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Research Economy & Knowledge Transfer Study & Teaching Campus & University Life





BTU INTERNATIONAL



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THE EDITORIAL



Dear readers,

with this issue we would like to inform you about current projects, developments and activities at the BTU Cottbus-Senftenberg. The year 2019 brought us an extraordinary boost for science, transfer and research in many ways. At this point I would like to mention the cooperation with the DLR Institute for Decarbonized Industrial Processes and the Fraunhofer Institute for Energy Infrastructure and Geothermal Energy, which will locate to the BTU - a great success for us.

One much discussed topic not only in Cottbus and Lusatia, but throughout Germany, is structural change. At the BTU, scientists are researching the prospects for the transformation process of an entire region. Lusatia will have to reinvent itself when lignite mining and electricity generation is phased out by 2038. Coal mining has had an economic, social and cultural impact on many generations. From the changes in the cities and mobility to future land use and energy supply, our experts will show you approaches to possible change.

In this issue, we have not only compiled insights into the various research areas of the BTU, but also a large number of exciting stories and interviews about committed students, doctoral candidates, and alumni. Colorful photo pages about various festivities at BTU and in the city invite you to immerse yourself in campus life. Exciting projects, business start-ups and cooperations show you the success of the transfer of knowledge and technology at our university.

I hope you enjoy reading, discover new things and tell others about it!

Best wishes,

Christiane Hipp Prof. Dr. rer. pol. Acting President of the BTU Cottbus-Senftenberg



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Around 2,350 foreign students are currently studying at the BTU Cottbus-Senftenberg, equating to over 30% of the student body. This steady internationalisation through projects in teaching and research is constantly reflected by the large amount of foreign scholarship holders who contribute to the international flair of the BTU in Cottbus and Senftenberg. The international students come from over 100 different countries, mainly from China, India, Syria, Iran, Nigeria, Turkey, Russia, Morocco and Poland. Some of their most popular degree courses include Environmental and Resource Management, Architecture, World Heritage Studies, Power Engineering, Business Administration and Media Technology.

International and German students at the BTU campus in Cottbus-Sachsendorf



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The energy research conducted by the DLR will make a significant contribution to the decarbonised energy system of the future. Its portfolio includes renewable energy sources, energy conversion technology, energy storage and energy system analysis (Illustration: DLR)

RESEARCH

CARBON DIOXIDE REDUCTION IN INDUSTRIAL PROCESSES

BTU scientists are working with the new institute of the German Aerospace Centre (DLR) to explore CO_2 -reduction options for industrial processes

By the year 2030, Germany aims to have reduced its greenhouse gas emissions by at least 55% compared to the levels measured in 1990. Substantial greenhouse gas neutrality should then be achieved by 2050. Increased efforts are needed to achieve these objectives, such as the accelerated decarbonisation of high-energy industrial processes like steel and aluminium production. Moreover, coal-fired power stations must be turned into low-carbon energy conversion systems to reduce emissions. BTU researchers are planning to work with the DLR Institute of Low-Carbon Industrial Processes in the future to develop alternative, low-emission technology for high-energy industries that do not work with fossil fuels. »Making the industry climate neutral in the medium to long term will be an internationally mammoth task. Future ideas and innovations for this transition will come from Lusatia, which will make an important contribution to Germany's development as a climate-friendly, industrialised country«, explains the acting President of the BTU, Prof. Dr. Christiane Hipp.

This future research partnership has been structured by the German Aerospace Centre and the acting director of the new institute, Prof. Dr. Uwe Riedel, in cooperation with the BTU, Prof. Dr.-Ing. Christoph Egbers and a team of scientists. Prof. Egbers, who holds the Chair of Aerodynamics and Fluid Mechanics at the University, says: »The establishment of the new DLR Institute in the field of energy research is a decisive signal and an important building block for the further development of Cottbus as an academic melting pot. It has tremendous structural and technological significance for Lusatia«. He adds: »We'll be working with the DLR Institute to develop high-temperature heat pumps and virtual models, which can be used to optimise industrial processes«. Three joint appointments are planned between the BTU and DLR at the Cottbus site. Both expect the institute to start its work with 60 members of staff and, depending on the market demand, it may even continue to grow in the future.

DLR Institute of Low-Carbon Industrial Processes

The German Aerospace Centre's new institute is a state-funded project designed to promote structural development. 60 scientists will work in Cottbus and Zittau – 30 at each site – and another 15 jobs are planned in administration and technical support. The Federal Ministry of Economic Affairs and Energy (BMWE) will provide 10 million euros each year in basic funding. Brandenburg and Saxony are co-financing the institute with an annual investment of 550,000 euros at each location, and they have each agreed to provide 10 million euros in start-up capital.

RESEARCH INTO HYBRID ELECTRIC AIRCRAFT ENGINES

On 8 July 2019, the State of Brandenburg and Rolls-Royce signed an agreement at the BTU Cottbus-Senftenberg, outlining their plan to conduct more research into hybrid electric aircraft engines

The Prime Minister of Brandenburg, Dr. Dietmar Woidke, and the Chairman of the Board at Rolls-Royce Germany, Dr. Dirk Geisinger, signed the document at the Research Centre for Lightweight Materials. Prime Minister Woidke describes the project as a triple win-win situation: »Brandenburg as a whole – and Lusatia in particular – will consolidate their status as leading locations in the aviation industry. Hybrid electric engines will allow Rolls-Royce to focus on a real future issue, create new markets and make a contribution to more climate-friendly aviation. And the BTU will effectively be able to boost its public image through a project designed to resolve urgent environmental issues«.

Acting President, Prof. Dr. Christiane Hipp, is also pleased about the new agreement: »This proves once again that the scientific capacity of our university is in high demand due to our ability to address the pressing issues of our time«.

Prof. Höschler sees the agreement as an important signal for the research of aircraft engines at the BTU: »We expect to attract even more young people to mechanical engineering with the introduction of this cutting-edge field of research at our University Technology Centre. They will be able to help significantly reduce the carbon footprint of the aviation industry«.

It's no coincidence that the agreement was signed at the BTU Cottbus-Senftenberg, where a large amount of the research into new engines will be conducted over the next few years. A new ground-breaking field of research will be added to the Rolls-Royce University Technology Centre (UTC), which has now been in operation for 15 years. The Chair of Aircraft Engine Design, held by Prof. Dr. Klaus Höschler, has been investigating the installation and integration of aircraft engines since 2012, and these topics will form part of the research. Other BTU chairs will also contribute their expertise, including Prof. Dr.-Ing. Georg Möhlenkamp (Power Electronics and Drive Systems), Prof. Dr.-Ing. Johannes Schiffer (Control Systems and Network Control Technology), Prof. Dr.-Ing. Markus Bambach (Mechanical Design and Manufacturing) and Prof. Dr.-Ing. Dieter Bestle (Engineering Mechanics and Vehicle Dynamics).

For over fifteen years, researchers from the BTU Cottbus–Senftenberg have been working alongside experienced engineers at Rolls-Royce to create cutting-edge methods and technology for future engine generations.



∧ Dr. Dirk Geisinger (left), Prof. Christiane Hipp and Dr. Dietmar Woidke after signing the agreement

Since 2004, automated design processes have been developed at the university in cooperation with engine manufacturer Rolls-Royce – from individual engine components to optimisation strategies designed to support holistic decisions in engine development. The aim is to enable the construction of lighter and more efficient engines in the future, reduce emissions, shorten development times and cut development costs.

Background to Engine Research at the BTU

Prof. Dr.-Ing. Klaus Höschler was named the Director of the Rolls-Royce University Technology Centre (UTC) at the BTU on 1 November 2019. He took over from Prof. Arnold Kühhorn, who had held the position for 14 years after establishing the UTC with Prof. Dieter Bestle in 2005 and consistently promoting its development.

The primary objective of the UTC is to research lighter and more climate-friendly engines for the aviation industry. The work carried out in Cottbus revolves around the fields of »Multidisciplinary Process Integration« and Automation Technology. Six chairs are currently working on joint projects with Rolls-Royce at the UTC, generating annual third-party funding of around 1.9 million euros. The funds are mainly used for academic staff and student assistants. A further expansion is planned for the research of hybrid electric engines, which will also involve other chairs at the BTU.

RELIABLE ENERGY SUPPLIES ARE ESSENTIAL

Solutions for the efficient, sustainable and cost-effective reliability of the energy supply during the reform in energy policy

Since the mid-1990s, no significant decline in CO_2 emissions in Germany has been observed in the field of power generation to suggest even the slightest growth of renewable energies. From 1994 to 2014, emissions from the power generation sector fluctuated between 340 and 380 million tons of CO_2 equivalent. A slight downward trend can be noted from 2015 onwards, but the relevant statistics have only been extrapolated for 2016 and estimated for 2017.

»The main reason why CO_2 emissions have remained at similar levels over the past 20 years in the field of power generation is because nuclear has been phased out at the same time. The inconvenient and dynamic part-load operation of coal-fired power stations became necessary to compensate for the fluctuating levels of power generated by photovoltaic and wind systems and to meet customers' energy demands throughout the year«, explains Prof. Dr.-Ing. Harald Schwarz. »The contribution of wind and photovoltaic to the secured power generation capacity of electricity is around 0-2% of the rated capacity, so relatively



 Prof. Dr.-Ing. Harald Schwarz sees combined gas and steam plants, power-to-gas technology and power-to-heat technology as alternatives to carbon-based sources of energy to increase the reliable output from renewable sources small. Despite ambitious expansion plans in the field of renewable energy, I see the danger that Germany will only be 80% capable of reliably supplying the country with domestically generated electricity by 2022, as recommended by the »Coal Commission«, and this figure could fall to 60% by 2030, and 40% by 2038. While it may be possible to build new power stations with a reliable output by 2030 and 2038, this won't be possible by 2022.«

Any power that can no longer be generated in Germany will be purchased from energy markets in neighbouring countries. That will be difficult to achieve in the required magnitude, because our neighbours have extremely high electricity demands in their own countries in the winter. In 2018, for example, some production facilities in the German aluminium industry had to be shut down for certain periods on 78 days, because the output from domestic power stations was insufficient and the foreign electricity market was unable to deliver.

The reliable output of energy from renewable sources can be increased through systems like combined gas and steam plants, where hydrogen produced from renewable sources is also combusted. Other measures include power-to-gas technologies, where renewable electricity is converted into hydrogen or methane and these gases are used for various applications, as well as power-to-heat technologies. In this case, the generation of warmth from electrical energy enables cost-effective energy storage and reconversion. For the rapid but temporary compensation of fluctuations in renewable energies, large batteries or vehicle-to-grid technologies can be used to regenerate electricity from the batteries of electric and hybrid cars back into the public grid.

Prototypes for all these technical options have been developed up to the lower megawatt range. Extremely high investments will be needed to scale these prototypes up to the gigawatt range, and this will have to be achieved through a further increase in electricity prices. Moreover, it will take several decades to achieve such an increase by the factor of 1,000.

Chair of Energy Distribution and High Voltage Engineering PROF. DR.-ING. HARALD SCHWARZ

INTELLIGENT SYSTEMS FOR STABLE POWER SUPPLY

Solutions for the reliable and efficient transmission and distribution of electrical energy with a steady increase in distributed generation

The massive expansion of renewable energy as part of the current reform in energy policy is having a major impact on the structures of electricity transmission and distribution grids and their users. »We often have to break new ground from a technical, economic and regulatory perspective to adapt to the current changes. We just have to think of the increasing development of medium- and high-voltage wind farms and the rapidly growing decentralised supply of low-voltage power through distributed photovoltaic roof systems«, explains Prof. Dr.-Ing. Johannes Schiffer on the Chair of Control Systems and Network Control Technology at the BTU. »There are also new decentralised cogeneration systems, such as combined heat and power plants and regenerative charging stations for electric vehicles, as well as decentralised storage systems like batteries for the short-term smoothing of demand and energy generation over the course of a day, and hydrogen production systems for the supply of electrical energy in >dark spells< and other situations«.

As a result, the technical characteristics of the new structures are fundamentally different from those of conventional grids and generation units. Examples include the rapidly increasing performance of power converter systems and the reversal of typical energy flow directions. Prof. Dr.-Ing. Georg Möhlenkamp, who works at the Chair of Power Electronics and Drive Systems, summarises the challenges: »In distribution grids with many photovoltaic roof systems, for example, the feed-in power of the photovoltaic systems is sometimes much higher than the local consumption. From the perspective of the entire system, these distribution grids then become generating units. As the applications of power converters are still new, their interaction with existing conventional grid components is still untested in many operating scenarios. And as grid configurations change depending on the weather conditions, the decentralised feed-in is also constantly changing. However, the global structural transformation of energy systems also offers exciting opportunities. For example, converters have a much faster reaction time than conventional synchronous generators. Their behaviour in the grid can be very flexibly and actively adjusted using software with appropriate control and optimisation strategies. This flexibility must be exploited intelligently for the development of efficient solutions.«

Due to the increasing complexity and number of systems and components to be coordinated, centralised strategies appear to be increasin-



The networking of grid components using distributed, cooperative grid management and control systems has the potential to allow renewable energies to take over important systemic tasks from conventional generators

gly inappropriate. Instead, these should be replaced with distributed, cooperative grid management and control systems, where each individual component has a certain degree of »intelligence«. The networking and exchange of information between these components will allow the systems to, at least partially, take on systemically relevant tasks provided thus far by conventional generators.

The Chairs and research groups at the Institute of Electrical and Thermal Energy Systems are developing solutions for many of these issues, in order to contribute to the success of the energy transition and ensure the efficiency, sustainability and reliability of energy supply in the future.

Chair of Control Systems and Network Control Technology **PROF. DR.-ING. JOHANNES SCHIFFER** Chair of Power Electronics and Drive Systems **PROF. DR.-ING. GEORG MÖHLENKAMP**

MADE IN COTTBUS: TURBO FUEL CELL 1.0

The results of the MAXEFF research initiative are to be further developed as part of an emergency programme for structural change

A successful reform in energy policy can only be achieved with the further development of electricity and gas grids. The gas grid can be used for energy transport and storage. In addition to »Power to X« transformation points, highly effective »X to Power« converters will play a major role in the future, because they will have to compensate for any lack of electricity generated by plants before the scheduled withdrawal from coal power in 2038.

This requires a high level of flexibility with regard to the gas composition, because polymer electrolyte membrane (PEM) fuel cells need pure hydrogen (H₂). At the same time, however, the hydrogen content in the existing natural gas infrastructure must not exceed 10% by volume. Following the transition to »green gas infrastructure«, figures of 20% to 50% by volume could be achieved with the necessary adjustments (as estimated by the German Association of Gas and Water). In other words, a highly effective energy converter is required that can convert H₂ and methane (CH₄) in any ratio and can also work as a decentralised and intelligently networked »energy server« with the highest degree of efficiency.

In keeping with this idea, the »Energy Converters of the Future« research initiative was launched in 2014 by Prof. Dr.-Ing. Heinz Peter Berg on the Chair of Internal Combustion Engines and Aircraft Propulsion. The hybrid system »Micro-Gas Turbines (MGT) with Embedded Solid Oxide Fuel Cell(SOFC)« was chosen as the best solution. The SOFC is pressurised at



 SOFC stacks operate reliably at 700-800°C in the pressurised conditions of a micro-gas turbine (Photo: Mario Lehmann)

temperatures of 800 to 900°C and added to the thermal cycle like a combustion chamber. In other words, the turbine inlet temperature is not reached by burning the fuel, but by using the residual energy of the SOFC as waste heat. As the SOFC already converts fuel into electricity with a very high degree of efficiency (between 50% and 60%) and more electricity is generated from the waste heat in the thermal process, the potential efficiency of the hybrid system is over 75% (electric).

In 2016, this led to the emergence of the project »Development of Highly Efficient Hybrid Energy Converters from Solid Oxide Fuel Cells (SOFC) and Micro-Gas Turbine Systems (MGT)« as part of the MAXEFF research programme for the consolidation of technological and applied research at the BTU Cottbus-Senftenberg. The research programme received just over 901,000 euros in funding and was successfully completed in June 2019.

There was a technological breakthrough in January 2019, as it became possible to reliably operate SOFC stacks in the pressurised conditions of a micro-gas turbine. The air-bearing micro-gas turbine and the SOFC stacks already have a high degree of technical maturity and are produced in the local area (MGT in Cottbus, SOFC in Dresden). As the research and development work was being carried out, the findings were used to create a highly compact design, which has since become known around the world as TUR-BO Fuel Cell 1.0. This technology will be further explored and developed as part of the upcoming emergency measures for structural change in January 2020. At the end of December 2019 the BTU received funding of 4.8 million euros. With this, the »TURBO Fuel Cell«-Phase 1-development program was started exactly on schedule on January 01, 2020.

The MGT-SOFC system, in its highly compact TURBO Fuel Cell design, is a whole new class of technology that has been enriched by innovative fields of research. It is the world's most efficient system for the conversion of gaseous and liquid sources of chemical energy (hydrogen-methane, all fuels) into electrical work.

The waste gas is »breathable« and sustainable materials are used. In addition to its high importance for the energy market, it also has mobile applications (e.g. in rail transport and shipping). It will also have a high degree of regional significance for the future of Lusatia, as it will generate more jobs in research, development and the economy. Production is scheduled to get under way in Cottbus in 2026/27.

Chair of Internal Combustion Engines and Aircraft Propulsion **PROF. HEINZ PETER BERG**

NON-DESTRUCTIVE AND FULLY FUNCTIONAL AGAIN

In the future, lithium-ion batteries will contain cathode material that has been recovered without loss of quality from end-of-life lithium-ion batteries.

A lithium-ion battery for a luxury class electric vehicle weighs up to 780 kilograms and can achieve a range of up to 600 kilometers. This enormous performance is based on the chemical composition and on the design of the materials used as cathode and anode. This is particularly evident for the cathode material, a high-performance lithium-nickel-manganesecobalt-oxygen compound, which has to meet very specific requirements in terms of its composition and its processing in order to guarantee the required performance and lifetime.

Apart from its important functional properties, the cathode material is also very expensive, as it contains the valuable raw materials cobalt or nickel. Recovery of the elements contained in the cathode material is economically viable and reduces the dependency on raw material imports. Recycling processes developed to the present day are based on the complete destruction of the functional materials contained in the batteries by melting them in energy-intensive high-temperature processes or, after complete comminution, converting them into metal salt solutions in subsequent chemical treatment steps.

