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THE BULLETIN

OF THE SILESIAAN UNIVERSITY OF TECHNOLOGY

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**THE GRAND BALL OF THE SILESIA
UNIVERSITY OF TECHNOLOGY**
February 3rd, 2024, PreZero Arena Gliwice

Pictures: Maciej Mutwil

FROM THE EDITOR



From time to time, the world is filled with news about discoveries or groundbreaking achievements of scientists. Then, more than ever, we realize the value and importance of technological progress and its impact on our functioning. Especially when scientific achievements save human lives. This is certainly the case with the research results of dr Małgorzata Muzalewska and prof. Marek Wyleżoł, who are co-creators of printed implants that dissolve in the human body. 3D printing technology and bioresorbability are a real breakthrough in the field of medicine. The implants developed by scientists not only protect the organs by growing through the bone but also completely dissolve after some time. The invention of Polish scientists is already saving Ukrainian children mutilated as a result of hostilities. In the February issue of the Silesian University of Technology Bulletin, we would like to present this revolutionary solution to you. Readers will also find articles about other interesting scientific projects and innovative technological solutions, the possibilities of which are almost cosmic. As befits February, the issue will include hot topics straight from the heart.

I wish you an interesting reading,
Iwona Flanczewska-Rogalska

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MILLIONS FOR THE PROFESSIONAL DEVELOPMENT OF TEACHING STAFF

edited by: Jolanta Skwaradowska
photo: Karolina Marszał

THE NATIONAL CENTRE FOR RESEARCH AND DEVELOPMENT (NCBR) WILL PROVIDE UNIVERSITIES WITH OVER PLN 53 MILLION FROM EUROPEAN FUNDS FOR PROJECTS AIMED AT DEVELOPING THE TEACHING POTENTIAL OF ACADEMIC STAFF IN THE CONTEXT OF FUTURE CHALLENGES. THE SILESIAN UNIVERSITY OF TECHNOLOGY WILL RECEIVE NEARLY PLN 2 MILLION FOR THIS PURPOSE.

NCBR has resolved the competition "Development of qualifications and competences of teaching staff", announced as part of the European Funds for Social Development (FERS) programme. As a result, 21 universities from all over Poland will conduct projects thanks to which academic teachers and doctoral students will improve or strengthen their skills, especially teaching, in the field of green and digital transformation. One of the winners of the competition is the Silesian University of Technology, which will receive almost PLN 2 million for this purpose.

The project "Silesian University of Technology - a university supporting staff on the way to excellence" met the competition requirements to the greatest extent, taking first place, in terms of the number of points obtained, among the projects selected for co-financing. An experienced team of employees of our university, appointed by prof. Marek Pawełczyk, Vice-Rector for Science and Development, is responsible for the implementation of this project.

The project is addressed to staff employed at the Silesian University of Technology in teaching and

research-didactic positions, as well as doctoral students studying at the Joint Doctoral School of the Silesian University of Technology, conducting classes with students. This is a total of 230 people interested in improving their competences and qualifications.

– To ensure a high level of education in the higher education system, it is necessary to provide adequate substantive and didactic preparation of the staff involved in teaching - including doctoral students - carrying out classes with students. The need to expand the qualifications and competences of staff results from constantly progressing changes, evolution of knowledge and adequate response to, among others, climate change, shrinking resources of the planet, and social and economic development, which translates into the expansive progress of the so-called high opportunities (IT, energy) sectors. Staff with appropriate competences should have the latest knowledge and practical skills, as well as appropriate qualifications, which will translate into the quality of student education and, therefore, the development of the economy, green and digital transformation - says dr Anna Waligóra, assistant professor at the Department of Production

Engineering at the Faculty of Organization and Management of the Silesian University of Technology, project manager.

The aim of the project "Development of qualifications and competences of teaching staff" is to improve the quality of education within two years.

– In recent years, the Silesian University of Technology has introduced changes within the University, focusing on improving infrastructure, system integrity and organizational efficiency. The introduced innovations, as well as the development of new technologies, the increasing importance of green and digital transformation and the ongoing economic and social transformations - including those related to new generations of students - result in the need to constantly enrich the fields of study and the educational process by systematically improving the competences and qualifications of the University's teaching staff. Both employees and doctoral students of the Silesian University of Technology expressed great interest in these activities, notes dr Anna Waligóra.

The Silesian University of Technology, as a Research University, is



intensively involved in innovations focused on the processes of education and improvement of professional skills. In recent years, as part of many successfully implemented projects of the Knowledge Education Development Operational Program, the University has implemented numerous tools and forms to improve the competences and qualifications of staff, thanks to the support of NCBR. The University authorities recognized these projects as strategic projects, which are crucial for their development.

– The foundation that defines a public university is its employees, who constitute invaluable human capital influencing many aspects, such as the value of future generations, improvement of the quality of life, and economic growth of the country. The integral and lasting development of the university, which translates into the development of the country, is possible through continuous and constant improvement of the competences

of the teaching staff as a response to changes taking place in the turbulent external environment and taking place inside the organization. The conducted needs analysis showed that teaching staff are willing to deepen their professional skills and have a need to constantly develop knowledge and enrich their work towards professionalization - adds dr Waligóra.

The introduction of new and modified fields of study at the Silesian University of Technology, adapted to the development of the economy and the need of green and digital transformation, resulted in changes. Following these changes, educators at the Silesian University of Technology encountered new challenges related to educating students and the need to fill the competency gap.

– This is confirmed by the developed diagnosis of the needs of the University's employees and doctoral students. As a result of the research, a desire was identified

to improve competences or obtain qualifications through postgraduate studies - including specialized and prestigious MBA - combining elements of management, economics and finance, entrepreneurship, communication, and marketing with a focus on specific industries - says dr Anna Waligóra.

The development challenges of the Polish economy also include the national and foreign internships and study visits planned in the project, which aim to improve the teaching and substantive competences of employees and doctoral students by familiarizing them with real problems and solutions in industry and business. In this way, they will be able to adapt their teaching classes to current industrial and business problems, focused on modern production and technological processes related to production management, the circular economy, and the transformation of the digital and green economy. ■

SZCZIGA ON THE TRAIL OF THE MISSING

text: Jolanta Skwaradowska
photo: Tomasz Stoktosa

MEMBERS OF THE HIGH FLYERS STUDENT SCIENCE CLUB BUILT A SZCZIGA DRONE USED TO SEARCH FOR PEOPLE WHO ARE MISSING OR HIDING IN THE FOREST. THE DRONE IS A COMBINATION OF ARTIFICIAL INTELLIGENCE AND A THERMAL IMAGING CAMERA.

The construction of SZCZIGA took over eight months. The team included six students from three faculties of the Silesian University of Technology: Faculty of Automatic Control, Electronics and Computer Science, Faculty of Mechanical Engineering, and Faculty of Transport and Aviation Engineering.

– We decided to create a solution that will work in various conditions. The drone has a thermal imaging camera that allows it to detect human heat signatures in a dense forest. This allows the services to identify points of illegal border crossing, says Jakub Gutt, president of the High Flyers scientific club.

In addition to the thermal imaging camera, the drone is equipped with artificial intelligence elements.

– Artificial intelligence in this project is responsible for detecting human silhouettes in the camera image. The drone is equipped with an on-board computer that records the image, which is then sent to the



server. On it we can see marked places where people are - explains Krzysztof Połec, a member of SKN High Flyers.

- To create such a model, a group of programmers had to previously record video materials showing a bird's-eye view of an image from a thermal camera, which shows human heat signatures. After collecting such data, the tedious work of training this model begins. Teaching the model involves marking rectangles on such material, within which there is a person, adds the student.

The SZCZIGA drone can be used to search for missing people, e.g., in the mountains.

- Our drone reaches hard-to-reach and dangerous places. It can help rescuers in search operations without endangering human life, which is very important and even crucial, says Jakub Gutt.

The first tests turned out very well. The unit has proven its worth in the field, although, as students admit, there are several solutions that require improvement.

- Our project is still a prototype and has a very large commercial potential. However, in order to be used in real missions, it must be improved - adds Krzysztof Połec.

SZCZIGA tests took place in the Silesian Insurgents Park in Zabrze. - It looked like this: we gathered members of our circle and placed them in various places overgrown with trees and bushes. We wanted to test our system in areas where people can hide, said Krzysztof Połec.

After improving the drone's parameters, the students plan to



take part in unmanned aerial vehicle competitions.

- SZCZIGA is the first of three models we plan to build. We will optimize each of them later according to the rules of the competition in which they will take part. We definitely intend to use SZCZIGA in the Droniada competition, scheduled for June in the Silesian Park - summarizes Jakub Gutt.

The Interfaculty Scientific Club of Unmanned Flying Objects "High Flyers" was established in 2010. During this time, there have been over 40 members who share a common passion for innovation in the field of UAV (Unmanned Aerial Vehicle). The club's activities focus

on expanding knowledge and skills in the design, construction, and operation of these advanced systems.

High Flyers members successfully take part in competitions at national and international levels. 2024 also promises to be an exceptionally busy year. - We plan to implement many ambitious projects that are not only an engineering challenge but also a logistical one. We are looking forward to what the future will bring, ready for new challenges and successes, say the students.

The scientific supervisors of SKN High Flyers are: dr hab. Eng. Roman Czyba, prof. SUT and dr Eng. Jaroslaw Domin. ■

ARTIFICIAL INTELLIGENCE: READY, STEADY, GO!



Funded by
the European Union

text: Katarzyna Siwczyk
photos: Katarzyna Siwczyk

ARTIFICIAL INTELLIGENCE WEEK - ANOTHER OF 50 WEEKS IN THE EUROPEAN CITY OF SCIENCE KATOWICE 2024 TOOK PLACE FROM JANUARY 26TH TO FEBRUARY 4TH. SCIENTISTS FROM THE SILESIAN UNIVERSITY OF TECHNOLOGY AND UNIVERSITIES FORMING THE EMNK (EUROPEAN CITY OF SCIENCE KATOWICE) CONSORTIUM INTRODUCED AI-RELATED ISSUES TO THE INHABITANTS OF THE REGION, REGARDLESS OF AGE, AND TAUGHT THEM HOW TO USE IT ON A DAILY BASIS.

ARTIFICIAL INTELLIGENCE YESTERDAY AND TODAY

- Ten years ago, when I started to become interested in autonomous vehicles, my projects were rejected. They were too futuristic, and they didn't want to support them with any grants. Today, every innovation of this type is received with great enthusiasm - said prof. Wojciech Moczulski from the Faculty of Mechanical Engineering, leading a seminar on autonomous mobile systems as part of the Artificial Intelligence Week in the European City of Science Katowice 2024.

- I'll tell you more. The future of autonomous systems is not some distant vision, it has already arrived, it is happening right here, in Gliwice, before our eyes - added prof. Moczulski opening the discussion on autonomous vehicles.

In the seminar, Silesian University of Technology and leading companies involved in the development of autonomous systems presented many projects implemented in Gliwice and the region. It is worth emphasizing the activity of student scientific groups in this area, which undertake ambitious projects in the field

of autonomy of drones and Mars rovers, taking leading places in national and international competitions and competitions.

The fact that such projects can really change the ordinary lives of the region's inhabitants could be seen a few months ago, thanks to the autonomous minibus, which is the result of a project implemented by a consortium of Gliwice companies Bles sp. z o. o. - consortium leader - and Autonomous Systems sp. z o. o. and the Silesian University of Technology. As a result, a vehicle was created that is able to transport several people, without the participation of a driver, and only in rare situations, exceeding the "skills" of the autonomy system, supported by a remote operator. Tests of this solution took place in December on the campus of the Silesian University of Technology.



OVER 2,000 PEOPLE TOOK A RIDE IN AN AUTONOMOUS MINIBUS

20 test days, 400 courses and 2,799 participants - this is a brief summary of the Bles minibus testing stage, which was carried out in the academic campus of the Silesian University of Technology. The test results were

presented during Artificial Intelligence Week.

– In terms of passenger research, we are waiting for the results of the work of the team led by Professor Anna Timofiejczuk from the Silesian University of Technology and Anita Pollak from the University of Silesia. Certainly, any such checking of user opinions will be helpful in developing the vehicle and adapting it to the needs of passengers - explained Michał Kwiatkowski, business development manager at Bleeps, who noted that all possible proposed changes and suggestions will be important in the context of creating a version of the approved vehicle. However, to confirm the validity of the opinion, at least a few more similar implementations and studies are needed. – I can already inform you that in spring the vehicle will be operated for about a month, this time in Katowice – added Michał Kwiatkowski.

Currently, a team of psychologists from the University of Silesia is preparing the results of surveys in which both passengers and road users observing the vehicle participated.

The role of our scientists in this project, under the leadership of prof. Piotr Przysańka, was the preparation of algorithms and the remote operator station.

– The testing phase showed the acceptance of this type of latest user communication technologies by our society. This will probably be our next task. In addition, passenger safety and their driving experience are important to us. Anything that can improve these aspects will be the subject of further work. It should be emphasized that the testing phase did not reveal any serious tech-

nological defects, explained Anna Timofiejczuk, prof. SUT

THE YOUNG PEOPLE LIKED ARTIFICIAL INTELLIGENCE

Discussions during Artificial Intelligence Week, presentation of various solutions, were addressed to various age groups. This is important because of the need to familiarize with new technologies also those who are just learning about possibilities that they have never been able to use before in their lives.

– We had activities aimed at preschool children, adults, and seniors. I must admit that as I grew older, the belief that the use of AI could be dangerous increased, and questions and concerns arose. There were also people who did not ask, but immediately stated that artificial intelligence is evil. In turn, young people did not even need a definition of what artificial intelligence was or how certain algorithms work because they knew it and had no fear of it - admitted dr hab. Jan Kozak, prof. University of Economics in Katowice, coordinator of Artificial Intelligence Week.

