CENTRAL BOHEMIAN INNOVATION CENTER

CENTRAL BOHEMIAN REGION SUCCESS STORIES

RESEARCH
DEVELOPMENT
INNOVATION

Innovation in the heart
Central Bohemia Region

Central Bohemia Region

GOVERNOR'S FOREWORD

People are driven by an immemorial desire to discover and understand. Inventions that brought remarkable and sometimes unexpected progress to mankind continue to dazzle us today and we search for ways to make the best use of them. Such is the eternal cycle of science, rooted in the breathtaking adventure of exploration.

This adventure has a long history in Central Bohemia. Our region has one of the highest concentrations of scientific capacities in the Czech Republic. Central Bohemia wishes to be a proud partner of all research institutions, many of them world leaders in their fields of expertise. At the same time, we aim to facilitate the connection between these institutions and those who are ready to immerse themselves in education, discovery, and creativity. Innovations are about people and the people who live in our region have innovations at heart. I very much hope that this book will play its part in attracting new researchers who will write the next chapter in the exciting story of science.

Jaroslava Pokorná Jermanová
Governor of the Central Bohemia Region

INNOVATION IN THE HEART

It is a common idea, a philosophy, a way of life. For all who want to search for new ways and novel solutions. It is a source of inspiration and information for scientists, students, entrepreneurs, mayors and enthusiastic citizens of the Central Bohemia. The "Innovation in the heart" project aims at bringing successful innovation stories to businesses, research institutions and, most importantly, to the public at large. It seeks to facilitate cooperation and to inform about the best use of the Central Bohemian innovative potential.

Innovation in the heart
Central Bohemia Region

CENTRAL BOHEMIAN
INNOVATION
CENTER

We are the most fundamental tool of the Central Bohemia Region in supporting innovations. Through the employment of new technologies, services and information, we strive to improve life across the region. We take active part in improving the environment.

OUR PATNERS:

- Municipalities and towns
- Companies
- Science and technology research institutions

We are a team of experts who map out, analyze and design tailor-made services, projects and programs, ranging from consulting services to networking to administrative support for grant and subsidy programs. We have long experience in seeking innovation and investment opportunities. We focus on education in science and technology. We support creative industries.

MEMBERS AND FOUNDING MEMBERS:

- Central Bohemia Region
- Institute of Physics of the Czech Academy of Sciences
- Astronomical Institute of the Czech Academy of Sciences
- Research Institute of Geodesy, Topography and Cartography
- Czech Technical University in Prague