Both procedures require an enormous amount of energy and a variety of complex recovery and purification processes in order to finally obtain the pure metal salts for the production of new lithium nickel manganese cobalt oxide.

Within the framework of a research project, an industry-led consortium is addressing the task of recovering cathode material from end-of-life batteries without any loss of quality and suitable for a re-use in the prduction of new batteries. The project has been funded by the Federal Ministry of Education and Research (BMBF) since January 2019. On the BTU side, the Departments of Physical Chemistry and the Department of Processing Technology are involved in the project. The project leader, Prof. Dr. Jörg Acker, describes the project as follows: »Our goal is to work with the recycling and logistics company ERLOS to bring a well-established pilot process to industrial maturity. In the process, lithium traction batteries and battery cells are dismantled semi-automatically and then separated into their individual components, such as cathode foils, anode foils and separator foils. The desired cathode material, which is coated on both sides as thin layers on aluminium carrier foils, is automatically separated from the foils and collected by a very gentle process. Other battery components, such as the electrolyte and the lithium compounds it contains, are retained without emission and loss without risk to humans or environment.« The BTU team has to address a number of special challenges within the project: »Our team is working to recover the cathode material without any degradation in quality, which could be caused by mechanical damage, chemical changes to the material or unwanted side reactions. It is also essential to preserve the original design of the material, as it is crucial for its later performance. Cathode material that



 Prof. Dr.-Ing. Jörg Acker and research associate Jana Ducke are investigating cathode foil extracted from the lithium-ion battery of a dismantled electric car

is no longer functional is separated and can be reprocessed elsewhere,« says Prof. Dr. Acker.

The recovered cathode material will be used to manufacture test batteries of various dimensions, which are being intensively investigated by the project partner INTILION, a specialist in industrial battery systems. From the measurements, conclusions will be drawn about the performance of the recycled material and about improvements that are necessary to made in the process. Finally, the project should pave the road to high-volume recovery of high-quality cathode material. The so-called second-use lithium batteries produced from this material can be used for electric vehicles, but also for other industry-relevant applications, such as forklift trucks, floor conveyors or stationary storage systems.

Chair of Physical Chemistry PROF. DR. RER. NAT. HABIL. JÖRG ACKER

INCREASING YIELDS WITH THE RIGHT MIX

Rows of trees on fields increase fertility, prevent soil erosion and provide farmers with new sources of income

Dr. Christian Böhm and his team of researchers on the Chair of Soil Protection and Recultivation have been investigating the ecological and economic benefits of cultivating arable crops, trees and shrubs and rearing animals on patches of farming land. In March 2019, they travelled to Berlin to speak at the closing conference of the research project on the »Environmental Benefits of Agroforestry for Added Value and Energy«, where they showed how agroforestry can be used to the benefit of farmers, local authorities, landowners and even for the protection of nature and the environment. »Trees and shrubs protect fields from strong winds, which reduces soil erosion. The wind speed can be reduced by up to 96% to preserve the topsoil, the most fertile and agriculturally important part of the ground«, says Christian Böhm.

Another advantage is the fact that woody plants prevent nutrients and pollutants from entering the surface water and groundwater. Research shows that the average nitrate concentration in the groundwater is over 120 times lower under rows of poplars than under arable crops. Trees also improve the microclimate and reduce evaporation, leading to greater yields in drier areas, and they create an additional source of income for farmers through their fruit and firewood.

»The areas provide a habitat for birds and small animals, and they're ideal for rearing cattle, sheep and chickens«, explains Böhm. »Agroforestry systems are a promising and pioneering form of land use, but farmers are faced with numerous challenges, so we need to develop concrete solutions in the coming years«. For example, the legal framework is rather restrictive when it comes to designing agroforestry systems. »This is yet to be considered in German agricultural law, but we've been working with our partners to come up with a proposal.«

This project is coordinated by the BTU Cottbus-Senftenberg. Scientists from the university have been working with the Technical University of Munich, the University of Bayreuth and the Leibniz Institute for Agricultural Engineering and Bio-Economy in Potsdam-Bornim, as well as politicians, associations, administrative bodies and industry experts, in order to identify the requirements for the increased use of agroforestry in agricultural practice.

Trees protect fields from strong winds, which reduces soil erosion (Photo: Christian Böhm)

The project has received just under 3.3 million euros in funding from the Federal Ministry of Education and Research (BMBF) as part of its »Innovation Groups for Sustainable Land Management« scheme.

Agroforestry is rarely practised in Germany at present, but it is becoming increasingly important. This form of land use is more prominent in the agricultural practices of Western and Southern Europe. At the European level, agroforestry was included in the latest reform of the Common Agricultural Policy (CAP). In Germany, however, it is yet to be officially recognised as an independent form of land use. The European Agroforestry Federation (EURAF) was founded in 2011, and the »Arbeitsgemeinschaft Agroforst Deutschland« was established as an agroforestry are undisputed, especially in subtropical and tropical regions, and they have been scientifically proven by many studies in Central Europe and North America.

Chair of Soil Protection and Recultivation **DR. RER. SILV. CHRISTIAN BÖHM**



GLOBALLY NETWORKED STUDY OF ECOSYSTEMS

Environmental scientists at the BTU are collaborating with universities and institutions around the world to conduct research in landscape laboratories

Having an entire landscape as a laboratory might be a pipe dream for most environmental scientists, but it became a reality at the Brandenburg University of Technology around 15 years ago following the creation of the artificial »Hühnerwasser« water catchment area in the Welzow South mining region. At this year's General Assembly of the European Geosciences Union (EGU 2019), which was held in Vienna in April, the team from the BTU Research Centre for Landscape Development and Mining Landscapes managed to bring together representatives from the most renowned international landscape laboratories to agree on future cooperative projects for the first time.

In the run-up to the event, researchers from the Nanjing Hydraulic Research Institute (NHRI) in China visited the research centre in Cottbus and the »Hühnerwasser« area. The NHRI has one of the oldest major landscape laboratories, the »Hydrohill« near Nanjing, which has mainly been used for hydrological research since the 1980s. The Research Centre for Landscape Development and Mining Landscapes worked alongside the NHRI and the Landscape Evolution Observatory (LEO, Biosphere2) at the University of Arizona to organise the full-day session on »Ecosystem Development and Critical Zone Research: Large-Scale Experiments and Landform-Soil-Vegetation Coevolutionary Processes« for the EGU 2019. The session went down well with the community of experts, featuring 21 speeches and 18 poster presentations by participants from all four corners of the globe. On 11 April 2019, Prof. Wolfgang Schaaf (Chair of Soil Protection and Recultivation) and Dr. Werner Gerwin (FZLB) organised a meeting with representatives from institutions that have experimentation facilities for the study of environmental science like the BTU's »Hühnerwasser« area. In addition to the NHRI (China) and the University of Arizona (USA), the event was attended by representatives from the University of Alberta (Edmonton, Canada), the Institute of Environmental Assessment and Water Research, Barcelona (Spain), the Ben Gurion University (Israel) and the Charles University in Prague (Czech Republic).

The Charles University is currently following the example of the »Hühnerwasser« area by establishing research areas at an opencast mine in the Czech Republic. The BTU research group has been in close contact with the scientists there for a long time. A similar project is planned as part of



Representatives from the Nanjing Hydraulic Research Institute (China) visited the »Hühnerwasser« landscape observatory: (from left to right) Dr. Werner Gerwin in conversation with Prof. Lin Jin, Dr. Yang Na and Dr. Li Wie (Photo: Wolfgang Schaaf)

the BTU's new cooperation with the BGU in Israel. In autumn 2019, possible topics were discussed during a bilateral workshop in Israel that was funded by the German Research Foundation (DFG). Both universities are researching young ecosystems. The very different climatic conditions in Germany and Israel are viewed as an opportunity to identify generic processes of the initial development of ecosystems.

Such processes might be related to, e.g., developments in very young soils which can be found in frequently throughout the post-mining landscapes of Lusatia. The research group is interested in processes that might contribute to the supply of plant nutrients or the enrichment of humus and thus to the development of soil fertility. Landscape laboratories could play an important role in the identification of such processes, especially if they are operated under different conditions, i.e. if the climatic conditions are different and yet similar processes are still evident. As such, the establishment of a tight-knit network with institutions in other regions of the world is desirable for the operators of landscape observatories.

The first step in this direction will be the development of profiles for each landscape laboratory. The resulting similarities and differences will form the basis for a joint publication on the topic of »Large-Scale Experimental Research Infrastructure«, enabling the organisation of further joint laboratory experiments in the future.

Research Centre for Landscape Development and Mining Landscapes **DR. WERNER GERWIN**

TINY SENSORS UNLOCK THE SECRETS OF MATERNAL CARE

Researchers can now fully analyse the social behaviour of bats in the wild

Biologists are using miniaturised tracking sensors to investigate maternal care in bat colonies. Scientists from a group at the German Research Foundation (DFG) attached sensors to mother bats and their young, in order to automatically record the interaction between the animals. »Thanks to this technology, we now have evidence to prove that mother bats guide their young to new roosts. Researchers had previously attached antenna-controlled transmitters to bats and then tracked them on foot or in a vehicle, but there were often considerable gaps in detection. Furthermore, the low spatial resolution wasn't suitable for interpreting social interaction between individual bats«, explains Dr. Simon Ripperger from the Natural History Museum in Berlin.

Many bat species in temperate zones display a remarkable form of social behaviour. The females return to their birthplace every year. Their young must learn how to hunt and find new roosts on their own. The exact nature of these learning processes was previously unknown, as bats are very difficult to observe in the wild. In order to study their social behaviour, a radio-based sensor network was developed by the research group »Dynamically Adaptable Bat Tracking Applications Using Embedded Sensor Systems« with the help of Prof. Alexander Kölpin, Head of Electronics and Sensor Systems at the BTU, enabling the fully automated observation of the small animals.



 The tracking sensor is optimally adapted to the body of the female common noctule (Photo: Simon Ripperger) The sensors weigh only half as much as a one-cent coin. They were used to record the interaction between individual bats and observe the group dynamics of juveniles during their nocturnal hunting flights and their change of roost. »Since we didn't want to disturb the bats in flight, it was very important for the sensors to have a minimal total weight – one or two grams at most, including the battery, circuit board and antenna – and a shape that wouldn't restrict their natural movement«, explains the researcher. »That was a big challenge when it came to designing such a complex system. The antenna had to be greatly reduced in size, and the 3D circuit had to be adapted to the body of the bat. We also had to keep aerodynamics in mind. After creating the basic functions of the mobile sensor node, we gradually added more features to avoid burdening the bat with a large mass while enabling the recording of all important data«, says Kölpin.

The end product was a light and miniaturised wireless sensor node with a localisation and communication interface for use on flying bats. The researchers also investigated energy-efficient transmission protocols to maximise battery life and relieve the module's energy management. Close interaction demonstrates how mothers properly guide their young to new roosts. This rare behaviour had long been suspected of bats, but the observation of their activities has only been made possible by the technological developments achieved by the research group.

The BTU is working in the DFG research group FOR1508, »Dynamically Adaptable Bat Tracking Applications Using Embedded Sensor Systems«, in cooperation with the Friedrich-Alexander University Erlangen-Nuremberg (Group Ambassador), the University of Paderborn, the Natural History Museum – Leibniz Institute of Evolution and Biodiversity Research in Berlin, and the Technical University of Braunschweig. »When we started, we were very sceptical about the huge challenges posed by our project, so I'm all the more pleased that the research group has managed to deliver such convincing results in all areas«, explains the spokesman of the research group, Prof. Robert Weigel.

Chair of Electronics and Sensor Systems PROF. DR.-ING. HABIL. ALEXANDER KÖLPIN

SEMICONDUCTOR TECHNOLOGY BEYOND THE BOUNDS OF SILICON

Innovative optoelectronic components are being developed in the new Microelectronics Research Laboratory at the BTU Cottbus–Senftenberg

Microelectronics is part of our everyday lives: No computer, car or identity card could work without it. It is usually hidden beneath the surface of a product, invisible to the naked eye.

The challenge is to develop, manufacture and market these highly complex electronic systems in a short space of time – and at an affordable price. The technology should also be reliable and energy-efficient. If we take a look at the latest trends such as artificial intelligence, e-mobility, medical diagnostic systems and sustainable energy, it becomes clear that microelectronics will become even more important in the future.

Prof. Inga Anita Fischer (Head of Experimental Physics and Functional Materials), Prof. Jan Ingo Flege (Chair of Applied Physics and Semiconductor Spectroscopy) and Prof. Michael Beck (Chair of General Electrical Engineering) are investigating innovative optoelectronic components, such as sensors and integrated light sources, which enable safe, fast and energy-efficient data transmission. Some of the possible applications include rapid sepsis detection tests in emergency medicine, ultra-fast data transfers and industrial process monitoring, such as quality controls during food production.

Most electronic circuits currently use Silicon as a semiconductor material. This material is ideal for applications in the semiconductor industry due to its abundance in nature and, as a consequence, relatively low production costs. However, Silicon-based technology is gradually reaching its physical limits: It is particularly inefficient for optoelectronic components. BTU researchers are now trying to integrate new materials on a Silicon platform.

»We'll only be able to develop new applications once we've integrated more semiconductors or materials on the silicon platform, such as oxides and polymers. This will allow us to produce optical sensors that consume less energy and enable optical data transmission«, says Prof. Inga Anita Fischer. She is collaborating on this project with the Leibniz Institute of Innovations for High Performance Electronics (IHP) and the Fraunhofer Institute for Photonic Microsystems (IPMS).



 Prof. Dr.-Ing. Jan Ingo Flege (left), Prof. Dr.-Ing. Michael Beck (right) and Prof. Dr.-Ing. Inga Anita Fischer are studying the integration of new materials in a silicon platform to make data transfers safe, fast and energy efficient

The BTU Cottbus–Senftenberg launched its new »Microelectronics Research Laboratory for Silicon-Based Optoelectronics« (ForLab FAMOS) in February 2019. By the end of 2021, the research laboratory will have received 2.51 million euros in funding from the Federal Ministry of Education and Research (BMBF). Twelve other microelectronics research laboratories were launched at the same time throughout Germany. The BMBF is providing a total of 50 million euros for investments in microelectronics research at universities around the country.

Chair of Experimental Physics and Functional Materials **PROF. DR. RER. NAT. HABIL. INGA ANITA FISCHER**

In March, BTU student Luisa Näke attended a polar training camp in Hardangervidda, a mountain plateau in Norway, to prepare for her Greenland expedition (Photo: Iceploration)



BTU STUDENT ON EXPEDITION IN GREENLAND

Luisa Näke is committed to climate research. Her Bachelor Thesis deals with elevation changes in ice caps

In the hot summer months, you can cycle to a lake for a nice swim, fly to a stunning seaside resort or, of course, go on an icy expedition to Greenland like BTU student Luisa Näke. In July, she joined Professor Karel Pavelka from the Czech Technical University (CTU) in Prague on the »Ocean Change – Turn the Page« expedition, which was launched by polar explorer Arved Fuchs. He embarks on polar expeditions on »Dagmar Aaen«, a sailing ship converted for such purposes. This year, he wanted to raise awareness of climate change and its impact on the Arctic region. The group travelled around the east coast of Greenland near Tasiilaq, using a drone to carry out photogrammetric measurements of the Knud Rasmussen Glacier.

On 12 July 2019, Luisa Näke made her way to Greenland for a three-week research trip. »Everything was packed and ready to go. Our equipment included sensible clothing, measuring tools, food and satellite communication devices. I was really excited to find out what was in store for me.« The expedition was partly organised by Thomas Hitziger, a mathematician on the Chair of Structural Mechanics and Numerical Methods at the BTU. He had already visited Greenland back in 2015, where the elevation profile had been measured kinematically for the first time to ensure the constant supply of elevation data for the entire stretch of land. This was repeated in the peripheral areas in 2017, and measurements for the entire 700 km route will be taken again next year. The university professor was always so enthusiastic about the long-term project that Luisa Näke became curious. She is now about to complete her bachelor's degree in Civil Engineering and is dealing precisely with this field of climate research: "The world's major ice caps, such as Greenland, act as

sensors for global climate change, and so long-term projects like this are really interesting. We're not really interested in annual fluctuations; our focus is on long-term trends. As part of my Bachelor Thesis, I am mainly studying and comparing kinematic data from 2015 and 2017. Static measurements from previous expeditions are only relevant in specific areas. My findings will be used for the expedition in summer 2020«, says the committed student. She even helped to collect data during this year's research trip.

The BTU is the working closely on the project with the CTU in Prague, the TU Dresden and the Beuth University of Applied Sciences in Berlin.

WHAT DOES SWEAT REVEAL ABOUT OUR PHYSICAL FITNESS?

Therapists are using long-term stable sensors to measure human health through the skin as opposed to previous blood-based techniques

If the oxygen taken in during intense endurance exercise is not enough to generate the energy required by the muscles, a metabolite is produced in the form of lactic acid. The lactate levels in a person's blood provide an indication of their metabolism. If they are too high, muscle activity diminishes. Prof. Dr. Sven Michel and his team of researchers are working on the project »Development of Textile-Based and Planar Sensors for the Non-Invasive Real-Time Measurement of Lactate Levels for Diagnostic Purposes According to Clinical, Therapeutic and Sports Medicinal, Performance-Oriented Requirements (LC-Sens)«. Their aim is to develop textile-based sensors that can also measure the substance in human sweat through clothing.



»If you've ever sprinted round a track, you'll have noticed that your movements gradually stopped functioning and you started to cramp up«, says the head of the new LCSens research project, Prof. Michel. »Your lactate levels can be between 12 and 20 millimoles per litre of blood. That's ten times higher than the normal lactate levels of an adult, which is under 1.8 millimoles per litre of blood. Similar levels can be noted in the case of certain heart diseases. You can imagine how strenuous everyday life must be in such cases«, continues Prof. Michel.

The head of Therapy Sciences and former top-level athlete is no stranger to the effects of lactate. »If we know the maximum lactate levels of each individual, we can pinpoint the effects of their workouts, such as the main areas of fat burning or the increased conditioning of metabolic buffering capacity.«

In cooperation with the Institute of Textile Machinery and High-Performance Textile Material Technology at the Technical University of Dresden, the researchers hope to work with Prof. Dr.-Ing. Chokri Cherif, head of the institute and winner of the Future Prize awarded by the Federal President, to further simply the measurement of physical strain.

The LCSens research project will run for two years and will initially receive around 600,000 euros in funding from the Federal Ministry of Economic Affairs and Energy. The scientists are trialling the technology under clinical conditions with the Hoyerswerda Clinic in the Lusatian Lake District.

