From inclusive education to nuclear energy

Selected projects supported from the Operational Programme Research, Development and Education

EUROPEAN UNION
European Structural and Investment Funds
Operational Programme Research,
Development and Education

MINISTRY OF EDUCATION,
YOUTH AND SPORTS

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Publisher: Ministry of Education, Youth and Sports (MEYS)
Photo source: the archive of MEYS projects (OP RDE)

Prague 2018
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Ladies and gentlemen,

You have just opened a publication in which we present selected successful projects from the Operational Programme Research, Development and Education (OP RDE), which is managed by the Ministry of Education, Youth and Sports of the Czech Republic. Selecting the projects was not an easy process. The harder work we had when making the selection, the more pleased we are that OP RDE is truly successful and that it systematically helps to improve the educational and research environment in the Czech Republic. To give you an idea - at this moment we are administrating over 8,500 projects in various stages of implementation. At the end of the programming period there will be around 20,000 of them. With this number we rank among programmes with the widest impact.

The support from OP RDE is directed towards three key areas - three priority axes (others than Technical Assistance). The first one is focused on investments in research and development, the second one on investments in higher education and in human resources in research and development, and the third one is aimed at regional education. All three priority axes are being successfully implemented, although each one has its own specifics.

Investments in research and development enabled the beneficiaries to build top research teams with international experts, to support excellent research projects not only of European but sometimes even of world importance and to implement projects with high potential for application in practice. The huge excess of demand over the allocation showed us that

investments in research and development are still needed and that the Czech scientific environment has a great potential for further development. We are very pleased with it and we will use the experience in negotiating the new programming period.

The second priority axis involves multiple funds. It combines investment and soft projects. We have managed to start off systemic changes in higher education institutions - we have supported the creation of new study programmes or modification of the existing ones to better meet the demands of the 21st century and we added investments to that. Out of non-investment activities we have supported the mobility of both starting and experienced scientists, we have helped to cultivate the research environment in the individual Regions or have contributed to improve the management and human resources processes in research organizations.

We are delighted that the simplified projects or so called ¨templates¨ have found their place in Czech schools. More than 70% of nursery, primary, secondary and (post-secondary) vocational schools implement projects that are targeting the support of their staff, training and development of teachers´ skills or activities for children and pupils. On the European scale the Czech Republic is unique and it is presented as a model example of how to get the interventions directly to recipients - i.e. schools. In addition, we have also supported conceptual projects - OP RDE resources are used by municipalities and regions in planning and improving education in their territories. This strategic approach is bearing fruit - many schools and education authorities are changing and opening up to new impulses, children, parents and the public.

Since the beginning of the programming period we have announced 55 calls offering CZK 92 billion in total. In this publication we present only a fraction of our projects. But in every drop of water a whole ocean is hidden, as they say.

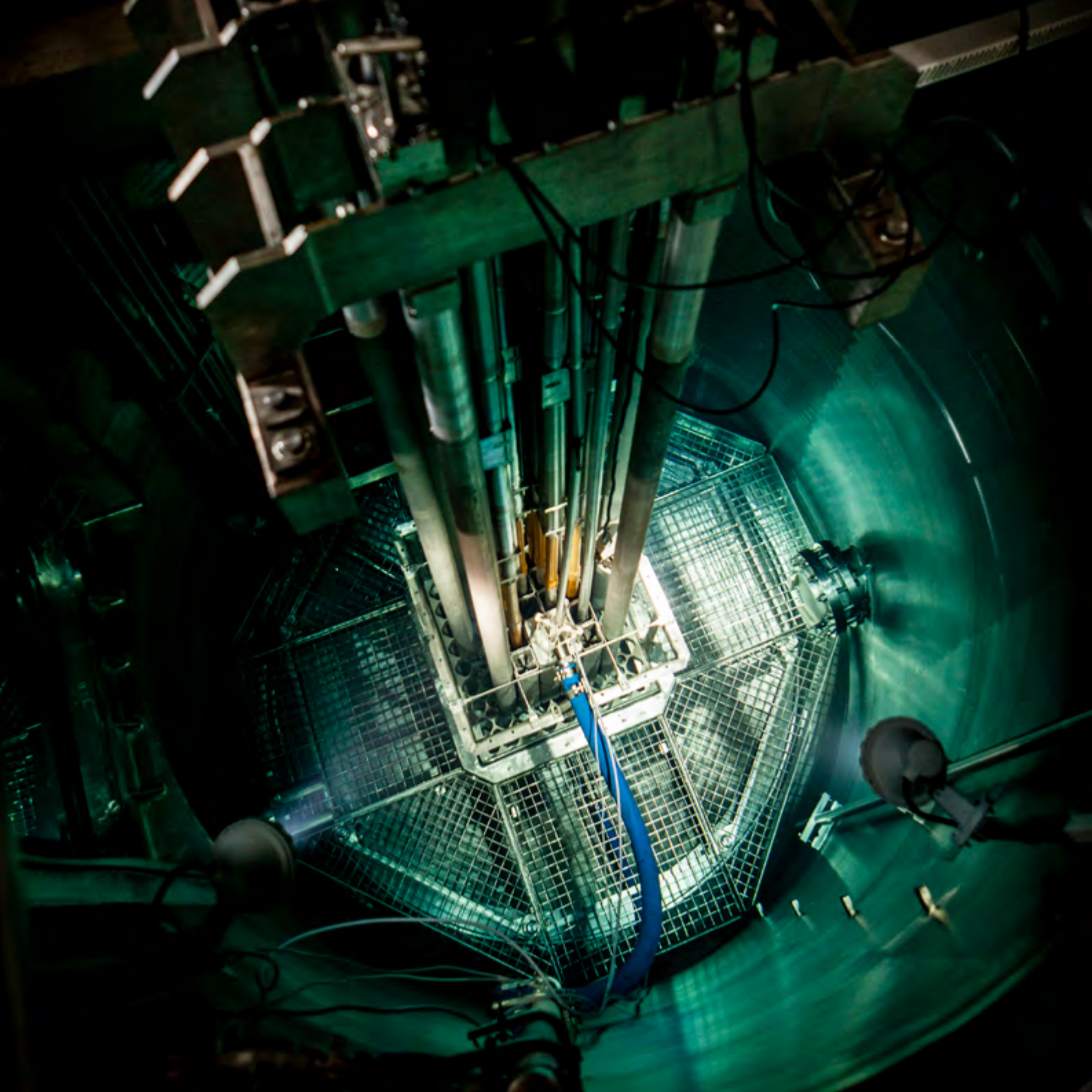
We hope you will find the reading about successful OP RDE projects inspiring.

PhDr. Mgr. Václav Velčovský, Ph.D.

Deputy Minister for the management
of the EU and ESIF Section

The OP RDE website gives regular information on the successfully completed projects from all areas supported from the operational programme.

The booklet you are holding presents a collection of all previously published articles which are based on testimonials of the project implementers themselves.



The safety and security of nuclear installations

„We protect the population against the possible harmful effects of the nuclear installations. We also protect the installations against potential harmful influences from outside. At the same time, we must be absolutely sure that we use the installations only for peaceful purposes.“

doc. Ing. Ľubomír Sklenka, Ph.D.
Head of the Department of Nuclear Reactors and Training Reactor VR-1

Project title:
Safety and security of nuclear installations and forensic analysis of nuclear materials
Implemented by:
Czech Technical University in Prague
Implementation period:
01.05.2017 – 30.06.2022
The project was supported with a grant of CZK 9,807,880, of which the EU contribution is CZK 7,444,181.

Czech Technical University in Prague submitted its project within the call “Developing research-oriented study programmes” (Priority axis 2), which fosters human resources for research and development through enhancing research-oriented (doctoral) study programmes. The call is linked to the strategy of higher education institutions and to priorities of the RIS3 strategy.

„Let‘s start with one of the frequently asked questions that appears in connection with nuclear installations: Is the operation of a nuclear reactor safe? The public naturally asks this question. The basic terms that will help us with the answer are “safety” and “security”. If we talk about the reactor safety, we mean the protection of the surroundings of the reactor, i.e. the people, who live close to the reactor, but also the protection of animals or plants. Security of the reactor means then protecting the reactor itself against its surroundings,“ the Head of the Department of Nuclear Reactors and Training Reactor VR-1 Ľubomír Sklenka explains and continues: „The use of nuclear energy began sadly with nuclear bombs and therefore it is often perceived negatively by the society. However, since the 1950s a so called system of safeguards has been in operation. It lays down that nuclear energy may only be used for peaceful purposes. Everything is stringently screened and recorded. This way the nuclear material can function as a fuel in the reactor or, for example, we use it as an experimental material.“

„Safety can be further subdivided into three components. The first of them is the nuclear safety. To achieve it, the fission chain reaction must be kept all the time under the control so that the reactor does not get overheated and does not explode, for example. The second component of safety is the radiation protection. The third component is the emergency preparedness as it is necessary to have skilled and trained people who would recognize that something undesirable is happening in the reactor and could adequately respond in such situations. The security of the reactor can be also divided into three components. The aim of the physical protection of the installation is to prevent the theft of nuclear material that could be later misused and it is carried out through security checks of all visitors, for example. Another component is the cyber security related to the current digitization. The last component involves all employees who move around the reactor. It is the information security and it basically means that employees are not allowed to share the information on how their workplace operates, because such information could be misused by someone,“ Ľubomír Sklenka explains further on.

„99% of all bachelor‘s, master‘s and

doctoral study programmes are associated with safety, but none of them is in fact aimed at security. After 2001 it started to be explored in the US. In Europe there is one similar programme in the Netherlands and one in Germany. In our country we have operated a reactor for 27 years and we perceive how the community of experts is divided to „safety“ and „security“. There is a barrier between them, of course. The purpose of our project is to create a unique doctoral programme where the students will be taught to view a nuclear installation comprehensively. Forensic analysis of nuclear materials, which deals, for example, with the possibility of someone stealing nuclear material and of the subsequent investigations, is another part of the project. If such a material was found somewhere, we would find out where it was from using conventional nuclear-chemical methods,“ Ľubomír Sklenka describes the project focus.

The project team will spend two years preparing the new doctoral programme. It is planned to admit about five students annually into a four-year full-time study programme. A promising cooperation has been already established in the US namely with the University of Tennessee and at Middlebury Institute in Monterey, California. Even now there are foreign students interested in studying the prepared programme. Graduates of the programme could be able to work e.g. as analysts in organizations that operate nuclear installations, in research reactors or supervisory bodies.