The fact that young people positively accept new possibilities of using artificial intelligence could also be seen in Rybnik, where even younger primary school students who took part in the classes knew some programs and applications using AI.

– During the Artificial Intelligence Week in Rybnik, our activities were directed primarily to children and teenagers. The youngest participants could learn how AI works using the example of automatic recognition of traffic lights by the Photon robot. The slightly older ones could take part in an escape room with artificial intel-

ligence and learn about the use of AI in robotics. Finally, we invited all interested to participate in workshops on image recognition using an open database of celebrity photos - says dr Eng. Aldona Rosner from the Continuing Education Centre (CKU) in Rybnik.

Young people participated in these activities with passion, not asking questions about whether artificial intelligence was something to be afraid of, although the Week's coordinator himself admits that this question came up very often during other activities.

– We even had a special discussion panel aimed at dispelling any doubts. Like other experts who participated in these discussions, I will say: no. We should not be afraid of artificial intelligence as such, which we see in science fiction movies, but we can take into account that as a tool it can make mistakes and make mistakes. We should use it wisely, but it is not a solution that poses a threat to us - explained Jan Kozak, prof. of University of Economics in Katowice. Scientists dealing with AI have no doubt that this year will be marked by further new solutions using artificial intelligence. After Artificial Intelligence Week, we invite you to participate in subsequent EMNK (European City of Science Katowice) events. You can read about 50 weeks in the City of Science for residents of all ages in the media of the Silesian University of Technology and other universities forming the European City of Science Katowice 2024. ■

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THE SILESIAN UNIVERSITY OF TECHNOLOGY LIKES TO HELP!

Text: Jolanta Skwaradowska
photos: Tomasz Stokłosa

A MARS ROVER, A BOLIDE AND A TRAIN SIMULATOR - ALL THIS COULD BE SEEN AT THE STAND OF THE SILESIAN UNIVERSITY OF TECHNOLOGY DURING THE 32ND FINALE OF THE GREAT ORCHESTRA OF CHRISTMAS CHARITY. DURING THE EVENT, WHICH TOOK PLACE ON JANUARY 28TH, A UNIVERSITY'S SWEATSHIRT, DONATED BY THE RECTOR OF THE SILESIAN UNIVERSITY OF TECHNOLOGY, PROF. ARKADIUSZ MĘŻYK WAS AUCTIONED.



Representatives of our University were waiting at the Market Square in Gliwice from noon. – The Silesian University of Technology participates in this charity event every year. What the Great Orchestra of Christmas Charity does is very necessary and that is why we want to play together with the Orchestra. As always, our students and scientists are eager to get involved in organizing such events, said Magdalena Pawlaczek from the Promotion and Communication Centre of the Silesian University of Technology. – We like to help and get involved. We often organize various types of workshops for children, e.g. on assembling robots or programming. We like to do charity work and infect people with our passion, that's why we are here today - adds Jakub Gugrul from the Silesian Phoenix Student Science Club, which presented the Mars rover.



Students from PolslRacing showed their racing car, and the Faculty of Transport and Aviation Engineering showed their train simulator, which was very popular, especially among the youngest. – Everyone who visited us could drive the Impuls 36WEa train, exactly the same as that used by Koleje Śląskie. Interestingly, this simulator was designed by our students. Here we can simulate natural conditions, such as those experienced by train drivers every day - said dr Eng. Adam Mańka from the Faculty of Transport and Aviation Engineering of the Silesian University of Technology.

At our stand, representatives of the Academic Dance Ensemble of the Silesian University of Technology "Dąbrowiaczy" also encouraged people to support the Orchestra, presenting beautiful folk costumes.

In the afternoon, the auctions started on the stage. The auctioned items included a sweatshirt donated by the Rector of the Silesian University of Technology, prof. Arkadiusz Mężyk. In addition

to the sweatshirt, the winner of the auction also received invitations to our university's ball, which took place on February 3rd. In turn, the Biotechnology Centre of the Silesian University of Technology decided to put up for auction a tour of their laboratories. During the tour, the winner will be able to, among others: learn the secrets of scientists' work.

Pupils of the Academic Secondary Comprehensive School of the Silesian University of Technology also joined the Great Orchestra of Christmas Charity, supported by the Volunteer Centre of our university, which made its rooms available to the ALO staff. – We help pupils with organization and logistics, we have prepared hot drinks, soup, and small snacks so that young volunteers can rest here for a while, warm up, and eat something – said Małgorzata Sotczyńska- Rąb, head of the Student Career Office.

ALO (Academic Secondary Comprehensive School) joined the organization of WOŚP for the third time. This year, over 60 students

collected money. – Almost every children's hospital has equipment from the Great Orchestra of Christmas Charity. When we were born, each of us had our hearing and eyesight checked using equipment with a red heart stuck on it. So, the awareness that help is being provided is beautiful, and in addition, we meet so many amazing people here, said Luiza Gross from the ALO staff.

This year, the Great Orchestra of Christmas Charity raised money for equipment needed to diagnose and treat lung diseases after the pandemic, both in children and adults. ■



STUDENT SELF-GOVERNMENT

The new term of office of the University Board of the Student Self-Government of the Silesian University of Technology began in January. By decision of the student parliamentarians of December 6th, 2023, **Dawid Mordarski**, a student of the Faculty of Organization and Management, became the chairman. He is responsible for the most important decisions made by the University Student Self-Government and for coordinating the work of all UZSS members.

The University Board of the Student Self-Government of the Silesian University of Technology also includes:



Dawid Mordarski, chairman of the Student Self-Government of the Silesian University of Technology, student of the Faculty of Organization and Management



Błażej Brudny, student of the Faculty of Electrical Engineering, Deputy Chairman and Member of the Management Board. He is responsible for social media and promotes events of the Student Government and the Silesian University of Technology.



Katarzyna Ilczuk, student of the Faculty of Organization and Management, Member of the Management Board for Projects. She is the head of the most important committee in the Student Government, responsible for organizing mainly events such as: theme parties, Karaoke with the local government, RPG with the local government, board games with the local government and many other events, including charity ones.



Michał Szymanowski, student of the Faculty of Civil Engineering. Member of the Management Board for Teaching and Benefits. He deals with the regulations of studies, regulations of benefits and the remote education platform from the substantive point of view.



Emilia Skwarek, student of the Faculty of Biomedical Engineering. Member of the Management Board for Development and Evaluation. Training trips, on-site and online training for local government officials, evaluation of the Student Government and job fairs are just a few of the projects Emilia undertakes.



Michał Bartyzel student of the Faculty of Automatic Control, Electronics and Computer Science Member of the Management Board for Computerization, who is responsible for creating and maintaining the Student Self-Government website, but also for ensuring the operation of inanimate items.



Grzegorz Król, until recently a student of the Faculty of Automatic Control, Electronics and Computer Science, since March this year a student of the Faculty of Mechanical Engineering, Member of the Management Board for Scientific Clubs and Student Organizations. Grzegorz is responsible for contact with student organizations operating at the Silesian University of Technology. He watches over the Scientific Circles, their financing and operation.

Each of them is committed to their previously set goals and open to new, unexplored paths. Open cooperation and optimism in action allow the Management Board to make unanimous decisions on matters important to the entire academic community.

The mission of local government officials is to actively work for the welfare of students of the Silesian University of Technology.

Contact via the local government's social media or by e-mail to biuro@samorzad.polsl.pl. ■

IS NUCLEAR ENERGY A WAY TO DECARBONIZE?

Edited by: Anna Świdarska

photo: Przemysław Bratkowski

WE TALK ABOUT NUCLEAR ENERGY, THE COUNTRY'S ENERGY SECURITY AND THE STRATEGY CHOSEN IN CONNECTION WITH THE POLISH NUCLEAR ENERGY PROGRAM, AS WELL AS THE ROLE OF SCIENTISTS FROM THE SILESIA UNIVERSITY OF TECHNOLOGY IN THE DECARBONIZATION PROCESS, IN THE LATEST EPISODE OF THE PODCAST "LET'S TALK ABOUT SCIENCE" WITH DR HAB. ENG. ŁUKASZ BARTELA, PROF. SUT - FACULTY OF ENERGY AND ENVIRONMENTAL ENGINEERING.

The opportunity to talk came during the Nuclear Energy Open Days organized at the University, during which scientists and students met with representatives of the most important companies and institutions related to nuclear energy. From this semester, the Silesian University of Technology is recruiting for a new field of second-cycle studies - nuclear energy. This is the University's response to the significant demand for specialists in this industry.

– These are studies for ambitious people who want to change the world, because nuclear energy is the area of the economy, the techno-

logical area that, in global terms, is intended to decarbonize the energy industry, in particular turning away from coal-based energy and moving towards zero-emission sources. Nuclear energy already needs lawyers, banking specialists, economists and, of course, engineers - emphasized prof. Bartela, who is also the manager of the DEsire project implemented at the Silesian University of Technology in cooperation with the Ministry of Climate and Environment. The aim of the project is to develop a plan for the decarbonization of the national energy sector to constitute a roadmap for future investment processes in the field of Coal-to-Nuclear policy.

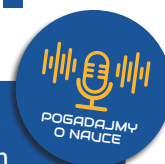
– In our project, we focus on developing a plan for decarbonization of coal-fired units and transforming them into nuclear units, i.e. in order to use the potential of the existing infrastructure within coal-fired power plants. And this is not only technical infrastructure, but also certain intellectual value. The Ministry of Climate and Environment is responsible for the Polish Nuclear Energy Program and is also responsible for implementing the effects of our project. Our technological partners are Energoprojekt-Katowice and the Institute of Nuclear Chemistry and Technology, which have excellent competences in the field of nuclear safety.

The task of the Silesian University of Technology will be to establish an Ener-

gy Transformation Cluster, we will create a platform for the exchange of ideas for all beneficiaries of the Coal-To-Nuclear process. We have to move away from coal, whether we want it or not, international agreements oblige us to do so. We assume that in 2050 we will not have large-scale coal-fired energy units and let us remember that today this is the basis of the country's energy security. Our task is to propose various solutions - just because someone is a supporter of nuclear energy does not mean that they see no place for other technologies in the national energy mix - said prof. Bartela.

More about what should be included in the Polish energy mix, about plans to build the first nuclear power plant in Poland and small SMR modular reactors - as well as about the locations in which they will be built - in the podcast of the Silesian University of Technology "Let's talk about science: from coal to atom". We invite you to listen to the conversation. ■

You can listen to more on this topic in the podcast "Let's talk about science".



METAMATERIALS AND SENSORS WILL HELP SURGEONS

text: Jolanta Skwaradowska

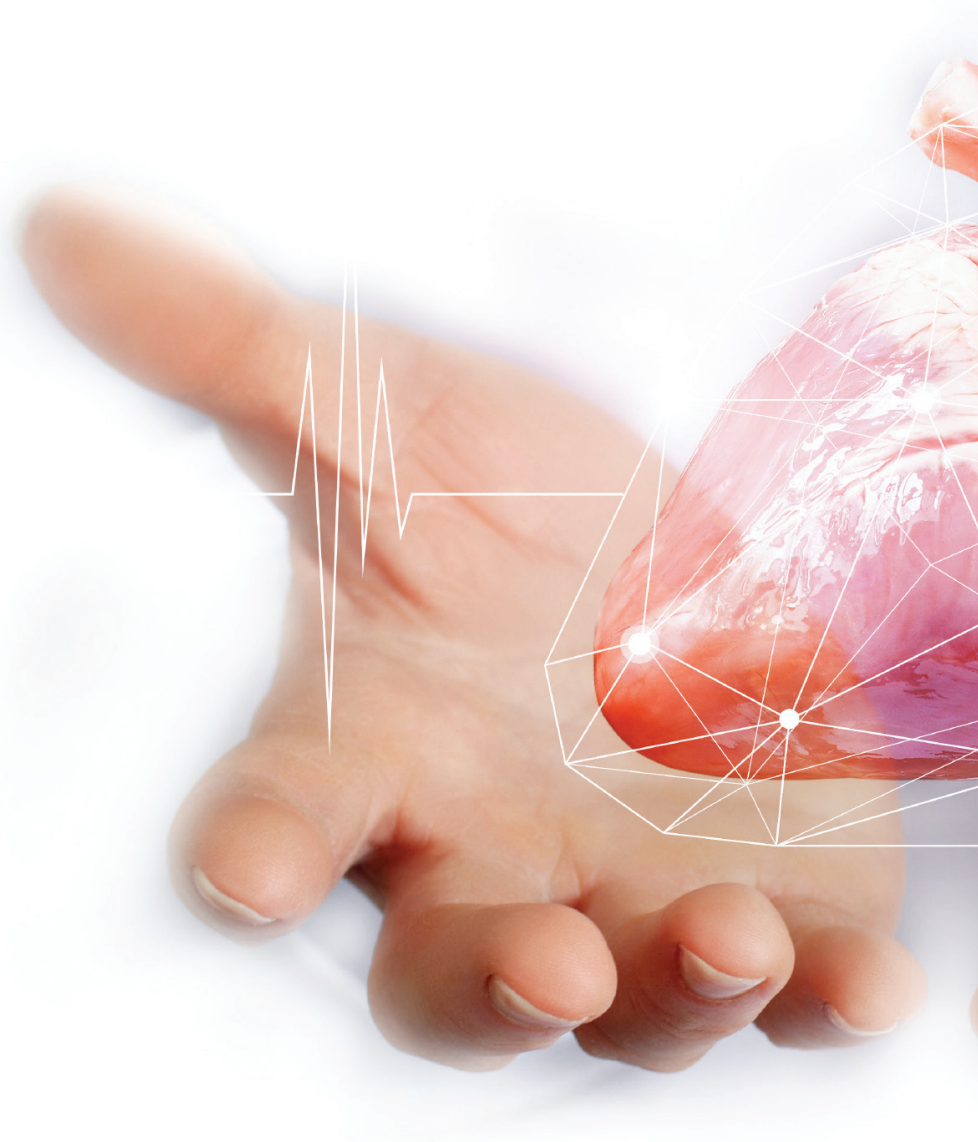
photo: mat. RIB

THE FACULTY OF BIOMEDICAL ENGINEERING OF THE SILESIA UNIVERSITY OF TECHNOLOGY IS IMPLEMENTING A PROJECT, WHICH AIMS TO DEVELOP NEW GENERATION SURGICAL TOOLS. THESE TOOLS ARE USED DURING CARDIOVASCULAR SURGERY TO MINIMIZE TISSUE TRAUMA.