Chair of Therapy Sciences II PROF. DR. PHIL. HABIL. SVEN MICHEL

< The textile-based sensor measures lactate levels in real time (Photo: Titus Martin)</p>

ARCHITECTURE AS A SOURCE OF KNOWLEDGE

Prof. Dr.-Ing. Klaus Rheidt, Spokesman for the DFG Research Training Group 1913 »Cultural and Technological Significance of Historic Buildings«, discusses the study of cultural values reflected by structures from very different geographical and temporal settings

BTU NEWS: What topics are being investigated by researchers at the Research Training Group?

→ **PROF. RHEIDT**: The DFG Research Training Group 1913 is conducting academic research on historic buildings, focusing on the interplay of art, technology and society in different temporal and cultural settings. We see historic buildings as a reflection of cultural values and a mirror of the cultural and technical knowledge of their era. This imbues buildings with a whole new significance as a representation of the architectural and technical achievements of their time and culture. The range of topics includes Bauhaus architecture, the development of early iron and concrete structures, English country houses, ancient, medieval, and contemporary cities, large religious buildings with their construction history and preservation technologies, palaces, fortifications as well as railway/transportation-history.

BTU NEWS: What do these topics have in common

→ **PROF. RHEIDT:** All our researchers are specifically examining buildings or the actors involved in their construction. Their primary source is the built fabric visible today, which is the focus of our research. The investigation of these very different buildings presents us with common questions, such as those concerning the construction process, the building site, its organisation and logistics. They mainly revolve around intercultural factors, such as migration phenomena. Migration introduces new elements of architectural culture to a region and alters construction practices in the societies of arrival. Our research projects are addressing different approaches to the study of historical buildings, and they focus on the underlying attitude behind the design and construction of



 Prof. Dr.-Ing. Klaus Rheidt brings together the worlds of humanities and engineering in his work

the buildings. For example, the »language« of the architect and engineer can vary significantly with regard to their cultural environment and the use of technology. These common themes are some of the cross-cutting issues at the Research Training Group, where all participating researchers are contributing their ideas from the perspective of their specific discipline. This debate has resulted in four international colloquiums, and more are set to follow. These make the results of the intensive discussions held at the Research Training Group visible to the public.

BTU NEWS: They are building bridges between different disciplines.

→ **PROF. RHEIDT:** The mixture of top-level individual research in specific fields and interdisciplinary discourse on cross-cutting issues is a defining feature of the Research Training Group. This overarching discourse is particularly effective in bringing together the very different worlds of humanities and engineering without questioning the more targeted nature of individual research. This approach now occupies a special position in the increasingly specialised world of research, where there are hardly any links between disciplines and where completely different languages are spoken in some cases. The Research Training Group is specifically looking to establish dialogue between disciplines. In fact, this was even highlighted by the DFG inspectors as one of its special qualities.

Thank you for the interview!

BTU researchers have spent many years investigating historic buildings, historic building constructions and the architecture of bygone eras. The Chair for History of Art has carried out important research on Bauhaus architecture and its protagonists in Weimar and Dessau. The Chair of Construction History is an international leader in the study of historical iron constructions. Researchers from the Chair of Architectural Conservation can look back on over twenty years of successful research in the field of English country houses. And the Chair for the History of Architecture is investigating the history of the construction and use of large ancient buildings and urban systems, as well as medieval cathedrals. These diverse approaches to architectural research are complemented by the research fields of our partners, such as the Leibniz Institute of Spatial Social Research in Enker with its Research Centre for Architecture and Urban Development in the GDR, and the Winckelmann Institute at the Humboldt University of Berlin with archaeological urban research projects in the Near East. These diverse areas of research are brought together at the Research Training Group.

Chair of the History of Architecture **PROF. DR.-ING. KLAUS RHEIDT** Spokesman of the DFG Graduate College Head of the Institute of the History of Art and Architecture

TALES FROM OUR DOCTORAL CANDIDATES

Doctoral student Marco Dehner and post-doctoral researcher Paula Fuentes González from the Graduate College 1913, »Cultural and Technical Values of Historical Buildings«, describe how archaeology, architectural research and construction history go hand in hand

Marco Dehner is investigating the architecture of isolated buildings in the city of Petra.

»My area of expertise is classical archaeology. I have been researching the architecture and architectural decoration of isolated buildings in Petra, Jordan, since April 2017. I am particularly focusing on individual architectural structures like the Nabataean capital, the combination of column and entablature arrangements, and the unique combination of individual decorative elements within individual decorative groups. There has been a lack of extensive research into the architectural decoration of isolated buildings from the Nabataean period – and therefore the first century BC and the first and second centuries AD – because the focus of most investigative work has been the famous rock façades since Petra was rediscovered in the 19th century.

The Graduate College offers me the ideal combination of archaeology, architectural research and construction history, so that I can examine the research material comprehensively and from many different perspectives. For example, the methods used in architectural research give me a better understanding of the buildings at the centre of my studies and allow me to reconstruct their appearance in combination with archaeological findings. As an expert archaeologist, my close contact to construction history has taught me the basics of construction engineering and allowed me to identify and discuss the findings that otherwise would not have been considered in my work.

In October 2018, we were given the opportunity to spend nine days in Jordan, where we discovered the country's rich cultural and architectural history and thoroughly discussed issues related to historical buildings, construction practices and the preservation of historical monuments. I



 Marco Dehner and the team at the Graduate College visited Jordan in October 2018 View of the city of Petra (Photo: Marco Dehner)

The post doctoral student Dr. Paula Fuentes studies Belgi–an vaults like the Collégiale Notre-Dame de Dinant (Photo: Paula Fuentes González)

particularly remember our guided tour of the restored and reconstructed Moses Memorial Church on Mount Nebo. We were shown around by the restorer himself, Franco Sciorelli, before enjoying a follow-up discussion on the technical aspects of his work and the associated monumental value and museum character of the building«.

Dr. Paula Fuentes González is fascinated about vaults and their technical aspects

»For centuries, vaults have been considered ideal structures to cover buildings of significance. The introduction of new construction materials in the 19th century, such as iron and reinforced concrete, promoted a new way of building with new structural forms. Masonry and timber were no longer the only structural materials at hand. However, with the taste for historical architecture, vaults continued to be built.

Vaults and the technical aspects around them are fascinating study objects: not only do they influence the aesthetics, but they are a key element of the structural system. Today, there is an increasing interest in the construction aspects of vaults. However, vaults built during the 19th and 20th centuries have barely been studied, probably because they are still too recent. Did the construction of these vaults follow traditional techniques or were there any innovations? How did the new materials modify the construction of vaults?

In my project called »Building vaults in Belgium in the 19th-20th centuries: the transformation of a historical structural system in the age of the new materials«, I will study the evolution of vault construction in Belgium in the 19th and 20th centuries, taking into account the evolving context of industrialization. What fascinates me about this topic is studying the evolution of a structural element that, after a slow development over centuries, underwent a new flourishment with important innovations just before its decay due to the Modern Movement in Architecture.

The project will be developed in collaboration with the Vrije Universiteit Brussel and has been submitted for a Marie Curie Individual Fellowship 2018. This fellowship will give me the opportunity to focus on this project for two years, working in a new University in a different country, which will greatly enhance my academic career.«



STUDY & TEACHING

»THE STUDIES ALLOWED ME TO DISCOVER NEW HORIZONS«

From Moscow to Cottbus and back: Liudmila Buzina got the job of her dreams thanks to her studies at BTU

Liudmila Buzina from Moscow studied the World Heritage Programme from 2014 until 2017 at BTU Cottbus–Senftenberg. She has recently completed the Graduate Survey, is now a member of ICOMOS Russia and works as Deputy Head of the World Heritage and International Communication Department at Russian Scientific Research Institute of Cultural and Natural Heritage named after D. S. Likhachev

BTU NEWS: How come that you studied WHS in Cottbus?

→ LIUDMILA BUZINA: The Master Programme »World Heritage Studies« is unique in its sense, it combines multidisciplinary approaches, gives the possibility to study different ways of treating heritage. This programme is one of the first programmes about World Heritage that appeared. Germany was, is and always will be one of my favorite destinations: In 2010 being a student of the Russian University I did an internship in Germany at the local municipality of the city of Gelsenkirchen. I really enjoyed my stay there and when the time came to decide where to achieve a Master degree there were no hesitations that Germany is one of the best options. I spoke some German already and got a DAAD scholarship for my studies at BTU – that was one of the motivations as well.



 Alumna Liudmila Buzina wants to save the cultural heritage for future generations (Photo: Liudmila Buzina)

BTU NEWS: How did the course of studies change your perspective on World Heritage?

 \rightarrow LIUDMILA BUZINA: The World Heritage Master course is a perfectly structured, well-organized programme based on a holistic, multidisciplinary approach. This master studies permitted me to significantly expand my knowledge in the cultural sphere, to get to know cultural diversity and peculiarities, and to study an international view on the problems of protection of cultural and natural heritage sites. One of the obvious advantages of the programme is its multiculturalism – there are students from all over the world studying together; this fact brings outstanding possibilities to exchange ideas and views with people from different cultures and backgrounds, to get to know the diverse world around us. First and last, the years spent in Cottbus turned out to be a unique life experience.

BTU NEWS: What are you doing professionally now? What are typical tasks in your everyday work?

→ LIUDMILA BUZINA: Currently I work as Deputy Head of the World Heritage and International Communication Department at Russian Scientific Research Institute of Cultural and Natural Heritage. I have a challenging job because of the coordinating and management role, but I truly enjoy our pleasant working climate and multiply opportunities to undertake scientific work. The Heritage Institute and the Department I work for definitely give me the possibility to use acquired knowledge and skills, realize my own ideas, pursue continuous learning and do something useful for my country and the whole world society. The World Heritage and International Communication Department is dealing with the tasks of conservation, protection and promotion of World Heritage in Russia. Among my main responsibilities is elaboration of nomination dossiers and management plans for Russian heritage sites for submission to the World Heritage Center. Since the beginning of my work at the institute I have already taken part in several projects in this regard.

BTU NEWS: What do you remember the most from your time at BTU Cottbus-Senftenberg?

→ LIUDMILA BUZINA: I really enjoyed the vibrant new discoveries, self development and new perspectives. Remembering every one individually, and adoring all collectively, I thank the BTU staff for these magnificent studies that have enriched my life with new colors, made my world amazing and turned my dream to save the cultural heritage for future generations into reality.

Thank you for the interview!

INTERNATIONAL COOPERATION FOR DEVELOPMENT

Kester Audu from Nigeria came to Cottbus to do his master studies and he left Germany with a lot of plans and project ideas to make his home country a better place

BTU NEWS: Why did you decide to study at BTU?

→ KESTER AUDU: I studied Environmental and Resource Management (ERM) at BTU because of the interdisciplinary nature of the programme, the attraction of international students to this university and the ease of the admission process. When I go back in time and think about my studies in Cottbus, I can say that I really liked the serenity and cool ambience of the university environment as well as the friendly and welcoming nature of the staff, especially the International Relations Office team. My Master's Thesis focused on the career path of ERM students after their studies and I earned a good grade at the end of my programme.

BTU NEWS: What is your current job about?

 \rightarrow KESTER AUDU: I work as a management consultant in Africa, as a returning expert of the Centre for International Migration and Development, a programme jointly run by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the Federal Employment Agency of Germany. My responsibility in host organizations is to design and deploy programmes and projects for sustainable development. Two examples of my project work include: first the Thinking and Learning Lab, a knowledge sharing platform for graduates and selected faculty. The idea is to co-create ideas and drive transformative business processes for organisational and national growth. Second the Machine and Equipment Consortium Africa (MECA)-Nigeria, which is a start-up in the field of agricultural mechanization focused on solving access to tractors for farmers in Nigeria. MECA repairs and refurbishes the tractors and rents them at a small price to small and medium scale farmers who ordinarily would not have access to these tractors.

BTU NEWS: How did your studies help you on the career path?

 \rightarrow KESTER AUDU: My studies in Cottbus have helped me a lot in mycareer path. I am able to design and develop projects and structure programmes in a more sustainable manner. Moreover, I have built a good relationship with Dr. Lutz Laschewski of the Chair of Social Science and Environmental issues, who also happen to have su-



∧ Kester Audu studied Environmental and Resource Management at BTU

pervised my master's thesis, and he has guided and advised me in most of my projects in Africa. The fact that he came to Nigeria to see the progress of some of my projects is one of the best moments in my life so far. This was his first visit to the African continent and I am amazed how a relationship between a teacher and a student built from the classroom in Cottbus can grow that far, it is indeed a great thing!

BTU NEWS: Where do you see yourself in five years?

→ KESTER AUDU: I will continue in the path of international cooperation for development, and with the enormous opportunity in Nigeria and the African continent, I will be working with international and local partners to create a platform for venture capital and angel investors in Germany to invest in start-ups, small and medium-sized enterprises (SMEs) in Nigeria and Africa. Because of my love for research and development, I will be engaged also in a part time doctoral programme in Germany in the area of entrepreneurship and innovation. As I continually create value and success through these activities, I am certain at some point I may have to be invloved in some political assignment for the government of Nigeria because of the importance of polices to economic, social and environmental issues.

Thank you for the interview!

SEOUL-BERLIN CITY DIALOGUES

The BTU is participating in the German-Korean Partnership Programme (GEnKO) of the German Academic Exchange Service DAAD

Berlin and Seoul do not, at first, have much in common in terms of their size, as the German capital has 3.6 million inhabitants and the metropolitan region of South Korea more than 25 million. Seoul's city centre is as big as the whole of the Berlin urban region and the population density more than three times greater. There are, however, good reasons for a scientific comparison of both cities, as both are currently working on plans for 2030. Both cities are also united by a history of post-war rebuilding and defined by a history of division as well as a modern surge in growth and a highly regarded global ascent. It is against this background and on the basis of the »Seoul – Berlin City Dialogues: Comparative Evaluation of Architectural and Urban Performance in the Contemporary Urban Strategies of Berlin and Seoul« partnership programme, which was launched in 2019 and funded by the DAAD, that scientists from the BTU and the renowned Seoul National University (SNU) hope to better understand the future development of both cities.

Scientists intend to learn from one another with a view to urban planning strategies and planning cultures as seen against the 2030 horizon. The research topic has been prepared since 2016 on the basis of initial scientific contacts by guest professor Dr. Ing. Gernot and will, by means of the launched partnership programme, enable an exchange between students as well as junior and senior researchers from both universities.

In the next three years, the project teams will, with local visits, be in close collaboration with one another on current urban development projects. They will jointly develop criteria for project evaluation and will in this



way be able to conduct a comparative analysis of select sample projects. Three steps are planned for this:

In the first step, the spatial characteristics and urban development strategies will be examined on the basis of the respective urban layouts and individual planning regions to establish similarities and differences. For this, the depth of detail of the respective planning strategies as well as the dominant urban development policies will be compared. Based on this, four planning regions will then be monitored at a time in order to establish similarities between both capitals on the level of urban planning as well as the realisation. In Berlin, the regions will involve so-called transformation regions from the urban development concept (STEK) for example Berlin TXL, Schöneweide-Adlershof-BER and Marzahn-Hellersdorf as well as Buch. In Seoul, scientists can choose the regions from the seven sub-centres (Sangam and Susaek, Changdong-Sanggye, Cheongnyangni-Wangsipni and Yongsan) as well as the city's twelve further distinctive regions (Dongdaemun, Gongdeok, Sadang-Isu, Suseo-Munjeong). The third step involves assessing the respective urban development and architectural significance of the examined regions and possible development alternatives.

After the political turnaround in Korea, Berlin's urban development process is generally being viewed as an important reference which could, in the event of a possible unification on the Korean peninsula, function as a concept for Seoul as well as for other border cities. The project partners of »Seoul-Berlin City Dialogues« are Prof. Youngsang Kwon of the Department of Civil and Environmental Engineering of Seoul National University (SNU), one of South Korea's most renowned universities, and Hanbyul Shim, PhD as Research Fellow of the Centre for Asian Cities as well as Jeongil Seo, PhD of the Future Consensus Institute, Seoul. Guest professor Dr. Ing. Gernot Weckherlin (architectural theory) is leading the project for the BTU Cottbus–Senftenberg. Guest professor James Miller Stevens (urban planning) and PD Dr. Ing. Eva Maria Froschauer (art history) are also participating in the project.

Department of Architectural Theory **DR. ING. GERNOT WECKHERLIN**, guest professor

Work meeting at the Seoul National University, April 2019 (Photo: Kim Jae-Kyeong)

CHINA AND CONSTRUCTION ENGINEERING AT THE BTU

An agreement between the BTU and the Hefei University aims to promote student exchange in construction engineering and encourage Chinese master's students to study in Cottbus

In April 2019, a high-ranking delegation from the Chinese Hefei University visited the BTU Cottbus-Senftenberg. Guests included President Prof. Dr. Qidong Wang together with Chairman Feng Jia and Vice Chairman Jianan Sun of the International Academic Office as well as the dean of the Faculty for Computer Science of Hefei University Ming Tan. The delegationn was welcomed in the name of the university management board by BTU Vice President Prof. Dr. Katrin Salchert together with Mareike Kunze, Head of the International Relations Office.

The talks focussed on intensifying student exchange and research cooperation in the field of construction engineering which has also been approved by both universities with the signing of a cooperation agreement. In order to offer the delegation an insight into the work and current research topics, Prof. Dr.-Ing. Hartmut Pasternak and his academic colleague Dr. Zheng Li invited the delegation to the Chair of Steel and Timber Construction. Here Prof. Wang, whose background is in the field of construction engineering, showed considerable interest in the research on steel components in combination with carbon fibre reinforced plastics (CFRP), which improve stability and rigidity, as well as in the simulation of internal welding stress.

In recent years, Hefei University has actively developed the cooperation with German universities and the BTU also benefits from this. In 2018, Prof. Dr. Pasternak took up the invitation of the dean of the university's construction engineering faculty and visited Hefei in order to assess the opportunity for student exchange. At the same time, he reported on the BTU's research work in the context of steel construction applications in Germany and offered insights into studies and areas of work in this field at the University of Cottbus. This was evidently a success as the current cooperation agreement shows: in the future, more Chinese students will take their masters in construction engineering at the BTU. The students are already prepared for this during their bachelor studies at Hefei University where they learn German and, in the fifth semester out of six, learn about construction engineering in Cottbus for the first time through the BTU exchange programme Studexa.