„The study programme will be highly individualized and highly experimental. Our reactor is an ideal real nuclear installation used to demonstrate things. It can be compared with a process of getting a driving license ,- at first you learn to drive on a simulator and then suddenly you sit in the car. The sense of responsibility, which you don’t get even on the best possible simulator, is a great added value. You don’t need to be afraid of nuclear energy, if you know how to handle it. On the other hand, you should never stop feeling respect for it.“ Ľubomír Sklenka says and finally adds: „Our ambition is to build safe nuclear installations, economically and socially acceptable, and to increase their quality.“

Nationwide network Laborky.cz

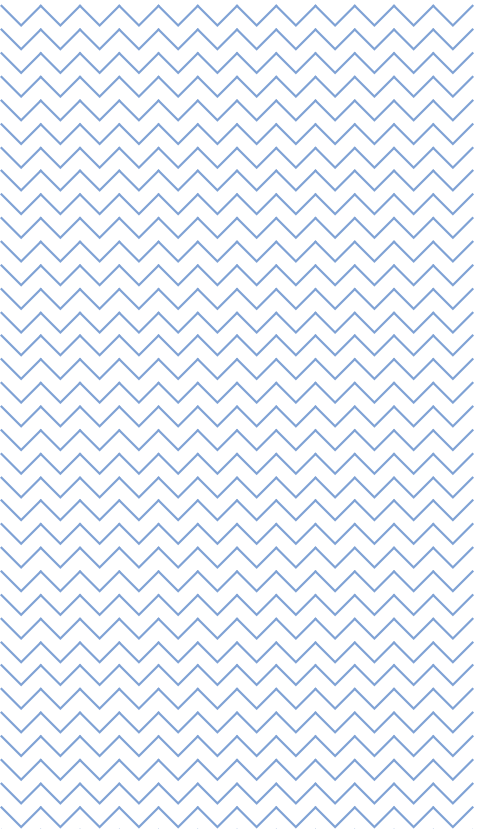
„Schools show high interest in getting involved in the project. The experiments are designed for educators in the first place but they are often attended by pupils who really enjoy it. We are truly delighted that the project also has such an impact which is actually not the primary one.“

RNDr. Milan Dundr, CSc.
Headmaster of Václav Beneš Třebízský Grammar School in Slaný

Project title:
Nationwide network Laborky.cz as part of the Grammar School in Slaný
Implemented by:
Václav Beneš Třebízský Grammar School
Implementation period:
01.01.2017 – 31.12.2019
The project was supported with a grant of CZK 37,453,291, of which the EU contribution is to CZK 30,262,259.

Václav Beneš Třebízský Grammar School received the financial support for this project within the call “Capacity Building for the Development of Schools I” (Priority Axis 3). The aim of the call is to support schools in the role of peer support centres and to foster mutual learning of schools and teachers in areas such as reading, maths and science (pre)literacy, polytechnic education or individualization of education. Within this call methodological materials may also be developed for preschool education and teachers may go abroad for study visits.

„The project Nationwide network Laborky.cz at the Grammar School in Slaný builds on the successful after-school activity of young explorers called Laborky (Czech word for "Labs"), which was opened at our grammar school in 2009. The explorations are carried out by former students, teachers, younger and older pupils after the compulsory lessons in their free time. Together they discuss the experiment procedures and sometimes it happens that an idea suggested by the youngest one of them is the real solution. Experiments carried out by our pupils appeared, for example, on the TV show Miracles of Nature and teachers from many other schools came to our grammar school to try them. Thanks to that, our teachers gained information on teaching methods used in other schools and identified procedures that could be used in our school," headmaster Milan Dundr describes the start of the project and continues: „That´s why we thought about how we could enable other schools to participate in Laborky on a larger scale."



Under the project Nationwide network Laborky.cz at the Grammar School in Slaný so called peer support centres are being formed. After the first year of implementation there will be such a centre in one school in each region of the Czech Republic. After the second year two schools will dispose of such a centre thanks to the project support and after the third year three schools in each region will have the centre. The main aim of peer support centres is to share the experience in exploration teaching among primary and secondary schools under the guidance of the Grammar School in Slaný. „Currently, the project is in the second year of implementation and there are already 28 peer support centres. At the end of the project there should be 42 of them in total. Every school working as a peer support centre must invite another five schools to join in. That is altogether 210 schools involved. Initially we were concerned that we were trying to pass on to the others something that they already know, but we found out that we have something to offer. Moreover, an excellent group of people got together," the Grammar School headmaster Milan Dundr says.

Schools show great interest in getting involved in the project. These are mostly "upper" primary schools (5th grade to 9th grade), but some secondary schools and grammar schools also join in. „At the be-

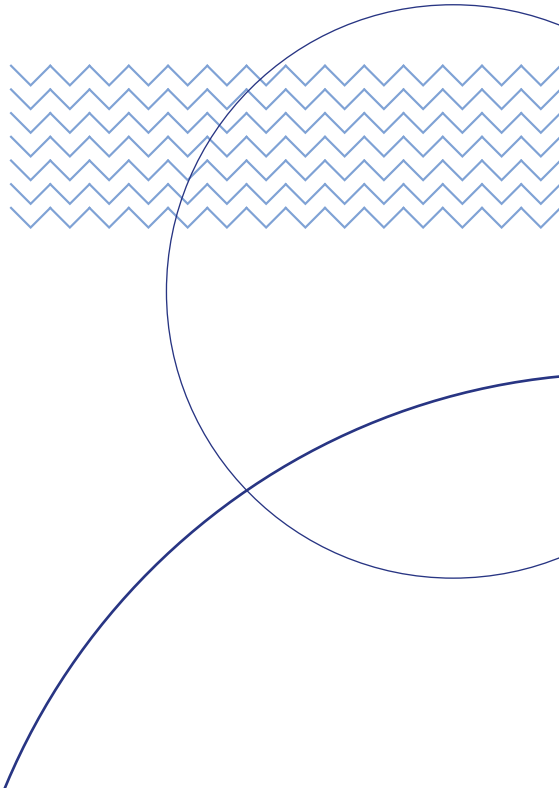
ginning we will organize a conference to bring together two or three teachers from all newly participating schools and we will show them, for example, how to work with webinars, shared materials webpages or how to create short descriptive videos. Every month an experiment, a methodological sheet, a video on the experiment and a webinar are prepared for them," Milan Dundr explains the role that the Václav Beneš Třebízský Grammar School in Slaný plays in the project.

„We are preparing and we will distribute a package of tools for all the schools involved, which includes, for example, a robotic kit from Lego, a measuring system, tablets with measuring software or kits for experiments," says the project manager Martin Šturm and adds: „We want to venture into areas such as robotics and cybernetics, which are popular now and which children will encounter in practice, and we need special equipment for that."

The involved schools also have their responsibilities. For example, based on materials prepared by the Grammar School in Slaný, they perform the experiments together with the invited schools and record videos. These videos (so-called Labík) are then placed on the website to be available for others. It is also important to carry out continuous evaluation and provide feedback to the Grammar School in Slaný. Schools, for example, inform about what worked or did not work in the webinars, what new things they discovered, they share further ideas or expand the topics. „We are very pleased when an involved school says that it is a project that makes sense and the money is really reasonably spent. One of our goals is to inspire teachers," Milan Dundr, the Grammar School headmaster, says.

The topics of the experiments come either from the Laborky club, from the participating schools or they are motivated by children's questions. „For example, we discussed why roads are salted, how the rocket flies, how the theory of large numbers works, what fingerprints are for, why ice floats or the fluorescence and electrostatics principles," Martin Šturm lists.

„In the experiments we focus on science and do not distinguish between chemists, biologists, physicists and mathematicians. The experiments are of course prepared with the help of experts in the field, but afterwards then can be tried by anyone. Teachers from other schools appreciate how the communication at our school works. The exploration teaching at our school is based on giving only hints to pupils to which direction they should lead in the experiment, otherwise they explore independently. We want to teach children to ask questions on their own. We do not target only gifted children, every child showing interest can join in. The children get so excited about the experiments that sometimes teachers have to send them home long after the standard teaching hours, even on Friday afternoon," Milan Dundr says and Martin Šturm adds: „In the time-consuming chemical experiments it even happens that the students try to persuade the headmaster to let them stay overnight at school so that they can complete the experiment."



Conservation of tangible cultural heritage

„The care for monuments is an equilateral triangle linking the natural sciences, humanities, conservation and restoration.“

doc. Dr. Ing. Michal Ďurovič
Head of the Department of Chemical Technology of Monument Conservation at University of Chemistry and Technology Prague

Project title:
Doctoral school: Conservation sciences in the care for tangible cultural heritage
Implemented by:
University of Chemistry and Technology Prague
Implementation period:
01.06.2017 – 31.1.2022
The project was supported with a grant of CZK 3,489,660, of which the EU contribution is CZK 2,648,652.

The University of Chemistry and Technology in Prague submitted its project within the call “Developing research-oriented study programmes” (Priority Axis 2), which fosters human resources for research and development through enhancing research-oriented study or doctoral programmes. The call is linked to the strategy of higher education institutions and to priorities of the RIS3 strategy.

At the University of Chemistry and Technology in Prague, in cooperation with the Czech Technical University in Prague and the Film and TV Faculty of the Academy of Performing Arts in Prague, a new doctoral study programme will be created, which will focus on conservation and care for tangible cultural heritage. „Our intention is to create a totally new doctoral programme that should build on the bachelor's and master's degree study programmes related to conservation, restoration and overall care for monuments," the head of the Department of Chemical Technology of Monument Conservation, Michal Ďurovič, explains and adds: „The care for monuments is an equilateral triangle linking the natural sciences, humanities, conservation and restoration. These triangle sides must be exactly the same, as well as the benefits of the fields mentioned. And that's exactly how we would like to implement our doctoral programme."

The project "Doctoral school: Conservation sciences in the care for tangible cultural heritage" will involve besides the University of Chemistry and Technology in Prague also the Film and TV Faculty of the Academy of Performing Arts in Prague and the Czech Technical University in Prague. An expert will also be invited from the Faculty of Restoration at University of Pardubice. The emerging field responds to the demand for highly educated professionals in the field of cultural heritage conservation. The project is currently implemented by a nine-member team that draws its inspiration mainly from educational institutions in the Netherlands and Denmark.

The doctoral programme, in which the first students will enrol in the academic year 2020/2021, will target mainly the graduates of Master's programmes aimed at conservation, restoration and preservation of monuments. The study programme will be designed as a four-year full-time programme with the possibility of extension for another three years as a combined form. „The programme will focus not only on preservation of monuments but also e.g. on the restoration of photographs. In the Czech Republic it is a new and gradually developing field. Students will gain a good understanding of the history of art and photography, heritage preservation, natural sciences, but will also master various methods of restoration. They also must be able to work well with literature and information sources as the intervention of restorers can sometimes be irreversible," adds Michal Ďurovič.

Thanks to interdisciplinarity, the graduates will be able to address all issues relating to conservation, restoration and overall preservation of cultural heritage. They will apply their experience, for example, in government institutions such as the National Library, the National Archive or the National Heritage Institute. Their expertise will contribute to the improvement of the conservation of our tangible cultural heritage. „The Czech Republic will have a high-quality preservation of monuments and the conservation science will move to a much higher level. Last but not least, it is also about prestige. The preparation will include close collaboration with the organization ENCoRE (The European Network for Conservation Restoration Education), which draws up the standards for training restorers and conservators at various levels of higher education. With a high degree of probability we can therefore expect international acclaim and interest of students from other European countries," Michal Ďurovič concludes.

Health and Diseases Research

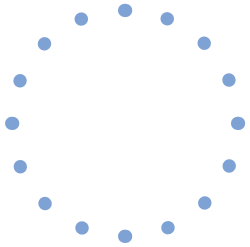
„We will develop new methods and technologies, which will help us to find answers to key questions in the field of health and diseases.“

prof. Janos Hajdu
Head of the research team ELIBIO

Project title:
Structural dynamics of biomolecular systems - ELIBIO
Implemented by:
Institute of Physics of the Czech Academy of Sciences (Institute of Physics of CAS)
Implementation period:
01.12.2016 – 31.10.2022
The project was supported with a grant of CZK 245,057,337, of which the EU contribution is CZK 208,298,736.