Central Bohemia Region

CTU
CZECH TECHNICAL UNIVERSITY IN PRAGUE

FZU Institute of Physics of the Czech Academy of Sciences

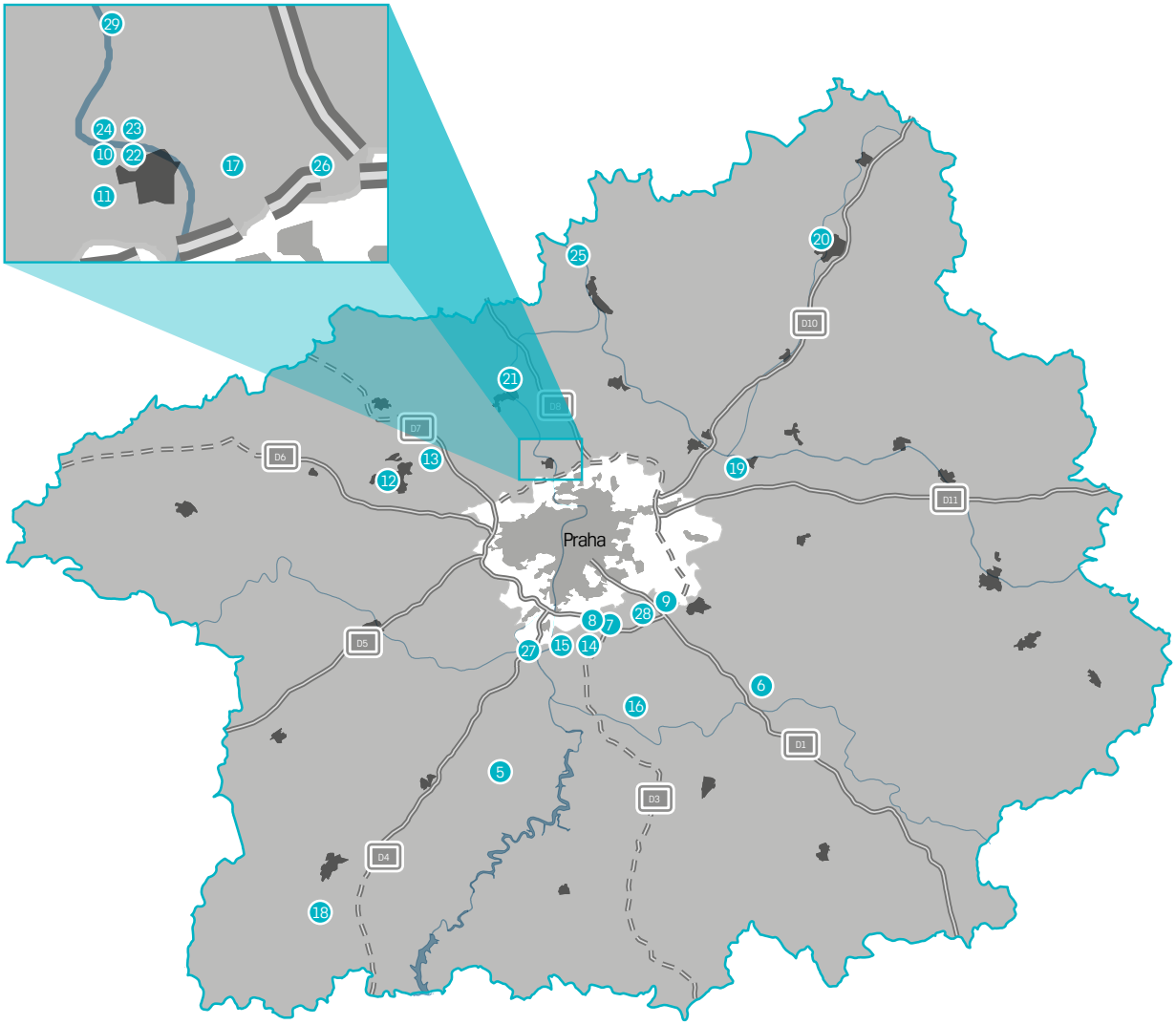
asu Astronomický ústav AV ČR

VUGTK

CEO'S FOREWORD

Research institutions in the Central Bohemia Region are active in a wide range of fields: they focus on technology, natural sciences, agriculture, biotechnology, and medicine. In addition to research, they are engaged in education and popularization of science. Our book called **Central Bohemian Region Success Stories - Research, Development, Innovation** was written for both experts and public at large. It presents 25 research centers, describes their main activities, their most interesting projects, and their popularization and educational work so that the reader can understand better what they do. I am very pleased to announce the publication of this modern guide to research in Central Bohemia. I hope it will become an enjoyable read for all research and development enthusiasts and a useful tool for those regional educational establishments that seek to enrich their courses.

Vilém Růžička
CEO, Central Bohemian Innovation Center



AERODYNAMIC LABORATORY IN NOVY KNIN, INSTITUTE OF THERMOMECHANICS OF THE CAS

INTRO

The Institute of Thermomechanics of the Czech Academy of Sciences is multidisciplinary and interdisciplinary in nature. Its research ranges from the study of the properties and flows of liquids and gases, through the properties and behaviour of solids to electrical engineering, electrophysics and biomechanics. Scientists from the Institute participate in the development of more efficient turbines in thermal power plants, predicting the spread of hazardous substances in the air, designing more efficient methods of component cooling etc. They contribute to the development of artificial human vocal cords, non-invasive detection of hidden defects in materials and structures, measuring the elasticity of human skin or the response of various materials including food to dynamic loading as well as designing electronic performance converters and industrial drives and propulsion systems.

SUCCESS STORIES

The low-pressure steam turbine rotor in the Počerady power plant developed by Doosan Škoda Power in collaboration with the Aerodynamic laboratory in Nový Knín rotates at 3000 rpm, with the tip moving at 2440 km/h. Due to the high rotation speed and the rotor blade mass the persistent centrifugal force acting on the rotor corresponds to a load of 444 tonnes. This is the equivalent mass of several electric locomotives. In such extreme conditions every detail of the blade design matters. Scientists from the Aerodynamic laboratory have for some 50 years been utilizing powerful wind tunnels and high-end experimental facilities to optimize the flow around turbine blades and other continuous flow machines. This leads to more efficient equipment, and thus significant savings in electrical energy generation.