Hefei is the 2,000-year-old capital of the Anhui province with more than 8 million inhabitants. In recent decades, industry, infrastructure and education have developed immensely here. The average living space per inhabitant has increased from 3.7 square metres in 1987 to 35 metres in 2018. The huge demand for new buildings can be seen in the many building sites throughout the area. In the future, construction engineering students at the BTU will now also have the opportunity to see this for themselves and experience this first hand.



Vice President Prof. Dr. Salchert and President Prof. Wang sign the cooperation agreement (Photo: Mareike Kunze)

Federal funding for model universities in China

Since 1985, Hefei University is one of two model universities for applied sciences in China with German support. Federal Chancellor Angela Merkel and Chinese Prime Minister Keqiang Li visited the university together in 2015. Both heads of government described the university as a role model for 30 years of successful cooperation between Germany and China. With a specially established fund, Chinese-German cooperation in various fields, particularly education, will be further supported here in an exemplary way.

Chair of Steel and Timber Construction PROF. DR.-ING.HABIL. HARTMUT PASTERNAK DR.-ING. ZHENG LI



Björn Fiebig, who studies Materials Chemistry at the BTU in Senftenberg, working in the laboratory in the physical chemistry work group

FROM THE MOLECULE TO THE MATERIAL

The Materials Chemistry degree programme offers networked knowledge and involves students in projects

Using a pipette, Björn Fiebig takes a sample of a clear solution from a centrifuge tube and places this on a graphite carrier which is then positioned in an atomic spectrometer. In this analytical apparatus, the sample is heated to more than 2,000 degrees Celsius and the atoms broken up so that these can be examined. This work is part of a project conducted by the physical chemistry work group led by Prof. Dr. Jörg Acker and in which the Materials Chemistry student at the BTU in Senftenberg is actively involved. This concerns the recovery of cathode material from used lithium batteries to reuse this in new ones (see also page 9).

In another project, Björn Fiebig is helping to extract valuable materials from the red mud, which occurs during aluminium synthesis and will then be reused. He is also involved in a basic research project which focuses on reaction mechanisms for dissolving silicon in fluoric acid/nitric acid mixtures.

Hereby, the 26-year-old Berliner only started his studies in the new Materials Chemistry programme at the BTU in Senftenberg in the winter semester 2018/19. »That can't be it«, he said to himself after he had gained his higher education entrance qualification after his training as chemicaltechnical assistance at the Lise Meitner School of Science. He then came to Lusatia with his girlfriend Kimberly Primke, who is studying biotechnology at the BTU. His professional qualification forms the ideal prerequisite for working in the laboratory so soon after the start of studies and for also using the modern technology here to work with dangerous substances. Prof. Acker and his team, scientific associate Anja Rietig and laboratory engineer Tim Sieber, appreciate Björn Fiebig's dedicated work. »I would definitely recommend the Materials Chemistry studies«, says Björn at the end of the first semester. »It's really interesting and varied. I'm particularly fascinated by the preparative and analytical chemistry and my experiences so far have been really positive. Here I mean the intensive support from the professors and employees as well as the student service, the modern facilities and, of course, the active involvement in research projects.« The student also praises the favourable rents in Senftenberg. As a keen volleyball player, he makes use of the university's sports offers and he's also looking forward to the season kick off at Lake Senftenberg. Björn sees the BTU's close proximity to BASF Schwarzheide GmbH as a further benefit of the location and is already thinking of doing a master degree here. »I imagine doing something for the environment«, he explains. »It would be great to be able to develop new materials later, for example composite materials, which are biodegradable or solar cells with increased efficiency.«

Department of Physical Chemistry **PROF. DR. RER. NAT. HABIL. JÖRG ACKER** Materials chemistry bachelor degree programme **BJÖRN FIEBIG**

FINDING THE TRUTH WITH FORENSIC ANALYSIS

The university's master study programme »Forensic Sciences and Engineering« at the BTU is unique in Germany. In this, students use the state-of-the-art opportunities of the Central Analytical Laboratory

»The dispute involves acknowledging a work accident. The driver lost control of the vehicle in a bend, probably because he was going too fast. The car skidded and the right side hit a concrete pillar whereby the fuel tank was ripped open. As a result of the leaking fuel which ignited immediately, the vehicle caught fire, the front hit a crash barrier, somersaulted and landed 15 metres behind the roadside ditch on a field.« – This is how the judicial facts of a case might start if Prof. Thomas Fischer is called upon for his help.

This occurs when the evidence at the scene of the crime does not allow an exact clarification of the circumstances leading to the accident: how did the fire spread in the vehicle? What was the temperature in the cabin? How much time did the occupants have to exit the vehicle? Can the burn injuries be plausibly explained with this? Courts are interested in questions like these if, for example, there is a dispute between the insurance companies. In any case, they can only be answered with the help of combustion tests and subsequent software simulation. Alongside this, a further key area of the investigation work is formed by forensic fire debris analysis. This aims to establish any residue of arson-related materials and differentiate between materials which occur naturally in a fire or which one would expect at the scene of the fire. don't usually know how the courts ultimately decide«, explains laboratory head Prof. Fischer: »We rarely know all the circumstances of a case and we contribute only one of many puzzle pieces in finding the truth. Forensic analysis is an applied discipline and has more similarity with other applied natural science disciplines than one would think.«

These similarities also led to the Central Analytical Library with its modern facilities being the venue of choice for the student analytics internships of the pilot programme »European Master of Forensic Sciences« funded by the EU ten years ago. Since then, a great deal has happened: the university's master programme Forensic Sciences and Engineering, which arose from this and is unique in Germany, has become an established element of the further education programme at the BTU. Its acceptancy is high, particularly amongst the security authorities, not least also due to jointly supervised master theses at the Federal Criminal Police Office, several state criminal police offices as well as legal and forensic medical institutes in which many graduates have, meanwhile, also found jobs. The work in the EU project »MUL-TI-modal Imaging of FOREnsic Science Evidence (MULTI-FORESEE)« forms the starting point for research in non-destructive imaging trace analysis at crime scenes.

Analyses such as these as well as many others are conducted in the Central Analytical Laboratory often also in cooperation with further facilities of the BTU. What happens with the investigation findings? »We



The further education degree programme »Forensic Sciences and Engineering« in German has been offered by the BTU since the winter semester 2011/12. It is aimed at lawyers, and employees of official authorities, the police, fire brigade, customs, civil protection and more. Furthermore, it is also of interest to assessors and experts who are already working for courts, authorities, insurance companies or private persons and wish to broaden their forensic knowledge. Since the introduction of the programme, it has been taken by 70 students and 40 completed this with a master degree. The degree programme coordinator is Prof. Eike Albrecht.

Central Analytical Laboratory **APL. PROF. DR. RER. NAT. HABIL. THOMAS FISCHER**

< Prof. Dr. Ing. Thomas Fischer and technical assistant Mandy Turski conducting examinations in the Central Analytical Laboratory

A DIFFERENT TYPE OF RECRUITING: VIRTUAL EDUCATION TRADE FAIRS

With a virtual BTU exhibition stand and live chats, the International Relations Office is showing the way when it comes to recruiting students

»Merhaba Izmir! Hello and good morning Izmir!« announced a virtual education exhibition in November 2018. The local Turkish Goethe Institute had organised the exhibition for interested pupils and potential students of the Turkish town and surrounding area on the Aegean coast. Approximately 620 participants registered for the exhibition. However, according to an estimate of the Goethe Institute, many more pupils took part in reality as, in many cases, only the teachers had registered yet they had followed the exhibition together with their classes in classrooms or even school assembly halls.

Around 160 people visited the BTU's virtual exhibition stand, 70 of which chatted in English, German and Turkish with Angela Buhl, Recruiting Officer in the International Relations Office (IRO) and student assistant Okan Yalcindag from Turkey. Hereby, almost 1,200 chat messages were sent and almost half of the potential students asked very in-depth questions. Due to this considerable interest, the IRO staff are now very optimistic that they will be able to welcome several of these at the university in the future.

The main focus of the virtual visitors was engineering sciences and technical study programmes such as computer science, architecture, electrical engineering, power engineering and mechanical engineering. There were also in-depth questions on the dual studies and the town of Cottbus as well as student life, living, financing and recreational possibilities.



∧ The BTU's virtual exhibition stand

Alongside the personal and group chats, pupils also found out information about the BTU from image videos which were being shown on a screen on the virtual stand and could be seen in full screen mode. A »virtual pinboard« also showed brochures, pdf documents and links to BTU websites which illustrated the university's study programmes, application procedures and study terms and conditions in Cottbus and Senftenberg.

International recruiting is also increasingly being carried out in this way today. A personal, local contact which does, of course, offer numerous benefits is not always possible due to lack of staff, time or money. Virtual exhibitions as well as webinars (online talks in a virtual conference room), meanwhile, are able to reach many pupils – particularly from German schools abroad and international schools with German as one of the main subjects – cost and time efficiently as well as conveniently and effectively.

»Besides making contact via one of the most important environments of our target group – the virtual world – we are also present on site. The TAKEV school in Izmir, for example, a long-standing partner institute of the BTU, invited guests to an onsite exhibition in March which we participated in,« explains Angela Buhl who, along with Hanne Sommer, academic staff member in the fine arts at the Faculty of Architecture, Civil Engineering and Urban Planning, met several hundred potential students from various Turkish schools belonging to the PASCH network, which has a network of over 1,800 schools that place a special focus on German worldwide. Alongside the advice and talks at the exhibition stand by Angela Buhl, Hanne Sommer also offered several workshops on the subject of architecture, all of which were very well received. »These pupils are particularly interesting from a recruiting viewpoint as the exhibition and workshop reach suitable and very well educated applicants particularly for our bachelor's courses«, says Angela Buhl.

International Relations Office **ANGELA BUHL** Recruiting Officer in the International Relations Office

NEW UNIVERSITY PARTNERSHIP LAUNCHED

The BTU Cottbus-Senftenberg and the Pedagogical University in Maputo plan to work together in the field of renewable energies

In January 2019, the BTU welcomed a delegation of four visitors from Mozambique at the central campus in Cottbus. The visit was intended as the first step towards a future university cooperation between the BTU and the Pedagogical University (PU) in Maputo, Mozambique. This was made possible thanks to the Fact Finding Mission »Education and entrepreneurship for sustainable development – implementation of renewable energy sources in Mozambique« which was financed by the DAAD and initiated by Eva Leptien and Prof. Eike Albrecht of the Chair of Public Law with Reference to Environmental and Planning Law, Prof. Magdalena Mißler-Behr as Head of the Start-up Service as well as Thomas Hasenauer from the Centre of Continued Scientific Training.

The visitor's programme included workshops which particularly focused on the various factors in the transition to renewable energies. Participants also discussed how to create the necessary conditions for this with the involvement of the local people. In this, the BTU set up an interdisciplinary team incorporating the initiators which included the Vice President for Knowledge and Technology Transfer and Structure Prof. Katrin Salchert. The Pedagogical University (PU) offers the necessary institutional support as it teaches students in the technical field and in natural and engineering sciences to approach social problems from a solutions-orientated viewpoint. Hereby the PU was represented by a skilled team headed up by Prof. Armindo Monjane, Dean of the Faculty of Natural Sciences, who is also an alumna of the DAAD.

Professor Eike Albrecht summed up, »With our workshops at the BTU, we wanted to combine the technological aspects which are important for the implementation as well as the commercialisation of renewable energies with the social and business side of it. This serves as a formula for the establishment of sustainable structures in Mozambique as well as in many other countries worldwide.«

The programme was complemented by Gilda Monjane from Mozambique who, as an external expert, gave a fascinating talk in front of many interested students as part of the public lecture series »Open BTU.« Gilda Monjane works as an advisor in the Ministry of Mineral Raw Materials and Energy (MIREME) in Mozambique and has herself set up a successful renewable energy start-up during her long career. In her work, she is also committed to empowering women in developing countries. The lecture represented a very special moment for Gilda Monjane and Professor Albrecht.

Gilda also took part in a DAAD alumni seminar in the past, which was organised at the BTU in 2012 and during which she visited the Hanno-



 Gilda Monjane, who accompanied the delegation from Mozambique to the BTU as an external expert, in the UN building in Ethiopia during the »African Women Leaders Network« (Photo: Santa Ernesto)

ver Messe, where she made the contacts which helped her to fulfil her renewable energy start-up. She emphasised, »Social independence, particularly of women, can, for example, be realised by supporting businesswomen in the field of solar energy. This creates additional value for the individual women as well as for society as a whole. Sustainable development is promoted by such partnerships and innovation.«

The successful week full of discussion and new perspectives was only made possible thanks to the support and constructive cooperation of many of the participants. A small BTU delegation can now look forward to a return visit to Maputo in May.

Chair of Public Law with Reference to Environmental and Planning Law **EVA LEPTIEN** Ten students of Deakin University in Melbourne participated in the project held by Steven Cooke and Alexandra Skedzuhn-Safir on examining the military history and heritage at Port Arthur in December 2018 (Photo: Dr Steven Cooke)

ELEMENTS OF CRIME AND CONTROL

Exploring the possibilities of an enhanced site interpretation at a World Heritage Site: A hands-on seminar with Deakin University studies the former prison at Port Arthur in Tasmania

Scuttling amidst lush vegetation in Tasmania's Port Arthur are some astonishing wombats and potteroos, suggesting that here, at the other end of the world, nothing but peace and tranquillity prevails. First appearances, though, conceal the dark and moving nature of the history of this place: it was the site of one of Australia's convict's prison. It had begun to operate as such in the 1830s, and shortly after it was closed down in 1877, it had already become a touristic destination, so that in the interim period between the two world wars there existed already three hotels and two museums. However, in the 1990s at this very place it was where a mass killing occurred giving then rise to restrictive gun laws in Australia.

Since 2010 Port Arthur, together with the nearby Coal Mines and the Cascades Female Factory Historic Sites are part of the World Heritage List of altogether eleven Australian Convict Sites where over eight decades an estimated 166,000 convicts from the British Empire were sent with the intent of being both punished and reformed (see also https://whc.unesco.org/en/list/1306/multiple=1&unique_number=1648; and https://portarthur.org.au/). Not only were men imprisoned here but also women, as well as children. Port Arthur constitutes a cultural landscape encompassing buildings connected directly to the convicts like the somewhat iconic prison building (see image), the separate prison, the asylum, and places where prisoners carried out their daily work in the woods as lumberjacks or near the waterside building ships. Other structures are associated with the controlling forces of the site, like the homes of civil officers and their families, or the military barracks.

Port Arthur was also the site of the next stage in the development of the teaching and research partnership between BTU and Deakin University, in Melbourne, Australia. Since 2013 BTU has offered an award winning dual degree program where selected students complete a Master of World Heritage Studies at Cottbus and a Master of Cultural Heritage at Deakin. The DAAD has supported this programme through the Integrated International Study Programmes with Double Degree financed by the German Federal Ministry of Education and Research (BMBF). As part of the collaboration and academic exchange between the two uni-



versities, Steven Cooke - the course director of the cultural heritage and museum studies programmes at Deakin, has run study projects at BTU for the World Heritage Studies programme, while Alexandra Skedzuhn-Safir, academic assistant at the Chair of Architectural Conservation at BTU recently co-held the field school at Port Arthur. Deakin has partnered with Port Arthur over a number of years to investigate the military history and heritage of the site: something that might get overlooked given the focus on convicts. The aim of the recent project was on firstly to assess the current narratives presented through guides and signage on site at the museum. Secondly, the ten students were to examine if and to what extent visitors were aware of the different historic actors, their roles and their importance as part of the former convict prison system to fully understand the meaning and value of the site during that particular period. For that reason, interviews of visitors took place as well as a first analysis of visitor movement within the site. The preliminary result showed that although the most frequented stops at the openair museum are prisoner-related, visitors in general would still welcome additional information on the military element of the place.

With her interest in and academic focus on marginalised people and means of spatial separation, Alex's input concentrated on the spatial history of the site as well as the possibilities maps offer to visualise not only historic events but also contemporary visitor movement to facilitate the assessment of challenges and needs in presentation at Port Arthur. This collaboration is prompting further research into the spatial history of this site and its presentation possibilities.

Deakin University **DR. STEVEN COOKE**

Senior Lecturer and Course director of the Cultural Heritage and Museum Studies programmes

BTU Cottbus-Senftenberg **DR. ALEXANDRA SKEDZUHN-SAFIR** Academic assistant, Chair of Architectural Conservation

WELCOME TO BTU

The BTU is known for its warm welcomes, from the Welcome Reception to the exchange of experiences from DAAD scholarship holders

Great expectations: In the 2019/2020 winter semester, 42 new DAAD scholarship holders started their studies at the BTU Cottbus-Senftenberg. A small ceremony was held on 20 November 2019, where the students were welcomed by Acting President Prof. Christiane Hipp from the BTU and Kai Franke, the Head of the Berlin Office at the German Academic Exchange Service (DAAD). Prof. Dr. Bachar Ibrahim, co-founder of the »Friends of the DAAD« in Cottbus, and Alaba Obafemi Paul Olukoya, a doctoral candidate on the Chair of Environmental Planning at the BTU, shared their personal experiences to help students adapt to their new academic environment and student community. They offered valuable tips and ultimately encouraged the newcomers to actively approach their German classmates, even though some of them might not feel overly confident with their German. Prof. Dr. Ibrahim reiterated how important this was, because friendships made in Germany last a lifetime. At the small reception that followed, the international newcomers shared their first impressions with DAAD alumni, the International Relations Office and advanced scholarship holders.

Around 2,350 foreign students are currently studying at the BTU Cottbus-Senftenberg, equating to over 30% of the student body. This steady internationalisation through projects in teaching and research is constantly reflected by the large amount of foreign scholarship holders who contribute to the international flair of the BTU in Cottbus and Senftenberg, allowing the DAAD to host its welcome event there every year. One month previously on 22 October 2019, the traditional Welcome Reception was attended by 650 international students in the large dining room on the Main Campus. This is both a welcome party and information event, and it forms an integral part of our welcome culture for foreign university students. This is where new students have the chance to personally meet their contacts from the International Relations Office, who have often spent several weeks providing help and advice via email and by phone regarding the complicated and time-consuming formalities for entry into the country and enrolment. The students also find out about events and trips designed for them to explore the region. Some of the helpful information concerns study-related German courses, support options, contact details of German host families and the extensive range of sports activities at the university. Acting President Prof. Christiane Hipp was joined by representatives from the City of Cottbus and the Studentenwerk of Frankfurt (Oder) as she welcomed newcomers from over 100 countries, and there was also a diverse entertainment programme featuring Bollywood dancing, flamenco, singing and drumming.