The goal of the call “Support for excellent research teams” (Priority axis 1), which the Institute of Physics of CAS submitted the application to, is to create new research teams in cooperation with leading international research experts and to provide the teams with appropriate material and technical background. The existence of the teams should support the effective use of infrastructures for research and development, the growth of the infrastructures to benefit the region, should ensure the effective transfer of knowledge from abroad and to support the ability to create an internationally competitive environment.

The aim of the ELIBIO project is to explore new areas of the science of light and optics and make breakthrough discoveries in biology, chemistry and physics. The centres ELI Beamlines and BIOCEV with the support of international partners are creating an interdisciplinary centre of excellence for life sciences. „We will explore fundamental questions in the physics of photoemission and electron dynamics in relativistic regime with X-rays and will study biomolecular interactions with ultrafast optical spectroscopy. New findings in the study of the structure, function and dynamics of cells, organelles and biomolecules will enable the implementation of experiments that haven´t been feasible so far," Janos Hajdu, head of the sixteen-member international research team, says. The aim of the project is also to educate a new generation of Czech and foreign scientists. At the same time the project has a great potential to open up new scientific areas with an impact, for example, in biology.

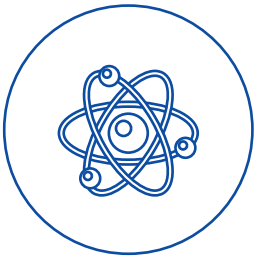


Thanks to the union of two centres of excellence, laser pulses are used in the project for interaction with all different types of biological material. „We need to fine-tune the laser sources to such a level, such an energy and such an intensity, which will enable and capture the changes in biological material, made by the pulse impact, while the biological material can´t be destroyed. Or if it has to be destroyed, we must record the studied phenomena using an ultrafast detection system before the damage devalues them," Michael Vích, manager of PR activities, explains. The research results will have an impact on a wide range of scientific disciplines and they will give direction to the further development of technologies and instrumentation in Europe and outside of it.

The international team operating the ELIBIO project consists of scientists working in the laser centre ELI Beamlines in Dolní Břežany and of scientists from the BIOCEV centre in Vestec. „Even though the formation of the research team is still in progress, it already meets regularly once a fortnight. The team consists of senior as well as junior researchers, mostly post-doctoral students but doctoral students are welcome to join us, too." Vích says. The team cooperates with other external experts, too.

The purchase of new equipment is also an important part of the support of the research itself and the research team. In this case, for example, a representative of the latest generation of laser systems for optical spectroscopy and several different microscopes are financed from the project. The project also envisages international cooperation. The project team communicates with the German research centre XFEL, the Swedish University of Uppsala, universities in Hamburg and Leipzig, the Technical University of Berlin, the Max-Born Institute in Berlin and others. „This makes ELIBIO a project, whose scope of importance and participation spans the borders of the Czech Republic," Michael Vích concludes.

Excellent research at Charles University



„Science doesn´t know any boundaries. Our excellent teams are involved in various projects and interact with prestigious workplaces around the world.“

prof. MUDr. Tomáš Zima, DrSc., MBA
Rector of Charles University

Project titles:
Creativity and adaptability as a prerequisite for Europe‘s success in an interconnected world
Research Centre for Infectious Diseases
Centre for the research of pathogenicity and virulence of parasites
Increasing the effectiveness and safety of pharmaceuticals and nutraceuticals: modern methods - new challenges
Implemented by:
Charles University
Implementation period:
The projects will be implemented in the period 2018-2022.
The projects were supported with grants of CZK 1,136,205,493, of which the EU contribution is CZK 864 855 652.

The purpose of the call “Excellent research” (Priority Axis 1), under which Charles University submitted its application, is to support problem-oriented research of interdisciplinary nature, which will foster effective utilization of research centres and initiate the achievement of internationally competitive quality of research in terms of its originality and practical impact. The support will be provided towards a research project of the related research team, and material and technical equipment.

Charles University received the financial support within the call "Excellent research" for four projects: "Creativity and adaptability as a prerequisite for Europe's success in an interconnected world (KREAS)", "Research Centre for Infectious Diseases", "Centre for the research of pathogenicity and virulence of parasites", and "Increasing the effectiveness and safety of pharmaceuticals and nutraceuticals: modern methods - new challenges". „Thanks to these projects, Charles University can keep at the top of European and global research in area, which the projects are linked to. Moreover our teams will not lose their position and the support will help them move forward. In addition, in these areas of science the position of the university within the world scientific community will strengthen," the Rector of Charles University Tomáš Zima says towards the projects.

The individual research teams working on the projects are composed of senior scientists, post-graduate students, but also post-doctoral students. The involvement of scientists and doctoral students from abroad is also envisaged: „Precisely because these teams are excellent, quality young scientists at the beginning of their scientific career are chosen to join them. At the same time we want to enrich the teams not only by our own colleagues, but especially by skilled colleagues from abroad, other universities or from the Academy of Sciences," Professor Zima adds.

„Concerning the focus of the projects retrofitting of the relevant workplaces is also planned. The Pharmaceutical Faculty (project "Increasing the effectiveness and safety of pharmaceuticals and nutraceuticals") will receive analytical devices such as chromatographs and cytometers, the Medical Faculty in Plzen (project "Research Centre for Infectious Diseases") will obtain a mass spectrometer. In the case of the Faculty of Philosophy (project KREAS) new hardware and software equipment will be ensured. The Faculty of Science (project "Centre for the research of pathogenicity and virulence of parasites") envisages the renewal of some apparatuses and their extensions," the Rector explains.

Each of these projects will directly affect the scientific environment and the whole society. „The aim of the KREAS project is to describe processes happening in Europe and in the Czech Republic and to find out how the society should respond to them. It's not just the question of migration but also of how to prevent conflicts and how to handle them. In case of the research of parasites by the Faculty of Science the specific outputs include the possible treatment of infestations, their correct diagnosis and the search for new medicines for resistant parasites, or on the contrary, disturbance of the parasite transfer between the host and the ill person. This concerns e.g. borreliosis and tick-borne encephalitis. In the research on infectious diseases our colleagues investigate sepsis, diseases of transplant patients, viral diseases, the monitoring of antibiotic resistance and the search for new approaches to treatment. Finally, the Pharmaceutical Faculty explores how to improve medicines in order to make them more effective and reduce their side effects. The projects thus combine basic and applied research with an impact on the society," Charles University Rector Tomáš Zima concludes.

Building an excellent scientific team at CULS

„We are doing everything in our power to benefit our landscape and its people, to find a scientifically sound and reliable way to improve or at least maintain its functionality.“

prof. Ing. Marek Turčáni, Ph.D.
Dean of the Faculty of Forestry and Wood Sciences, Czech University of Life Sciences Prague

Project title:
Building an excellent scientific team at the Faculty of Forestry and Wood Sciences of CULS and its instrumental and technical facilities, focused on the mitigation of climate change impacts on forests (from the level of genes to the level of landscape)

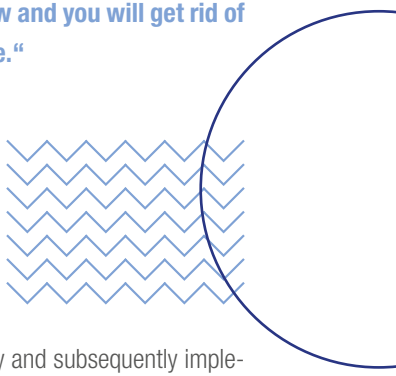
Implemented by:
Czech University of Life Sciences Prague

Implementation period:
01.12.2016 – 31.10.2022

The project was supported with a grant of CZK 246,016,958, of which the EU contribution is CZK 175,533,100.

The Czech University of Life Sciences Prague received the grant for its project within the call “Support for excellent research teams” (Priority Axis 1). The goal of the call to create new research teams in cooperation with international research experts and to provide the teams with appropriate material and technical background. The existence of the teams should support the effective use of infrastructures for research and development, the growth of the infrastructures to benefit the region, should ensure the effective transfer of knowledge from abroad and to support the ability to create an internationally competitive environment.

Czech University of Life Sciences Prague received funding to build an excellent scientific team focused on the mitigation of climate change impacts on forests (EXTEMIT-K). „The project explores the possibilities of the adaptability of forest ecosystems to better withstand adverse conditions and influences such as the bark beetle," the Dean of the Faculty of Forestry and Wood Sciences Marek Turčáni explains and continues: „The cooperation within the international team will be beneficial for Czech science and research. Our aim is to collect knowledge from abroad that could be applied to solve similar problems in the Czech Republic. For example, in Sweden the trees infested with bark beetle are identified by sniffer dogs. A person can recognize such a tree after a month from the attack, but the dog after a week. That is a huge advantage, because when the tree is infected, you can't save it, but you can cut it down and remove it from the forest. This will interrupt the generation flow and you will get rid of the bark beetle."



As part of the project the Faculty of Forestry and Wood Sciences plans to provide the necessary infrastructure and cooperate with internationally famed scientists who will help with the preparation and a potential acquisition of international projects. „The seventeen-member team of Professor Nils Fredrik Schlyter of the Swedish University of Agricultural Sciences will include experienced researches and researchers at the beginning of their career, both from abroad - for example, Hungary, Slovakia, Pakistan or India - and from our country. The team will address current and future challenges in forest ecosystems of the Czech Republic caused by climate change and will search for scientific solutions to protect forests as carbon sinks," the Faculty Dean Marek Turčáni says.

The project's ambition is to gain knowledge in the field of chemical communication of insects, which could mean a major innovation in the methods of forest protection against damage by the spruce bark beetle. It could also determine the limits of physiological resistance to the impact of drought and heat in combination with a bark beetle infestation. This would significantly influence the strategic approaches to changes in the composition of tree species in areas where spruce will not be sustainable. The application of these strategies would have positive effects mainly in medium altitudes which are generally more covered with spruce forests. The Faculty Dean Marek Turčáni adds that the research centre will, thanks to the support, carry out the research in a significant way and subsequently implement the methodologies for improving the condition of forests on nearly a half of the Czech Republic's territory, i.e. where spruce forests grow.

The project is truly practically oriented and responds to current problems that forests face. A side effect may be, for example, reducing the number of trucks that haul off the contested felled trees or preventing land degradation. „We are doing everything in our power to benefit of our landscape and its people to find a scientifically sound and reliable way to improve or at least maintain its functionality," the Faculty Dean Marek Turčáni concludes.

Creative partnership for an inclusive school

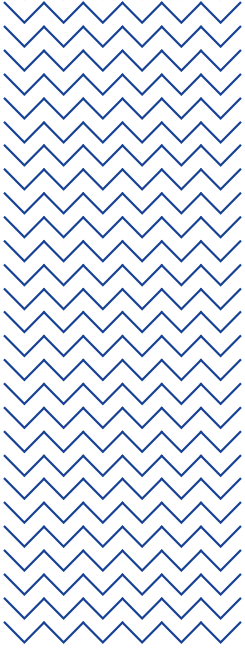
„In the Creative Partnership projects we often observe that pupils change at some stage, we could say they bloom somehow. Because they have the time and space to discover their abilities and skills they have not been aware of until now, in a creative way. They find their role which is the best for them and in which they experience success. Another change is afterwards visible in a way how the pupils perceive each other in the classroom and how teachers perceive them.“

Mgr. Marianna Sršňová
Director and founder of the Society for Creativity in Education

Project title:
Creative partnership for an inclusive school
Implemented by:
Palacky University in Olomouc in cooperation with the Society for Creativity in Education
Implementation period:
01.10.2016 – 30.09.2019
The project was supported with a grant of CZK 44,563,360, of which the EU contribution is CZK 37,878,856.