FOR THE PUBLIC

Open days CAS Science and Technology weeks
Tours for elementary schools and the public
Student internships on the Science unbarred project

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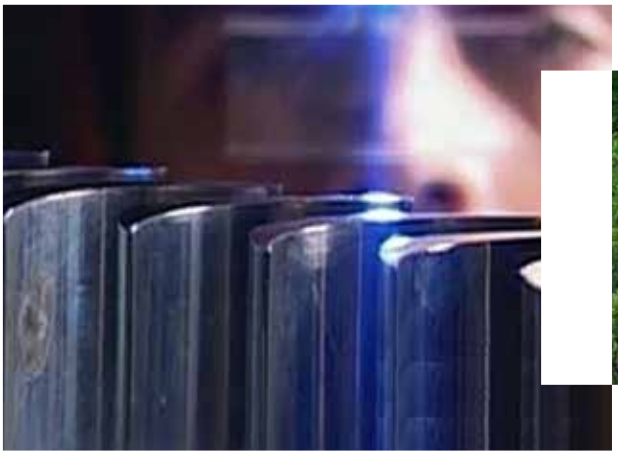

ASTRONOMICAL INSTITUTE OF THE CAS

Astronomický ústav AV ČR

INTRO

The Astronomical Institute of the Academy of Sciences of the Czech Republic is the leading scientific institution in the fields of astronomy and astrophysics in Czechia. The prime focus of the Institute is to conduct scientific research and development in astronomy and astrophysics, covering more specifically the formation, development, dynamics and physical properties of stars, stellar systems and related bodies, researching the Sun, solar activity and its effects on processes both on Earth and in interplanetary space, researching the Earth's surroundings, the dynamics of natural and artificial bodies of the solar system as well investigating interplanetary matter and how it interacts with the Earth's atmosphere.

SUCCESS STORIES

The Institute is involved in projects on the development and construction of instruments for missions by the European Space Agency ESA. This also includes instruments for the Solar Orbiter probe, for its 2020 journey toward the Sun. The probe will explore the Sun closer than any probe hitherto, at a distance comparable to the orbit of Mercury. We anticipate obtaining unique findings that will advances our knowledge of this our nearest star. Astronomers regularly keep an eye out for information about current celestial events. The most interesting overhead phenomena can be seen by visitors at the Astronomical Observatory in Ondrejov.

FOR THE PUBLIC

Public access tours of the Ondrejov observatory, Excursions – for elementary & secondary schools (from April to October), The 'What we're working on' series, Other public events, For children and youth

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BIOCEV – BIOTECHNOLOGY AND BIOMEDICINE CENTER OF THE CAS AND CHARLES UNIVERSITY IN VESTEC

BIOCEV

INTRO

In the Czech and European scientific context, BIOCEV represents the apex comprehensive platform for developing modern biotechnology and biomedicine. Establishing this centre has enabled interconnecting domains in the technical and natural sciences, such as virology or chemistry that are strong in their own right. The BIOCEV research groups focus on detailed discoveries about organisms at the molecular level. Their findings are geared towards applied research and the development of new therapies to counter serious medical conditions. Research achievements of work done at BIOCEV include medicines targeted to the precise site of injury in the body as well as protein and tissue engineering.

SUCCESS STORIES

An agent that completely neutralized cancer cells in one of the most aggressive forms of breast cancer. New antibiotics against streptococcus and staphylococcus infections. A unique vaccine for the treatment of infectious diseases. The first ever documentation of how the tooth develops, potentially useful in the fight against cancer. Another example is the revolutionary discovery of an organism entirely lacking mitochondria, known as the 'cellular power plants'. These are just some of the achievements of the scientific teams from the BIOCEV centre. Among other things, they are engaged in developing more resilient vaccines for farm animals, but also food-quality research from the standpoint of epigenetics – changes in gene expression driven by many factors (diet, lifestyle, etc.).

FOR THE PUBLIC

Open days as part of Science and Technology week of the CAS, Excursions – for nursery, elementary & secondary schools and the public, Scientists into Schools scheme – sending out chemists and biologists, Student internships

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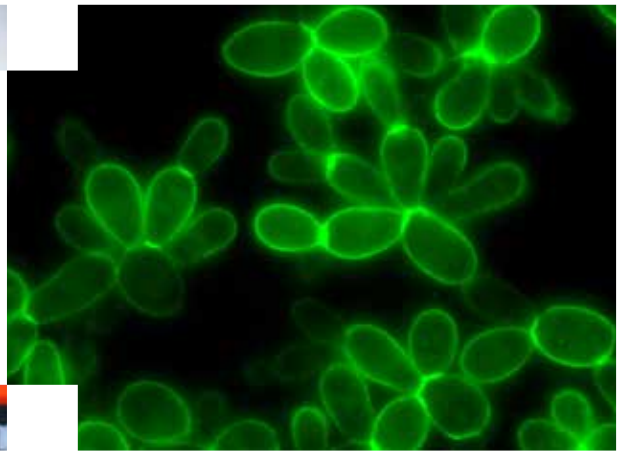