The main goal of the project, implemented at the Faculty of Biomedical Engineering, is to develop and produce new generation of traditional and laparoscopic tools that ensure safe and controlled closure of blood vessels. This will protect the tissue from overload, which will reduce gripping injuries.

– The project involves the use of modern biocompatible, atraumatic metamaterials and sensors on the working surfaces of tools, ensuring safe tissue gripping. Moreover, the use of hydrophobic coatings is intended to ensure easy washing and sterilization, which will enable their reuse - said dr hab. Eng. Marcin Basiaga, prof. SUT, project manager.

Vascular clamps that are currently available on the market have a limited ability to control the pressure force during surgical procedures. The design of some tools makes the pressure



distribution uneven along the entire length of the jaws.

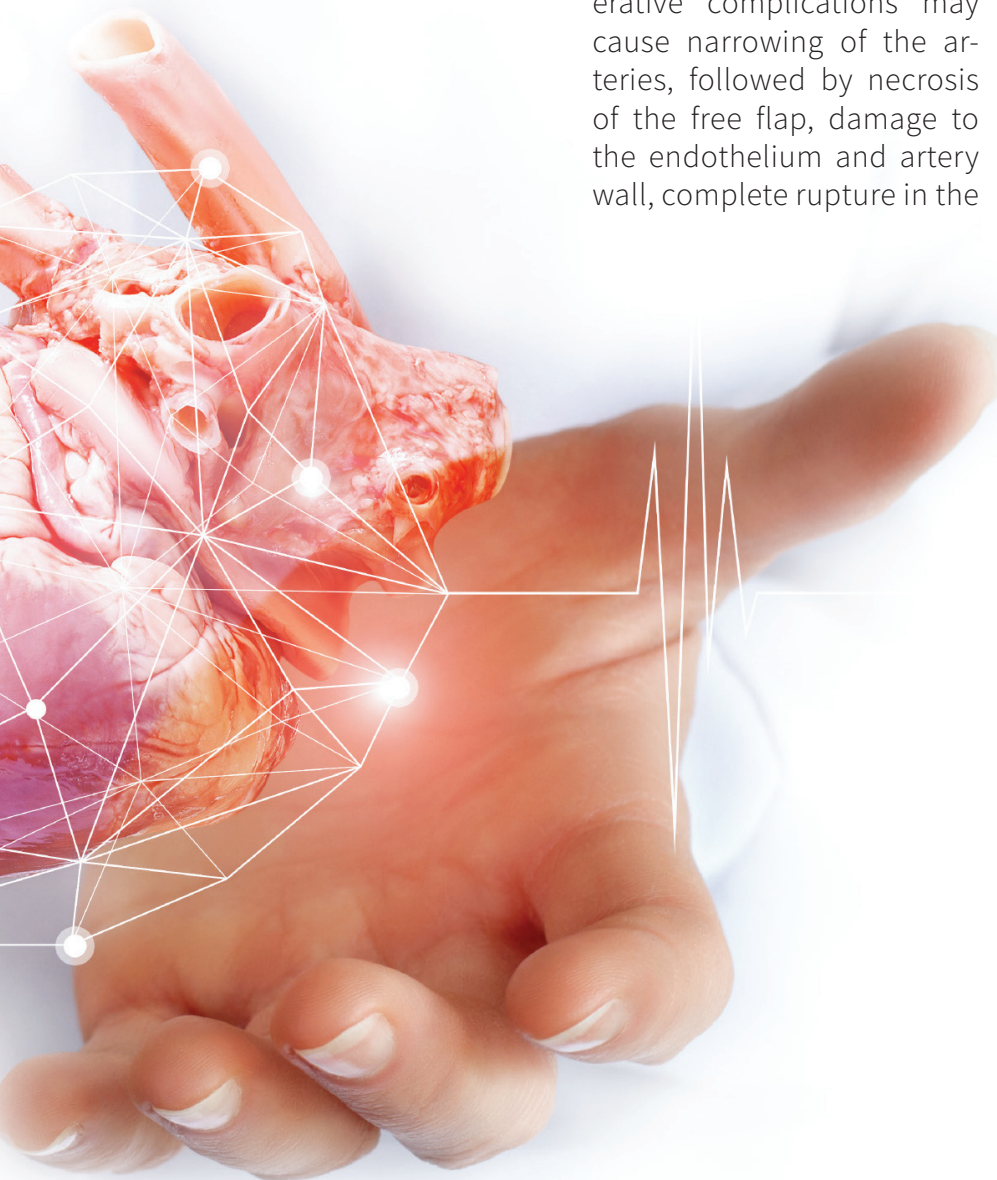
– Currently, there are no appropriate normative requirements that would specify the values of pressure force for individual vessels, especially those differentiated in terms of mechanical properties. To reduce tissue damage, some manufacturers offer so-called atraumatic inserts made of soft materials. However, research shows that the quality of the inserts is insufficient, mainly due to their low susceptibility to deformation - notes dr hab. Eng. Marcin Basiaga, prof. of SUT.

Other solutions proposed the use of special sensors, but they did not bring satisfactory results.

– State-of-the-art clamping and gripping instruments in the cardiovascular system and in thoracic surgery do not provide real-time control of the pressure force. Consequently, almost all vascular procedures carry the risk of excessive clamping/grasping forces. The most common postoperative complications may cause narrowing of the arteries, followed by necrosis of the free flap, damage to the endothelium and artery wall, complete rupture in the

centre of the vessel or blood clots, interrupting blood flow to the organ or limb - adds the scientist.

The project called "Advanced metamaterials dedicated to cardiovascular surgery to minimize tissue injuries" is implemented with the participation of nine consortium members, including four foreign ones (three from Austria, and one from Turkey). The leader of the project is the Silesian University of Technology. For its implementation, the Faculty of Biomedical Engineering obtained funding for a total amount of almost PLN 2 million, eight hundred thousand. The project manager at the Silesian University of Technology is dr hab. Eng. Marcin Basiaga, prof. SUT from the Department of Biomaterials and Medical Devices Engineering. ■



DISSOLVABLE IMPLANTS SAVE LIVES

text: Anna Świdarska

photos: Maciej Mutwil, mat. Syntplant Sp. z o.o.

A SURGICAL IMPLANT THAT GROWS OVER THE PATIENT'S BONE AND DISAPPEARS FROM THE BODY AFTER SEVERAL MONTHS - THIS IS NOT SCIENCE FICTION, BUT THE RESULT OF THE WORK OF A GROUP OF SCIENTISTS, INCLUDING THOSE FROM THE SILESIA UNIVERSITY OF TECHNOLOGY. DR ENG. MAŁGORZATA MUZALEWSKA AND DR HAB. ENG. MAREK WYLEŻOŁ, PROF. SUT FROM THE DEPARTMENT OF FUNDAMENTALS OF MACHINE DESIGN, FACULTY OF MECHANICAL ENGINEERING, ARE PART OF THE TEAM THAT DEVELOPED PERSONALIZED 3D PRINTED IMPLANTS - BIORESORBABLE AND BONE-FORMING. THIS INNOVATIVE SOLUTION HAS ALREADY HELPED SEVERAL PATIENTS IN POLAND AND UKRAINE.

A BREAKTHROUGH IN PAEDIATRIC NEUROSURGERY

A four-year-old girl from Mykolaiv, Ukraine, suffers a terrible accident. Doctors save her life, but they are unable to do anything about the huge bone loss - as a result of the accident, the girl has a hole in her head, which constitutes almost one-third of the surface of the skull. The child is alive, but even a minor injury can pose a fatal threat to her. Ukrainian neurosurgeons are looking for help abroad - in a war-torn country, such

complicated cranioplastic surgeries are practically impossible to perform. Bone defects are usually filled with native bone, taken from other parts of the operated patient's skeletal system. Such procedures are time-consuming and due to the destabilization of the health care system in Ukraine, they are currently practically not carried out. Moreover, the bone loss is enormous, and the child is growing, so the procedures would have to be performed repeatedly. There are no implants that would

not deform the child's head due to its growth, and multiple surgeries are physically exhausting for the little patient. Pavlo Plavskij, head of the neurosurgery department of the National Specialized Children's Hospital "Ohmatdyt" in Kiev, the largest such facility in Ukraine, contacts the Polish company Syntplant, which, among others, with scientists from the Silesian and Poznań Universities of Technology, is developing, as part of a scientific project, bioresorbable biodegradable implants for bone reconstruction procedures. The company has appropriate material in the form of filament for 3D printers and technology for producing implants. There is no design of an implant that, after implantation, will "grow" with the child. The scientific team includes dr Eng. Małgorzata Muzalewska and prof. Marek Wyleżoł from the Silesian University of Technology and they are taking up the challenge of developing an implant for a girl from Mikołajów.



Implant model for a girl from Mikołajów



Implant surgery performed at the National Specialized Children's Hospital "Ohmatdyt" in Kiev

She is a biomedical engineer; he is a mechanical engineer. Using the latest virtual modelling technologies, they successfully develop models of bioresorbable bone implants. Their excellent cooperation will once again result in an innovative solution.

MODEL COOPERATION

– My role is to model the patient's anatomical structures – explains dr Eng. Małgorzata Muzalewska – Because our implants are personalized, my work always starts with the results of computed tomography tests. Based on them, using specialized software, I develop a virtual anatomical model, then prof. Wyleżoł, using the haptic modelling technique, creates a model of an implant filling the defect, adjusted to the curvatures of a given bone. – Our ambition is for our implants implanted in patients to look as anatomical and as technical as possible – adds

the professor, emphasizing that he has been involved in virtual modelling as a hobby for over 24 years. – We have equipment at the University for haptical modelling. This is a very complicated and rarely used virtual modelling technique in Poland, perfectly suitable for creating models of elements of the skeletal system, i.e. those that do not have the typical geometric features so characteristic of the technique.

The result of the scientists' painstaking work was the creation of an implant model for the little patient, the design of which was based on a system of connected flat ribs that form the curves of the skull. Scientists called the implant adaptive because it "grows" with the child. It is characterized by susceptibility to stresses occurring between the implant and the edge of the skull, which expands during growth. Thanks to special grooves between the ribs, the implant

can be deliberately deformed, which gives the body space for bone growth. The implant was successfully implanted in a 4-year-old girl at the end of 2022. In the following months, scientists from the Silesian University of Technology developed implants of a similar design for two children, aged 6 and 8, which were also successfully implanted. The surgeries were performed as part of social assistance, free of charge for patients, thanks to grant funds. At the request of doctors, and out of concern for the well-being of patients, information about innovative treatments was made known with a considerable delay. All three children are doing well, which means that the scientists' work has opened up new possibilities in the field of paediatric implantology.

– Our little patients are under constant care of doctors, they have regular examinations using computed tomography, which show that our im-



Marek Wyleżoł, Silesian University of Technology; Monika Knitter Poznań University of Technology; Małgorzata Muzalewska, Silesian University of Technology; Marcin Wątrobiński, Syntplant Sp. z o. o., Monika Dobrzyńska-Mizera Poznań University of Technology.

plants are working, i.e. they are starting to grow over the children's native bone – says prof. Wyleżoł. – All children are feeling well, we have direct contact with their doctors, and we are very happy that we managed to help them.

IMPLANTS OF THE FUTURE

The novelty of the implants developed by the team of scientists is that they are made of bioresorbable and bone-forming materials, i.e. they are overgrown with bone tissue. The material is developed and manufactured by a team of scientists from the Poznań University of Technology. The implants are made of modified polylactide with many additives. Its main advantage is that it is resorbed, i.e., it safely disappears from the human body after about 18 months. Bone-forming admixtures stimulate the patient's body, which causes bone tissue to grow into appropriately designed spaces.

– What is also innovative is that the modified polylactide is processed into a filament that we can use in 3D printers, thanks to which we are able to produce implants very quickly. Of course, this process takes place in sterile conditions, in a special chamber. After printing, the implant is subject to radiation sterilization (this can only be done in Warsaw). After this process, it can be implanted into the patient's body - explains dr Eng. Muzalewska.

SCIENCE IS A MISSION

Bioresorbable implants have already helped several patients and are successfully used in fields of medicine such as maxillofacial surgery, neurology, dentistry and orthopaedics. They are an ideal solution in cases where current medical possibilities have been exhausted. They are a lifesaver for patients after cancer treatment, genetic defects, or accidents. They

can save lives, but also significantly improve their quality. Just like in the case of a young woman who, after suffering a complicated jaw fracture in a traffic accident, was doomed to have a deformed face. Doctors saved her life, but without a personalized implant, it was impossible to recreate the jaw and teeth. Scientists also modelled a fragment of the jaw of a patient with a depressed sinus or a teenager with a cleft palate who had already undergone several previous, unsuccessful procedures.