“Creative partnership for an inclusive school” is a project implemented by two entities in close cooperation. The grant beneficiary is Palacky University in Olomouc, which received the financial support for the project within the call “Literacies” (Priority Axis 3). Its partner is the Society for Creativity in Education. The aim of the already completed call “Literacies” was to improve the conditions for providing quality support to pupils with special educational needs, especially pupils from socio-economically disadvantaged and culturally different background.

The "Creative partnership for an inclusive school" project started off thanks to the idea of the Society for Creativity in Education almost two years ago. The Society for Creativity implements it in close cooperation with Palacky University in Olomouc. The concept of the project is based on the British programme The Creative Partnerships. It is a unique concept as the participating schools themselves define a clear objective they want to focus on. At first, the teachers in close collaboration with artists think up a class project that is tailor made for the pupils. The objectives may be different. Some teachers want to work together with the artist on improving the classroom climate, others focus on the development of communication skills, literacy or numeracy.



„In the very name of the project Creative Partnerships all its essence is hidden - the project is about creativity and partnership, about cooperation of teachers, artists and pupils. All the components need to be balanced in here. The teacher should be involved in all stages of implementation, from planning up to reflection and all the participants should follow the set objective," Marianna Sršňová, director and founder of the Society for Creativity in Education, says.

Cooperation between schools and artists has a significant positive impact on pupils, which was confirmed already within the evaluation of the pilot project. The impact ranges from personal development and improving the preparedness of pupils for life to an increased motivation to learn. „In some cases we observed that during the project implementation the absence of pupils dropped. We also received feedback from some secondary schools, that consequently the number of students who moved from apprenticeships to upper secondary schools has grown," says Katarina Kalivodová who is in charge of preparing expert reports and case studies in the project. Improved learning results and other positive aspects were also shown by a research carried out as part of the aforementioned umbrella programme in England, which involved about 1 million children and more than 90,000 teachers.

The artists are involved in the project either as so-called creativity consultants or as artists from creative professions. „Although the role of the creativity consultants may seem vague and difficult to define, it is absolutely crucial. They work as mediators, consultants and creativity experts, they participate in planning, supervise the implementation of the objectives and consult the progress of the project with representatives of the school. Last but not least they later evaluate the entire work," Sršňová refers.

Jan Pražan is one of the creativity consultants and he participates in the implementation of several projects in classes at a primary school in Přerov. He is a visual artist and since he resonates with the principle of linking arts and education, the role of consultant fits him very well. „We map

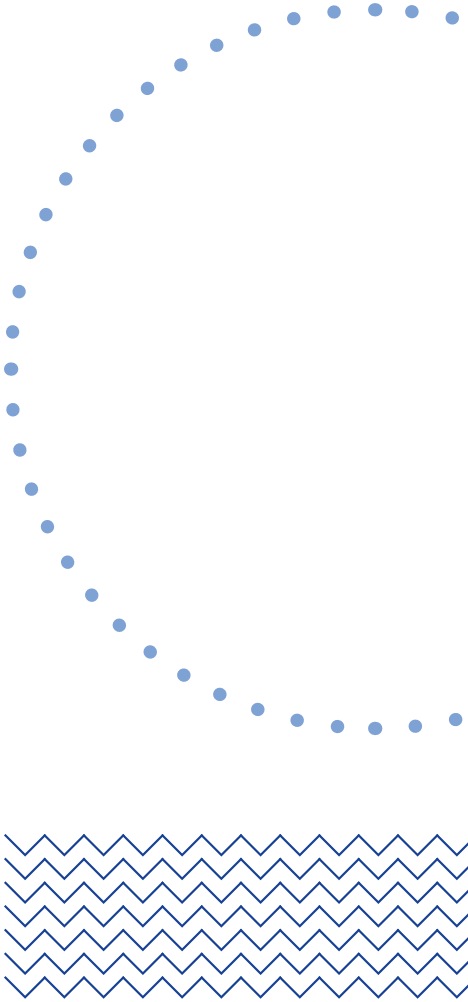
the needs and interests of the entire class, we look for an individual approach to everyone and try to mediate between the artist and the teacher," Pražan describes the role of consultants. Together with Tomáš Chalupský, an artist in the field of video production, they worked with 10 year-old pupils on a project called Fantasy Pirates in the previous school year. „Tomáš is a video artist and with the pupils he created screenplays and short films, which is a great format. Everyone could find their own role, whether it was acting or standing behind the video camera or writing the script, simply everyone had the opportunity to apply their creativity," Pražan says. What´s more, during the implementation of this class project an interesting fact was revealed. A pupil who didn´t express himself much and kept rather in the background throughout the school year played finally the main part in the short film.

What is the magic of learning with an artist according to the project implementers? In their opinion, it is a combination of several factors. One of them is the actual approach to pupils, because the artist can be a friend and a peer for the children unlike the teacher who still represents certain authority for the pupils. Another factor is the change of the environment, as the artists often take the class outside. Last but not least, an openness to various unconventional approaches to teaching methods and innovative solutions to problems play an important role too. Pupils are mostly involved in the selection of the artists in the initial part of the project when they together with the teacher and the creativity consultant try to figure out which art direction is closest to them. Some classes tend more to communicate using visual means and choose a visual artist or photographer, other classes choose to cooperate with an actor, for example.

Teachers themselves evaluate the project as a very beneficial not only for pupils but also for their own personal and professional development. The project is also positively evaluated by the grant provider, the Ministry of Education, Youth and Sports. The Ministry had nominated it for the international competition ESF VET award announced by the European Commission as a part of the third year of the European Vocational Skills Week - Discover Your Talent 2018.

Overall, the "Creative Partnership for an Inclusive School" involves 16 schools, both primary and secondary. The project will support approximately 1,000 pupils, at least 290 pupils are from a socially disadvantaged or culturally different background. For more information about the project please visit the website of the Society for Creativity in Education:

https://www.crea-edu.cz/projekty/kreativni-partnerstvi-pro-inkluzivni-skolu.



LAP Prague 14

„The best feedback is to hear from the teachers from our schools following words: ‚Thank you for what you do, it makes sense.'"

Mgr. Ing. Lucie Svobodová
Deputy Mayor for Education and European Finance (2014 - 2018)

Project titles:
Location Action Plan (LAP) Prague 14 / LAP Prague 14 II.
Implemented by:
Municipal District of Prague 14
Implementation period:
01.05.2016 – 30.10.2017/ 01.01.2018 – 31.12.2020
The project LAP was supported with a grant of CZK 3,924,018, of which the EU contribution is CZK 1,962,009. The follow-up project Local Action Plan Prague 14 II was supported with a grant of CZK 8,698,071, of which the EU contribution is CZK 4,349,035.

LAP Prague 14 is a project that has been supported within the call "Local action plans for development of education" (Priority Axis 3). The aim of the call is to improve the quality of preschool and primary education through a systematic approach, joint planning and sharing of innovative methods, through cooperation between education authorities, schools and other stakeholders in the field of education (e.g. NGOs). The call targets projects which focus on inclusive education, cooperation between family and school or on ensuring equal access to education.

The playground of the nursery school Sluníčko in Prague 14 is busy. A group of children is fully engaged in pouring sand into a bucket hanging on a simple pulley, another group of preschool children is playing drivers who are refuelling at a petrol station right now. Children are enjoying the game on a renovated playground that was modernized and equipped with new designs supporting technical thinking. All this was possible thanks to the involvement of the nursery school in the project "Local Action Plan for Education Development (LAP) Prague 14". „In order to apply for a grant to upgrade the school and kindergarten equipment, we had to join the LAP project first and to develop a strategic framework for investments," Lucie Svobodová, Deputy Mayor of Prague 14 for education and European finance, explains. She adds that one of the conditions for a successful financing of many investment projects is the involvement of schools in Local Action Plans for Development of Education.

Thanks to the EU funds, the municipality district of Prague 14 and Dolní Počernice have already managed to build seven new playgrounds with elements supporting polytechnic skills of pupils. The municipality district would like to build other three in the near future.

When asked what is hidden behind the project name "LAP Prague 14", Deputy Mayor states: „The project is about a common discussion and partnership between representatives of schools, teachers and other stakeholders who have something to tell about the education issues in Prague 14 and enable them to plan the strategy for the development of education in their municipality together."

According to Svobodová, the planning process helped to identify strengths and weaknesses in education and at the same time it exposed the requirement of schools to cooperate more closely with the representatives of the education authority. „Among other things, headmasters welcomed the possibility to set the financing of activities more efficiently and the opportunity to be more clear about the possible involvement in other projects," Svobodová added. The project involved 22 primary and nursery schools from the municipality

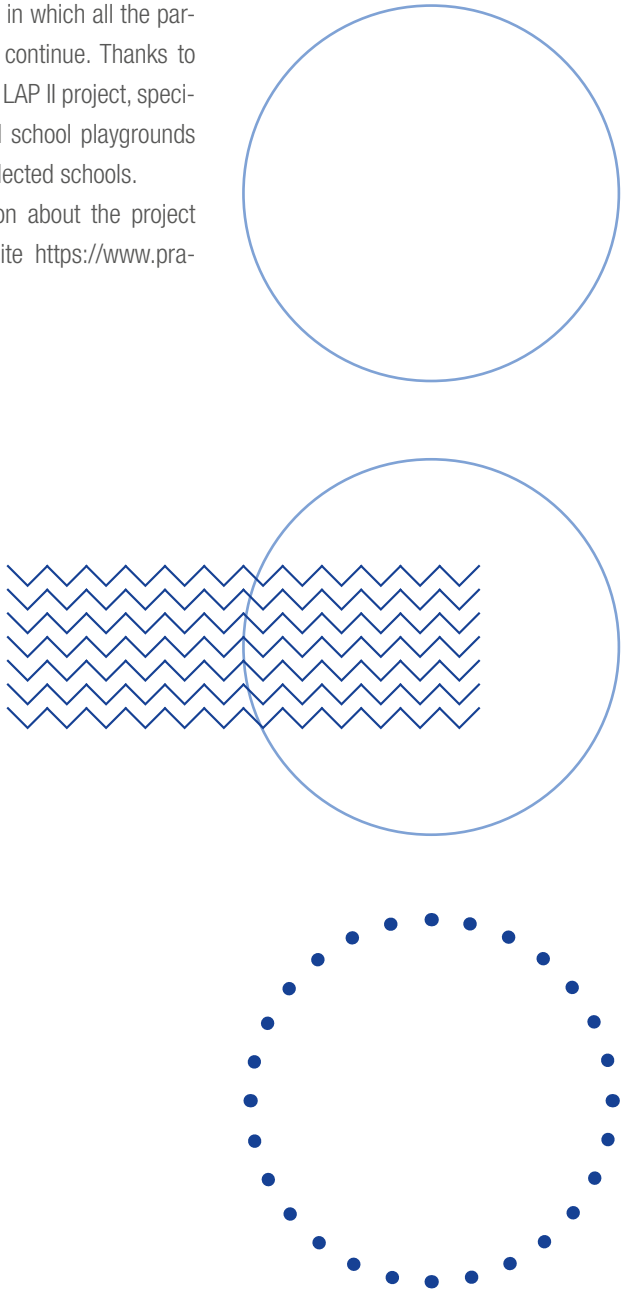
district of Prague 14 and Dolní Počernice in total.