INSTITUTE OF BIOTECHNOLOGY OF THE CAS

INTRO

The Institute of Biotechnology of the Czech Academy of Science is engaged in leading-edge fundamental research in the molecular-biological sciences and its applications in human medicine as well as other areas of human activity. Research is conducted under two research programme streams – the first being the Development of Diagnostic and Therapeutic Procedures. Its aim is to clarify the molecular mechanisms of severe diseases, develop procedures for prevention, prepare new methods for their monitoring and diagnostics and develop tools for the molecular therapy of the accompanying pathological conditions. The second programme – Structural Biology and Protein Engineering is dedicated to researching biomolecules, proteins and nucleic acids. Understanding their structures and interactions will enable their modification and subsequent use in diagnostics, medicines or other materials.

SUCCESS STORIES

During its relatively short existence the Biotechnology Institute has achieved remarkable results. Because today's science is very closely bound up with the practical application of research findings, the Institute cooperates with numerous universities, research institutes and private companies nationwide and abroad. Among the outcomes are a whole range of antibodies, detecting sperm quality finding application in assisted reproduction. Cooperation with the makers of veterinary drugs has brought the successful development of new diagnostic procedures and vaccines. One great success arising out of long-term cooperation with a Czech investor was to commence the first stage of clinical trials of an anti-cancer substance called MitoTam, which it is hoped will significantly suppress breast cancer and act against other cancers.

FOR THE PUBLIC

Open days
Participation in the Science and Technology Week

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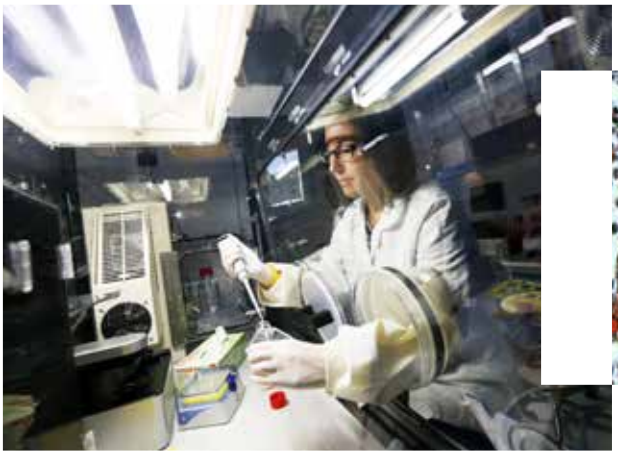

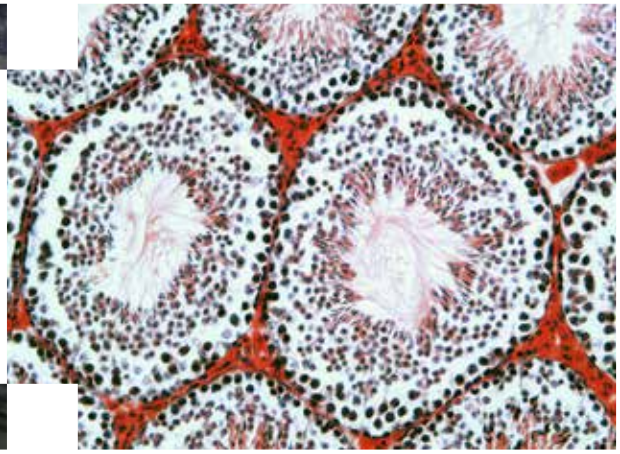

INSTITUTE OF BOTANY OF THE CAS

INTRO

The Institute of Botany of the Czech Academy of Sciences conducts scientific research right across the board, especially in the field botanical disciplines. The Institute currently has over 300 staff, of whom some 120 are researchers and doctoral students. In addition, the Institute manages the Průhonice park, inscribed on the UNESCO World Heritage list. It keeps in close cooperation with colleges, universities and public institutions, particularly so when it comes to protecting nature and the landscape. Cooperation with commercial entities is primarily evident in the field of biotechnology. Since 1966 the Institute of Botany has been publishing the international journal Folia Geobotanica, and since 2013 the science-popularization magazine Botanika.

FOR THE PUBLIC

Participation in the Science Fair – for elementary & secondary schools and the public, Science trek, activities for the public, Science workshops, for elementary & secondary schools and the public, Internships for secondary school students, One-time exhibitions

SUCCESS STORIES

The database of Czech flora and vegetation, which was opened to the public in the Spring of 2018 on the Pladias website, offers comprehensive and reliable information for professionals and the lay public alike. Experts will particularly appreciate the detailed information on the distribution of plant species and dozens of different biological and ecological properties listed for each species, which make it an exceptional source of data for scientific research. The general public will welcome the photos and other images including plant structures that help easily identify particular plants, as well as the interactive distribution charts. Practical use has been made of e.g. invasives research – botanists from the Institute of Botany have produced Standards for the Nature Conservation Agency of the Czech Republic on the disposal of invasive plants. Scientists from the IB have also analysed the surfaces of concrete, walls and construction materials in a range of ČEZ hydroelectric power plants in order to identify just where micro-organisms may cause health and safety hazards.