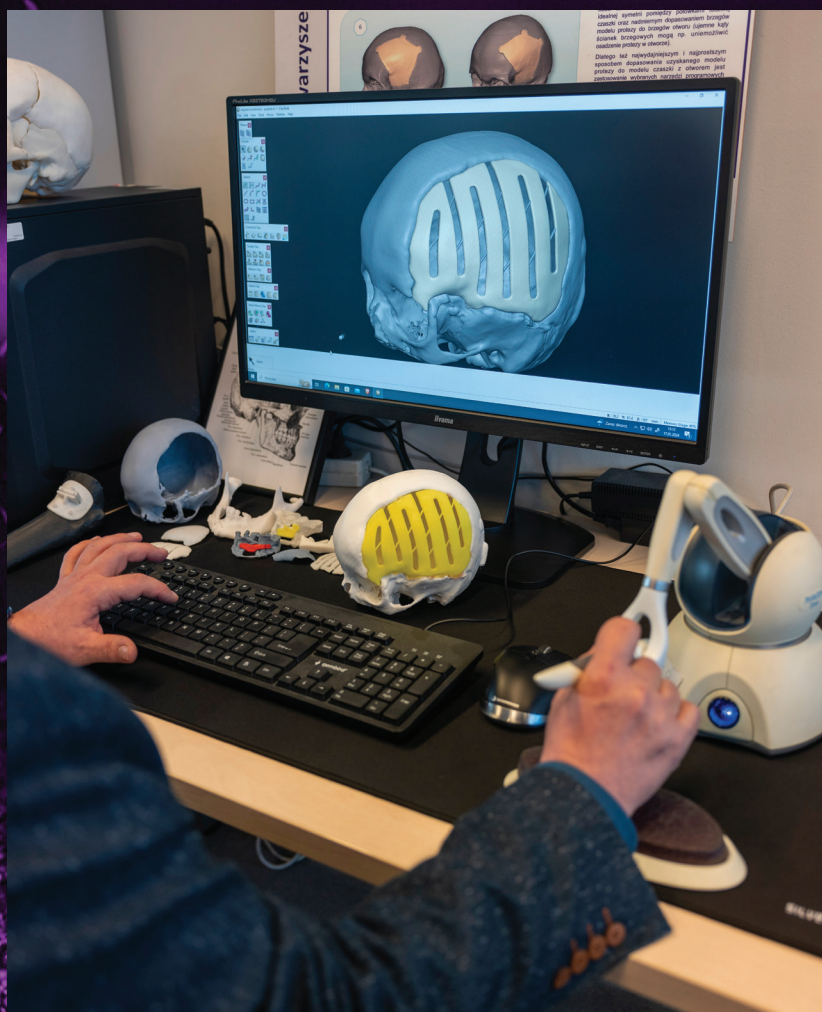
– We are in contact with doctors from the moment of creating models and constructing implants, to the surgeries during which we are present. This is a remarkably interesting experience, contributing a lot and improving the process of modelling subsequent implants - explains dr Eng. Muzalewska. – Engineers in the operating room or in the dentist's office are there to

advise on the method of implant fixation, i.e., the method of attachment. Of course, we always plan it in advance, but unexpected circumstances may occur during the procedure, which is always a valuable lesson for the future.

Bioresorbable, bone-forming implants can be used throughout the entire skeletal system. Scientists are developing personalized implant models, and further surgeries are already planned.

– As a mechanical engineer, I am particularly satisfied that my former hobby of virtual modelling has found application in the field of medicine. This is not an ordinary situation and that is why I feel a bit unusual, but I am very happy that my knowledge of virtual modelling has been applied to the treatment of people - says proudly prof. Wyleżoń. – I have always believed that science should serve people – he adds.

– There is great satisfaction with this project because we see that what we do works and helps people – adds dr Eng. Muzalewska. – Of course, health is our priority, but we are also incredibly happy when we



improve our appearance and aesthetics. For a young woman, the opportunity to replace a serious tooth loss is very important, it is a great satisfaction to see such a success.

The achievements of our scientists have already received

wide media attention, thanks to which more and more people, as well as medical facilities, ask about the possibility of cooperation. Congratulations on your success! ■



WILL THE EAGLE LAND ON MARS?

text: Martin Huć

photos: Marcin Januszka, Grzegorz Krawczyk

AS PART OF HIS MASTER'S THESIS, PAWEŁ POLNIK DEVELOPED AN INNOVATIVE CONTROL SYSTEM FOR AN EXPLORATION ROBOT CALLED ORZEŁ-7 (EAGLE-7). TO CARRY OUT THE RESEARCH, HE CREATED A TEST TRACK IN HIS OWN BACKYARD, SIMULATING MARTIAN CONDITIONS. HIS WORK WAS APPRECIATED AND TOOK THIRD PLACE IN THE COMPETITION FOR THE AWARD OF THE PRESIDENT OF THE POLISH SPACE AGENCY 2023.

I have always been interested in the topic of Mars rovers, so I decided to create an exploration robot Orzeł-7, which was printed using 3D printing technology - begins the story of Paweł Polnik, a 27-year-old from Wodzisław Śląski. He completed engineering and master's studies in Automation and

Robotics at the Silesian University of Technology. He is also a member of the SKN AI-METH scientific circle. His project was implemented at the Department of Fundamentals of Machinery Design at the Faculty of Mechanical Engineering.

The robot was placed on a special platform (its design was

used in the last Mars rovers), i.e. a suspension with six wheels, the so-called rocker-bogies on which it moved. However, the entire project was created during the pandemic, so the author had to change his idea of creating a test track for the robot, which was originally supposed to be built in mining areas.

– Ultimately, I recreated Martian conditions by building a realistic test track in my own backyard – says the hero of the article. – In an area of approximately 15-20 m², I placed obstacles, including stones of various sizes, so that the robot could explore the area.

However, before Orzeł-7 faced this task, Paweł Polnik took about 500 photographs of the track - both during the day and at night. The robot's autonomous control system is based on deep neural networks, so after processing data from photos using various parameters, the robot can classify road occupancy. It is also equipped with a camera mounted on the boom, thanks to which it scans



Dr hab. Eng. Wojciech Sitek, prof. SUT; Paweł Polnik MSc;
dr hab. Eng. Anna Timofiejczuk, prof. SUT



the area to be able to move around it independently and try to avoid obstacles. During tests on the track, when it encountered a stone, it stopped in front of it and after a while it passed it on the left side, as programmed. After scanning the area again, it moved on.

– When later, out of pure curiosity, I placed it outside the track, in a new place, all it could do was spin in circles. It could not determine its own position. However, this was not the subject of the work - explains Paweł Polnik. – I am very satisfied with my project. Its advantages are certainly educational properties, because it is not only theory but also practice. When I was reviewing the literature related to my work, I noticed that none of the cited open-source projects available on the market had sufficient parameters in terms of exploratory driving in outdoor conditions. Moreover, I believe

that the system I used, with appropriate modifications, can be used to create robots for space mining. Interestingly, there are already companies around the world conducting interesting research on this topic.

Paweł Polnik's master's thesis "Control system for an exploration robot based on deep neural networks" was awarded and took third place in the prestigious competition for the award of the President of the Polish Space Agency 2023.

– This is my life's success and the fulfilment of my dreams, as well as a reward for many hours of hard work to be on time – sums up Paweł Polnik. – I have always wanted to create a robot and such a control system, and studies at the Silesian University of Technology enabled me to do so. This project is proof that you can implement your ideas at low costs. I managed

to meet many important people from the industry. This gives great motivation to continue working. However, this is not only my achievement, but the result of working together with an amazing team: my supervisor, dr Eng. Marcin Januszka, dr Eng. Mateusz Kosior and the supervisor of the student scientific club AI-METH, dr engineer Piotr Przysławka, prof. SUT and MSc. Eng. Tadeusz Caban, who shared with me his design of a robotic platform for RC vehicles, based on which I could expand my idea.

– Currently, in times of such dynamic development of space flights, it is only a matter of time before further missions using exploration robots – says dr Eng. Marcin Januszka. – Paweł Polnik's master's thesis is particularly impressive and an outstanding achievement. Even as a small project - compared to huge government projects and



international space agencies - it adds another brick that allows us to reach increasingly distant places in space. Winning third place in the competition for the Award of the President of the Polish Space Agency confirms the scale of success. This is an award of great importance that emphasizes the importance and innovation of the presented solution. Orzeł-7 as a test platform will allow to validate the programmed behaviours of other robots in the future. Paweł Polnik's work is distinguished by its comprehensiveness and high quality of results. The achievement constitutes a significant contribution to the development of science and technology, especially in the area of space exploration, but not only. You can realize that there are still many places to explore with robots on Earth and under its surface.

The graduate of the Silesian University of Technology plans to soon start doctoral studies at our university, and he also has another project planned related to his professional work. On a daily basis, Paweł Polnik has been working at the Marcel mine in Radlin for seven years, currently as an inspector of the electrical department in the Teletechnics and Automation and Gasometry department. There, he deals with the visualization of dispatch systems for tracking the production process.

– I am currently at the stage of expanding my knowledge in the field of geophysics and seismology, because I would like to face something that is considered unpredictable, i.e. tremors – he explains. – I am currently working on the concept of a project to create a predictive model to recognize the initial symptoms

of energy shocks in the mine. The project involves the use of advanced seismological equipment and an extensive network of sensors that generate large amounts of data - the most important and most difficult part of artificial intelligence. The collected data about previous shocks will be processed by appropriate neural network architectures, i.e. deep learning techniques, in order to recognize the first symptoms of future shocks. Maybe with the help of neural networks and artificial intelligence it will be possible to predict them? I know that it seems a bit abstract and almost impossible, but at the Silesian University of Technology and in the research club I participated in many interesting projects, so I am very curious about the effects of this work, even if they turn out to be unsuccessful. ■

ON ONE NOTE

text: Martin Huć
photos: Martin Huć

THEY SPEAK TECHNICAL LANGUAGE EVERY DAY, BUT DURING REHEARSALS THEY WERE UNITED BY THE LANGUAGE OF MUSIC. ON FEBRUARY 13TH, THE SYMPHONY ORCHESTRA OF THE SILESIAN UNIVERSITY OF TECHNOLOGY CELEBRATED ITS FIRST BIRTHDAY. ITS LINEUP CONSISTS OF OVER 50 MUSICIANS, AND THEY HAVE GIVEN A FANTASTIC CONCERT.

STANDING OVATION

Several dozen musicians on stage, many great songs, a packed auditorium with a lively audience that awarded the heroes of the evening with a standing ovation. This is what the first Christmas and New Year's concert looked like, organized by the Orchestra of the Silesian University of Technology together with the Academic Music Ensemble of the Silesian University of Technology and the KLAŠTER Mixed Choir. It was the culmina-

tion of the first official year of activity of the Orchestra, the idea of which dates back many years and was related to informal musical meetings of students in the academic estate.

– At the beginning, these were small projects that could be compared more to so-called shows, i.e., individual performances with accompaniment, or performances by chamber ensembles – says Daria Kałużyńska, co-founder of the orchestra. – We and the mu-

sicians sometimes spontaneously gathered and added splendour to celebrations at our university, such as anniversaries or the inauguration of the academic year, but these were not permanent events.

The history of the orchestra began inconspicuously, with meetings in a smaller group. The first attempt was scheduled for July 8th, 2022, with a seven-person team.

– Back then, we were more like a big band than an orchestra.



We had no idea in which direction it would lead us - whether we would stay in this structure permanently, or whether we would stay in an orchestra with a dominant brass composition, or whether a larger string section would join us - recalls Joanna Szottysik. – However, all this became clear over the summer, because at the beginning of October, a dozen or so people, forming a small symphonic ensemble, came to our "illegal" rehearsals. Over the next months - ultimately leading to the establishment of the orchestra as a student organization - over twenty people came to play with us.

However, music enthusiasts had to deal with many formalities. This was a completely new scope of responsibilities for them. This required a lot of patience from the orchestra and getting to know the procedures in force at the University from the inside out. We also went to a meeting with the authorities to discuss the creation of the orchestra. His Magnificence Rector of the Silesian University of Technology, prof. dr hab. Eng. Arkadiusz Mężyk reacted very enthusiastically to the news about such a project, and soon the orchestra was established as an official organization.

– We are also grateful to Mrs. Katarzyna Dudek, who is the president of the Academic Music Ensemble. She received the title of "godmother" of our orchestra because she contributed to its creation from the formal side - say the orchestra members.

At that time, the management was also clarified, consisting of the president and found-

er - Joanna Szottysik, Daria Kałużyńska - co-founder, Jonasz Michalik, responsible for social media, and Hubert Przegendza - the author of the orchestra's logo. Recently, Helena Koszałka has also joined the management board - a concertmaster who has been with the orchestra since its inception. In April 2023, Kamil Pawłowski, a double bassist and composer, became the conductor.

For the newly established team, the first years of work are characterized by dynamic changes, therefore the founding team decided to give up their current duties in March 2024. Miłosz Korpól, a graduate of symphony and opera conducting at the Academy of Music in Katowice, was appointed as the new conductor. We will certainly hear about his activities with the orchestra soon.

RECRUITMENT SUCCESS

– Finally, after we became a student organization in February last year, we planned to start official recruitment at the beginning of the new academic year – says Helena Koszałka. – We tried to promote the orchestra in every possible way and reach places where we had not been heard before. We set up a Facebook page and an Instagram account. We also made recruitment posters which we hung in the university's departments.

The musicians had to wait patiently for someone to show up. However, the effect exceeded their wildest expectations and, to their surprise, at one of the rehearsals, which take place in Gliwice at 9 Hutnicza Street, so many new people showed up that they could barely fit in the room.

Currently, the orchestra consists of over 50 musicians, including students of our university, first-year students, graduates, PhD students, and employees.

– We also bring together people from the Medical University of Silesia, the University of Silesia, and other Silesian universities – says Jonasz Michalik. – Surprisingly, we were also joined by graduates of the Academy of Music. We have a place for people who come from Germany or from beyond our eastern border. You can still join. We are looking for people who play string instruments, especially viola and double bass. We will also be happy to accept bassoon and French horn players as members of the orchestra.