The headmasters and teachers themselves see the cooperation as beneficial. The Director of Sluníčko Nursery School Ivana Jandová especially appreciates the common trips on which teachers can learn a lot from each other and inspire each other. „When the opportunity came to participate the follow-up project LAP II, we did not hesitate and agreed with our participation, because we consider the initiated activities meaningful," Jandová sums up the cooperation.

The outputs of the first phase of the LAP project showed a great many ideas on how to work together to improve the quality of education. These ideas are already being implemented at the next level of the project called "Local Action Plan Prague 14 II". „Our main goal is to continue in what we have set up in the first phase, we want to further intensify the cooperation among the actors in formal and non-formal education, between schools and parents, and last but not least, to try to get the bodies of social and legal protection of children more involved in the discussion," Deputy Mayor Svobodová says.

Open School Days and events called "Town of Leisure Activities" are examples of good praxis which were proven in the first part of the project and in which all the participating schools will continue. Thanks to the participation in the LAP II project, specialized classrooms and school playgrounds could be created in selected schools.

For more information about the project please visit the website https://www.praha14.cz/.

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Maths clubs or playful exploration of maths

„The sense of security and joy of success that children experience in the maths club are very important for our target group. Children learn to be self-confident, to trust their own judgment and not to be afraid to express their opinion. They can spontaneously enjoy not only the successfully solved problems, but equally the errors that force them to think about why they occurred and how to rectify them.“

Mgr. Klára Horáčková
Teacher and head of the maths club at Primary School Kolín V.

Project title:
Maths clubs - a lab to adapt teaching focused on building schemes for the needs of pupils with socio-economic and cultural disadvantages
Implemented by:
New School, a public benefit society (NGO)
Implementation period:
01.01.2017 – 31.12.2019
The project was supported with a grant of CZK 15,947,624, of which the EU contribution is CZK 13,555,480.

New School received a grant for this project from the call “Literacies” (Priority Axis 3). The aim of the already completed call was to ensure the conditions for providing higher quality support to pupils with special educational needs, especially pupils from socio-economically disadvantaged and culturally different background. Projects submitted within this call focus on promoting mutual learning between schools and teachers or on leisure activities intended to develop literacies. Research pilot projects are also supported.

The project Maths Clubs has been implemented by the non-profit organization New School based in Prague since January 2017. It started in three schools and today the numeracy is fostered by specially trained teachers in nine after-school clubs located in eight schools all over the Czech Republic. In these clubs pupils from socially or culturally different or non-stimulating environment have the opportunity to experience maths differently, through Hejný's method, in small groups and in an entertaining way.

„Above all, the clubs must be entertaining for children, that's why they are designed as a leisure activity. The results of the pilot phase of the project showed that pupils attend the clubs regularly and fluctuation is very low. Hejný's method itself is entertaining and, moreover, in the clubs we often use rhythm, activity games or singing. The time spent here is generally dynamic and the kids appreciate that," Zuzana Bednářová, project manager of New School, says.

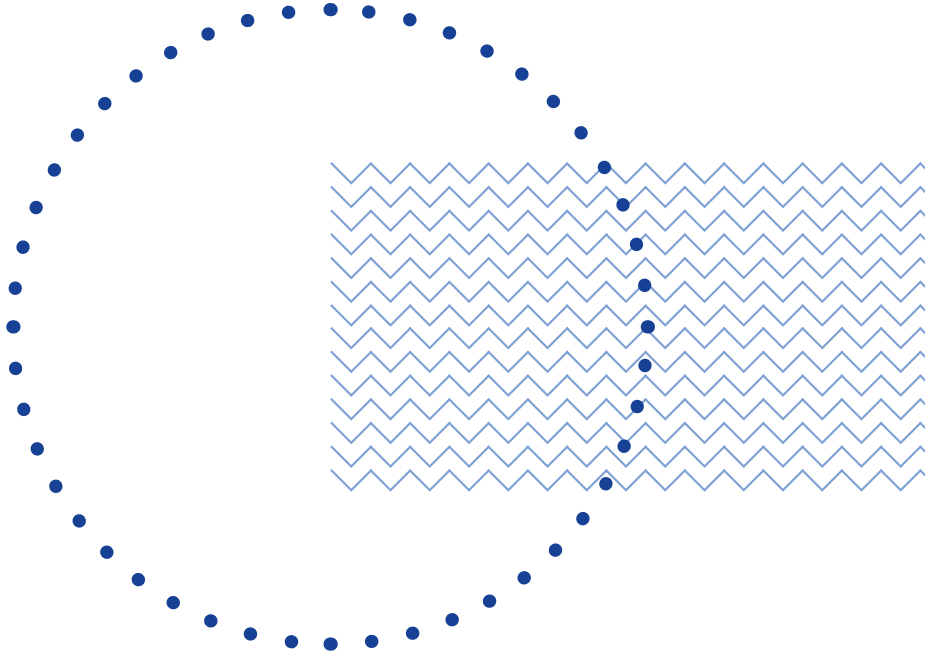
The project Maths Clubs is designed as a pilot one. In practice, this means that during the test phase the implementers looked for ways to adapt Hejný's method to the needs of children with different life experiences or with a native language other than Czech at first. They prepared 36 scenarios with a detailed methodology to be taught in the club and they tested the scenarios in three test clubs. Subsequently, they adjusted them as needed so that the scenarios could serve as a recipe for all the leaders of the maths clubs.

„We often encounter the opinion that Hejný's method is suitable particularly for gifted children. However, as our experience is different, we'd like to change these stereotyped views and prove that Hejný's methods can be successfully used in working with all pupils," Bednářová says. According to her, it is sometimes difficult for teachers to cope with a different life experience of disadvantaged children, which leads to a poor school performance. „For example, if you don't have the appropriate vocabulary, you do not speak Czech or simply, due to difficult living conditions, you don't know what playing dice are, you will simply not solve a problem based on using of dice regardless of what your IQ score would be. Teachers must therefore reformulate many tasks or adjust them to the target group," Zuzana Bednářová explains.

Teachers themselves evaluate the project as a very beneficial one not only for pupils but also for their own personal and professional development. Some of them describe in their comments that the project has enriched them with new approaches and methods used in teaching. The prepared methodology is a good source of inspiration for them.

On the other hand, they admit it is demanding, mainly in terms of time. „The club leader must prepare the club room and all the activities subsequently he/she must also process the outputs, write and create an audio recording with his/her comments, keep a class book and do the administration. It is therefore very time-consuming," Klára Horáčková, a teacher from a Kolín primary school, admits. But in the same breath she adds that she sees a lot of sense in activities of the club which has been running at their school for four months only. Children have space in the maths club for opening up and saying their opinion. „In their own class environment a large number of pupils sometimes fails to do so. The reason is, that these are children often came to the first grade with a certain deficit and they are still trying to catch up with their classmates. In the club they make a great progress in both mathematics and social competences," Horáčková concludes.

The clubs are designed for 10 to 15 children from 1st to 3rd grade. They take place once a week and last 90 minutes. In total about 200 children should go through these clubs during three years. The project partner is the public benefit society (NGO) H-Mat serving as an umbrella organisation for activities related to Hejný's method of teaching mathematics. For more information about the project please visit the website: www.novaskolaops.cz/mk-o-projektu.



Competitive graduate of Mendel University in Brno

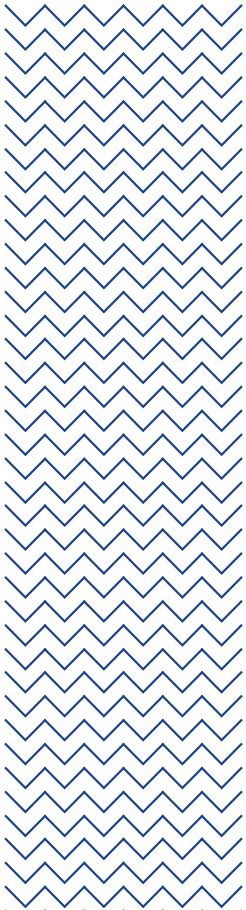
„A competitive graduate must be adaptable to labour market conditions in contemporary society.“

prof. Ing. Robert Pokluda, Ph.D.
Dean of the Faculty of Horticulture, Mendel University in Brno

Project titles:
Competitive graduate of Mendel University in Brno/ Infrastructure for competitive graduate of Mendel University in Brno
Implementation period:
01.06.2017 – 31.12.2022/ 01.06.2017 – 28.02.2021
Implemented by:
Mendel University in Brno
The projects were supported with a grant of CZK 485,220,215, of which the EU contribution is to CZK 412 437 182.

The above-mentioned projects of Mendel University are supported by the “ESF call for higher education institutions” and by the “ERDF call for higher education institutions” (Priority Axis 2). Together with the call “Research infrastructures for educational purposes - construction or modernisation” and the call “Developing research-oriented study programmes” they form a so-called quadruple call that included „soft activities“ of higher education institutions focused on improving the quality, competitiveness and employability of graduates together with the associated investments. In the quadruple call more than CZK 17 billion were prepared for higher education institutions.

„If necessary, the competitive graduates must be able to use their theoretical knowledge and other skills in a wide variety of applications," Robert Pokluda, Dean of the Faculty of Horticulture, says and continues: „The study programme Horticultural Engineering and the specialization Viticulture and Wine-making can be used as an example. A competitive graduate of such a programme is able to manage a team of workers in the production of grapes or work as a specialist in the cellar technologies. But he/she is also prepared to innovate wine production technologies, develop new winery products and he/she also knows about marketing and the related gastronomy and agrotourism."



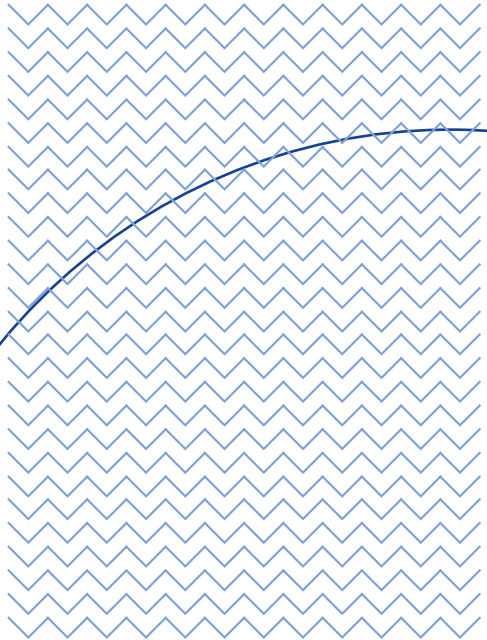
Through these projects Mendel University (MENDELU) seeks to provide top facilities for modern forms of education including practice-oriented education in classrooms and laboratories of contemporary standard. Key study programmes will be equipped with unique apparatuses enabling students to familiarise the technology that is ready for Industry 4.0 in all the spectrum of the MENDELU educational areas.

„For example, students of the Landscape Architecture programme will be able to use a drone to scan the landscape and subsequently make models for planning its further development. Another interesting feature is a climate-controlled greenhouse for teaching gardening, where through a mobile phone you can monitor the temperature, watering or fertilizing of plants and evaluate their effect on the growth of different cultures. In the laboratory of applied geoinformatics students will have measuring instruments that allow the use of remote sensing in the evaluation of vegetation, climate processes and changes in global processes," Robert Pokluda lists, adding: „We want to encourage graduates to get employed in fields they had previously studied. If the proportion of graduates in companies of our focus increased by 5 to 10%, it would be a significant contribution to stabilization both in agriculture and in forestry where the disproportion has been the greatest for a long time."