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RESEARCH CENTRE ŘEŽ

INTRO

The Research Centre Řež was founded in 2002 as a 100% subsidiary of ÚJV Řež. Its prime mission is research, development and innovation in the field of energy, in particular, nuclear power. To this end it has at its disposal an extensive research and experimental infrastructure, including research reactors LVR-15 and LR-0 and technological loops. A substantial expansion of the research infrastructure was brought about by significant investment as part of the SUSEN (SUStainable ENergy) project. Other significant activities of the company include participation in the international Jules Horowitz Reactor project – to develop and build a new high-power nuclear reactor for material and nuclear fuel research as well as numerous other national and international projects.

SUCCESS STORIES

The SUSEN project has brought funding into the Czech Republic for the research community and in particular for its executors — the Research Centre Řež and University of West Bohemia in Pilsen – a European Union contribution of nearly 2,200 million CZK; a unique opportunity for significant expansion of its energy research and development capacity. The aim of the project is to contribute to the safe, reliable and sustainable operation of existing energy facilities, in particular Gen II and III nuclear power plants and extension of their working life by 20-40 years. A further aim of the project is the research and development of future nuclear reactors generation (Gen III+ and IV) and the development of fusion reactors.

FOR THE PUBLIC

Tours for secondary schools and colleges of the research reactors: LVR-15 and LR-0, Training – for college students, Reactor access to students under the Capacity for ideas programme, Further cooperation with colleges under the SUSEN project

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CTU CENTRE OF VEHICLES FOR SUSTAINABLE MOBILITY

CENTRUM VOZIDEL UDRŽITELNÉ MOBILITY

INTRO

The Centre of Vehicles for Sustainable Mobility is a research institution of the Czech Technical University Faculty of Mechanical Engineering whose activity is particularly focused on the needs of the automotive industry with quite broadly ranging expertise – on combustion engines, hybrid and electric drives, gear mechanisms of various kinds, electronics and microelectronics, mechatronics (e.g. autonomous driving), while deploying 1D and 3D simulation tools across the expertise domains. The cross-disciplinary functioning of the centre is evident e.g. in the energy sector (electric drives, distributed energy) or the chemical field (fuels, lubricants). In these areas it serves to broaden the scope of fundamental and above all applied research, which is strongly linked to innovation activities supporting the competitiveness of the automotive industry and of related fields.

SUCCESS STORIES

The centre cooperates with leading domestic and foreign laboratories and workplaces involved with research and development, as well as industrial companies in the Czech Republic. The main partner is the domestic car manufacturer ŠKODA AUTO, and also notably the Ford Motor Company. The Research Centre is also a member of several international organizations and bodies, like the European Green Vehicles Initiative Association, preparing cooperation calls under the HORIZON 2020 initiative. Thanks to these activities the Centre has partnered with major European projects. The CTU Faculty of Mechanical Engineering has through the activities of the Centre and other centres co-founded two major technology platforms, the Czech Hydrogen Technology Platform and the Czech Mechanical Engineering Technology Platform.

FOR THE PUBLIC

Open days, guided tours and excursions for the public

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CTU FACULTY OF BIOMEDICAL ENGINEERING

FACULTY OF BIOMEDICAL ENGINEERING CTU IN PRAGUE

INTRO

The Faculty of Biomedical Engineering of the Czech Technical University in Prague was established in the year 2005. Its scientific, research and developmental activities are aimed at technical, medical and managerial disciplines applied in biomedical engineering, medical informatics, and medicine and population protection. In research and innovation, the faculty strives for quality research on both national and international level and it is systematically heading towards the status of a reputable institution. It seeks to strengthen its standing through cooperation with industry, healthcare and public administration bodies and to create conditions for growing the innovation potential, other creative activities, technology and knowledge transfer. A priority of the faculty is mainly its multidisciplinary staff, instrumentation and material support of long-term national or international grants.