– We focus on a friendly atmosphere and the pleasure of playing, but we are aware that the pieces we want to present are ambitious and require skills at approximately the level of the end of the second grade of music school – explains Daria Kałużyńska. – Of course, we do not pigeonhole anyone and we have self-taught people in our ranks who are doing very well, so we do not set any specific requirements regarding education.

The oldest person in the orchestra is dr hab. Eng. Wojciech Więclawek, prof. of SUT.

– I started my adventure with the trumpet when I was ten years old – says prof. Wojciech Więclawek – In the meantime, I played in five orchestras. A few years ago, unfortunately, without success, I tried to organize a brass band at our university. So, it was natural for me that after receiving an invitation from President Joasia to join the or-

chestra's activities, I accepted it with great pleasure.

– For most of us, playing in an orchestra is a way to further develop our passion – says Helena Koszałka. – Many members of the orchestra have had a lot in common with music for a long time but did not want to connect their professional careers with it – it is known that technical studies are a slightly safer choice. Gaming is also a kind of escape from everyday life, rest and time spent in a pleasant atmosphere. No wonder, because we have everything you need here - good music combined with good company.

THE AUDIENCE DEMANDED AN ENCORE

Months of preparations and rehearsals led to their first great undertaking, which was the above-mentioned Christmas and New Year's concert. The inconspicuous idea of creating

a university orchestra resulted in a great spectacle, ending with endless applause and encores.

– The concert was the largest undertaking we have faced so far. For us - novices in organizing such events - it was a very valuable experience that taught us a lot - says Daria Kałużyńska. – We do not hide the fact that the last weeks before the concert were exhausting. We had to increase the frequency of rehearsals to practice orchestral pieces and pieces with choir accompaniment, remembering that January is a month of carnival and Christmas concerts, and many of our musicians do not limit themselves to playing only in our orchestra. It is also pre-session time and students also had more work at the University. We are even more grateful to everyone who, despite the difficult period, persistently attended rehearsals.

The over-hour-long concert consisted of two parts. In the

first one, we heard Christmas carols from all over the world, as well as Christmas songs such as "Last Christmas" and "Rock-in' Around the Christmas Tree". The second part featured movie motifs, e.g. from "Spirit: Stallion of the Cimarron", "Pirates of the Caribbean" and "Jaina Homeland", from the soundtrack of the computer game "World of Warcraft". In the near future, the musicians plan to expand their repertoire to include classical music and more songs accompanied by a choir.

– We were very surprised and at the same time pleased with the turnout at the concert - we absolutely did not expect the hall to be overcrowded - say the board members. – This is the greatest reward for us. This means that people want to listen to us and there is a demand for this form of culture, which we will be happy to try to provide to the University community! ■



LONG LIVE GRAND BALL OF THE SILESIA UNIVERSITY OF TECHNOLOGY!

text: Katarzyna Siwczyk
photo: Maciej Mutwil

HALF A THOUSAND PEOPLE MET ON SATURDAY, FEBRUARY 3RD, 2024, AT ARENA PREZERO AT THE SILESIA UNIVERSITY OF TECHNOLOGY BALL. STUDENTS, ACADEMIC TEACHERS, SCIENTISTS, AND FRIENDS OF THE SILESIA UNIVERSITY OF TECHNOLOGY TOOK PART IN THE FUN. AMONG THEM WERE POLITICIANS, LOCAL GOVERNMENT OFFICIALS, AND REPRESENTATIVES OF BUSINESS PARTNERS WITH WHOM THE SILESIA UNIVERSITY OF TECHNOLOGY COOPERATES ON A DAILY BASIS.

We are very happy to return to the tradition of the Silesian University of Technology Ball. The last such ball - the 75th anniversary ball - took place in 2020, and a dozen or so days later the pandemic broke out. After everything that has happened in recent years - the fight against the pandemic, the war in Ukraine, the economic and energy crisis, it is time to return to tradition. This is an event during which the academic community, but

also friends and the socio-economic environment have the opportunity to integrate, talk about future cooperation and simply build good relationships - said the Rector of the Silesian University of Technology, prof. dr hab. Eng. Arkadiusz Meżyk, who solemnly welcomed the guests.

Artur Tomasiak, chairman of the Silesian University of Technology University Council, also said that the balls of the Silesian University of Technology are conducive to friendly

meetings, but also to expressions of thanks.

- This is an excellent initiative that should be continued in the coming years. This is an opportunity to sum up. The Rector should be thanked for being able to guide the Silesian University of Technology through these meanders during a period of so many crises, and as his term of office is ending, he should also be thanked for a period of very good cooperation to the benefit of the university. New projects were

the University of Silesia in Katowice, I know perfectly well the challenges our Silesian universities face, said Borys Budka. - The Silesian University of Technology is a symbol of technical thought in the region and can become an embassy that shows that we can be proud of Silesia - he added.

For the Secretary of State in the Ministry of Science and Higher Education, prof. Marek Gzik, the Silesian University of Technology Ball was an opportunity to take a break after intense months of work in the Sejm of the Republic of Poland.

- I am still a proud representative of the Silesian University of Technology, and I am always happy when I can come back here and meet the academic community, despite the challenges that I have been taking up for several months, said prof. Gzik. - These meetings and conversations give me the opportunity to listen to problems and experiences, which today I am trying to turn into specific actions when it comes to the state's science policy - added Minister Gzik.

There was a lot of discussion behind the scenes on many levels about the challenges facing science and higher education. Students, scientists, academic teachers, as well as graduates who actively participate in the life of the Silesian University of Technology had fun together on the dance floor.

- I am a graduate, but also a teacher on leave and I come back here with sentiment to meet all my friends. For me, the ball is not only fun, especially as a local government official - due to other functions - I use

this opportunity to talk behind the scenes about how to make Silesian universities - including the Silesian University of Technology - grow stronger and be even more recognizable on the world maps - said Marcin Krupa, mayor of Katowice.

There was no end to conversations, meetings, and fun together. There was also a traditional polonaise and a big cake. Several hundred guests had fun in the PreZero Arena until dawn. And all thanks to the support of the sponsor - Huta Łabędy SA

- We have been cooperating with the Silesian University of Technology for a long time. I am a graduate of the Faculty of Energy and Environmental Engineering, so I am even more pleased if I can support my Alma Mater. Last year we celebrated our 175th anniversary. Although the University of Technology is much younger, for as long as I remember, it has always cooperated with the steelworks in the field of staff training and innovative solutions. Without this modern technical support, the steelworks would not exist today, so we must cooperate - said Marek Bar, president of Huta Łabędy, who received the title of Friend of the Silesian University of Technology.

Another opportunity to celebrate together may be next year. The eightieth inauguration of the academic year at the Silesian University of Technology will take place in October. ■

 **HUTA ŁABĘDY S.A.**

implemented, new places were created, such as EHTIC in Zabrze, the Academic Aviation Training Centre and new departments in Katowice - said Artur Tomasik.

The development of the Silesian University of Technology was also appreciated by other distinguished guests who, accompanied by the Academic Dance Ensemble "Dąbrowiaczy", were welcomed on the red carpet by His Magnificence Rector of the Silesian University of Technology. Among them were representatives of state authorities - the Minister of State Assets - Borys Budka, as well as the Deputy Minister of Science and Higher Education, associated with the Silesian University of Technology, prof. Marek Gzik.

- The Silesian University of Technology is, above all, people - excellent scientists and educators, and today is an opportunity to meet them, talk about the future, and share their comments. As a teacher and assistant professor at

PROJECTS IN THE ECO RHYTHM

text: Katarzyna Siwczyk
photos: Krzysztof Gronowicz

TABLES MADE OF USED TIRES, A CAT BED MADE OF AN OLD TV, AND INTERIOR DECORATIONS MADE OF CARDBOARD - THESE ARE JUST SOME OF THE ECOLOGICAL PROJECTS OF STUDENTS OF THE FACULTY OF ARCHITECTURE THAT WERE PRESENTED DURING 4 DESIGN DAYS. VISITORS ALSO SAW A CERAMIC MODEL OF THE CAMPUS OF THE SILESIA UNIVERSITY OF TECHNOLOGY IN GLIWICE.

From January 25 to 28, one of the largest events for architecture, decor and design enthusiasts took place at the International Congress Centre in Katowice. 4 DESIGN DAYS, as usual, attracted crowds of residents from all over the region who were looking for inspiration and learning about trends for the upcoming seasons. Discussions on this topic were held with the participation of scientists from the Silesian University of Technology.

Thanks to the involvement of employees and students of the Faculty of Architecture, an attractive stand was also created.

– We always promote the Faculty of Architecture, our students, and the achievements of our employees. All our industrial partners are present at these fairs, with whom we talk about new scientific and research projects, and we even join grant projects together. This is an excellent opportunity to establish good business relations,

not only for scientists, but also for students - said dr hab. engineer arch. Klaudiusz Fross, prof. SUT, Dean of the Faculty of Architecture.

The main gem presented at the WUT stand during this year's edition of 4 DESIGN DAYS was a ceramic model of the academic campus in Gliwice.

– This year we focused on presenting crafts. Crafts supporting architects and interior designers. The mosaic we presented was an example of this. Architecture should benefit from cooperation with craftsmen, artists, and producers, in line with the Bauhaus idea, said dr Krzysztof Groń, vice-dean of the Faculty of Architecture. – 4 DESIGN DAYS create conditions for students to meet producers and designers and provide the opportunity to talk about possible fields of cooperation. I prepare students all year round to present themselves at the fair, because it is a great opportunity for them, added dr Groń.

The students took full advantage of their opportunity. For several days, they proudly told fair guests about their projects, which fit the trend of a sustainable approach to life that protects the climate. All projects were ecological.



Weronika Piechulek, a student of the Faculty of Architecture, made her debut at the fair



Julia Wybraniec - a student of the Faculty of Architecture presented a model of the academic town

– My passion was born by accident. I just noticed that a lot of used tires end up in landfills - even worse, in forests! – or go to waste disposal. So, I came up with the idea of reusing them. This is how the table was created, said Anna Całus, a postgraduate student at the Faculty of Architecture. Her project required little financial outlay. All you needed was plywood, some glue, and jute rope. The result is a modern and elegant table in a fashionable Scandinavian style.

– I think everyone can do such experiments. I believe that there is a lack of education at the primary school level to encourage people to recycle. Every time we have to throw something away, we should consider whether we can still use it somehow, advised Anna Całus. Giving objects a new life goes hand in hand with responsible consumption and production, as global climate organizations have been calling for years. But this is not the only reason why it is worth converting old furniture.

– It should be noted that handicraft is increasingly appreciated,

not everyone wants to have the same furniture from the same well-known store. If a piece of furniture is made of real wood and not ordinary plywood, it gains value over the years and its collector value increases, said Magdalena Barosz, also a postgraduate student in interior architecture and design. Her project aroused considerable interest among fair visitors, because it was impossible to ignore the cat resting in the bed of an old TV set from the times of the Polish People's Republic.

– At the beginning, the idea was to convince the household to have a cat. I was looking for arguments to prove that a cat can also have its place at home. I designed a bed based on a TV set. I took the picture tube out of it and replaced it with an upholstered base that my cat loves to sleep on. So, it's neat and fashionable at the same time - explained the designer.

In addition to the cat hideout, parametric furniture made of cardboard made its debut at the fair.

Weronika Piechulek emphasized that the furniture, although professionally designed, follows the trend of good fit to the space and

uses ecological materials - recycled cardboard.

– We have stools, chairs, and tables. We promote the reuse of materials. We have already contacted one of the companies that provided us with such products. So, there is a chance for further ideas. We learn an ecological approach to design during classes. As the young generation, we know how important it is, added Weronika.

During classes at the Faculty of Architecture, students develop creativity. The projects they implement include not only furniture, but also utility objects, such as plates. ■



You can hear more about ecological design in the podcast "Let's talk about science".



BIOCHEMICAL ASPECTS OF LOVE

text: Jolanta Skwaradowska
photo: istock

WE CELEBRATE VALENTINE'S DAY ON FEBRUARY 14TH, SPRING IS ALSO UPON US, THE WORLD IS COMING TO LIFE, AND ALL THIS IS CONDUCIVE TO FALLING IN LOVE. THAT'S WHY IT'S A GOOD OPPORTUNITY TO TALK ABOUT LOVE, BUT FROM A... SCIENTIFIC PERSPECTIVE. WHERE DOES LOVE BEGIN, HOW QUICKLY CAN YOU FALL IN LOVE, HOW LONG DOES FALLING IN LOVE LAST AND CAN YOU BECOME ADDICTED TO THIS FEELING? WE WILL TALK ABOUT ALL THIS - AND MORE - WITH DR ENG. JUSTYNA MAJEWSKA FROM THE DEPARTMENT OF MEDICAL INFORMATICS AND ARTIFICIAL INTELLIGENCE, FACULTY OF BIOMEDICAL ENGINEERING, VICE-DEAN FOR EDUCATION AT THE FACULTY.

Doctor, we colloquially say: the heart is not a servant, which suggests that love begins in the heart. But as we know, from a scientific point of view, it looks different.

The heart has nothing to do with love. To begin with, we must clearly distinguish true love from the state of falling in love, which in the vast majority of cases is only a kind of prelude to love. Our brain, or more precisely its area called the hippocampus, which is an element of the limbic system, is responsible for falling in love. This part of the brain is responsible, among other things, for processing information that reaches us on an ongoing basis, as well as for memory processes and our emotions.

What senses are involved in this process?

When we meet someone special to us, our senses such as sight, hearing, and smell receive a number of stimuli and transmit them to the hypothalamus, where they are processed and "compared" with our memories that we store in the hippocampus. After their

positive verification, our body releases substances such as phenylethylamine (PEA), also called the "love hormone", which stimulates the brain to synthesize and secrete other neurotransmitters that determine our well-being.

How quickly can we fall in love - in other words - is it possible to fall in love at first sight?