Students will be able to participate in solving practical tasks that can be used in the continuing education or in practice. „One

such interesting challenge could be innovation of the forms of timber processing through a technological line obtained from a project in the field of Furniture Design. It will be much more practical and targeted form of education because students will be able to touch the outcome literally. Another task will be evaluating the quality of the processed product of horticultural production, namely vegetable, fruit or wine. Students will be involved in the analysis of qualitative parameters of the products they had prepared themselves. This way they will better realize the connection among requirements for the feedstock, the production technology and the finished product," Robert Pokluda describes.

The projects will focus also on students with special needs. A crucial aspect of working with students with special needs is to adapt the academic environment to their needs and capabilities. Therefore besides to the obligatory physical access, the projects include other activities to facilitate work in practice rooms. „It also includes ICT technology enabling the processing of images or data from teaching so that it is easier for students with special needs to work with them. Moreover, one of the projects includes the creation of a specialized workplace for consultation and work with students who need assistance in teaching, in finding a job, but also in personal life," Dean Pokluda explains and concludes: „Implementation of the projects is challenging due to their comprehensiveness across the university. I would like to take this opportunity to express gratitude to all who contributed to their preparation and faultless run. I similarly appreciate the cooperation with the Ministry of Education, Youth and Sport, where I can see an effort to understand our problems, to seek common ground for example in the field of growing administration work and not to lose sight of the main objective that is the development of a modern, open and competitive university, where students gain the maximum for their employability across Europe."



Support for inclusion, numeracy and literacy

„Thanks to the support from the Operational Programme Research, Development and Education we raise the level of our school and nursery.“

Iveta Myšková
Director of the nursery and primary school Okna, Česká Lípa district

Project title:
Support for inclusion, numeracy and literacy
Implemented by:
Primary and Nursery School Okna, Česká Lípa district
Implementation period:
01.08.2016 – 31.7.2018
The project was supported with a grant of CZK 608,132, of which the EU contribution is CZK 516,912.

The call “Templates for Nursery and Primary schools I” (Priority Axis 3) under which this project was submitted, helps schools to succeed in inclusive education. It allows educators to share experience not only among themselves but also with parents, to establish reading and maths clubs and to improve the transition of children from nurseries to primary schools.

„Teachers from nurseries are excited about visits in other nurseries. Sharing of experience is of a great benefit for them. Our primary and nursery school can afford activities that would not be feasible without the Operational Programme Research, Development and Education.

The use of school assistants who can dedicate their time to individual children in classrooms is of great importance for our establishment.

Another meaningful activity is the reading club which involves all pupils. Parents were interested in seminars, conducted for them, conducted by our teachers. From September, we will carry out other planned activities such as a club of logical and board games, further education of nursery school teachers and successful continuation of workshops for parents," Iveta Myšková, director of the nursery and primary school Okna in the Česká Lípa district says.

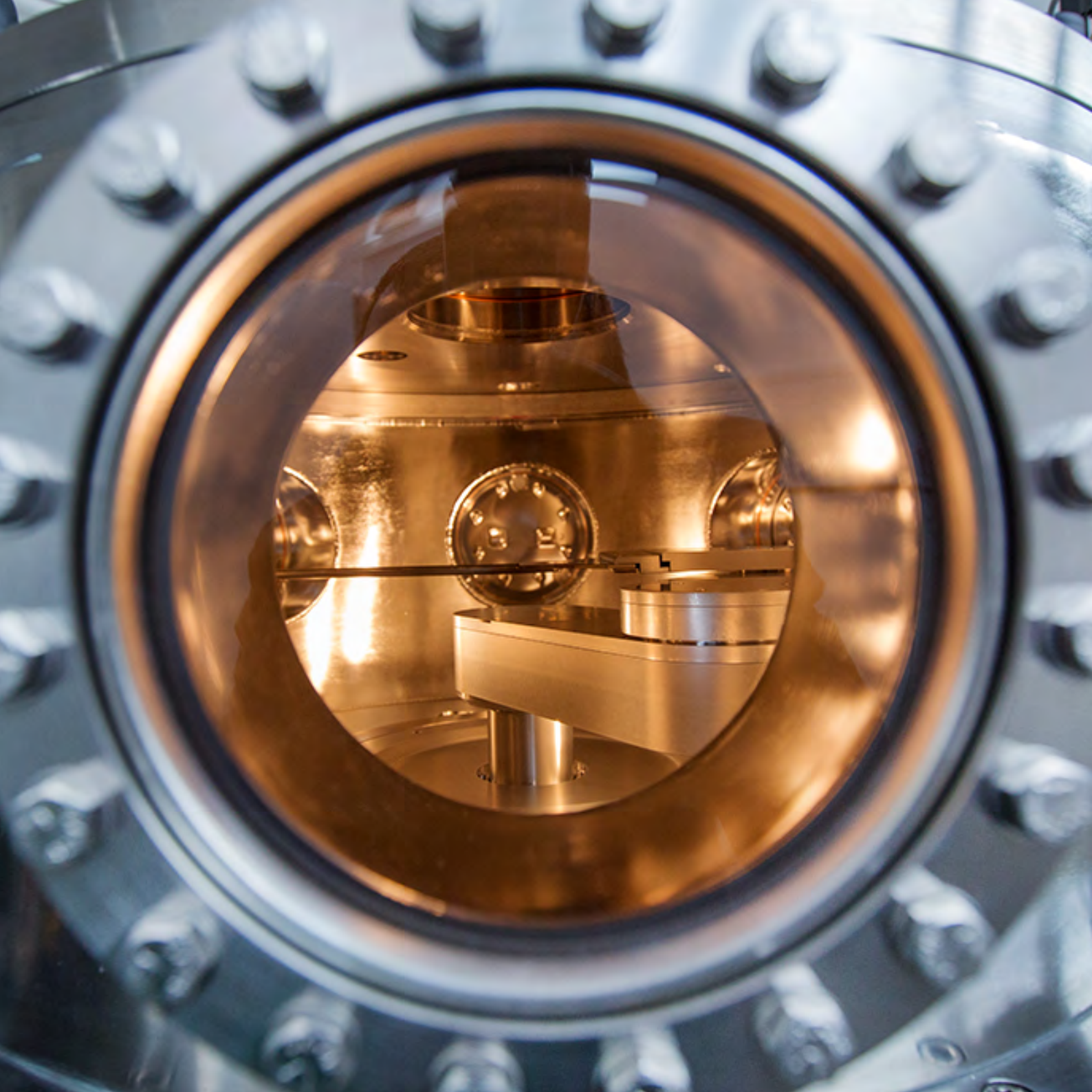
„Our facility has ideal conditions for inclusive education. We maintain smaller numbers of children and pupils in classes, teachers prioritise individualization of education. We have provided them with teacher assistants and special educators. Thanks to the project, we added staff to our team and our teachers are interested in further education or in gaining experience at other schools. The development of these conditions will enable quality education for all children. In our schools, there are two school assistants. One of them is assigned to a class of the primary school and the other to a nursery unit. They mean significant assistance for the teachers and the support is perceived very positively by both teachers and parents," says Myšková says.

With the increasing number of children with special educational needs, the requirements on the competences of teachers are also growing. Director Myšková states that dissemination of expertise in various areas such as speech therapy or work with hearing or physical disability and, of course, the methodological support, are important for the quality of education individualization of education.

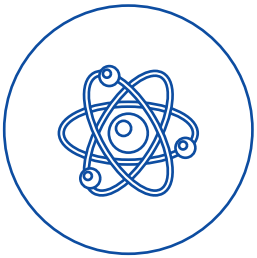
„The parents of our children and pupils are also getting trained. The aim of meetings with parents is to learn about the teaching methods used by the school, and to explain them for why this approach is important. Parents have the opportunity to try out maths according to Professor Hejný method, a reading workshop or playful English. They also get familiar with aids and other materials for teachers. There is mutual information sharing and inspiring feedback between the teachers and parents."

Nowadays, children have a problem with expressing themselves or with interpreting the content of a read text. The attractiveness of books is unfortunately diminished by following social networks and the online environment in general. It is therefore desirable to strengthen pre-literacy already from pre-school education. The director decided to use the template for reading literacy and in collaboration with other teachers she introduced reading workshops.

„Several times a year we held a reading project with a joint activity for children from the primary school and the nursery. The projects are based mainly on folk traditions and are often inspired by nature, because the teacher of the reading workshops is also a teacher in the forest class of our nursery," the school director concluded.



Prediction and research of the properties of new materials



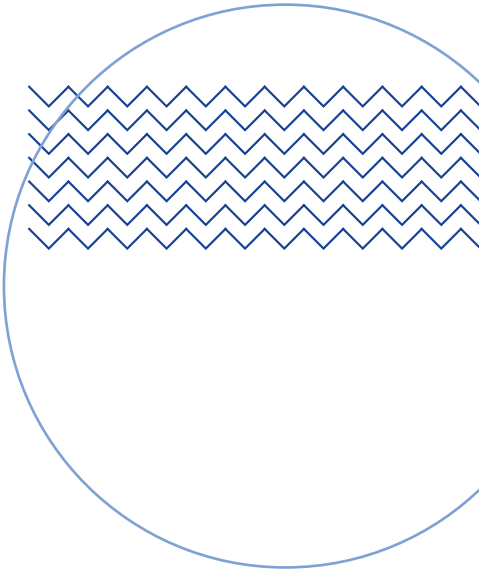
„The project combines experimental and theoretical research of electron structure, which are the areas where the research in the Czech Republic is at a high level. Therefore, there is something to build on, to draw on, but also to further develop.“

doc. Dr. Jan Minár
Head of the research team

Project title:
Computational and experimental design of advanced materials with new functionalities
Implemented by:
University of West Bohemia in Pilsen
Implementation period:
01.09.2016 – 31.10.2022
The project was supported with a grant of CZK 155,060,641, of which the EU contribution is CZK 131,801,545.

The University of West Bohemia in Pilsen applied for a grant in the call “Support for excellent research teams” (Priority Axis 1). The aim of the call is, in a cooperation with leading international research capacities, to create new research teams with appropriate material and technical background. The existence of the teams should support the effective use of infrastructures for research and development, the growth of the infrastructures to benefit the region, should ensure the effective transfer of knowledge from abroad and to support the ability to create an internationally competitive environment.

An excellent sixteen-member research team, established in the New Technologies centre at University of West Bohemia in Pilsen, focuses primarily on research and design of new materials and more specifically also on environmental-friendly use of energy in various aspects. The aim is to link the experimental and theoretical sphere. „The research team was divided into two halves. The first one deals with theoretical calculations and with predicting the properties of new materials. The second part of the team studies those predictions and seeks to confirm them by experiments," the team leader Jan Minár explains. It is the linkage of the theoretical plane with the experimental one that is unique about this project. „It is a great advantage that the results of our research can also be tested," Petr Kavalíř, Deputy Director for External Relations, adds.



"Computational and experimental design of advanced materials with new functionalities" is a flagship project of the university institute New Technologies - Research Centre (NTC) of the University of West Bohemia. The key and core activity of the project is to build an excellent international research team led by Associate Professor Jan Minár. The team consists of top experts in research of electronic and spectroscopic properties of materials, both in the field of theoretical calculations and in the field of experimental techniques. Experts from France, Germany, Slovakia, but also Pakistan are included.