SUCCESS STORIES

The faculty focuses largely on projects connecting technology, medicine, health and social services, safety and security as well as emergency services. Its graduates are experts with an interdisciplinary education who help save human lives and develop new biomedical technologies. The research and teaching labs of the faculty benefit from state-of-the-art devices, equipment and simulation technology and the workplace ranks among the top ones when it comes to neonatal high-frequency lung ventilation, research into telemedical systems for monitoring and supportive treatment of diabetes, as well as the development of new procedures in emergency and disaster medicine. At present, for example, its activities include developing fast thin-film scintillators for high-resolution 2D imaging.

FOR THE PUBLIC

Open days, Participation in events: Science Fair, Prague Museum Night, Science Festival, Researchers' Night, CAS Science and Technology Week, Science Café Kladno, conferences and lectures

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CTU UNIVERSITY CENTRE FOR ENERGY EFFICIENT BUILDINGS

UNIVERSITY CENTRE FOR ENERGY EFFICIENT BUILDINGS CTU IN PRAGUE

INTRO

University Centre for Energy Efficient Buildings (UCEEB) brings together top academics from the Czech Technical University in Prague that work together on sustainable buildings issues. UCEEB was created to facilitate university-industry cooperation, focusing on the commercial applicability of research findings and technology transfer. Its added value is its ability to develop, innovate and come up with original solutions in the field of sustainable buildings covering their entire lifecycle, including a healthy internal environment, with respect to investments, operating costs and energy savings.

Company profile:
Number of R&D&I departments: 6
Number of laboratories: 21
Number of scientists: 121
Total number of employees: 200

SUCCESS STORIES

Solar Air Water Earth Resource (S.A.W.E.R.) system seeks to turn a dry and hot desert into a green landscape. The joint project of CTU UCEEB, CTU Faculty of Mechanical Engineering, and the Institute of Botany of the Czech Academy of Sciences will be presented in the Czech pavilion at Expo 2020 in Dubai. It represents a system for drawing water from the air, characterised by a completely autonomous operation. Its energy requirements are entirely covered by solar power. S.A.W.E.R. comprises of two components: one for extracting water out of the desert air and the other one for cultivating the desert into fertile land.

FOR THE PUBLIC

Professional training courses and seminars
Guided tours
Open days
Participation in fairs, conferences and lectures

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INSTITUTE OF PHYSICS OF THE CAS, ELI BEAMLINES

INTRO

ELI Beamlines is a part of the ELI (Extreme Light Infrastructure) pan-European project. ELI Beamlines aims to establish and operate the world's most intense laser system. With ultra-high power 10 PW (1 petawatt = 1,000,000,000,000,000 watts) and concentrated intensities of up to 10^{24} W/cm^2, we offer our users a unique source of radiation and rays of accelerated particles. These beamlines will enable pioneering research not only in physics and material science, but also in biomedicine and laboratory astrophysics and many other fields. The center was opened in 2015.

FOR THE PUBLIC

International Day of Light – for the general public, Talent Academy – for talented secondary school students, Dolní Břežany Science Fair – for elementary schools, Involvement in the project entitled Elixir to schools, promoting science and natural history subjects in elementary & secondary schools, Science Fair – for students and the general public, Researchers' Night – for the lay and professional public, CAS Science and Technology Week– for secondary schools and the general public, ELISS – ELI summer school for undergraduate and graduate students

SUCCESS STORIES

As well as basic research and development in the field of lasers, ELI Beamlines also deals with applied research addressing a wide range of issues incuding cancer treatment, medical imaging, fast electronics, ageing studies of a nuclear reactor and development of new nuclear waste treatment methods. Thanks to ELI Beamlines, the Czech Republic will become a host country of top international research, which provides significant potential not only for attracting investment into advanced advanced technologies with high added value, but also for companies, excellent researchers and technical staff from the fields of optics and laser sciences, material sciences, electronics and engineering. The Czech optical and photonic industries play an important role in development of technological components needed to build ELI Beamlines, to maintain them and further develop. ELI Beamlines is therefore also a pillar in the development of regional innovation initiatives.

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INSTITUTE OF PHYSICS OF THE CAS, HILASE

INTRO

The HiLASE Centre is one of the workplaces of the Institute of Physics of the Czech Academy of Sciences. The HiLASE team is dedicated to developing a new generation of high energy diode-pumped solid state laser systems with high repetition rates. With this technology, lasers are significantly stronger, more powerful, more compact, and more stable than currently available devices. The Centre has been in operation since 2014 in Dolni Brezany.

SUCCESS STORIES

One of the research topics is the operation of the Bivoj superlaser. This is the most powerful diode-pumped solid-state laser, a unique laser technology developed jointly by researchers from HiLASE together with British scientists from the Science and Technology Facilities Council. However, the greatest added value of the center is the unique combination of experimental laser development and advanced industrial applications under one roof. Thanks to close cooperation with high-tech companies and knowledge of their needs, the HiLASE center focuses mainly on the preparation of functional materials, increasing the resistance of the material and on laser micro-processing. Within the Open Access programme, the HiLASE infrastructure is available also to interested parties from other research institutions.