The over 2,350 international students mainly come from China, India, Syria, Iran, Nigeria, Turkey, Russia, Morocco and Poland. Some of their most popular degree courses include Environmental and Resource Management, Architecture, World Heritage Studies, Power Engineering, Business Administration and Media Technology. The event was financed through the »DAAD STIBET I« programme with funds from the Federal Foreign Office (AA).

International Relations Office **MAREIKE KUNZE**



Welcome Reception for DAAD scholarship holders at the Information, Communication and Media Centre (IKMZ)

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IN A DIFFERENT COUNTRY AND YET LIKE HOME

The study of biotechnology at the BTU is characterised by its internationality, among other things. Doctoral students take advantage of the opportunity to research with Prof. Vladimir Mirsky according to the latest scientific findings

Arwa Laroussi from Tunisia is developing optical-electrochemical biosensors for the detection of (bio)molecules. The doctoral student is simultaneously enrolled at the BTU Cottbus-Senftenberg and the University of Tunis and is doing her doctorate under a so-called cotutelle agreement, which requires attendance at both universities. Since 2016 she has been commuting between Tunis and Senftenberg. Initially, the master's graduate in Analytical Chemistry worked very successfully in a joint research project by Prof. Vladimir Mirsky at the BTU and Prof. Noureddine Raouafi at the University of Tunis on the development of bioanalytical sensors. This success was to be continued, and so, with the support of the International Relations Office at BTU, both professors applied for a German-Tunisian doctorate, which is to be completed in 2020.

The problem of financing their studies was also solved - with a small scholarship from the University of Tunis, a bridge scholarship from the Equal Opportunities Officer and DAAD funding from BTU's Graduate School as a research assistant for the acquisition of teaching skills. In her final qualification phase, she will be employed as a doctoral student in the Department of Nanobiotechnology.

»It was very difficult at the beginning,« recalls Arwa Laroussi. »It was the first time I left home. But I was very well received here and made many friends. In the meantime I feel almost at home at the BTU and in Senftenberg. There are very good study conditions, excellent supervision and ultra-modern laboratories. I particularly like the fact that I meet a lot of students from all over the world and that we do sports together, for example«.

Julia Efremenko from Kaliningrad has taken a completely different path so far. Although she has only been a doctoral student at the BTU in the field of Nanobiotechnology since October 2018, she has known Senftenberg for a couple years. On the basis of university cooperation and the DAAD's Eastern Partnerships programme, she has already worked several times since 2012 at the former Lausitz University of Applied Sciences and then at BTU Cottbus-Senftenberg. Research visits have repeatedly led the graduate Food Biotechnology graduate from the Uni-



 Doctoral students Julia Efremenko (left) from Kaliningrad and Arwa Laroussi from Tunis feel well looked after in the nanobiotechnology research group in Senftenberg

versity of Kaliningrad to the nanobiotechnology working group. This resulted in two publications in specialist journals on the development of a new concept of electrochemical sensor technology and its application for determining the freshness of fish. This convinced Professor Mirsky of her abilities and he suggested that she do her doctorate at the BTU. Julia Efremenko is now employed as a research assistant in a qualification position in the Department of Nanobiotechnology. As part of her doctorate, she is working on the development of electrochemical sensors based on electrically conductive polymers with chemosensitive properties.

»I have found the opportunity to do my doctorate at the BTU to be a very good opportunity for my personal development,« said the doctoral student, adding that »I really like the fact that I can work here in such a pleasant atmosphere and under such comfortable conditions.« Coming from Kaliningrad, the former Königsberg with its strong German influence, it wasn`t difficult for Julia Efremenko to settle in Germany. »I feel at home,« she says, »and Senftenberg reminds me very much of Kaliningrad«.

Department of Nanobiotechnology PROF. DR. VLADIMIR MIRSKY DR. KARIN CLAY TONDER

INTERNATIONAL SOCIAL WORK

The DAAD will invest around EUR 740,000 in the structured internationalisation of our study programme in Social Work by 2023

The German Academic Exchange Service (DAAD) has launched a new funding programme, »HAW.International«, with the aim of preparing students in practical courses for the globalised labour market of the future. The BTU has emerged as one of 14 German universities to submit a successful project proposal with a new concept for its study programme in Social Work. Mareike Kunze, Head of the International Relations Office (IRO) at the BTU, explains the idea behind the project proposal: »Following the example of our study programme in Social Work, our aim is to implement measures that focus on degrees at universities of applied sciences with practical teaching concepts in the context of internationalisation. These model measures will also generate a crucial spillover effect to further ensure the structured internationalisation of universities of applied sciences«.

The following objectives are being pursued as part of the project referred to as »HAW.International@BTU – A Teaching and Research Network in the East«:

- The enhancement and development of bi-national study programmes in Social Work to increase the number of incoming students from Ro mania and Poland;
- The increased feedback of existing bi-national courses into the regular programme in Social Work to increase the internationalisation of teaching throughout the bachelor's course;
- The expansion of the study programme network by forging new partnerships with Kraków in Poland and Cluj in Romania: Both universities will take part in a professor and student exchange programme for a double degree, creating more favourable options for prospective students;
- The establishment of an online platform for the German-Polish-Romanian network
- The greater integration of practice facilities in Germany, Romania and Poland during the practical stages of the degree and the establishment of theoretical and practical projects to be investigated in final papers (networking of practice facilities, conference with all universities involved, exchange of specialists);
- The development of joint research projects (also involving doctoral candidates).

In addition to the International Relations Office, the project is being run by Dr. Kay Mengel (coordinator of the German-Polish study programme)



 Representatives from the City of Timisoara, the City of Cottbus, the BTU and the West University of Timisoara (Photo: Ulrich Paetzold)

and Donita Grosu (coordinator of the German-Romanian study programme). The project is directed by Prof. Dr. Ulrich Paetzold. Thanks to the funding, more human resources can be added to ensure the development of the study programme content. The target regions of the cooperation are Poland and Romania. The existing partnerships with the Gorzów Academy (since 2001) and the West University of Timisoara (since 2009) will be further consolidated. Furthermore, the bachelor's courses conceived as double degrees (German-Polish and German-Romanian) in Social Work will be consolidated with ten new study places every year.

Targeted measures will be used to advertise the new study options to incoming students. The courses may be promoted, for example, by awarding scholarships within the DAAD programme, offering additional intensive German language courses and providing short-term lectureship positions and study trips. The establishment and development of further partnerships

is also planned in Poland and Romania, where memoranda of understanding have been established with the Pontifical University in Kraków and the University of Cluj. Current issues in social work will ideally be covered at tri-national conferences with the involvement of experts from the field. This funding project underlines the current internationalisation strategy of the BTU Cottbus-Senftenberg, which sees itself as the »Academic Gate to the East«.

Chair of Psychology **PROF. DR. PHIL. ULRICH PAETZOLD** International Relations Office **MAREIKE KUNZE**

RETURNING FROM BAKU FOR STUDIES IN COTTBUS

Four mechanical engineering students have chosen to do a master programme at the BTU after an Erasmus exchange semester. The students live by the Caspian Sea and completed their bachelor degrees at the TU Azerbaijan in Baku

At the end of July 2019, the students first returned to their homes in Azerbaijan. However, two months later, they – Dashqin Turabov, Samir Amirli, Hasan Alizada and Rovshan Hasanov – were back at the BTU to complete their master in mechanical engineering. During the exchange semester, the four young bachelor students were able to experience studies at the BTU first hand. In response to the question of what influenced their decision, Dashqin answers spontaneously and the others nod in agreement: »The good facilities and the opportunity to work practically on systems, in workshops and laboratories. This is particularly interesting for us and not possible in this way at the university in our country.« Degree programme co-ordinator Prof. Sylvio Simon explains the difference to the German academic system: »The reference to research as we are familiar with from our universities does not exist at the universities in Azerbaijan. The focus is on a high level of teaching but the research is reserved for the academies.«

Prof. Simon understands the motives and adds: »The four students were, for example, able to gain practical experience in water jet cutting and conduct ultrasound examinations on plastics – the latter even as part of an industrial project.« Here, students are able to conduct application orientated research on how processes can be transferred onto plastics which are known for metal processing. And at the BTU, students are often involved in such projects. »This allows them to learn by researching and to apply and strengthen their theoretical knowledge practically«, adds the programme co-ordinator. Why did they choose the BTU? Sa-



The students and department staff together with Prof. Sylvio Simon (back left) and the initiator of the cooperation with Azerbaijan Prof. Peter (front right) at the farewell gettogether in a Cottbus restaurant (Photo: Prof. Sylvio Simon) mir answers: »We got to know the BTU students Waldemar Mack and Alexej Andruschin at the TU Baku and the idea to study here came from this contact.« Both the BTU mechanical engineering students were in Baku at the time as part of an Erasmus programme, Waldemar Mack in the winter semester 2017/2018 and Alexej Andruschin one year later, in 2018/2019.

All four Azerbaijanis love Germany and prepared for their time here with German courses. They enjoy being here and have plenty of contact with other students. The four students have already been admitted to the master studies which means nothing now stands in the way of the start of their studies in the winter semester. The students think that Erasmus+ is a good programme and, with financial support and a one-off travel cost reimbursement, they also manage well financially. They pay 205 euros for a room in a student hall of residence and the study fees also include the semester ticket which allows them to be very flexible, explain Samir and Dashqin satisfied. Prof. Simon adds, »Via the programme, students can spend up to 12 months per degree in Germany – for the bachelor, master and PhD. It's great!«

The cooperation between the BTU and the TU Azerbaijan in the Erasmus+ programme was launched in 2017, although the two universities have already been cooperating for seven years now. Prof. Simon describes this as excellent. Everyone understands each other very well, as the partners usually speak German - in the academic world this is quite common, as many lecturers have learnt the language from the DAAD programme. In this way, the partners are currently also working on a German-speaking master programme in mechanical engineering which will be launched in three years. A network has also been created between Azerbaijan, Poland, the Czech Republic and Germany in the field of mechanical engineering with a focus on energy technologies. For his work in this, Sylvio Simon received the honorary doctorate title of the TU Baku in June 2019. With this, he belongs to a group of only 15 academics who hold this award in the university's 70-year history (see also page 49).

Department of Tool Making Machines **PROF. DR.-ING. SYLVIO SIMON**

MY LIFE-CHANGING EXPERIENCE

Australian alumna Gabrielle Harrington has many good memories of her studies in Cottbus and Melbourne

»Through meeting so many students from all over the world with a passion for heritage, I have made lifelong friends and began to understand just how complex heritage is«, says Australian alumna Gabrielle Harrington. She still has many good memories of her enjoyable time spent studying at Cottbus. After her bachelor's degree at the University of Sydney, Gabrielle went to Deakin University in Melbourne to do a masters, where she chose the dual degree programme World Heritage Studies/Cultural Heritage in Melbourne and Cottbus.

She is, meanwhile, working in the Sydney Living Museum as Curriculum Program Deliverer and in the museums of the University of Sydney as Education Officer. Gabrielle highly recommends the dual degree programme, »My time at both the BTU and Deakin University as part of the dual degree programme was the most incredible and life changing experience. I chose to pursue this programme because I am passionate about world heritage and saw the potential for this programme to put me ahead of others in gaining a career in heritage.«

The BTU Cottbus-Senftenberg and the Australian Deakin University are renowned worldwide for their research and teaching in the field of heritage studies. The BTU was, for example, able to convince the UNESCO to establish a UNESCO Chair in Heritage Studies in Cottbus already in 2003 thanks to its unique cultural heritage research. The Cottbus Chair in Interculturalism headed by Professor Dr. Anna Amelina currently holds the title of UNESCO Chair in Heritage Studies. The close, long-standing cooperation between both universities has led to, amongst other things, the joint master's programme with a dual degree in World Heritage Studies and Cultural Heritage. Students complete their studies with semesters spent in in both countries. »The programme, which is in English, focuses on European viewpoints of cultural heritage at the BTU and Asian-Pacific viewpoints at Deakin University«, says Degree Programme Coordinator Prof. Dr. Ing. Michael Schmidt. »World heritage students need to register for the programme separately before the start of studies and only the best applications are accepted. The BTU awards only ten places for the dual degree annually. The selection process also guarantees a high quality in teaching and of the seminars in which the students learn a great deal from one another.«

The international degree programme was launched in 2016 and it was recently time to review the experiences of the first generation of international alumni who met in Cottbus in October 2018, under the title »Career Perspectives in the Heritage Field«, to discusses their different professional experiences. Alumni from Australia, Germany, England, India and Mexico discussed their occupational experiences and gave tips



In the World Heritage Studies/Cultural Heritage course, Gabrielle Harrington (6th from right) discovered her passion for cultural heritage and made friends for life. The photo was taken on a boat trip in Berlin during the alumni meeting (Photo: Mohammad Abu Al Hasan)

for their countries, which was of great interest not only for the alumni but also the current students who were in the audience. An alumni website has also been launched which presents subject-related exchange as well as interesting alumni stories to strengthen the alumni network: https://dualdegree-heritage.com. The alumni meeting ended with a visit to Berlin and showed, above all, that studying together can also create a lifelong, close association – also extending beyond continents.

Dual Degree Master's Programme World Heritage Studies/ Cultural Heritage

PROF. DR. DR. H.C. (NMU, UA) MICHAEL SCHMIDT Alumni Office DANIEL EBERT



Daniel Edward Huck (middle) was presented with the \rightarrow DAAD Award at the enrolment ceremony

»LOTS OF PEOPLE WANT TO MAKE THE WORLD A LITTLE BETTER HERE«

The winner of the DAAD Award, Daniel Edward Huck, talks about his social commitment, his time at the BTU and his plans for the future

Many people describe their studies as the nicest time of their lives. Impressive memories are created by their thirst for knowledge, freedom and adventure. Every year at the BTU Cottbus-Senftenberg, first-semester students attend an enrolment ceremony before starting a new chapter of their lives, and a prize is awarded to an international student who is already in the middle or even at the end of this exciting adventure. The aim of this award is to increase the visibility of the many foreign students enrolled at German universities and to draw attention to their incredible stories. This year's DAAD Award – and EUR 1,000 in prize money – was presented to Daniel Edward Huck from the United States of America. »This award means a lot to me. It represents the trust bestowed upon me by the German Academic Exchange Service (DAAD), the BTU and my colleagues. At the same time, it is truly humbling to see so many students here in Cottbus who work hard every day to make the world a little better.«

Daniel Huck has just completed a master's degree in Power Engineering, where he was one of the best international students in his year. He has also stood out for his outstanding commitment as a language tutor and his tireless support for events aimed at international students. He has particularly fond memories of the »Potluck Dinners« that he organised. »The idea behind these social dinner events was for everyone to bring something from their home country. It was always nice to see so many international students come together and share part of their culture. Each meal was labelled with a card displaying the name of the dish and its country of origin. I've kept all the cards.«



In addition, his social commitment is especially reflected by his aid work for refugees. »I travelled to Serbia with a few friends to distribute food, shoes and basic hygiene products. It was very cold and wet on the Bulgarian border, so many refugees were in desperate need of warm and dry clothing – we were their first port of call. At the start of our time there, we had no idea how hard our job would be or how dangerous the journey taken by the refugees was and still is. Their faces were heartbreaking. In Serbia, I saw what it means to fight for your life. I sincerely hope our work has made a difference.«

The mechanical engineer came to Cottbus in the 2016/17 winter semester. He had previously worked at a power plant in Arkansas, USA, where he had to deal with an increasing number of problems caused by the current energy infrastructure and climate change. This is how he developed a burning desire to take up studies in the field of renewable energy. He believes the Power Engineering programme at the BTU is mainly characterised by its scope, depth and practical orientation. He feels happy in Cottbus and at the university: »The BTU brings together people from all four corners of the globe, which is really valuable. And students here have the opportunity to make an active contribution to structural change.« Daniel Huck would also like to help shape the future after completing his studies – he has already accepted a job in Hamburg, where he will develop and implement thermal energy storage at Siemens Gamesa Renewable Energy.

EXPLORE THE WORLD -DISCOVER YOURSELF

Hundreds of students at the BTU Cottbus-Senftenberg have already taken their first steps into the big, wide world through Erasmus+ or PROMOS. Their impressions are now shown in an inspiring photo exhibition

The view from the tent into the great expanse of the Negev Desert in Israel seems almost unreal. Esteban Javier Menares Barraza, who is currently completing a master's degree in Environmental and Resource Management (ERM), spent two semesters at the Ben-Gurion University of the Negev in the middle of the Israeli desert. During his stay in Israel, he not only enriched his specialist knowledge during study projects; he also came into contact with Israeli landscapes and culture. A semester abroad allows students to immerse themselves in new cultures and gain insights into new academic perspectives. It is ultimately an important step in the personal development of young adults.

Around 88% of BTU students who have completed one or more semesters abroad state that they can now work better with people from different cultures. They also find it easier to adapt and cope with new situations. An impressive 100% say they now know themselves better than before and are in a much better position to assess their own strengths and weaknesses. 87.5% believe they have broadened their specialist knowledge. These results are based on an assessment of the Mobility Tool survey completed by Erasmus+ participants immediately after their stay abroad. Given the numerous advantages of stays abroad, they are funded by institutions like the German Academic Exchange Service (DAAD). Every two years, the DAAD publishes a study in which explicit reference is made to the importance of study-related stays abroad for integration in the national and international labour market. The study encourages students to make use of this valuable opportunity. That's why various funding programmes such as Erasmus+ and PROMOS have been set up to give students with financial difficulties the chance to realise their dream of studying abroad.

Since the beginning of November, Esteban's picture has been displayed as part of the »Explore the World – Discover Yourself!« photo exhibition in the cafeteria on the Main Campus at the BTU. The 20 different and very personal impressions of former exchange students might just inspire others to follow in their footsteps and take a closer look at the world's incredible diversity during their studies. The exhibition shows a special selection of completely different perspectives, including countries like Finland, South Africa and Taiwan. The International Relations Office (IRO) helps students choose a partner university and answers questions on the organisation of their stay abroad, on their funding options and on their intercultural preparation. It really pays off to broaden your horizons – find out more about these opportunities. And now is the perfect time, because the IRO at the BTU is launching its next round of applications for exchange places for the 2020/21 academic year. The application deadline is 1 February 2020.