One of the main motivations of scientific research in general is to understand why materials have the characteristics they have. „In the project, research of the geometric structure of substances (i.e. the distribution of atoms in space) is interconnected with the research of the electron structure of substances (i.e. research of the behaviour of electrons in solids). These are the areas that are important for material research, especially for the searching of new materials with new properties. Our specific goal is to focus on materials suitable for environmentally friendly production and environmentally friendly use of energy in various aspects," Jan Minár adds. An important part of the project is an international collaboration and professional internships. „There are many workplaces abroad which focus on theoretical calculations (e.g. the workplace of Professor Ebert at the Ludwig-Maximilians-Universität in Munich or the workplace of Professor Karol Hricovini from Université de Cergy-Pontoise in Paris), or on experimental techniques (e.g. the workplace of Professor Fadley at Lawrence Berkeley National Laboratory in the US)," Associate Professor Minár desribes.

Thanks to the project, the Czech Republic has gained an excellent workplace that will make it visible on the international stage and will help to increase the prestige of NTC and the Pilsen Region itself. „We can prove that research in this technologically relevant field is at excellent level in the Czech Republic. This way we can increase the respect for the Czech science, which may extend to respect for the Czech industry and the Czech society in general," Jan Minár concludes.

Development of innovative environment in the Ústí nad Labem Region

„Some strategic projects have a great potential to transform the region in the future. It is certainly appropriate to continue in initiated activities.“

Mgr. Miroslav Cingl
RIS3 manager of the Ústí nad Labem Region

Project title:
Smart accelerator for the Ústí nad Labem Region
Grant Beneficiary / Project Partner:
Ústí nad Labem Region / Innovation Centre of the Ústí nad Labem Region
Implementation period:
01.03.2016 – 28.02.2019
The project was supported with a grant of CZK 25,251,189, of which the EU contribution is CZK 21,463,511.

The call “Smart Accelerator” (Priority Axis 1), which the project of the Ústí nad Labem Region was supported from, allows the individual regions of the Czech Republic to develop innovative environment using the National Research and Innovation Strategy for Smart Specialization of the Czech Republic or its relevant regional annexes (RIS3). For the regions CZK 650 million were prepared within this call.

„Thanks to the Smart Accelerator project, the financial support of the Ústí nad Labem Region for activities aimed at fostering innovation and entrepreneurship is increasing continuously. That brings important actors such as large technology companies into the region. There is also a great interest in events where companies can share their experience with each other or in meeting events for companies and research organizations such as speed dating," Miroslav Cingl, RIS3 manager of the Ústí nad Labem Region, describes some changes already initiated by the Smart Accelerator in Ústí nad Labem.

Smart Accelerator for the Ústí nad Labem Region is interconnected with the activities of the Innovation Centre of the Ústí nad Labem Region (ICUK). In the project the Ústí nad Labem Region is responsible as the grant beneficiary for the project management and the Assistance activity, the other activities are implemented by the ICUK team as the project partner.

„The main objective of the Smart Accelerator in Ústí nad Labem is to support the so-called innovation ecosystem. We try to stimulate the mutual communication and cooperation among the different stakeholders, such as companies, research organizations and the regional government in order to create tools that will help transform the economy of the Ústí nad Labem Region," RIS3 manager of the Ústí nad Labem Region, Miroslav Cingl, says and continues: „We are looking for opportunities and solutions for the Region through strategic projects and interventions. With regard to regional smart specialization, a chemistry-focused study was drawn up and subsequently the work on another study dealing with region-specific branches of chemical technology is under way."

„As a result of the ICUK activities, a new topic of autonomous (smart) mobility appeared in the region. Cooperation has been negotiated between the Valeo company and Jan Evangelista Purkyně University, which is financially the largest contract research of the university in its history," Miroslav Cingl says. And Ondřej Klein, marketing manager of ICUK, adds: „The project consists of cooperation on the development of autonomous steering systems, i.e. unmanned driving for the automotive industry. In addition, the ICUK initiated a feasibility study for testing of autonomous cars in Ústí nad Labem."

A very significant output of the Smart Accelerator in Ústí nad Labem is the region´s marketing strategy for innovation,

research and development. A number of promotional and marketing activities are implemented within the project. For example, a newsletter called Neuron for Your Business and Innovation is published. „Another interesting output are interactive Virtual tours of innovative companies and research organizations in the region, which present selected companies and research organizations in a modern way. Smart Accelerator has also enabled to present our startups and, thus, the innovative ecosystem of the region at the prestigious futuristic event Future Port Prague," Ondřej Klein explains and continues: „The networking event Speed Dating that took place e.g. at the Science Research Innovation Fair in Brno was well evaluated. For the target group of students the "Champions Breakfast junior" event, where the students are motivated to start business through successful stories of entrepreneurs and current business trends, have been popular. This event acts as a necessary precursor and recruitment for an incubation programme for novice entrepreneurs."

The Smart Accelerator also helped to extend the incubation programme Startup Go with a sub-programme for starting entrepreneurs in the field of gastronomy, called Foodies Go. „We basically responded to the demand from those interested in the incubator. A similar programme within the Czech Republic existed only in Prague. Another interesting activity of the Smart Accelerator in Ústí nad Labem is the Stages project which aims to boost creativity and mathematical thinking of talented pupils in primary schools. The project has already been pilot tested at nine primary schools in the Ústí nad Labem Region and more than 500 pupils took part in it," Ondřej Klein says.

„Some strategic projects have a great potential to transform the region in the future. An example can be Datamining, a new competence for the Jan Evangelista Purkyně University and other organizations in the Region in the field of Big Data, or higher visibility of the scientific research environment in the Region thanks to participation in different events such as the Science, Research and Innovation Fair in Brno. It is certainly appropriate for the initiated activities to continue through the Smart Accelerator II project. But it will take a long time," Miroslav Cingl, the regional RIS3 manager, concludes.

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Strategic planning of the development of the educational system in the Liberec Region

„We try to invent and subsequently implement meaningful educational events, which at the same time lead to an effective implementation of the Regional Action Plan for Education Development of the Liberec Region I.“

Mgr. Lucie Ptáková
Lead project manager of the project Regional Action Plan of the Liberec Region

Project title:
Strategic planning of the development of the educational system in the Liberec Region
Implemented by:
Liberec Region
Implementation period:
13.01.2016 – 12.01.2022
The project was supported with a grant of CZK 19,999,300, of which the EU contribution is CZK 16,999,405.

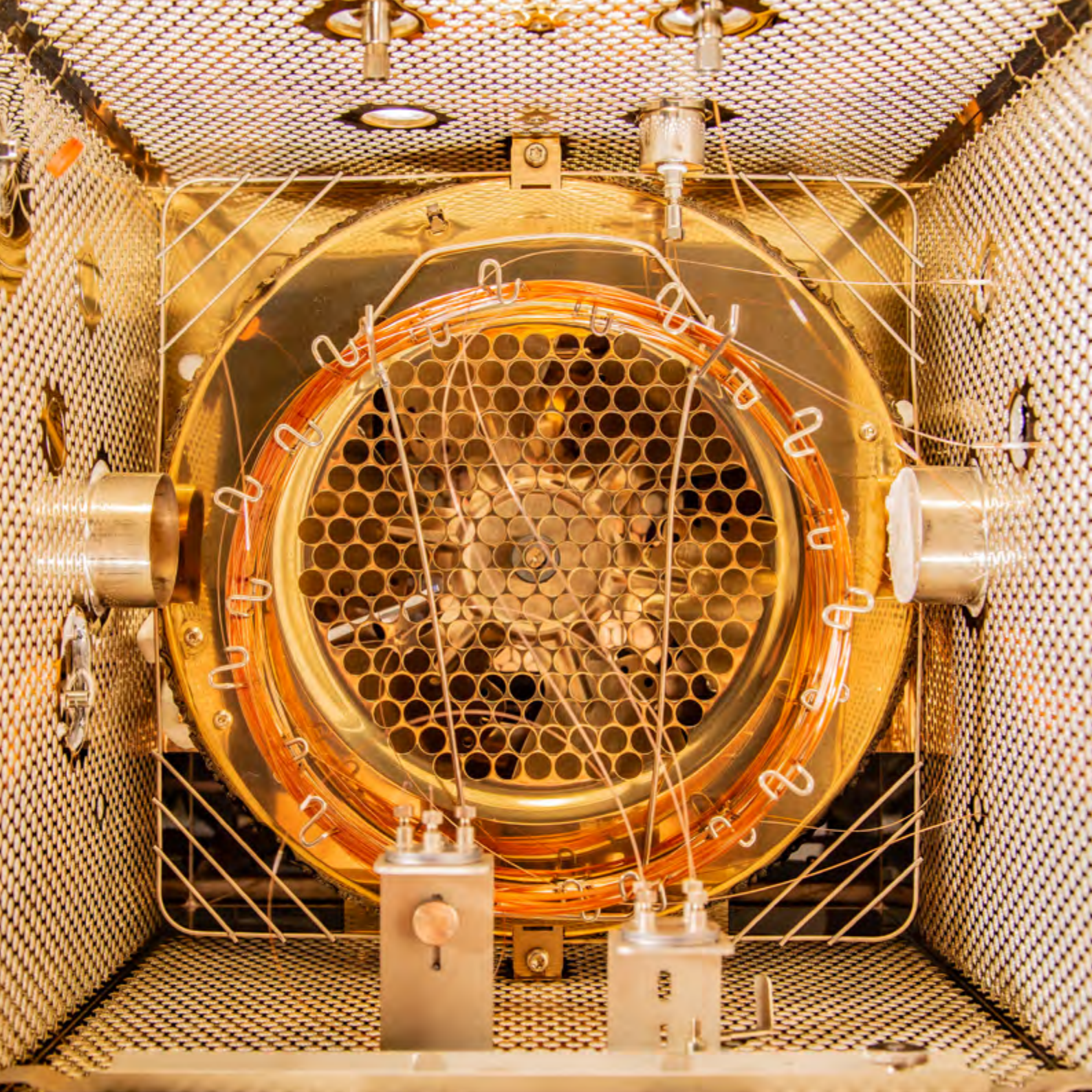
The Liberec Region got the financial support for this project within the call “Regional Action Plans for the development of education” (Priority axis 3). The aim of the call is to improve strategic management and planning of regional education in the region, promote joint planning or sharing of activities in the region, which will contribute to the realization of the Long-Term Plan for Education and the Development of the Educational System of the Czech Republic as well as the individual regions. At the same time, the supported activities will improve the quality of education at schools with an emphasis on supporting schools with weaker results, weaker pupils and on development of the potential of each pupil.

„Within this project, five specialized platforms were created for discussion of important issues in the field of education. These platforms are open to all the relevant actors and at the moment we can boast the cooperation with already 350 participants. A training event called Assistive Devices in Practice is worth mentioning. It was dedicated to the key topic of Inclusion support and included a unique showcase of assistive devices that allow disadvantaged students to participate fully not only in education but also in common activities," says lead project manager Lucie Ptáková. In terms of creation of the Regional Action Plan for Education Development of the Liberec Region, she adds: „It was quite a challenging process, as over 95 professionals were involved in its preparation. The resulting output, however, sums up the needs and different points of view and is thus more complex."