FOR THE PUBLIC

Open days, International Day of Light – for the general public, Science Fair, Talent academy, Researchers' Night, CAS Science and Technology Week, Science Teaching and a Science Fair in the Dolní Břežany elementary school, Business Breakfast, meeting with representatives of industrial institutes and companies

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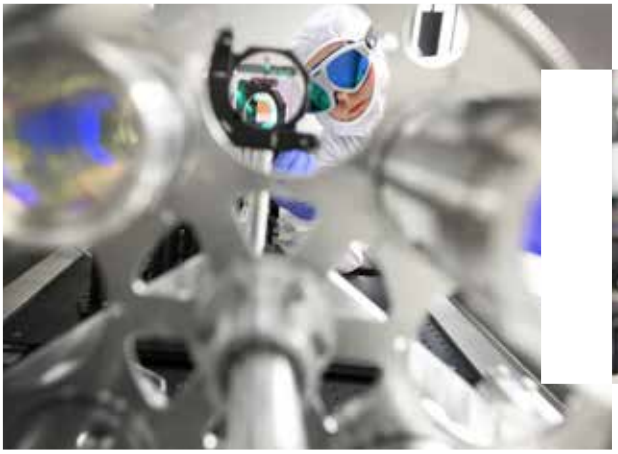

INSTITUTE OF FOREST ECOSYSTEM RESEARCH

INTRO

IFER – Institute of Forest Ecosystem Research is an independent private research organization, focused on issues of productive forest ecology. IFER develops detection methods to gauge forest status, economic management, and determining the volume quality of stock wood mass. It makes use of data on the state of forest ecosystems, from which it proposes adaptation measures applicable under operating conditions. IFER works for the owners and administrators of forest holdings; ministries, government administration, national parks, research and academic departments not only in the Czech Republic but around the world. IFER results directly influence developments in some types of forestry research, such as the growth tables of major tree species covered by legislation. IFER has played its formative role in the modern concept of economic planning.

SUCCESS STORIES

IFER is successfully bringing together technological development with research findings and activities, leading to the practical and commercial application of research results. From 1995 onwards IFER has been focused on developing technologies for computer-aided field data collection enabling data management and processing. This technology has been developed into the commercially available Field-Map product, combining a wholly integrated hardware and software solution. It is used in forestry research, management and as a corporate information system. Field-Map is inherent in nearly all IFER activities, at one and the same time supporting research activities and giving the feedback needed for ongoing development. Field-Map currently has a whole host of users in the Czech Republic and in a further 40 countries around the world.

FOR THE PUBLIC

Earth Day for elementary school pupils, Summer School Stock-take for college students, Internships for college students, Participation at trade fairs and conferences, Field-Map Educational International User Conference, Dendrometric laboratory

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NATIONAL INSTITUTE OF MENTAL HEALTH

NÁRODNÍ ÚSTAV DUŠEVNÍHO ZDRAVÍ

INTRO

The focus of the programme of the National Institute of Mental Health (NUDZ) is research into neurobiological mechanisms that lead to the onset of the most serious mental disorders (schizophrenia, clinical depression, anxiety and stress reactions). Part of the research is also the developing and testing of new diagnostic and treatment methods. The solution approach to the issues is based on the interdependence of methodologies encompassing molecular biology, animal models and clinical research and testing. The National Institute of Mental Health was established by restructuring the Prague Psychiatric Centre on 1 Jan 2015 and its aim is to become the touchstone department in the field of mental health in the Czech Republic.

SUCCESS STORIES

In one of the projects, NUDZ researchers are focusing on swift and targeted diagnostics of the early warning signs of certain psychoses by utilizing modern communication and information technologies. These allow patients to keep in touch with their doctor, regardless of the clinician's current availability. Among the other projects are e.g. new therapeutic approaches for the treatment of psychoses using natural cannabinoids, namely for patients with clinical depression. NUDZ also hosts an internationally unparalleled project exploring the overlap of other diseases with neurological and mental illness. This phenomenon has thus far been insufficiently studied or understood, and adversely impacts the quality of life of patients and their loved ones.

FOR THE PUBLIC

Open days
Seminars, workshops, lectures
Festival Na hlavu ['On the head']
Laboratory of the mind – The series of popularizing lectures of Laboratory of the mind.