Stimuli received by the senses are transmitted in the brain at a speed of about 400 km/h, so we can say that this is the speed at which we can fall in love with someone, i.e. at first sight.

What does this process look like biologically, what are the subsequent stages of falling in love?

After positive verification by the brain of our potential partner, the body begins to release phenylethylamine (PEA) - a highly addictive substance, acting similarly to amphetamine and causing us to lose the ability to rationally judge the situation and start looking at our partner through the so-called "pink glasses". Increased PEA con-

centration stimulates the synthesis of neurotransmitters such as norepinephrine, which causes, among others: an increase in blood pressure and constriction of blood vessels, which makes us blush at the sight of someone. The level of dopamine - the "happiness hormone" - also increases. Dopamine works similarly to cocaine, is very addictive, and is responsible for the feeling of the so-called "butterflies in the stomach" and for not seeing the world beyond our object of sighs.

That is, when we are in love, we do not behave completely rationally.

This conglomerate of highly addictive substances that are released in our body every time we see a loved one makes us feel like we're on the proverbial high. We want to spend time with such a person practically all the time, we become hyperactive and, of course, irrational. For a person who gives us such strong emotions, we can do almost anything. We become absolutely uncritical towards it.

According to the World Health Organization, love is a mental illness with specific symptoms.

The state of falling in love is classified as a mental disorder and has a number in the International Classification of Diseases - F.63.9. If we look at what happens to us when we are in love, especially in the first phase of falling in love, we will notice that this "disease" has specific somatic symptoms in the form of increased sweating, trembling hands, 24-hour activity, loss of appetite, feelings of anxiety, obsessive thoughts, extreme emotional states, etc.

So, can we alleviate these symptoms?

I don't think it's possible. We need to wait it out and enjoy what we experience, remembering that it is a temporary state.

And how long can this state of love last?

The period of falling in love usually lasts several months, but it can last longer - up to three or four years. Of course, the greatest release of phenylethylamine and other neurotransmitters occurs at the very beginning of the relationship. Over time, their concentration decreases until it finally reaches a minimum level. When narcotic substances stop being secreted in our body, we become rational and start to look at our "other half" soberly and critically.

We are talking here about situations when the object of our desires reciprocates our feel-

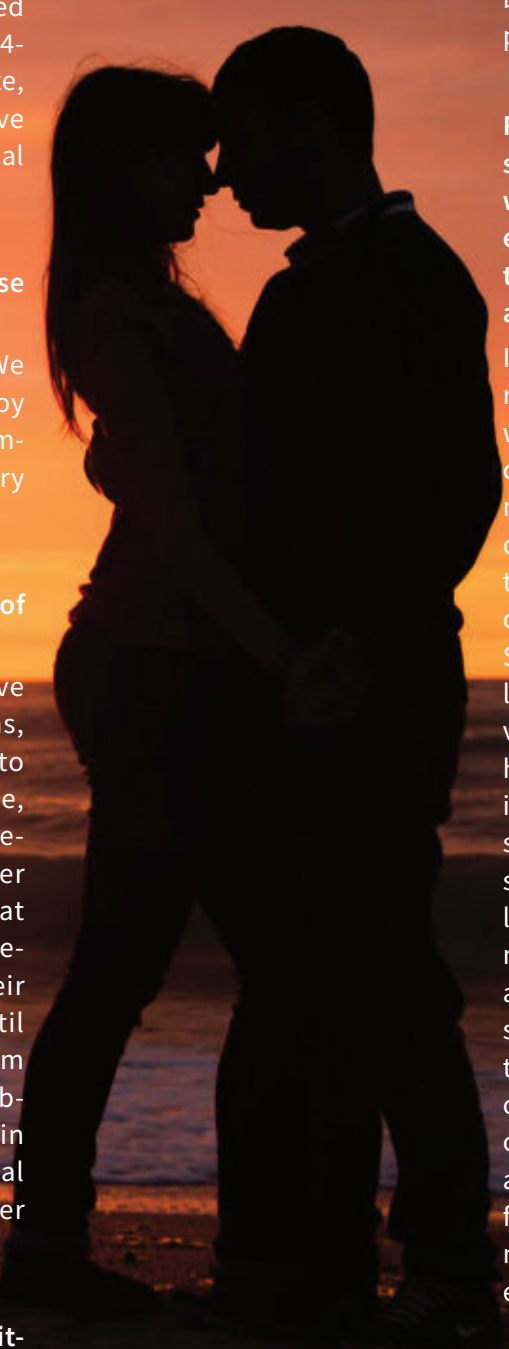
ings. But what happens if this remains unrequited, how do you deal with rejection?

If the object of our love has stopped reciprocating our interest, we may experience one of the most difficult feelings for us, i.e. rejection. This may be accompanied by low mood and even depression, probably related to the low level of neurotransmitters to which we are addicted. I think it's good

to remember that the feeling of falling in love always passes and during our lives we usually meet several people with whom we can fall in love. Therefore, we have to wait through this state of feeling rejected. It is then worth paying more attention to physical activity and a proper diet, which may also increase the concentration of, among others, serotonin and dopamine in the body, which will ultimately improve our mood.

Falling in love fades away, we start to look at our partner without rose-coloured glasses, so what should we do to turn the initial fascination into a deeper, lasting relationship?

If, after the storm of hormones responsible for falling in love, we decide that we want to continue our relationship, we must make sure to show each other tenderness, not forget to hug our partner, kiss, give compliments and support. Such behaviours cause the release of oxytocin in women and vasopressin in men. These are hormones that play a key role in feeling emotions, building social relationships, reducing stress, giving a feeling of relaxation, peace, bonding, and mutual acceptance. If people in a relationship are satisfied with such emotions and do not want to feel the "high" again that comes from the initial stage of falling in love, they have a chance to build true, beautiful, mature love. We must remember that true love is not an emotion but our choice. ■



EVENTS

A NEW SPECIALISATION UNDER EURECA-PRO

From March 1st, in the field of Management and Production Engineering at the Faculty of Organization and Management of the Silesian University of Technology in Zabrze, for second-cycle students of full-time and part-time studies starting their education, a new specialization "Sustainable consumption and production" will be offered, implemented as part of the European consortium EURECA-PRO.

"Sustainable consumption and production" is a specialty that offers enormous development opportunities in a very modern and innovative area of activity of the global economy. It is dedicated to graduates of all first-cycle studies conducted at the Silesian University of Technology and other universities.

We invite all those interested to familiarize themselves with the educational offer in this field at: <https://www.polsl.pl/roz3/kierunek-zarzadzanie-i-inzynieria-produkcji/> or to contact the Department of Production Engineering in Zabrze directly at: 32 277 73 11. ■

A LETTER OF INTENT REGARDING THE SCIENTIFIC PROGRAM FOR SILESIA HAS BEEN SIGNED

Universities associated in the Academic Consortium– Katowice City of Science, signed a letter of intent regarding the Scientific Program for Silesia. On behalf of the Silesian University of Technology, the cer-

emony was attended by the Vice-Rector for Infrastructure and Promotion, dr hab. Eng. Tomasz Trawiński, prof. of Silesian University of Technology



photo: Sławomir Rybok UM Katowice

The initiator and originator of the Scientific Program for Silesia is the Rector of the University of Silesia, prof. dr hab. Ryszard Koziołek. The substantive assumptions were developed by: Vice-Rector for Science and Finance of the University of Silesia, prof. dr hab. Michał Daszykowski and the Vice-Rector for Science and Development of the Silesian University of Technology, prof. dr hab. Eng. Marek Pawełczyk.

The program will be a multi-year cooperation project between universities belonging to the Academic Consortium - Katowice City of Science. It assumes financing of scientific research aimed at solving the most important challenges of energy, economic, environmental and social transformation in the region. The goal is also, among others, strengthening the international visibility of the university, engaging social, business, and local government partners in the implementation of research projects, as well as enabling

students and doctoral students to cooperate with experienced research staff. ■

EMINENT SCIENTISTS ON CLIMATE CHANGE

At the invitation of the Silesian University of Technology, two outstanding scientists - dr Anna Cazenave from the Laboratoire d'Etudes en Géophysique et Océanographie Spatiales in Toulouse, France, and dr Thomas Stocker from the Swiss University of Bern - pioneers in their fields, conducted inspiring lectures presenting the complexity of the processes behind climate change.

The guests visited the Silesian University of Technology for three days. ■



photo Maciej Mutwil

CHINESE NEW YEAR

The Year of the Wooden Rabbit ends and the Year of the Wooden Dragon begins - grand New Year celebrations are underway in China. This is the most important holiday in the calendar, also called the Spring Festival. On this occasion, teachers and students from China studying at the Silesian University of Technology in cooperation with Yanshan University invited their Polish friends to celebrate together.

Guests from Poland and China met at the Employees' Club of the Silesian University of Technology and went on an intercultural journey together. There were artistic performances, interesting facts about 12 mysterious Chinese zodiac signs and the division of the year into 24 solar dates, as well as reports from employees of the Silesian University of Technology who had the opportunity to visit the Middle Kingdom and conduct classes there. Those interested could try their hand at calligraphy or the pronunciation of Chinese phrases related to the holiday, which was not easy at all, but it relaxed the atmosphere among the participants. ■



photo Przemyslaw Bratkowski

WEBINAR ABOUT THE FUTURE OF ALUMINIUM PACKAGING RECYCLING

The Silesian University of Technology took patronage over a free webinar "The future of recycling aluminium packaging", which will take place on February 29th at 12.00.

The webinar is organized by the RECAL Foundation for the recovery of aluminium packaging. It is addressed to participants in the broadly understood aluminium packaging management chain. The speech during the webinar will be delivered by, among others: dr Eng. Wojciech Hryb from the Department of Technologies and Installations for Waste Management at the Silesian University of Technology, who will discuss issues related to

sorting metal packaging. More information: www.recal.pl ■

THE GZM METROPOLIS GAME WAS CREATED AT THE SILESIA UNIVERSITY OF TECHNOLOGY

The Metropolis Game - this is the name of the card game, which was created with the Upper Silesian-Zagłębie Metropolis in mind, has already been optimistically received by the GZM authorities and may soon become a new promotional gadget for the metropolis.

On January 30th, at the Faculty of Architecture of the Silesian University of Technology, there was an official presentation of a new game designed by students of this faculty together with their supervisor - dr hab. Eng. arch. Tomasz Bradecki, prof. of SUT.

- This is a game dedicated to the Upper Silesian-Zagłębie Metropolis. All cards refer to its structure. They refer to the cities and communes that are part of the metropolis. The game can be played in several ways. The simplest version is to put together a puzzle. In this way, you can arrange the GZM map - explains the creator of the game, prof. Bradecki. ■

"NATURE KNOWS BEST" - OPENING OF KRZYSZTOF ROSTANSKI'S EXHIBITION.

"Nature knows better" is the title of the painting exhibition authored by dr hab. Eng. arch. Krzysztof Rostański, prof. of SUT. On January 17 in Galeria X at the Faculty of Architecture of the Silesian University of Technology at 10 Strzody Street in Gliwice the exhibition was opened.

The author admits that this exhibition is an important event in his life. - It's my safety valve, it gives me great pleasure, because

without painting life would be unbearable. I believe that there is no point in creating art if you don't show it, says Krzysztof Rostański, professor SUT. ■

SPRING FAIR OF JOBS, ENTREPRENEURSHIP, TECHNOLOGY AND ACCESSIBILITY OF THE SILESIA UNIVERSITY OF TECHNOLOGY



photo Maciej Mutwil

The 30th edition of the Spring Job, Entrepreneurship, Technology and Accessibility Fair of the Silesian University of Technology will be held on March 4-11, 2024. The event was planned in a hybrid mode - online on a remote platform and on-site in the "Nowa" hall of the Sports Centre of the Silesian University of Technology.

The fair will be held on a remote platform from March 4th to March 11th at www.targipracypolsl.webexpo.pl, and on-site on March 11th from 9 a.m. to 3 p.m. in the "Nowa" hall of the Sports Centre of the Silesian University of Technology. ■

INTERNATIONAL INTERDISCIPLINARY SCIENTIFIC AND SOCIAL CONFERENCE

The Community of diversity, equity and inclusion conference will be held on March 21st -22nd, 2024, in Katowice: "Towards supporting well-being and sustainability" (Różnorodność, Równość i Inkluzja w społeczności – wspieranie dobrostanu i zrównoważonego rozwoju). The University of Silesia in Katowice invites all interested to the event.

The conference is organized as part of the Katowice European City of Science 2024 celebrations. It will be devoted to the problems of implementing equality and diversity policies and plans, but also to other aspects of developing the well-being of various social groups, with particular emphasis on the gender context. ■

“HOW DEEP IS SPACE” - A MULTIMEDIA SHOW FOR STUDENTS.

Nearly five hundred primary school pupils took part in a multimedia show entitled "How deep is space?" The event took place at the Mrowisko Student Culture Centre, as part of the "Science with Culture" project. The show was prepared together with the Astrolab Space Education Centre. The show began with a view of our planet from the perspective of the international space station, i.e. from over 400 kilometres away. Then the youth

"went" to the Moon, learned what the Sun is, what it is made of and how it works. Finally, the Voyager space probe took participants to the furthest reaches of the solar system. ■



photo Jan Szady

SUCCESSSES

PROF. MICHAŁ ŻELECHOWER IS AN HONORARY MEMBER OF THE EUROPEAN MICROBEAM ANALYSIS SOCIETY

Prof. Michał Żelechower - professor emeritus of the Silesian University of Technology - became an honorary member of the European Microbeam Analysis Society (EMAS). The professor is the only person from Poland who has been honoured with this distinction.