 One of the motifs used in the exhibition, showing the view from a tent during a student's stay in the Negev Desert, Israel (Photo: Esteban)

International Relations Office **MICHAEL MANNEL**

BEST MINT STUDENT AND OTHER OUTSTANDING ACHIEVEMENTS

BEST MINT STUDENT

Anna Populoh, Masters in mechanical engineering

Anna Populoh excels with excellent study achievements and voluntary social commitment. As a student, she is a role model for her fellow students who, in her work with renowned companies such as Porsche, Bugatti and Class, proves that she knows how to assert herself in a male dominated work environment. As one of the few females on the mechanical engineering course, Anna Populoh has always excelled with above average work. As part of her master's thesis, she spent two months teaching in a school in Uganda where she assisted an orphanage. During her semester abroad at the Namibian University of Science and Technology (NUST), she helped children, after her day at the university, with their homework as part of a social project. In the summer, she and the Gütersloh sports association also organise an annual two-week holiday camp for young people from disadvantaged backgrounds in the Netherlands. Since May 2011, Anna Populoh has been a member of an Amnesty International young people's group. She is also actively involved in the German-French friendship circle Beelen/Villers-Ecalles.

Since 2016, the MINT prize has been honouring, as part of measures promoting equality, outstanding and committed master' students studying mathematics, computer science, natural sciences and technology.



THE SOROPTIMIST INTERNATIONAL CLUB AWARD

Miriam Oeter, Masters in renewable raw materials and energies Miriam Oeter has organised music and culinary evenings as get-togethers for international doctoral candidates. She informs and advises new PhD students and, in doing so, makes their first few months in Cottbus easier. Since 2015, she has been voluntarily working for IAESTE e.V. in Cottbus and, since 2017, for the BTU Buddy Programme of the International Relations Office. She also helps refugees with visits to the doctors or the authorities by acting as a translator. From an early stage, she already started working, amongst other things, in a women's refuge, monastery and girls' home during her travels in Cameroon and Latin America. »Soroptimist International« (SI) is the world's biggest service organisation for professional women. With the award, the Cottbus SI Club honours students' social, intercultural and ethical commitment.

OUTSTANDING ACHIEVEMENT IN UNIVERSITY SPORTS

Sarah Kruber, Masters in environmental engineering Brandenburg state karate champion and second in the German university sports championships as well as international success

Hans Krüger, Bachelors in land use and water management Brandenburg state boxing champion (B class) and second in the German university boxing championships (B class)

Anna Populoh also excelled with above average work in her mechanical engineering studies with Prof. Dr.-Ing. Holger Seidlitz

»ENCOUNTERS IN WHICH FRIEND-SHIPS ARE FORMED«

The interdisciplinary student team of BTU's Senftenberg Campus returned from the world's biggest energy efficiency contest in London proud of its results

At the Shell Eco Marathon Europe 2019, the students not only achieved the hoped-for qualifying run with their energy-saving car but also jumped to seventh place. With their self-built hydrogen powered »Lupus«, the team of the applied courses mechanical engineering, electrical engineering, business administration engineering and biotechnology faced stiff international competition in London's Mercedes Benz-World from 2 to 5 July. A total of 160 teams including twelve from Germany were represented with their vehicles in the friendly contest. In the contest which is held annually, participants have to cover a certain distance in a self-built vehicle using as little fuel as possible.

At a meeting with the Lusatian Dynamics team in Senftenberg, BTU President Prof. Dr. Christiane Hipp praised the commitment of the students and presented them with a certificate honouring this. »I would particularly like to thank you for always exploring the opportunities of modern technologies«, she emphasised.

For its participation in the Shell Eco Marathon, meanwhile already for the eleventh time, the team had almost totally repositioned itself and entered in the particularly challenging Urban Concept category. This includes vehicles which are also suited for road transport. With their excellent performance, the students and their new team manager Samantha-Josephine Schneider from the dual study programme engineering economics, achieved not only their goal but exceeded all expectations.

»The students, particularly Ramón Roy as the only electrical engineer, gave it their all in London«, reported Christin Faulstich, representative in the Institute of Mechanical Engineering and Management. The team organiser particularly highlighted »the wonderful cooperation with the other teams at the Shell Eco Marathon«. Prof. Dr. Peter Biegel, the initiator and long-standing mentor of the project, also took a break from his retirement and travelled to London to support the students. After the second qualifying run, which ended early, the vehicle was optimised, after which it was the third run, which brought the much hoped-for success. »I was extremely happy after the run and the immense pressure which had been on me disappeared as I knew that the work of the past three years had been worth it«, said Niklas Richter, one of two drivers of the »Lupus« and mechanical engineering student. »To get out of the car and see the happy faces of my team members after the run makes me unbelievably proud of what we have achieved together.«

The interdisciplinary and international team Lausitz Dynamics thanks all its 30 supporters who made the pioneering project and the practical training associated with this possible. »Hereby, I would particularly like to mention SpreeGas, GMB, GASAG and the Stadtwerke Forst«, highlighted Christin Faulstich.

The students intend to take part in the international contest also in 2020, but until then they have a great deal of interesting development work ahead of them. A special challenge is to make fuel cells even more effective. Interested students are welcome to join the team and supporters are equally welcome!

Team Lausitz Dynamics CHRISTIN FAULSTICH, M. ENG.

The students and their energy-saving vehicle »Lupus« in the paddock at the Shell Eco Marathon 2019 in London: (from left to right) Alexander Leschke, Samantha-Josephine Schneider, Ramón Roy, Markus Riedel, Niklas Richter, »Lupus«, Pascal Fritzsche, René Junge, Peter Laube, Christin Faulstich (Photo: Team Lausitz Dynamics)

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STUDENTS SHAPE LIFE IN THE UNIVERSITY AND CITY

Hand-made or presented by bands: music, song, dance and many colourful ideas are all part of campus life

Students as well as many Cottbus residents look forward to the concerts which are held at the BTU in the summer. The great interest speaks for itself – whether for the two-day student summer festival or the »Laut gegen Nazis« (against right wing extremism) event. There is a relaxed atmosphere and plenty of student style and the later the evening gets, the fuller the forum and the more crowded the area in front of the stage. The intercultural Festival Cottbus Open, which is a regular fixture of the Cottbus town festival, is also very popular. At this festival, international students present a varied programme and culinary delicacies from the whole world in the park by the city wall. Everyone who is tolerant of others and has an open attitude to the world is welcome!



∧ Students prepare dishes from their home countries for the residents of Cottbus



 Opening of the CSD weeks (Cottbus Pride) for Cottbus and the Niederlausitz at the BTU



It's still early and the first dancers venture into the area in front of the stage at the summer festival



 Chilling-out with music and conversation: the student festival offers something for everyone



∧ A great mood prevails in front of the stage in the Puschkinpark

DIVERSE AND OPEN FOR ALL

In 2019, the initiators of the »Cottbus ist bunt« alliance won the Steh-auf prize for their idea and joint initiative

The new public bus was already festively inaugurated under the motto »Cottbus ist bunt« (Cottbus is colourful) in May 2019. The event was attended by many alliance partners including representatives of the LEAG, FC Energie Cottbus, the Carl-Thiem Clinic as well as the state theatre and the city of Cottbus. The »Cottbus ist bunt« alliance was launched two years ago by the BTU president at the time Prof. Dr. Ing. Jörg Steinbach and FC Energie trainer Pele Wollitz, who wanted to show that Cottbus is a great, colourful city: varied and open for all, irrespective of origin or religion. In autumn 2018, the alliance agreed on a declaration for a respectful cooperation amongst the people of Cottbus and this, meanwhile, has 45,000 supporters and 893 signatures. The Cottbus declaration remains open for signing by further supporters.

Under the motto »Cottbus ist bunt«, the alliance, which also includes Cottbuser Aufbruch, has already organised two football matches between the international students at the BTU and a selection of fans as well as a young people's team of FC Energie. In March, the initiative then also took part in the Cottbus carnival. The striking »Cottbus ist bunt« logo can be seen in the form of banners and flags at many of the city's institutions for example the town hall, the CTK, the main LEAG building, on the university campus and in the Stadion der Freundschaft.



∧ The presentation of the Steh-auf prize in Potsdam

Steh-auf-Preis

On 29 August 2019, the F.C. Flick Foundation awarded the »Stehauf-Preis für Toleranz und Vielfalt« (Stand up for tolerance and diversity prize) which comes with prize money of 10,000 euros. Many alliance partners attended the prize presentation ceremony in the state chancellery. The money will be used to organise and hold further campaigns and initiatives in the coming months.

www.cottbus-ist-bunt.de



Representatives of the institutions participating in > »Cottbus ist bunt«

AT HOME ON THE STAGE THAT SIGNIFIES THE WORLD

BTU students presented their debut on the Kammerbühne stage of the Cottbus State Theatre in front of an enraptured audience – we spoke to singer Lara Kobela

»What pleased us most was that our first concert for the state theatre was completely sold out«, says Lara Kobela cheerfully. However, the journey here presented the instrumental and vocal performance and teaching student with numerous challenges. »Think of music which particularly moves you and which you would like to share with others« – this was the assignment given by Prof. Dr. Katharina Bradler in the concert pedagogy/music seminar. The head of music pedagogy and her research associate Annemarie Michel initiated the cooperation with the state theatre. After this, it was up to the young musicians ...

First, the students had to find a suitable title for the concert and then they had to compile advertising materials and arrange the programme. This was how »imPuls – students in concert« came into being. Hereby »imPuls« not only refers to the beat of the music but also music as a driving force and as something which triggers emotions, ideas and memories – a reason to examine a composition more closely, take another perspective of it and overcome any prejudices.



At the end of January 2019, the time had come and the students invited their audience to the Kammerbühne stage to go on an undreamt-of musical journey. In a varied programme, the 13 students from Germany, China, Russia and the Ukraine took listeners through several epochs of musical history from traditional and classical to jazz. The special appeal of this lay in the contrasting melodies, the surprising turns and, not least, the cultural diversity. Guests enjoyed, amongst other things, »classical« compositions by composers such as Fürstenau, Rossini, Beethoven, Chopin and Lehár as well as pieces by Argentinean tango legend Piazzolla, Japanese crossover musician Takemitsu and American jazz bassist Mc-Bride.

»This crossover concert was a debut for our study programme. It was for all of us particularly special, exciting and also challenging to perform on the Kammerbühne. And, as the feedback was so positive, we have laid the foundation for further concerts of this kind«, says Lara Kobela.

The singer with the high-pitched, bell-like voice has music in her blood. Her grandfather was a Sorbian composer and her uncle is a musician and actor. Her grandmother used to take her to classical concerts and theatre when she was young. Sometimes she was even allowed to go behind the scenes and see the singers off stage, in private, which really fascinated her. Then, when her mother registered her for singing lessons when she was eleven years-old, it was no longer possible to imagine her life without music. In instrumental and vocal performance and teaching, Lara Kobela found her ideal course. »I knew I would have a musical profession already early on but I also wanted a certain degree of financial security. I therefore didn't at first think of establishing myself as a singer and taking the solely artistic route. My grandparents then recommended this course, which combines both elements: you get the financial security from the teaching training and also have the chance to develop artistically through the individual teaching and concert practice.«

Department of Music Pedagogy PROF. DR PHIL. KATHARINA BRADLER ANNEMARIE MICHEL

Students involved were Anastasiya Kadatska, Xi Wang, Dominik Schwetlick, Julia Henke, Haiqi Lan, Philipp Wende, Ran Yang, Richard Schönfelder, Laura Adler, Ivan Pilchen, Zhuwen Zhang and Chia-Chi Chiang, Lara Kobela (from top left to bottom right)

DANCE FEVER -THE BTU BALL 2019 IN PICTURES

In January, BTU students and employees glided across the floor in their smartest outfits there where they usually dine

When men and women can be seen walking through the streets of Cottbus on a cold winter's evening dressed in their smartest clothes, they are almost certainly heading to the BTU ball. At the start of 2019, it was again that time of year when students, employees, friends and partners of the university spent a wonderful evening with plenty of music, dancing and good cheer. Word has gotten around that the motto »We'll dance through the night« keeps its promise and the celebrations continued until the early hours. The BTU Cottbus-Senftenberg ball is traditionally associated with a great festive start to the new year, to which all who would like to join in the celebrations are invited. For this occasion, the university canteen on the Cottbus main campus transformed into a festive ballroom with musical entertainent provided by the band »Toni Gutewort and his Dance Orchestra« from Potsdam. With swing and soul music, rock 'n' roll as well as standard pieces, there was plenty of opportunity to take to the floor with something for everyone. The great musical mix is so well received by the mixed audience that the band, which includes past and present students of the university, is invited back to perform each year. Alongside the traditional opening dances there was, of course, also the late-night firework display which was met with much admiration. Cult DJ Philipp Gärtner from Cottbus also performed for the first time.









Students from the whole world, as seen here on the Senftenberg Cam- > pus, illustrate the international atmosphere at the BTU



BTU NUMBER ONE IN LECTURER MOBILITY

A DAAD study on the internationality of universities confirms the BTU Cottbus-Senftenberg's cosmopolitan profile

In a nationwide comparison, the BTU Cottbus-Senftenberg is able to assert its position as an international university. This was revealed by the »Internationality of universities« study which was conducted by the German Academic Exchange Service (DAAD), the German Rectors' Conference (HRK) and the Alexander von Humboldt Foundation.

The BTU is amongst the best German technical universities with regard to the mobility of lecturers as it came top in the number of Erasmus guest lecturers. In 2016, 16.5% of the BTU's lecturers, for whom teaching is their main profession, completed an Erasmus-funded teaching stay abroad while 19.5% came to the university as Erasmus guest lecturers. »We are very pleased with the study findings which show that we have done exceptionally well in recent years. Alongside our cross-border international cooperation, we will also continue to strengthen our profile in the future, for example in recruiting the world's best talents in research and academic affairs,« said Prof. Dr Christiane Hipp, President of the BTU.

The study confirms the high degree of internationality of studies offered at the BTU: the university came second in the »International undergraduate courses« and »Students and graduates with a foreign nationality« categories. The international courses are in seventh place nationwide overall. The university also came second in the percentage of EU-third party funding as well as DAAD financing per student. The BTU is amongst the top ten universities in, amongst other things, the number of scientific and artistic staff of foreign nationality (sixth place) and came tenth when it came to international cooperation and professors.

The collection of data on the internationality of German universities is a joint project of the DADD, HRK and the Alexander von Humboldt Foundation with the Society of Empirical Studies. In 2018, the study was conducted for the ninth time.

International Relations Office **MAREIKE KUNZE**

THE BTU REPRESENTS AN OPENNESS TO OTHERS AND TOLERANCE

The senate and executive committee have released a joint statement for democracy and human rights

Universities live off plurality of opinion which is established on a fact-based foundation. The discourse and pursuit of insights brings with it a culture which promotes and is open to debate. At the same time, the pursuit of new insights is orientated around methods and values which are associated with a humanistic defined view of the world and of humanity. This is closely related to a belief in the equality of all people in our society. Accordingly, the BTU is orientated, similar to other universities, to democracy and human rights. The essence of universities also involves, from this approach, being open to all that is new and focusing on what is beyond borders and circumstances.

As a new university which feels closely associated to the local region, we are committed to an openness to others and tolerance. Against the background of numerous discussions which are currently happening in many places, the university administration and the BTU Cottbus–Senf-tenberg senate have decided upon this public positioning. We view diversity and plurality as an opportunity for our social development: in contact with people who are often perceived as being »different« or »alien«, yet aren't necessarily so if one looks more closely, there is also an opportunity for opening up new realms of experience and development potential. Historic research has shown that societies benefit from immigration in many respects. We invite all who are open to others, as friends of this university, to work with us to respectfully meet diversity and variety and to carry the acceptancy of this diversity even more strongly into our society.

A firmly agreed goal and important asset of the BTU is that members of the university are able to develop freely in their individuality irrespective of their ethnic origin, gender, religion, ideology, age, disability or sexual identity. This stance can be viewed against the background of a system of values orientated around human rights as well as more pragmatic, demographic or economic signs. We want to continue to promote a welcoming climate in Cottbus and the Lusatian region for all those who are new here or who are temporarily living here as well as anyone who has just moved here permanently. For the future of the region, which is experiencing a structural change, this is an important prerequisite in attracting qualified people who also wish to stay here in the long term.

By signing the charter of diversity, the university highlighted its commitment to fairness and appreciation to its students and all employees already in 2011. Through a respectful interaction with one another and the long-term establishment of equal opportunities with comprehensive advice and support on all levels, it has a responsibility to an appreciative work and study environment which is free from any prejudices. In this way, the potential of each individual, with their diverse skills, backgrounds and life situations, is an asset for our university.

The BTU stands for a peaceful cooperation which is equal to all. This is, for example, shown in our »Cottbus is Colourful« initiative, which was originally launched by the BTU and FC Energie Cottbus and, meanwhile, incorporates an extensive alliance: the city of Cottbus, the city's marketing department, the Cottbus State Theatre, the Brandenburg State Museum, LEAG, Carl-Thiem clinic, Federal Association of Small and Midsized Enterprises BMWV, »Cottbuser Aufbruch« and the Cottbus Declaration« as they support democracy and a respectful cooperation for all citizens. This declaration can still be signed by anyone. Last but not least, critical thinking in science also signifies a self-reflective view of one's own actions: alongside institutionally established contact points, various work groups have also formed at our university in which those affected can get support and preventative approaches can be developed on an individual as well as university level.

www.b-tu.de/universitaet



∧ The Cottbus-is-Colourful bus on the BTU Forum on the central campus

ECONOMY & KNOWLEDGE TRANSFER

FIRST PITCHING EXHIBITION HOSTED BY THE START-UP SERVICE

Students, staff and alumni at the BTU had three minutes to present their innovative ideas to an interested audience

The aim of the first pitching exhibition hosted by the Founders' Service at the BTU Cottbus–Senftenberg on 7 November 2019 was to encourage more people to unlock their entrepreneurial potential. Students, staff and alumni at the BTU had the opportunity to present their ideas to a select audience from the fields of science, politics and business as part of a speed-pitching contest. All pitches were judged by a jury, which included Dr. Nora Baum (Pattarina GmbH) and Benjamin Andriske (Niederlausitz Aktuell), who have also founded companies based on their own creative ideas. The other two members of the jury were Prof. Dr. Torsten Kunze (Gebäudewirtschaft Cottbus GmbH) and Dr. Denny Thimm (BTU Cottbus–Senftenberg).