The Liberec Region also organised a very successful fair called Technology to Schools, which was held on 24 April 2017. As a part of its scientific programme, the fair hosted representatives of the Technical University in Liberec, representatives of companies dealing with applications that can be used in education and representatives of companies providing further education. Registered participants had the opportunity to view short entries about news in the overall concept of ICT in education, about the possibilities of using information and communication technologies in the running of schools, in organizing teaching and in teaching itself. They got inspired by practical examples of ICT use, educational games and applications.

„Through this project, we also support headmasters and other key staff of secondary schools and post-secondary vocational schools, regardless of their founders. The support comes in the form of education and exchange of experience in school management, evaluation of education quality and strategic planning. We regularly organize one-day or two-day workshops.

In the coming months and years we will also seek impetus for the development of secondary and post-secondary vocational education, and through meeting events we will enrich teachers in key areas for improving the quality of school-leavers. These key areas include the promotion of entrepreneurial competences, initiative and creativity, support of polytechnic education, support for vocational training including cooperation between schools and employers, development of career counselling, development of schools as centres of lifelong learning, inclusion support, development of language teaching, ICT skills, literacy and numeracy, improving care for gifted students," the lead project manager Lucie Ptáková says to conclude.



Research on aquatic and terrestrial ecosystems

„Obtaining all the food that we eat ultimately depends, directly or indirectly, on the quality of the soil and its ability to retain water.“

prof. Ing. Mgr. Jan Frouz, CSc.
Director of the SoWa research infrastructure

Project title:
Research on key ecosystem interactions between soil and water using the SoWa research infrastructure
Grant Beneficiary / Project Partners:
Biology Centre of the Czech Academy of Sciences (CAS)/ University of South Bohemia in České Budějovice, Faculty of Science of Charles University and Czech Geological Survey
Implementation period:
01.05.2017 - 30.4.2020
The project was supported with a grant of CZK 113,794,000, of which the EU contribution is CZK 96,724,900.

The CAS Biology Centre submitted the project to the call “Research Infrastructures” (Priority Axis 1). The call supports research infrastructure projects in research and investment activities. The aim of the call is the complementary support of the construction, upgrade, modernization and research activities of major infrastructures for research, experimental development and innovation set out in the “Roadmap of large infrastructures for research, experimental development and innovation in the Czech Republic for the period 2016-2022”.

Human communities, their development and prosperity are largely dependent on the sufficient amount of quality soil and drinking water. „Many experts believe that each soil has a limited amount of organic matter, and if we get below that level, the soil starts to lose its fertility in a cascade way throughout the series of processes and its erosion increases. It is estimated that the limit is somewhere below 0.5-0.75% of organic matter and we are getting dangerously close to that level. And our project is about all of that. We try to cover the key interactions between water, soil and nutrients responsible for providing clean water which can be modified to drinking water and to examine the impact on soil fertility and food supplies," the director of the SoWa research infrastructure, Professor Jan Frouz, explains.

The project is unique in its comprehensive view of soil and water. It examines, in detail, the interaction between soil and aquatic ecosystems in the scale of microcosms, mesocosms or the entire river basin such as runoff and water treatment, the cycle of nutrients and water in the landscape, the decomposition of organic matter and release of nutrients or key biological processes. „Usually the following procedure is used: we go to the countryside and we look for those interactions, which we cannot explain. On their basis we can then get some idea about how the things are mutually related and we can verify that idea further," Jan Frouz explains.

To be able to carry out these activities the researchers need many unique devices. Therefore, one of the main objectives of the project is to improve the equipment and to modernize and develop the SoWa research infrastructure. „SoWa has several unique facilities that are still being built such as the extensive network of experimental mesocosms. These are small tanks with aquatic ecosystems or containers with parts of soil where various manipulation experiments on medium scales (hundreds of litres) can be performed. We are also building an experimental drainage basin, which you can imagine as four leak-proof pools (using a compact sealing clay), which are filled with soil. Via these pools we will be able to monitor the surface runoff after precipitation, what nutrients the water carries off, but also how vegetation grows on the drainage basin and how it is related to water supply," Frouz explains.

More than thirty scientists who have extensive experience and knowledge in the field of ecology, hydrobiology, hydrology, zoology, soil microbiology and bioinformatics are involved in the project. New jobs will be created for young and talented scientists from abroad, which will strengthen the international dimension and excellence of the Czech science.

The research activities of the project will significantly improve fundamental understanding of the role of living and non-living processes in different parts of ecosystems and the role of these processes in maintaining the stability and the functioning of ecosystems. „Our research has an impact on the countryside and the way how we should treat it," Jan Frouz adds. The acquired knowledge will also have other practical applications. It can be used to develop the technologies of the 21st century with focus on the protection of land resources or on more efficient land use, for example in forestry and agriculture. Last but not least, the results will contribute to meeting the "Aichi Biodiversity target 15", which means to restore at least 15% of degraded ecosystems at the national level and (to some extent) at the European Union level by 2020.

University of the 21st century
High quality, modern and open

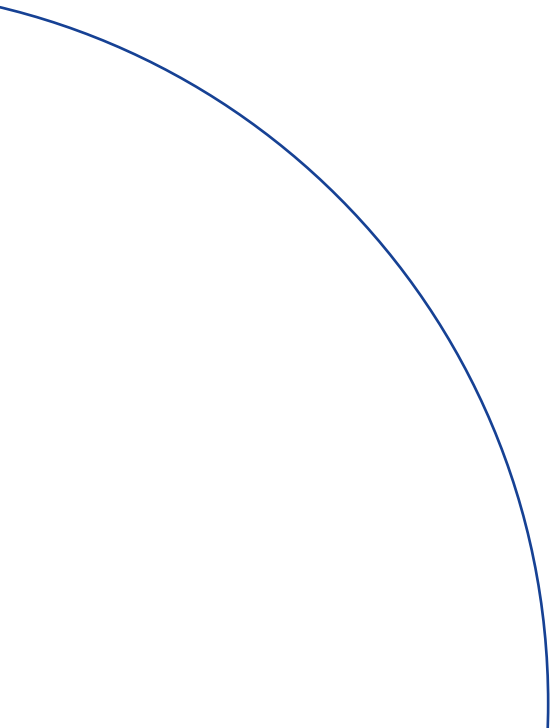
„We want graduates to leave the university as strong individuals.“

doc. RNDr. Martin Balej, Ph.D.
Rector of Jan Evangelista Purkyně University in Ústí nad Labem

Project title:
University of the 21st century - High quality, modern and open
Implemented by:
Jan Evangelista Purkyně University in Ústí nad Labem (UJEP)
Implementation period:
01.05.2017 - 31.12.2022
The project was supported with a grant of CZK 124,369,918, of which the EU contribution is CZK 105,714,430.

Jan Evangelista Purkyně University in Ústí nad Labem submitted its application within the “ESF call for higher education institutions” (Priority Axis 2). This call together with the “ERDF call for higher education institutions” and the calls “Research infrastructures for educational purposes - construction or modernisation” and “Developing research-oriented study programmes” form a so-called quadruple call that included „soft activities“ of higher education institutions, focused on improving the quality, competitiveness and employability of graduates together with the associated investments. In the quadruple call more than CZK 17 billion were prepared for higher education institutions.

Jan Evangelista Purkyně University with the financial support received from the Operational Programme Research, Development and Education implements the project "University of the 21st century - High quality, modern and open". „This project is formed by a group of projects that are closely related and fit together like a mosaic, which should create an image of a university of the 21st century. These are investment projects, instruments and laboratories adequate for this century. At the same time, funding will be provided also for soft, non-investment activities, i.e. human resources, foreign study visits, methodologies and a modern learning environment," University Rector Martin Balej explains and adds: „We want graduates to leave the university as strong individuals. It is important to ensure that during their studies each student will have the opportunity to cover the chosen subject not only theoretically, but also to come into contact with what they will use in their specific jobs after their graduation. We want to be more competitive, not only on the home turf but also internationally."



The project of UJEP focuses on providing QUALITY education and producing high quality graduates. UJEP will become an OPEN university, i.e. accessible also to students with special needs, as well as a MODERN university with systems of quality evaluation and strategic management in place.

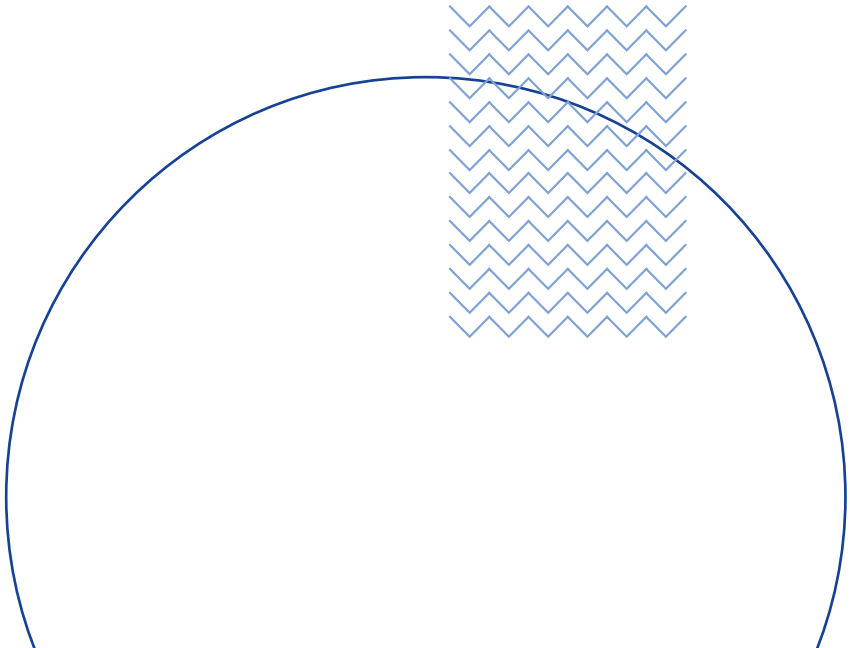
New modern teaching methods and the development of selected polytechnical, pedagogical and medical study programmes are supported. Professional and pedagogical competences of the academic staff are strengthened. „At the university level we want to introduce a labour market monitoring system for our graduates. At the same time we will support entrepreneurship of our students and graduates and we would like to establish closer ties with them," the University Rector Martin Balej says.

„It is important to teach students different procedures that will be applicable analogously to other apparatuses which the students may encounter later in their practice. We are also concerned about making the procedures more connected with praxis, because employers often criticize that graduates are not able to work

with the available devices. If we produce a graduate from the Faculty of Economics, who has never worked with any accounting system, the employers will not be delighted. Therefore, using the funds from OP RDE, we seek to incorporate these specific methods and tools into the study process," the University Rector specifies the project benefits for graduates.

The openness of the university, especially for students with special needs, will be ensured by the university counselling centre. „The university counselling centre is designed not only for students but also for employees and will carry out a wide variety of activities. There will be both psychological and educational counselling as well as career counselling for students who are finishing their studies. It will also gather all the job offers that are available in the region. We want to advise students with their jobs also during their studies. They can contact the centre with pedagogical-psychological or other problems too.

We assume that the counselling centre will cooperate with other institutions such as the Labour Office, the regional hospitals etc. I can imagine that the counselling centre will organise a model selection procedures so that students and subsequently graduates can prepare well for what will follow in the labour market. And we are trying to help our employees too. They may contend, for example, with a burnout or get into difficult working or living situations and need help or advice," University Rector Martin Balej concludes.



From inclusive education to nuclear energy
Selected projects supported from the Operational Programme Research, Development and Education

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First edition
Prague 2018
Free distribution

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