The European Microbeam Analysis Society (EMAS) is a scientific society with almost 500 members from around the world dealing with research methodology using corpuscular microbeams or EM radiation microbeams to study the structure of materials. It is opinion-forming and all global manufacturers of scientific equipment take into account the EMAS recommendations. ■

SCIENTISTS FROM THE SILESIA UNIVERSITY OF TECHNOLOGY IN THE POLISH ACCREDITATION COMMITTEE

Prof. Bożena Skołod, dr hab. Eng. Marek Roszak, prof.

SUT and dr hab. Eng Dariusz Grabowski, prof. SUT received from Dariusz Wieczorek, Minister of Science and Higher Education, nomination acts for members of the Polish Accreditation Committee, appointed for the 2024-2027 term. They received their nominations during the plenary meeting of the Polish Accreditation Committee of the 7th term. ■



photo PKA office

The Polish Accreditation Committee of the 7th term consists of 99 people, including 13 members of the engineering and technical sciences team. PKA members were appointed from among candidates proposed by universities, the General Council of Science and Higher Education, the Conference of Rectors of Polish Academic Schools, the PKA presidium, the Students' Parliament of the Republic of

Poland and national scientific associations and employers' organizations.

SCIENTIFIC AWARDS OF THE DIVISION IV ENGINEERING SCIENCES OF THE POLISH ACADEMY OF SCIENCES IN 2023

Dr hab. Eng. Stanisław Wrona, prof. SUT from the Faculty of Automatic Control, Electronics and Computer Science of the Silesian University of Technology received the scientific award of the Division IV Engineering Sciences of the Polish Academy of Sciences in 2023. The distinction was awarded to six scientists. ■



photo Robert Papliński PAN

– The award was granted for a series of works entitled: "Modelling, optimization and control in noise reduction systems", which was also the basis for the previously obtained habilitated

doctor's degree - said dr hab. Eng. Stanisław Wrona, prof. of SUT.

SANTANDER AWARDS FOR STUDENTS AND PHD STUDENTS OF THE SILESIA UNIVERSITY OF TECHNOLOGY!

The winners of the first edition of the Santander Awards for students and PhD students of the Silesian University of Technology have been selected. 50 winners have been selected and will receive bonuses of PLN 1,000.



photo Jan Szady

The Santander Award is one-off financial support for students and PhD students for their individual achievements. The founder is Santander Bank Polska. Students and doctoral students who could boast of achievements in science and non-university activities, social activity and involvement in initiatives at the Silesian University of Technology or in secondary school - in the case of first-year students - applied for the scholarship. The results in the recruitment procedure for the currently studied field were also taken into account. ■

A PUPIL OF ALO (ACADEMIC SECONDARY COMPREHENSIVE SCHOOL) IN GLIWICE IS A SCHOLARSHIP HOLDER OF THE ENDEAVOR SCHOLARSHIP PROGRAM.

Beniamin Kopiec, a third-grade pupil of the Academic Secondary Comprehensive School of the Silesian University of Technology in Gliwice, is among the four-person team of The Endeavor Scholarship holders. Beniamin will undergo training at the Space &

Rocket Centre in Huntsville, Alabama, United States.

The four winners will fly to the United States for a week of training at the Space & Rocket Centre in Huntsville. This centre has been operating since 1982. So far, it has trained over 900,000 people, several of whom became astronauts. ■



photo Maciej Mutwil

A GREAT START TO THE YEAR IN THE SILESIA ACADEMIC CHAMPIONSHIPS!

Students of the Silesian University of Technology made a great start to the competition in the next edition of the Silesian Academic Championships. They won medals every time in alpine skiing, snowboarding, sport climbing and darts competitions. On the highest step of the podium were: Jan Perdyła, Weronika Szafon, Mikołaj Wójcik and teams: twice the men's sports climbing team, the men's alpine skiing team and the darts team. ■



photo Arkadiusz Sypień

DR ENG. TOMASZ JAROSZ IN THE POLISH COMMITTEE FOR STANDARDIZATION

Dr Eng. Tomasz Jarosz, an employee of the Department of Physical Chemistry and Technology of Polymers at the Faculty of Chemistry of the Silesian University of Technology, was elected chairman of Technical Committee No. 12 and a member of the Sector Council at the

Chemistry Sector in the Polish Committee for Standardization.

The Polish Committee for Standardization (PKN) is the national standardization body responsible for organizing standardization activities.

Technical Committee (KT) No. 12 conducts standardization activities in the thematic scope including explosives, pyrotechnic products, ammunition for civilian purposes, matches and deals with the methodology of testing these groups of materials. ■

AWARD FOR THE DEAN OF THE FACULTY OF ARCHITECTURE OF THE SILESIA UNIVERSITY OF TECHNOLOGY

Dr hab. Eng. arch. Klaudiusz Fross, prof. SUT, is the winner of the Polish Herkules 2023 award. The award was presented on February 8th, 2024, during the Builder Awards 2023 gala.

Builder Awards are awards for the construction industry. They are an expression of recognition for the position, talent and successes in business management, as well as an impulse to act for companies, organizations, universities, and institutions. The selection criteria, in addition to the ability to bear risk, were primarily investment in human resources, innovation and implementation of pro-ecological solutions, as well as activities and provision of services for the development of construction and the companies that create them. ■



photo: private archive

PROJECTS

BECOME A CAREER AMBASSADOR IN THE EU

Recruitment for the EU Careers Ambassadors program has started. The program is aimed at students who would like to promote work opportunities in EU institutions at our University.

Those interested can express their willingness to participate by March 5th at career@polsl.pl. Please send two CVs according to the Europass template (in Polish and English) and a short justification written by the candidate - why they decided to act as an ambassador. ■

STOCK EXCHANGE SCHOOL AT THE SILESIA UNIVERSITY OF TECHNOLOGY

Registration for participation in Stock Exchange School courses organized by the Faculty of Organization and Management of the Silesian University of Technology has started.

As part of the Stock Exchange School, you can take part in two courses: STOCK EXCHANGE INVESTING FUNDAMENTALS - basic level (cost PLN 550) and STOCK EXCHANGE FOR INTERMEDIATE INVESTORS - intermediate level (cost PLN 600). When registering for two courses, you are entitled to a 10% discount. The upcoming dates are April 20-21, 2024 (STOCK EXCHANGE INVESTING FUNDAMENTALS) and June 15-16, 2024 (STOCK EXCHANGE FOR INTERMEDIATE INVESTORS).

More information at www.gpw.pl/szkola-gieldowa and at the following e-mail address: fundacjagpw@gpw.pl ■

NATIONAL TRUMPF HUETTINGER COMPETITION FOR THE BEST DIPLOMA THESIS

Up to 16 thousand PLN can be won in a nationwide competition for the best engineering, master's and doctoral theses organized by TRUMPF Huettinger. The total prize pool is PLN 90,000.

People who defended their studies in 2023 and whose thesis are related to one of the following scientific disciplines can apply for the competition: Automation, Electronics, Electrical Engineering and Space Technologies as well as Technical Information Technology and Telecommunications. Applications are accepted until 13th March 2024. Detailed information can be found at: <http://www.trumpf.com/s/konkurs> ■

INVITATION TO READ THE POB1 MONOGRAPH

We cordially invite you to read the POB1 monograph: "Recent advances in computational oncology and personalized medicine. Vol. 3, "Crossing borders, connecting science."

The third volume of the Advances in Computational Oncology and Personalized Med-

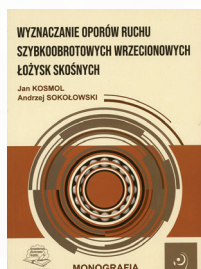
icine series is devoted to the exploration of the latest research and practical solutions within the Priority Research Area 1 (POB1) of the Silesian University of Technology. The monograph is available in the Digital Library of the Silesian University of Technology. ■

COMPETITION FOR THE DESIGN OF GADGETS PROMOTING THE SILESIA UNIVERSITY OF TECHNOLOGY

The Office of the Rector of the Silesian University of Technology invites you to participate in a competition for the design of gadgets promoting the Silesian University of Technology. Recruitment will last until March 15th, 2024. The competition is addressed to students of the Silesian University of Technology and pupils of Academic Secondary Comprehensive Schools of the Silesian University of Technology in Gliwice and Rybnik.

Interested persons may submit a maximum of three competition works in paper version and in electronic form in .pdf or .jpg format, including the logo of the Silesian University of Technology and the Research University. The competition entry should be an original work, not previously published anywhere and not presented or awarded in other competitions. ■

PUBLISHING NEWS



DETERMINATION OF RESISTANCE TO MOVEMENT OF HIGH-SPEED SPINDLES, ANGULAR CONTACT BEARINGS

JAN KOSMOL, ANDRZEJ SOKOŁOWSKI

Ed. I, 2023, PLN 26.25, p. 194

The monograph presents a theory for determining the resistance to movement of high-speed spindle, angular contact bearings. The aim of the theory was to determine those resistances that contribute to the generation of heat in the bearing. The focus was on the analytical determination of forces in the contact areas of the rolling element with the bearing ring raceways. A good consistency of the bearing movement resistances calculated on the basis of the proposed new design theory of bearing seats in HSC machines was confirmed.



RECTIFICATION OF TILTED BUILDINGS IN POST-MINING AREAS

KRZYSZTOF GROMYSZ

Ed. I, 2023, PLN 56.70, p. 408

The work published the results of research on the rectification of buildings tilted from the vertical axis. Developed, original methods for determining the reliable inclination of buildings were presented and an analytical model of the rectified object was defined, the parameters of which were determined in laboratory tests and in situ tests.



NEW MATERIAL AND TECHNOLOGICAL SOLUTIONS FOR WELDING AND SURFACING OF SELECTED STEEL ELEMENTS OF MEANS OF TRANSPORT

BOŻENA SZCZUCKA-LASOTA

Ed. I, 2023, PLN 24.15, p. 152

The monograph describes steels, which constitute a group of materials in the automotive industry. The growing importance of non-ferrous metal alloys, including aluminium and magnesium in the production of means of transport was signalled. Materials intended for surfacing of selected steel elements in order to regenerate them and increase resistance to abrasive and corrosion wear were characterized. The monograph presents original research on a new method of producing an intermetallic phase coating in the TIG surfacing process from a solid material based on the Fe₃Al phase. The method has been patented and is already used to protect the valve faces of a natural gas-powered engine.



SELECTED ISSUES OF SET THEORY AND RELATION THEORY. FACTS, TASKS, PROBLEMS, AND PROJECTS

MARCIN ADAM, WALDEMAR HOŁUBOWSKI, JAKUB JAN LUDEW, MICHAŁ RÓŻAŃSKI, ALICJA SAMULEWICZ, ROKSANA SŁOWIK, ADRIAN SMUDA, ROMAN WITULEA

Ed. I, 2023, PLN 51.45, p. 369

The monograph is a concise discussion of selected issues of set theory, with a broad scope of tasks and problems, both for independent solving and for getting acquainted with the methods of solving them. An important novelty of this publication are examples of projects that can be proposed to students to develop as part of additional activities.

POSITIONS, DEGREES, AND ACADEMIC TITLES

AWARDED PHD DEGREES

Dr Eng. Barbara BALON

Silesian University of Technology Faculty of Mechanical Engineering - assistant. Supervisor: dr hab. Eng. Krzysztof Kalinowski, prof. of SUT. Auxiliary Supervisor: dr hab. Eng. Iwona Paprocka, prof. of SUT. Thesis topic: "Scheduling production processes using a shared resource register organized based on the assumptions of Blockchain Technology." Conferring the degree of Doctor of Engineering and Technical Sciences with distinction. Discipline - mechanical engineering. Resolution of the Mechanical Engineering Discipline Council of December 20, 2023.

Dr Eng. Jacek BARCIK

DIGA s.c. Supervisor: dr hab. Eng. Mariusz Hetmańczyk, prof. of SUT. Thesis topic: "Method of obtaining operational information in mechatronic systems." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - mechanical engineering. Resolution of the Mechanical Engineering Discipline Council of December 20, 2023.

Dr Eng. Zygmunt BARTOSZEK

Supervisor: dr hab. Eng. Sławomir Kwiecień, prof. of SUT. Thesis topic: "Theoretical and experimental analysis of ground reinforcement with a pillow and a geomatress." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - civil engineering, geodesy, and transport. Resolution of the Civil Engineering, Geodesy and Transport Discipline Council of January 25, 2024.

Dr Eng. Paweł BENECKI

Silesian University of Technology Faculty of Automatic Control, Electronics and Computer Science - assistant. Supervisor: dr hab. Eng. Michał Kawulok, prof. of SUT. Auxiliary supervisor - dr Eng. Daniel Kostrzewa. Thesis topic: "Hyper-resolution reconstruction of digital images using deep convolutional neural networks." Conferring the degree of Doctor of Engineering and Technical Sciences with distinction. Discipline - technical information technology and telecommunications. Resolution of the Technical Information Technology and Telecommunications Discipline Council of December 19, 2023.

Dr Eng. Anna BUTOR

Supervisor: dr hab. Eng. Krzysztof Labisz, prof. of SUT. Thesis topic: "Analysis of the advisability of using recycling materials used for newly developed polymer railway sleepers based on LCC." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - civil engineering, geodesy, and transport. Resolution of the Civil Engineering, Geodesy and Transport Discipline Council of January 25, 2024.

Dr Eng. Sylwia CIESIELSKA

Silesian University of Technology Faculty of Automatic Control, Electronics and Computer Science - assistant. Supervisor: prof. dr hab. Joanna Rzeszowska. Thesis topic: "Mechanisms of regulation of redox state in living cells." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - biomedical engineering. Resolution of the Biomedical Engineering Discipline Council of January 11, 2024.

Dr Eng. Maciej DŁUGOSZ

Silesian University of Technology Faculty of Automatic Control, Electronics and Computer Science - assistant. Supervisor: prof. dr hab. Eng. Sebastian Deorowicz. Thesis topic: "Correction of genome sequencing data." Conferring the degree of Doctor of Engineering and Technical Sciences with distinction. Discipline - technical information technology and telecommunications. Resolution of the Technical Information Technology and Telecommunications Discipline Council of December 19, 2023.