The winning pitch was held by Yannic Adler and his team, who presented a glove-shaped cordless screwdriver with impressive functions and an innovative design. The joy surrounding the first prize is immense, and an application has already been submitted for the EXIST start-up grant. »Our invention makes it easier to work with small, delicate and awkwardly positioned screws. Our intuitively designed device is also lighter than a conventional cordless screwdriver. I've always been fascinated by the idea of conveniently tightening and loosening screws with the bit on your finger – and I've stuck at it. I've already had my development patented«, says doctoral candidate Yannic Adler.





 Members of the jury and the three winning teams at the inaugural pitching exhibition

Second place was claimed by BTU doctoral candidate Victoria Arnold, who also won the special GWC Award. Her pitch was about intelligently detecting harmful substances in building structures with an app for smartphones and tablets. Victoria Arnold explained the idea behind her project: »Asbestos is still lurking in many houses. It only becomes dangerous during demolition or rebuilding work. I'm working on the development of a device that can quickly detect asbestos on building sites to ensure its proper and immediate disposal.«

Third place went to BTU student Lukas Schuck, who has developed a winter usage concept for balconies.

Following the pitches and award ceremony, the guests had the chance to check out some of the exhibition stands featuring start-ups from the BTU, such as:

- \cdot Cheeezebude GbR a specially designed photo booth
- edröm GmbH a mobile power generator for the eco-friendly and quiet generation of electricity
- Integrated Smart Charging Revolution concepts for the integration
 of electric vehicle battery capacities in the electricity grid
- · kouk Kowald & Kummer GbR textile printing ideas

»The key objective of the BTU Start-Up Service is to make the general public aware of the start-up ideas currently emerging from our university and to attract new investors. The pitching exhibition was a huge success and will be held again next year at the Regional Cottbus Start-Up Centre on Campus (RCGC)«, states Stefanie Schiemenz from the Start-Up Service at the BTU.

Start-Up Service at the BTU Cottbus-Senftenberg **STEFANIE SCHIEMENZ**

< The interested audience eagerly await the speed-pitching contest</p>

SCIENCE AND A REVOLUTION

BTU graduate Ricardo Remus is developing an innovative method for concrete production and in 2018 won the main prize of the Lusatia Start-up (LEX) Award with his new company

Grey, solid and sturdy: concrete is one of the most commonly used building materials on the planet yet CO2 is emitted during its production. There is, however, a revolution in sight. Ricardo Remus, winner of the concrete canoe regatta, discovered his passion for this material during his applied civil engineering bachelor degree in Cottbus. He went on to do a master in building research and building materials sciences at the Potsdam University of Applied Sciences and the University of Weimar. Since then, he has been working with one subject in particular. »I wanted to find an energy-saving pioneering way to speed up the hardening of concrete. I achieved highly promising results during my doctoral studies at the University of Weimar. The clear potential of ultrasoundassisted concrete production really made me want to establish my own company«, said Ricardo Remus.

With the suitable premises, funding and a connection to the university as well an agreeable personal environment, he found the right conditions for this in Cottbus. He founded the company

Sonocrete with the support of the Future Lusatia Start-up Centre. »Sono stands for sonochemistry, which involves the influence of ultrasound on chemical reactions«, explains Ricardo, who was born in Thüringen.



In association with Dr. Christiane Rößler (Bauhaus University) and BTU alumni Paul Schötzigk (civil engineer) and Max Jentzsch (mechanical engineering), his company develops an innovative mixing technology for concrete plants which not only promises financial benefits but also protects the climate. Both motivated Ricardo Remus to an equal extent to bring the prototypes to the market. »The change to a more sustainable industry can work if you are prepared to put your ideas into practice and this is exactly what we are doing. We are revolutionising the production of concrete.«

Up until now, whole finished concrete parts such as walls, ceilings or stairs have been hardened with treatment with hot steam or heat chambers. Whilst the standard process of making concrete usually occurs in one step by mixing cement, sand, gravel and water, the team at Sonocrete only mix the reactive components cement and water before the process. They then introduce ultrasound waves directly into this mixture and, in so doing, supply the energy exactly there where it is needed. »Physical and chemical effects accelerate the hardening of concrete. This creates the basis for the faster hardening of the mixture already before the mould is filled with liquid concrete. Up until now, standard concrete production has also been associated with high CO2 emissions and a considerably high energy consumption. With our technology, we are able to significantly reduce the CO2 emissions in concrete production. In concrete terms, this means that the primary energy consumption is reduced by up to 75%. The ultrasonic method also allows us to increase the early hardening of concrete«, reports the civil engineer and young entrepreneur proudly.

This idea also convinced the jury of the Lusatia Start-up Contest LEX in 2018, which awarded 1st prize to Sonocrete. Its success also continued after this, and concrete plants from the whole of Europe have, mean-while, expressed an interest in the new method. Enquires have been received from Ireland, France, the Netherlands and even Canada. It seems as though the revolution in concrete production has begun! In Cottbus.

Young entrepreneur Ricardo Remus is revolutionising concrete production with his ultrasound method

SERIES PRODUCTION OF METAL COMPONENTSIN 3D PRINT

The planned new research lab »3DLAB« enables an excellent knowledge and technology transfer in the entire value chain of additive manufacturing at the BTU

In March 2019, the BTU Cottbus-Senftenberg and APWORKS GmbH agreed, in the presence of the Minister of Economics Prof. Dr.-Ing. Jörg Steinbach and the Minister of Science Dr. Martina Münch, that ultra-light additively manufactured metallic components will be developed in Cottbus. With the signing of the cooperation agreement between both partners, APWORKS is relocating to Cottbus. As a 100% subsidiary of Premium AEROTEC, the company reworks aviation technologies for use in industry. For this it will be working closely with the Chair of Construction and Manufacturing, headed up by Prof. Dr.-Ing. Markus Bambach, and the departments in the Panta Rhei Research Centre for Lightweight Construction Materials, at the BTU. The joint goal is to use the potential of additive manufacturing for various series applications from the manufacture of replacement parts to ultra-lightweight construction.

The market for metallic 3D print is growing at an impressive rate. Alongside the increasing productivity of the systems and numerous applications, the reproducible quality and quality assurance are also becoming increasingly important. »In the future, we will be able to orientate our research more closely to industrial practice. We look forward to the cooperation with such a well-known company as APWORKS«, says BTU Professor Markus Bambach. »The planned >3DLAB< will enable research of the entire process chain of additive manufacturing and further strengthen our profile in basic and applied research«, said Acting President of the BTU Prof. Dr. Christiane Hipp.



Joachim Zettler, CEO of APWORKS, added, »The new research laboratory is, to this extent, unique worldwide. The cooperation with the BTU will not only provide us with the latest research findings, but also help in the recruitment of specialist employees.«

The company and its new pilot production centre are relocating in close proximity to the BTU. In association with the »3DLAB«, the centre will optimise and further develop the entire value chain of additive manufacturing. One key research area is the qualification of components for the aviation industry. Hereby the company will primarily develop, together with its clients, pilot series for components in the medical, automobile and aviation industries and will be able to benefit from the expertise of the BTU whilst the university can conduct basic and applied research on current topics.

APWORKS GmbH

As a 100% subsidiary of Premium AEROTEC, the company has established itself as a high-quality provider of additive manufacturing in recent years. Together with the parent company, it forms one of the biggest 3D print service providers in Europe. As part of the world's biggest aviation companies Airbus, APWORKS specialises in the requirements of the aviation industry. With a focus on metallic 3D print (additive manufacturing), the company covers the complete value chain for the manufacture of components and replacement parts - from the optimised design of components and the selection of suitable materials and prototype construction to qualified series production. The added value for the clients from the fields of robotics, mechanical engineering, automotive, medical technology and aerospace: functionally highly integrated and optimised components with reduced weight and shorter manufacturing times. The realisation of significantly more complex geometries than previous is also possible.

Department of Construction and Manufacturing **PROF. DR.-ING. MARKUS BAMBACH**

Minister of Economics Prof. Dr.-Ing. Jörg Steinbach, Acting President of the BTU Prof. Dr. Christiane Hipp, Joachim Zettler, CEO APWORKS, Minister of Science Dr. Martina Münch and Prof. Dr.-Ing. Markus Bambach, Head of BTU Chair of Construction and Manufacturing (I.-r.) after signing the agreement

ATTOMOL - COOPERATION IN CANCER DIAGNOSTICS

In a long-term cooperation, a university specialist department and businesses are working on new test systems for identifying tumour cells

Cancer diagnostics often involves taking a tissue sample (biopsy) to carry out histopathological examinations on the tissue or molecular pathological examinations on the tumour cell DNA. In this, scientists seek to gain information which is as precise as possible about any mutations in the DNA to then enable the ideal treatment choice as part of personalised cancer treatment.

Tumour cells release genetic information which can reveal changes in the genes into blood. In recent years, liquid biopsy, a new analysis method, has therefore gained a considerable amount of attention. Instead of the more elaborate tissue samples, it is now possible to use blood and urine samples to provide evidence of tumour cells and tumour DNA. This new method has been developed in a cooperation with Dr. Werner Lehmann of Attomol GmbH and Prof. Dr. Mario Menschikowski from the Dresden University Clinic. From patient studies with acute leukaemia, scientists knew that biomarkers can be used in therapy control and for the examination of prostate carcinoma cells.

However, the tumour DNA can only be found in the blood in very small amounts, which is why it has only been possible to identify this with the development of new methods for the highly sensitive identification of nucleic acids such as the polymerase chain reaction (PCR). The PCR involves a bioanalytical method which is able to make several copies of a DNA segment for research and analysis.

The Federal Ministry of Research has been funding the regional innovation alliance PRAMED.BIO – precision medicine through biomarker-based diagnostics – Senftenberg since its founding in January 2019. The core of the alliance is the innovation centre in Senftenberg, where branches of the companies Attomol GmbH and GA Generic Assays GmbH are already located, near the BTU.

In the PRAMED.BIO growth core, scientists from Attomol GmbH and the BTU are developing, in association with other scientists, a modular and fully automated analysis system (PRAMED.BIO-Scan) which integrates all the necessary hardware modules and records and evaluates all mea-



∧ Besides tissue samples, it is now also possible to use blood and urine samples to identify turnour cells

sured data on the basis of the digital fluorescence. Until now, most stages had to be conducted by hand with manual processing being more susceptible to errors and harder to reproduce than automated processing. Furthermore, a fully automated analysis system offers further potential for digitalisation in hospitals and laboratories.

Research is also being conducted here into the development of test systems for the PRAMED.BIO-Scan for the characterisation of brain, throat and rectal carcinoma and coordinated with a view towards optimised diagnosis. This also includes the identification and validation of new biomarkers for these oncological questions and a clinical assessment of the overall system.

Department of Multiparameter Diagnostics **DR. RER. MED. STEFAN RÖDIGER**

EMERGENCY HELP IN A DISASTER REGION

Environmental scientist Dr. Annika Badorreck joined the Federal Agency for Technical Relief in Mozambique to provide the people here with drinking water after a cyclone

It all started in 2014 with a good resolution for the new year. Whilst many of these resolutions are quickly forgotten, Dr. Annika Badorreck put her project into practice. »I wanted to do voluntary work. As I am interested in people and technology, the Federal Agency for Technical Relief (THW) offered the perfect combination«, recalls the environmental scientist. Alongside regular training dates as well as the maintenance and servicing of vehicles and machinery, Annika is also often called upon to participate in assignments. The dry and hot summer months, in particular, can bring considerable risks: »We also went to the Lieberoser Heide heathland when it was on fire. The THW doesn't extinguish fires but we cleared the way, for example, for the fire brigade with our wheeled loader and laid pipes for the water supply. When you are that close to the danger zone, you really need to be able to rely on one another. This works and that's the nice thing about it«, she says. These joint operations really connect those involved and being dependent on one another really brings you closer together. Immense importance is attached to the group here and its solidarity.

Since the start of her voluntary work at the THW, Annika also wanted to go abroad and help people in great need and her professional background and experience of laboratory work in drinking water and environmental analysis made her the ideal candidate for this. A team from the whole of Germany meets four times a year for practice and training. In spring 2019, Annika Badorreck went on her first foreign assignment in Mozambique with the Rapid Deployment Unit Water Supply (SEE-WA). Cyclone Idai had caused severe flooding and major destruction in several regions of the African country. There was a shortage of clean drinking water and a threat of a cholera epidemic. The THW workers built a water purification plant in the disaster area to provide the people here with essential clean water. »As the lab worker of the group, I monitored the water quality several times a day; a process which involved analysing it for microbial and chemical impurities. If the limit values were exceeded, we would not have been allowed to supply it but it was always alright.«

Every morning, Annika got up at sunrise, at five o'clock, to conduct her first analyses before the start of the water distribution at six. Her working day was very full, but this didn't bother her. Quite the opposite: to see the gratitude in the eyes and gestures of the people here made it all worthwhile. As well as supplying drinking water, the THW team also analysed and purified wells and repaired roofs and this was always done surrounded by a circle of people.

The helpers' accommodation was in a small camp on the grounds of a school here. »When school started, the children sometimes sang for us. They also sometimes came to the water distribution point and bombar-



Dr. Annika Badorreck drawing water from a basic well. Water is, for example, drawn from this by means of discarded canisters from which the tops have been cut off. The open building style as well as the public wells with hand pumps are typical of this region in Mozambique (Photo: THW/Savalin Thiemann)

ded us with questions in their English which they learnt in school. These were wonderful moments. Whenever we had time, we used to make something for the children. For example, we built a swing«, recalls Annika Badorreck. By mid-May, the work was complete. The SEEWA was sure that everything was running smoothly again and they and their water purification plant were no longer needed. »It was a nice end.«

After a busy month in Mozambique, the agricultural scientist returned feeling fulfilled to her desk at the BTU. Whilst she had been away, colleagues had taken over some of her work. As an academic employee, she coordinates the scientific work in the »Chicken creek« project – an artificial drainage basin in the Welzow-Süd surface mine and works in ecosystem analysis and hydrology in post mining landscapes.

Annika's work with the THW is also a good way for her to balance out her daily work at the computer and in the laboratory. »I've learnt a great deal here; be it using a motorised chain saw or the many insights into technical things such as structural analysis. It would be nice if even more people could become involved in this type of voluntary work – this of course also includes students or employees from the BTU.«

Research Centre for Landscape Development and Minding Landscapes **DR. ANNIKA BADORRECK**

FROM BROWN COAL TO A HYDROGEN CITY

The BTU is taking part in the hydrogen network »DurcH2atmen« of the city of Cottbus, which is bringing together partners in science and industry

For the energy transition to succeed, it requires the right drive and storage technologies. Hydrogen can, if created with the aid of renewable energies, act as an important energy carrier. For many years now, research has been conducted at the BTU Cottbus-Senftenberg (BTU) on how production can be made as economical as possible. With the participation in the »DurcH2atmen« network, the research findings will now be implemented in practice. The project also aims to strengthen the Lusatia region.

The chairs of internal combustion engines and aircraft propulsion, power station technology and urban technology of the BTU are involved in this project. The Chair of Internal Combustion Engines and Aircraft Propulsion is supporting the development of the »Hydrogen Model City« with research and development to increase the efficiency of fuel cell systems and hydrogen engines. Prof. Dr. Ing. Peter Berg said: »We are currently working on highly efficient combustion engines which are operated by hydrogen.« This new technology is being tested in practical implementation in a new bus fleet at Cottbusverkehr GmbH.

The »TURBO Fuel Cell 1.0« project – a new technology class for the transition to the future water industry, will also be launched at the start of 2020. »With a decentral energy supply with the TURBO Fuel Cell, we will experience a social change«, says Prof. Berg convinced. The aim is to start production with the turbo cells by 2026, in the local region, of course. The Chair of Power Station Technology at the BTU is supporting the network with its expertise in the hydrogen and storage research centre (»hydrogen lab«) as well as in development and consultation in the establishment of a corresponding infrastructure. Prof. Dr.Ing. Kreutz is confident, »It is a competition of the regions. Those who take the first steps will also remain in the lead. With the hydrogen lab and real lab, we are combining the entire spectrum.«

The network partners at the public declaration in the Cottbus Town Hall

Cottbus recently won the nationwide ideas contest »Real labs of the energy transition« and the city will now become the »Real lab Lusatia« together with the towns of Spremberg, Lübbenau and Lübben. This involves urban infrastructure, energy-efficient building and low-emission transport. Cottbus plans to develop, amongst other things, a »Zero energy quarter« along the Marienstraße road, monitor and control energy supply and consumption in communal buildings, and convert vehicles in local transport to hydrogen propulsion.

Acting President of the BTU Prof. Christiane Hipp views the »DurcH-2atmen« network as an opportunity for the BTU to position its research in hydrogen more broadly and secure qualified employees. »We want to prepare our students for the future-related topic of hydrogen.«

Besides the BTU, the network also includes the city of Cottbus, the Cottbusverkehr local transport company and the city business development agency EGC, CEBra – Centrum für Energietechnologie Brandenburg GmbH, WTT



NEWS

BTU AND UNIVERSIDAD LAS PALMAS INTENSIFY RELATIONS

In November 2018, several meetings were held on Gran Canaria for intensifying the cooperation between scientists from the Institutes for Health and Medical Technology as well as the e-learning team of the BTU Cottbus-Senftenberg and the Universidad Las Palmas de Gran Canaria (ULPGC). Hereby particularly the content of possible research projects within the framework of EU funding programmes was discussed as well as other topics for future bachelor, master and PhD theses. Strategies for the ERASMUS student exchange programme were also agreed. Prof. Dr. Juliane Eichhorn, Head of Nursing Science and Clinical Care, maintains intense contacts to the Institute of Nursing Science here. Besides the cooperation meeting, the BTU was also again represented at the InnoEducaTIC conference, at which innovative teaching and learning strategies in the field of e-learning were discussed on an international level.

For several years, researchers from both universities have been examining topics relating to artificial intelligence such as hand writing recognition, writer recognition and verification, gait recognition, gesture recognition and speech analysis. Since 2014, there has been a close cooperation in this context between the software engineering department of the Institute for Medical Technology under the leadership of Prof. Dr.-Ing. Ingrid Bönninger and the Institute for Technological Development and Innovation in Communications of the ULPGC under the leadership of Prof. Dr. Carlos M. Travieso. Several research projects have already been successfully initiated and doctoral studies completed in this. Both universities aim to implement and incorporate innovative technologies in health and care in the diagnosis of specific disorders.



