. Of particular interest to young entrepreneurs are also practical guides on how to prepare a good pitch, how to get grants or how to expand networks, for example. The material extends from the early founder days up to mid-entrepreneurialism. Founders are frequently portrayed to talk about the new challenges and to pass on their valuable know-how. The Startup Salzburg newsletter also informs Salzburg’s founder scene about current industry events and news. www.startup-salzburg.at/blog
The health-enhancing effect of window blinds

The Salzburg-based sunshade manufacturer Schlotterer has not only developed daylight-diverting window blinds, it has also had their effect on health investigated scientifically.

If you want to know how natural resources such as light affect the physical and psychological state of humans, the road inevitably leads to the Institute for Ecomedicine at the Paracelsus Private Medical University. The focus of the research interest here is on the effect of natural and socio-cultural environmental influences on the physical and psychological state of humans. In addition, innovative methods are being developed to enable these influences to be measured. The Salzburg-based sunshade manufacturer Schlotterer has made use of this. The company has developed outdoor window blinds (known as Venetian shutters) that divert the daylight glare-free via the ceiling deep into the room. It has been a well-known fact for a long time that daylight has a positive influence on the immune system and mood of humans. The subject of interest here, though, was the extent of these effects particularly in rooms with more daylight.

Effect of daylight tested in school

"We were fortunate enough to find a very good location for this study in the form of the New Middle School in Adnet," says Arnulf Hartl, head of the Institute. "Here we selected four classrooms with the same solar radiation. We painted them all the same, fitted electricity and light meters and installed shading systems. Two rooms were fitted with standard systems, two rooms with the Schlotterer daylight diversion system. We then both questioned the pupils in these rooms and measured values such as the cortisol (stress hormone) level over a period of eighteen months." The result: More daylight has a significant stress-reducing effect and lowers daytime drowsiness.

A sharp reduction in the sleep hormone melatonin was found in the pupils of the classes fitted with the daylight diversion blinds. They also exhibited a higher work rate and better concentration. The positive stress processing increased, and the negative processing was significantly reduced during the course of the study. Following the study, all the classrooms were fitted with the Schlotterer window blinds.

www.schlotterer.at
www.pmu.ac.at/ecomedicine

The window blinds and their daylight-diverting properties were tested at the New Middle School in Adnet.

REGIONAL STATEGIES

How the project S3-4AlpClusters supports the implementation of S3 in the region of Salzburg

Science and innovation in Salzburg is based on a very well-developed, yet heterogeneous and fragmented, regional research landscape. This is attributable to the region-specific industry structures in non-technology areas and to the large number of small business enterprises. It is precisely the smallness of Salzburg’s structures that requires a high degree of networking and cooperation both internally and externally, in order to attain critical sizes, capacities and competences as well as creating an unmistakably distinctive profile for this region, focusing on the principle of further consolidating the strengths.

In keeping with the concept of smart specialisation, the goal of the regional strategy is firstly to build up nationally and internationally visible critical masses in Salzburg, and secondly to gear itself towards the needs of local business and society. This analysis gives rise to five areas for a smart specialisation of Salzburg. These are: Life Sciences, Information and Communication Technologies, Smart Materials, Intelligent Building and Settlement Systems as well as Creative Industries and Services Innovations.

The government of Salzburg and ITG Salzburg operate as a task force to develop, accompany and carry through the measures of implementation. The active participation of ITG in the S3-4AlpClusters project can be seen as a crucial and important aspect for strengthening Salzburg’s international orientation and expansion of coordination and cooperation activities.

A process for achieving structural transformation

The project introduces a systematic process, the S3 innovation model, which relies on the involvement of clusters for the identification and development of transformative activities. Tools are provided for each phase of the process: stress tests and synergy diamonds (a tool that facilitates the identification of transformative activities) are used as innovative ways of depicting existing capacities and detecting opportunities for structural transformation, both within and across regions. Entrepreneurial discovery workshops (EDW) build on this base of evidence in order to identify real transformative activities. Action development workshops (ADW) make it possible to work out concrete actions - such as R&D projects, networking or the development of critical skills - in order to gain critical mass for the identified transformative activities.

The implementation of these actions is supported by a collection of best practices of cluster services covering transversal fields such as education, technology, growth, research and collaboration. The partnership puts particular focus on facilitating the cross-regional implementation of actions, with the initiation of an interregional cooperation scheme (Alpine Cluster Innovation Express – ACIE) jointly funded by existing regional programmes. The intention is to align existing funding schemes and launch joint calls for the implementation of cross-regional actions. Finally, the S3 innovation model also includes a methodology for the evaluation and monitoring of the process. The entire process will be tested in pilot clusters and will result in a full training toolkit for cluster managers and regions by the end of the project. The project is still in the implementation phase. Salzburg (ITG) is leading the development of the training toolkit as well as the methodology for the evaluation and monitoring process of this innovation model.

www.alpine-space.eu/projects/s3-4alpcusters