Dr Eng. Magdalena FOLWARCZY-DRAGA

Silesian University of Technology - PhD student. Supervisor: dr hab. Eng. Katarzyna Tobór-Osadnik, prof. of SUT. Thesis topic: "Environmental costs in the process approach to the operating costs of mining companies." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - environmental engineering, mining, and energy. Resolution of the Environmental Engineering, Mining and Energy Discipline Council of January 18, 2024.

Dr Eng. Przemysław GARBACZ

Silesian University of Technology, Faculty of Energy and Environmental Engineering - administrative employee. Supervisor: dr hab. Eng. Robert Wejkowski, prof. of SUT. Thesis topic: "Optimization of secondary methods of flue gas denitrification in grate-fired boilers." Conferring the degree of Doctor of Engineering and Technical Sciences with distinction. Discipline - environmental engineering, mining, and energy. Resolution of the Environmental Engineering, Mining and Energy Discipline Council of January 18, 2024.

Dr Eng. Tomasz GAŚIÓROWSKI

Konstruktor Design Office in Chrzanów. Supervisor: dr hab. Eng. Radosław Jasiński, prof. of SUT. Thesis topic: "Load-bearing capacity and deformability of monotonically sheared AAC walls bound by reinforced concrete." Conferring the degree of Doctor of Engineering and Technical Sciences with distinction. Discipline - civil engineering, surveying, and transport. Resolution of the Civil Engineering, Geodesy and Transport Discipline Council of December 21, 2023.

Dr Eng. Mariusz HEJNE

Magna Casting Poland sp. z o. o. Kędzierzyn-Koźle. Supervisor: dr hab. Eng. Jarosław Piątkowski, prof. of SUT. Thesis topic: "The impact of changing the design of the injection mold and related technological parameters on the porosity of pressure castings from the EN AB 46000 alloy." Conferring the degree of Doctor of Engineering and Technical Sciences with distinction. Discipline - materials engineering. Resolution of the Materials Engineering Discipline Council of January 23, 2024.

Dr Eng. Dorota HUDY

Medical University of Silesia. Supervisor: prof. dr hab. Joanna Rzeszowska. Thesis topic: "Different mechanisms of microRNA action in the translation process." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - biomedical engineering. Resolution of the Biomedical Engineering Discipline Council of January 11, 2024.

Dr Eng. Daria KALUŻYŃSKA

Silesian University of Technology Biotechnology Centre - administrative employee. Supervisor: prof. dr hab. Eng. Jarosław Śmieja. Auxiliary supervisor - dr Eng. Anna Lalik. Thesis topic: "Modelling and analysis of selected mechanisms of regulation of intracellular processes." Awarding the degree of Doctor of Engineering and Technical Sciences. Discipline - biomedical engineering. Resolution of the Biomedical Engineering Discipline Council of January 11, 2024.

Dr Eng. Rafał MARJASZ

Supervisor: dr hab. Eng. Wojciech Kempa, prof. of SUT. Thesis topic: "Queueing models with a "Multiple Vacation" service suspension mechanism - analysis using SD". Conferring the degree of Doctor of Engineering and Technical Sciences with distinction. Discipline - technical information technology and telecommunications. Resolution of the Technical Information Technology and Telecommunications Discipline Council of November 28, 2023.

Dr Eng. Paweł MARZEC

Silesian University of Technology, Faculty of Transport and Aviation Engineering - assistant. Supervisor: dr hab. Eng. Grzegorz Kubica, prof. of SUT. Auxiliary supervisor - dr Eng. Monika Andrych-Zalewska. Thesis topic: "Analysis of the possibility of using mixtures of gaseous fuels with variable composition to power combustion engines." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - civil engineering, geodesy, and transport. Resolution of the Civil Engineering, Geodesy and Transport Discipline Council of December 21, 2023.

Dr Eng. Mateusz MORAWIEC

Silesian University of Technology Faculty of Mechanical Engineering - assistant. Supervisor: prof. dr hab. Eng. Adam Grajcar. Thesis topic: "The influence of strain rate on martensitic transformation in multiphase steels with retained austenite." Conferring the degree of Doctor of Engineering and Technical Sciences with distinction. Discipline - materials engineering. Resolution of the Materials Engineering Discipline Council of December 19, 2023.

Dr Eng. Dagmara PERZYŁO

Silesian University of Technology - PhD student. Supervisor: dr hab. Eng. Roman Starosolski, prof. of SUT. Thesis topic: "Model of unsteady deformations of the mining area using a new influence function taking into account its variability in time." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - environmental engineering, mining, and energy. Resolution of the Environmental Engineering, Mining and Energy Discipline Council of January 18, 2024.

Dr Eng. Aneta SIWCZYK

University of Occupational Safety Management in Katowice. Supervisor: dr hab. Eng. Marek Roszak, prof. of SUT. Thesis topic: "Shaping the quality of products and production processes based on the analysis of knowledge management in the organization." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - mechanical engineering. Resolution of the Mechanical Engineering Discipline Council of December 20, 2023.

Dr Eng. Ireneusz SMOŁKA

Silesian University of Technology Faculty of Automatic Control, Electronics and Computer Science - assistant. Supervisor: prof. dr hab. Eng. Andrzej Kwiecień. Thesis topic: "Analysis of methods for implementing programmable networks in industrial computer systems using the industrial Internet of Things." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - technical information technology and telecommunications. Resolution of the Technical Information Technology and Telecommunications Discipline Council of December 19, 2023.

veterinary surgeon Robert SORNAT

Supervisor: dr hab. Eng. Joanna Kalka, prof. of SUT. Co-supervisor - dr Anna Daniel-Wójcik. Thesis topic: "Development and validation of an alternative method for teratogenicity testing using *Hydra attenuata* and *Brachydanio rerio*." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - environmental engineering, mining, and energy. Resolution of the Environmental Engineering, Mining and Energy Discipline Council of January 18, 2024.

Dr Eng. Katarzyna SUCHOŃ

Łukasiewicz Research Network - Institute of Engineering of Polymer Materials and Dyes. Supervisor: dr hab. Eng. Józef Stabik, prof. of SUT. Thesis topic: "Epoxy composites with limited metal leachability filled with waste glass." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - materials engineering. Resolution of the Materials Engineering Discipline Council of December 19, 2023.

Dr Eng. Sebastian SYMA

Supervisor: prof. dr hab. Eng. Joanna Bzówka. Auxiliary Supervisor: dr hab. Eng. Marjan Łupieżowiec, prof. of SUT. Thesis topic: "Analysis of the dependence of deformation moduli of road structures in static and dynamic methods." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - Civil Engineering, Geodesy and Transport. Resolution of the Civil Engineering, Geodesy and Transport Discipline Council of December 21, 2023.

Dr Eng. Radosław SZKLAREK

Spinex - Spinkiewicz Sp. Supervisor: dr hab. Eng. Tomasz Tański, prof. of SUT. Auxiliary supervisor - dr Eng. Marcin Staszuk. Thesis topic: "Investigation of the structure and properties of silicide layers produced on molybdenum and niobium substrates." Conferring the degree of Doctor of Engineering

and Technical Sciences. Discipline - materials engineering. Resolution of the Materials Engineering Discipline Council of December 19, 2023.

Dr Eng. Tomasz SZWARC

Silesian University of Technology - PhD student. Supervisor: dr hab. Eng. Włodzimierz Wróblewski, prof. of SUT. Auxiliary supervisor - dr Eng. Tomasz Borzęcki. Thesis topic: "Analysis of working conditions and selection of geometric parameters of the air-oil separator for a gas turbine." Conferring the degree of Doctor of Engineering and Technical Sciences with distinction. Discipline - mechanical engineering. Resolution of the Mechanical Engineering Discipline Council of December 20, 2023.

Dr Eng. Tomasz TARASIEWICZ

Supervisor: dr hab. Eng. Michał Kawulok, prof. of SUT. Thesis topic: "Multi-image super-resolution reconstruction using deep graph neural networks." Conferring the degree of Doctor of Engineering and Technical Sciences with distinction. Discipline - technical information technology and telecommunications. Resolution of the Technical Information Technology and Telecommunications Discipline Council of December 19, 2023.

Dr Eng. Paweł TRACZ

Macro Molds Sp. z o.o. Supervisor: dr hab. Eng. Krzysztof Wacławiak. Auxiliary supervisor - dr Eng. Joanna Lisok. Thesis topic: "Modernization of collecting electrode production for the energy industry." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - mechanical engineering. Resolution of the Mechanical Engineering Discipline Council of December 20, 2023.

Dr Eng. Anna WACHOWICZ

Supervisor: dr hab. Eng. Dariusz Mrozek, prof. of SUT. Thesis topic: "Monitoring bee colonies using IoT devices to detect life-threatening situations for bees." Conferring the degree of Doctor of Engineering and Technical Sciences with distinction. Discipline - technical information technology and telecommunications. Resolution of the Technical Information Technology and Telecommunications Discipline Council of December 19, 2023.

Dr Eng. Dariusz ZIELIŃSKI

ALSTOM YWUS sp. z o.o. Katowice: Supervisor: dr hab. Eng. Damian Grzechca, prof. of SUT. Thesis topic: "Using a genetic algorithm to select communication interface protec-

tor elements in trackside devices." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - automation, electronics, electrical engineering, and space technologies. Resolution of the Discipline Council for Automation, Electronics, Electrical Engineering and Space Technologies of January 23, 2024.

Dr Eng. Magdalena ZORYCHTA-TOMSIA

Silesian University of Technology Faculty of Mechanical Engineering - administrative employee Supervisor: dr hab. Eng. Jarosław Żmudzki, prof. of SUT. Auxiliary supervisor - dr Eng. Mariusz Król. Thesis topic: "Laser melting of SLM powders for use on implants for mandibular defects based on numerical studies of the transfer of occlusal loads." Conferring the degree of Doctor of Engineering and Technical Sciences. Discipline - materials engineering. Resolution of the Materials Engineering Discipline Council of December 19, 2023.

POSTDOCTORAL DEGREES AWARDED.**Dr hab. Eng. Tomasz BARAN**

Łukasiewicz Research Network - Institute of Ceramics and Building Materials. Resolution of the Civil Engineering, Geodesy and Transport Discipline Council. Discipline - Civil Engineering, Geodesy and Transport December 21, 2023

Dr hab. Eng. Bożena ORLIK-KOŻDOŃ

Silesian University of Technology, Faculty of Civil Engineering - assistant professor Resolution of the Civil Engineering, Geodesy and Transport Discipline Council, Discipline - Civil Engineering, Geodesy and Transport January 25, 2024

Dr hab. Eng. Radosław SWADŹBA

Łukasiewicz Research Network - Upper Silesian Institute of Technology Gliwice. Resolution of the Materials Engineering Discipline Council. Discipline - materials engineering.

AWARDING THE ACADEMIC TITLE OF PROFESSOR**Prof. dr hab. Eng. Małgorzata JASTRZĘBSKA**

A graduate of the Faculty of Civil Engineering of the Silesian University of Technology. Dr - 03/07/2002, Dr hab. - 29.06.2011 r. Position of the University professor since 01.12.2016 r. Employment at the Silesian University of Technology since 01.10.1993 r. Title of professor of engineering and technical sciences December 13, 2023

Edited by Katarzyna Mryka



MARCH REPERTOIRE “MROWISKO STUDENT CULTURE CENTRE”

01.03

Lipny Borszcz – Open Stage
Improvisation 19:00

03.03

Ewa Błachnio – Stand-Up 20:00

07.03

Student Band Review part 1 20:00

13. 03

“Mel Gipson’s Friend” 19.00

14.03

“I can’t marry” 19:00

15.03

Good Evening with a Vinyl Record 20:00

16.03

Winter Reggae 18:00

17.03

Gliwice Record Exchange 09:00-13:00

19.03

Board games in Spiral Club 19:00

21.03

Student Band Review part 2 20:00

22.03

“The Bald Singer”, ATR 19:00

23.03

Rockoteka + Concerts : Moleskin
/Joe Palooka / Yllgen 19 :00

26.03

RPG with the Local Government 18:00

27.03

Drum Workshops 18:00

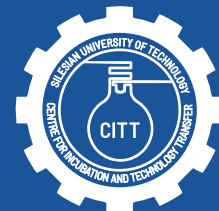


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3. Katowice International Airport in Pyrzowice, 42-625 Pyrzowice 90, Wolności Street, Departures terminal
4. Project Management Centre, 44-100 Gliwice 10, Banacha Street
5. NZOZ Academic Clinic, 44-100 Gliwice 5, Łużycka Street
6. Faculty of Automatic Control, Electronics and Computer Science ,44-100 Gliwice, 16, Akademicka Street
7. Faculty of Mechanical Engineering, 44-100 Gliwice 18A, Konarskiego Street
8. Institute of Physics - Centre for Science and Education, 44-100 Gliwice ,22B, Konarskiego Street
9. Faculty of Materials Engineering, 40-019 Katowice 8, Krasieńskiego Street
10. Faculty of Mining, Safety Engineering and Industrial Automation, 44-100 Gliwice, 2, Akademicka Street
11. Faculty of Organization and Management, 41-800 Zabrze 26-28, Roosevelta Street
12. Faculty of Biomedical Engineering, 41-800 Zabrze, 40, Roosevelta Street
13. Faculty of Transport and Aviation Engineering, 40-019 Katowice, 8, Krasieńskiego Street
14. Faculty of Civil Engineering, 44-100 Gliwice 5, Akademicka Street
15. International Centre for Interdisciplinary Research, 44-100 Gliwice 18B, Konarskiego Street, room 202
16. Zabrze City Hall - Customer Service Point, 41-800 Zabrze, 5 - 7, Powstańców Śląskich Street
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