 At the international InnoEducaTIC conference participants discussed innovative e-learning strategies (Photo: Dr. Tobias Kutzner)

NEW COOPERATION ENABLES STUDY VISIT IN JAPAN

The BTU Cottbus-Senftenberg and the University of Tokyo - School of Engineering have finalised their first cooperation agreement. BTU students can now spend up to two semesters at a department of the School of Engineering, for example in civil engineering, architecture, mechanical engineering, electrical engineering, chemistry, biotechnology or aerospace technology without having to pay tuition fees. Japanese students, meanwhile, can choose any course at the BTU. The agreement arose from an initiative of Prof. Dr.-Ing. Achim Bleicher, holder of the BTU Chair of Hybrid Structures - Structural Concrete. It was agreed following a study visit of Prof. Bleicher at the University of Tokyo which was supported by the Japan Society for the Promotion of Science and reflects the results of more than ten years' cooperation. This also included a Short Course on Active Structures in April in which 22 master and PhD students of various constructive subjects of the University of Tokyo, Yokohama National University and the Tokyo Institute of Technology participated. BTU students who are interested in a study visit at the Japa-



∧ Clock Tower of the University of Tokyo (Photo: Achim Bleicher)

nese university can contact the Chair of Hybrid Structures – Structural Concrete (Prof. Achim Bleicher, +49 355 69 2471) and the International Relations Office (Marina Lewandrowski, +49 355 69 2562).

FACT-FINDING MISSION IN MOZAMBIQUE

A delegation of five participants from the BTU Cottbus-Senftenberg travelled to Mozambique in May 2019 as part of the »Education and entrepreneurship for sustainable development - implementation of renewable energy sources in Mozambique« fact-finding mission. Here, they held exploratory talks with local universities in particular the Pedagogical University, the civil society as well as representatives of the regional industry and young start-up founders. Alongside the contact with university boards and scientists, the group also had the opportunity to visit a small village outside Maputo, a village without running water and not connected to a power supply network. For some time, a decentral solar system has been enabling the lighting of the living rooms here. For the guests from Germany, this was a memorable, impressive experience which is thanks to the committed energy entrepreneur Gilda Monjane who promotes photovoltaics in Mozambique. She actively supports the use of renewable energy sources as well as independence in rural regions with a special focus on the role of women and the needs of the local communities. At the end of January, she held a lecture on the central campus in Cottbus for this as part of the public lecture series Open BTU. The visit to Maputo was the continuation of initial talks for which an African delegation from Mozambique visited the BTU. The project



 The BTU delegation (from left to right): Thomas Hasenauer, Prof. Katrin Salchert, Mareike Kunze, Eva Leptin and Prof. Magdalena Mißler-Behr (Photo: Thomas Hasenauer)

was initiated by the Chair of Public Law with special reference to Environmental and Planning Law, the start-up service as well as the Centre of Scientific Further Training. The project is being funded by the German Academic Exchange Service (DAAD).

HONORARY DOCTORATE FOR INTERNATIONAL COMMITMENT

Prof. Sylvio Simon – Head of the Tool Making Machines Department and Degree Programme Coordinator of the Applied Mechanical Engineering course of the BTU Cottbus–Senftenberg as well as Chairman of the Institute of Environmental Technology and Recycling Senftenberg e. V. (IURS) – has been awarded an honorary doctorate of the Azerbaijan Technical University Baku (AzTU).

The honorary doctorate was awarded on 12 June 2019 at a meeting of the university's science council for the support and promotion of mechanical engineering at the AzTU. The university also stated as reason for Prof. Simon's honorary doctorate the successful knowledge and technology transfer in tool making machines and CNC supported machining processes as well as the exchange between lecturers and students which took place under Prof. Simon's leadership.

His support of doctoral and habilitation candidates in the examination of technical and mechanical-related topics was also highlighted as well as the intensive incorporation of the mechanical engineering of the AzTU in the scientific exchange with the BTU.

As the 15th honorary doctor of the AzTU, which was established in 1950, Prof. Dr.-Ing. Sylvio Simon is in the company of renowned scientists from Germany, the USA, Poland and Turkey. Alongside Prof. Simon, the university also thanked the former long-standing dean and dean of studies



The Vice Chancellor of the Azerbaijan Technical University Baku (AzTU) Prof. Xaliq Yahudov awards the honorary doctorate to Prof. Sylvio Simon (right); Prof. Ziyafat Kerimov can be seen in the background (Photo: Nina Danneberg)

of mechanical engineering in Senftenberg Professor Peter Biegel. With an honorary certificate, it honoured their achievements in the development of the cooperation between both universities.

The BTU delegation, which held talks on the continued cooperation at the AzTU in June, also included Nina Danneberg from the Tool Making Machines Department as well as Julia Morozova and Anton Evdokimov of the Chair of Joining and Welding Technology.

THERAPY SCIENCES FOR MEDICAL STUDENTS IN POLAND

In June 2019, 15 medical students of the twelfth semester of the Medical University of Lublin visited the BTU in Senftenberg. In the Therapy Science II department, they successfully completed the »Opportunities and boundaries of technology-assisted performance diagnostics in orthopaedics, internal medicine and neurology« course with Prof. Michel, which was made possible thanks to funding from the German Academic Exchange Service (DAAD).

The state Polish university hopes to include this programme in its modular catalogue in the future. »We have been offering programmes for the Brandenburg Medical University and the Dresden Technical University for four years«, explains Department Head Prof. Michel. »We are particularly pleased that we are currently also in demand internationally.« Prof. Wojciech Zaluska, Dean of the Medical Faculty in Lublin added: »We also honour the professional quality, innovative teaching concept and commitment of Prof. Michel with our university's honorary certificate.«



 Polish students of the Medical University of Lublin were guests of the BTU Cottbus-Senftenberg thanks to funding from the DAAD (Photo: Titus Martin)

INTERNATIONAL PHYSIOTHERAPY CONFERENCES

Therapy science lecturers and alumni co-organised the World Congress for Physiotherapy, which was held in Geneva in May 2019 with more than 4,500 participants. Prof. Dr. Christian Kopkow, Head of Therapy Sciences I, took part in the world congress with two lectures. Dr. Robert Prill of Therapy Sciences II as well as therapy science graduate Robert Schulz led two sessions, organised two poster presentations and were previously involved in the assessment of more than one hundred contributions for the conference which was a special success for BTU alumnus Robert Schulz. His systematic review on eccentric training for tendon injuries in the shoulder, which he completed as part of his bachelor thesis, was chosen as a poster for the congress in Switzerland. Matthias Zirr, a graduate of the physiotherapy dual study course and currently assistant lecturer, realised a further poster presentation.

Robert Schulz already gave a lecture on the »Symmetry of ground reaction forces during deadlifting in relation to the chosen grip« at the international congress »XXV International Disabled Peoples Day« in Zgorzelec, Poland at the end of March. Graduate Sophia Lichan, meanwhile, gave a lecture on »Prevention: an investigation of performance-determining coordinative and conditional abilities in the fire-fighting sport«. Furthermore, the insights from their empirical bachelor thesis were also published in the internationally renowned magazine: »International Journal of Sports and Exercise Medicine«. The first lecture prize of the conference in the »Graduate« category went to Tristan Badenhoop from the physiotherapy dual study course. He completed his dissertation on the »Coordinative efficiency of physiotherapy students« with Prof. Dr. Sven Michel, where he examined the coordinative performance of physiotherapy pupils.



 Poster presentation at the World Congress of Physiotherapy: (from left to right) Matthias Zirr, Robert Schulz and Dr. Robert Prill (Photo: Prof. Christian Kopkow)

EU FUNDING FOR STUDY STAYS WORLDWIDE

BTU receives 400,000 euros in funding for qualified mobility projects within the framework of ERASMUS+ with partner countries

The BTU Cottbus–Senftenberg has been successful in its application in the current generation of the ERASMUS+ programme for mobility with partner countries (KA107) in projects with twelve partner universities in six countries and is receiving 400,000 euros in funding from the European Union for its implementation.

With a duration of three years from August 2019 to July 2022, BTU professors and their teams from nine departments are taking part in the current project, which is being coordinated by the university's International Relations Office (IRO).

The ERASMUS+ mobility projects promote academic cooperation with all countries worldwide. Study stays of German students outside the EU as well as of non-European students in Germany are also eligible for fun-



ding. Lecturers, meanwhile, have the opportunity to teach abroad. University employees can also receive funding in their professional development, for example as part of further training measures abroad, job shadowing or training at a partner university.

International Relations Office **MAREIKE KUNZE**

THIS YEAR'S DAAD CONFERENCE HELD IN COTTBUS

In March 2019, 180 representatives from the international academic offices of universities from the whole of Germany met in Cottbus for the meeting of the German Academic Exchange Service (DAAD) to discuss the latest developments in foreign student studies at German universities. As a central forum, it is organised by the DAAD in cooperation with the BTU Cottbus-Senftenberg. The event was opened by the Acting President of the BTU Prof. Dr. Christiane Hipp and the Head of the Internationalisation Programmes for German Universities Division in the DAAD, Anke Stahl.

This year, the three-day programme again focussed on lectures and workshops on current topics relating to foreign student studies. To start with, participants discussed digitalisation, in particular the question of how this development is affecting the daily work of the international offices from advice to the follow-up support of international students. The meeting also offers plenty of opportunity for networking and an exchange of experiences. In this way, new employees are able to benefit from the expertise and routine of their colleagues. Participants were also able to use the »World Cafe« to make new contacts and discuss solutions to various questions from different viewpoints.

The range of topics covered in the reports and discussions included the introduction of study fees for students from non-EU countries, experi-



 Acting President Prof. Dr. Christiane Hipp welcomes guests to the BTU from all over Germany

ences on the use of webinars and social media, as well as an exchange on the REST Guideline together with representatives from the Federal Office of Migration and Refugees (BAMF) and the Cottbus Aliens' Registration Authority. The conference finished with a country information report on China, a lecture on consulting coaching and guided tours through the city of Cottbus.

DOCTORAL CANDIDATE RECEIVES EU GRANT FOR RESEARCH STAY

Dr. Paula Fuentes has received the Marie Skłodowska-Curie Individual Fellowship of the European Union for a two-year research stay at the Vrije Universiteit Brussels. The EU programme aims to strengthen the international mobility of young European scientists. Since October 2016, Dr. Fuentes has, together with her colleague Dr. Anke Wunderwald, been working in an interdisciplinary postdoc tandem under the joint title »The Art of Vaulting: Design and Construction of Large Vaults in the Mediterranean Gothic« in the DFG research training group »Cultural and technological significance of historic buildings«. The findings of this research project will be published in the collective volume »The Art of Vaulting. Design and Construction in the Mediterranean Gothic« by Birkhäuser Publishing.

Dr. Paula Fuentes trained as an architect at the Universidad Politécnica de Madrid where she also worked as assistant lecturer, at the university's School of Architecture, between 2010 and 2015. She began her EU-funded research work on »Brick Vaults and Beyond: the Transformation of a Historical Structural System (1830–1930)« in Brussels in May 2019. The research project is being supervised by Prof. Ine Wouters.



 Dr. Paula Fuentes has received the Marie Skłodowska-Curie Individual Fellowship of the European Union for a two-year research stay at the Vrije Universiteit Brussel (Photo: Paula Fuentes)

POLISH LICENTIATES IN SOCIAL WORK

Bachelor degree holders of the BTU Cottbus-Senftenberg's social work study programme, Anita Liszewska, Anne Weisel and Jasmina Jurasik as well as graduate Fabian Partyka have also been awarded the Polish licentiate in a ceremony at the Gorzow Academy. The four German alumni were already awarded their bachelors at the BTU Cottbus-Senftenberg in March. The Dean of the Faculty of Social Work, Health and Music at the BTU Cottbus-Senftenberg Prof. Dr. Ulrich Paetzold also travelled to Poland for the ceremony. In his greeting at the Gorzow Academy on 12 July 2019, he emphasised the importance of a good cooperation between both universities in the current political situation.

The integrated German-Polish dual degree programme in social work at the BTU Cottbus-Senftenberg and the Gorzow Academy was launched in 2004. Since 2008, the degrees of both universities have been annually awarded to students of this binational cross-border course. Alongside the regular degree Bachelor of Arts Social Work, students are also awarded the Polish licentiate degree. The studies are based on the general social work course at the BTU Cottbus-Senftenberg and are characterised by integrated topic-specific content for example a focus on intercultural, migration-related and international social work. The core of the studies is formed by a funded one-year study period abroad for which students prepare with special groups abroad and language courses.



 Anita Liszewska, Anne Weisel, Fabian Partyka and Jasmina Jurasik (from left to right) – alumni of the integrated German-Polish social work study programme are pleased to receive their Polish licentiates at the Gorzow Academy (Photo: Prof. Dr. Ulrich Paetzold)

Degree holders can work in all fields of social work in Germany and qualify for in-depth work in areas of intercultural social work and in the sector of international cross-border social work.

ART IN THE SPREEWALDTUNNEL

When Yasmin Nebenführ woke up this morning, she felt euphoric and happy. However, the evening before, things seemed very different when a look at her long »To do« list filled her with panic. Today, this is no longer the case! Today she is convinced that they will manage it. They are Yasmin Nebenführ, her friend Damien Laing and the other members of the artists' collective »Workroomfive«. On a Friday in December 2018, the group exhibited their works in the already closed Spreewaldtunnel in the Cottbus central railway station. »It all started with an e-mail. Damien was immediately fascinated by the tunnel and wrote to Deutsche Bahn which informed him that the tunnel had closed down. He then contacted the train station's manager, who was very impressed by the idea of having an exhibition«, says Yasmin Nebenführ happily, explaining how the project began. Once they had got permission, both the Australians started work on the project and asked friends and acquaintances whether they would like to exhibit their work.

Yasmin Nebenführ is studying World Cultural Heritage Management whilst Damien Laing is doing a semester abroad here in urban and regional planning. Both Australians have a passion for old buildings and an interest in using these for exhibitions. The focus is on the collective and the being together with friends, with the aim of exhibiting together. »We



 Three of the people behind Workroomfive: Damien Laing, Carl Soballa and Yasmin Nebenführ in the old Spreewaldtunnel just before the exhibition was set up (Photo: Hannes Soballa)

just want to hang our work on the walls and talk about art amongst ourselves as well as the visitors«, said the BTU student. Twenty artists from Berlin, Cottbus and the surrounding area took part in the project on the Friday and were able to breathe life into the Spreewaldtunnel for the last time. This special exhibition was attended by many visitors.

HERITAGE HEROES EXHIBITION AT BTU COTTBUS-SENFTENBERG

Heritage Heroes - Preserving World Heritage Together ran from 2-29 October 2019 at the Brandenburg University of Technology Cottbus-Senftenberg, in the library (called IKMZ). In conjunction, the library presented World Heritage in Danger (Welterbe in Gefahr), a complementary book exhibition with resources on topics in architecture, landscapes, archaeology, and other related fields.

Over 60 students and BTU Cottbus-Senftenberg staff visited the exhibit on 16 October for a special event. The evening featured presentations led by World Heritage Studies M.A. students Mei Enomoto and Margarita Shabeva and PhD researcher Lucija Matić, featuring heritage sites from their home countries Japan, Russia and Croatia. The night ended with a light reception.

The exhibit tells the stories of individuals who represent many others beyond themselves actively protecting humanity's endangered cultural and natural World Heritage in the face of armed conflict or natural catastrophe.

Special thanks to the German Commission for UNESCO who provided the exhibition.



∧ Many interested guests came to visit the exhibition on 16 October for a special event

THREE TURKISH STUDENTS MAKE A SUCCESSFUL START TO THEIR STUDIES

In the 2019/20 winter semester, three outstanding graduates from German schools abroad and partner schools received a motivational scholarship for the start of their studies. Selin, Defne and Murat have just started their bachelor's degrees in Business Administration and Engineering, Business Administration and eBusiness. They all come from TAKEV, one of the BTU's long-term German-Turkish partner schools situated in the city of Izmir on the Aegean coast. They stood out not only for their technical achievements, but also for their commitment to academic projects and their participation in the Model United Nations, a simulated UN conference for schoolchildren.

The Brandenburg University of Technology (BTU) Cottbus-Senftenberg awards three motivational scholarships to high-achieving new students every year as part of the Mentoring Initiative for German Schools Abroad and Partner Schools (BIDS), which is sponsored by the German Academic Exchange Service (DAAD) with funds from the Federal Foreign Office (AA).



Acting President of the BTU, Prof. Christiane Hipp (left), presented the new students with their scholarship certificates in a ceremony on 20 November 2019. The new students were also congratulated by Kai Franke (right), Head of the Berlin Office at the German Academic Exchange Service (DAAD), and Mareike Kunze (2nd from left), Head of the International Office at the BTU

ADMISSIONS ONTO THE NEW »ESIST« PREPARATORY PROGRAMME

The new »ESiSt« preparatory programme was launched at the BTU Cottbus-Senftenberg in the 2019/20 winter semester. The German abbreviation stands for the »successful start to studies for international students in Brandenburg«. It is a preparatory programme that helps foreign students obtain a higher education entrance qualification in the State of Brandenburg. The language and specialised course programme was launched in September 2019. The students come from countries like Jordan, China, Nigeria, Syria and India, where they have obtained university entrance qualifications that are not officially recognised as such in Germany. They have the opportunity to attend a course over two semesters before sitting a higher education entrance examination in a specific subject. This grants them access to all study programmes in their chosen field within the Brandenburg network. The BTU is working within the regional university association alongside the European University Viadrina in Frankfurt (Oder), Potsdam University of Applied Sciences, the Film University Babelsberg KONRAD WOLF, the Eberswalde University for Sustainable Development, Brandenburg University of Applied Sciences, the Technical University of Applied Sciences in Wildau and the University of Potsdam.

Before being admitted onto the programme, the students have to pass an entrance examination in mathematics and German, as well as meeting other requirements. The language course is not the only part of the programme; some of the other activities include writing workshops, conversation classes, an introduction to laboratory work and mathematics. In addition, all bachelor's programmes at the BTU are presented in an orientation module.

www.b-tu.de/esist



A ESiSt students come from countries like Jordan, China, Nigeria, Syria and India



MEET US AT THE GERMAN BOOTH!

In 2020 BTU Cottbus-Senftenberg will be represented at the big network fairs APAIE and EAIE. We look forward to meeting our partner universities, making new contacts with international colleagues, discussing current university policy topics with university representatives from all over the world and initiating new exchange programmes.

CONTACT internationaloffice@b-tu.de



EAIE 2020 CONFERENCE AND EXHIBITION **15-18 SEPTEMBER 2020** BARCELONA, SPAIN



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