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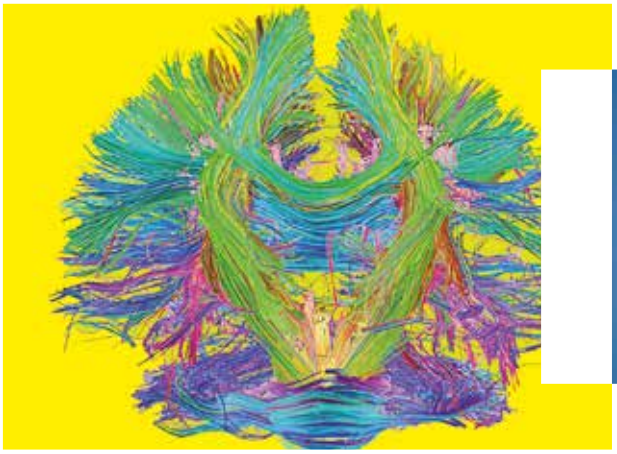

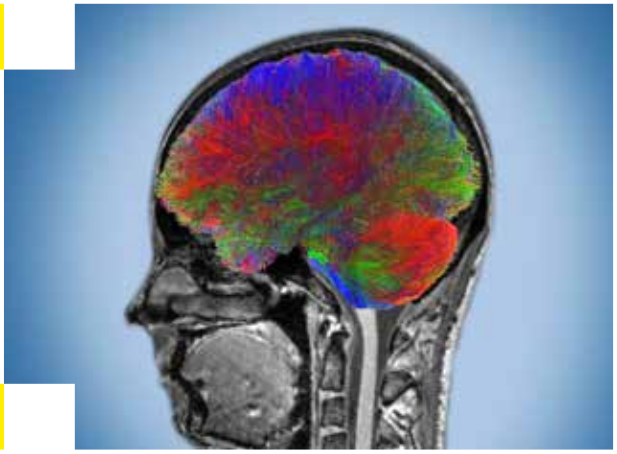

NATIONAL INSTITUTE FOR NUCLEAR, CHEMICAL AND BIOLOGICAL PROTECTION

INTRO

The National Institute for Nuclear, Chemical and Biological Protection is a public research institution, whose professional workplaces are particularly geared toward applied research and development in the field of highly hazardous chemicals, biological agents and toxins as well as nuclear and radioactive materials. This research is focused on both the recognition of such substances, i.e. their detection and identification, and protection against their effects as well as decontamination. The primary activities of the institute also cover security research in terms of protection against terrorist threats, as well as the aftermath of major accidents involving spillage of hazardous substances into the environment.

SUCCESS STORIES

Since the beginning of 2002 the institute has been responsible for the analysis of unidentified materials and potentially hazardous substances found on Czech territory. Any such finds must be made safe via the integrated security services and safely transported to the institute's laboratories. These are typically not life-threatening materials, the vast majority of them being various kinds of „white powders". In past, however, many of highly dangerous compounds were found in the Czech Republic, such as cyanides, strychnine, ricin, chemical warfare agents such as mustard gas and Lewisite, or chemical munitions from WWII. Other examples of finds containing less hazardous substances include occasionally seized drugs, radioactive compounds, or pressurized vessels containing toxic industrial gases.

FOR THE PUBLIC

Open days,
Guided tours and excursions for the public with previous agreement

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INTRO

SVUM is a private research organization based at the SVUM Scientific and Technological Park in Celakovice. It specializes in the fields of basic and applied research and developing metallic materials (ferrous and non-ferrous metals), plastics and composites. It has accredited laboratories and test rooms with far-reaching specialization in the industrial sectors of aviation, automotive, railways, energy and mechanical engineering. Thanks to its exceptional research focus, outstanding facilities and excellent staff members, SVUM stands out among Czech research institutions. SVUM contributes significantly to the development of companies which use metallic materials, non-ferrous metals, composites, and plastics in their products.

SUCCESS STORIES

Among the products SVUM makes using proprietary know-how as well as original Czechoslovak inventions are the METALOPLAST® composite foil METALOFLON® for bearings foils and housings used in door hinges and hoods by the automotive industry. Under the terms of international cooperation in research and development, SVUM has been involved in the MeTexCom project – 'Development of Hybrid Metal-Textile-Composite Structures' The project was praised by the Government representative of the German Federal Republic for successful cross-border cooperation in research and development between Germany, Poland and the Czech Republic.

FOR THE PUBLIC

Excursions – for primary & secondary schools and colleges,
Open days,
Participation in the Innotrans Berlin exhibition

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ŠKODA AUTO UNIVERSITY

ŠKODA AUTO Vysoká škola

INTRO

ŠKODA AUTO University was established in 2000 and it is the only university in the Czech Republic founded by a large multinational corporation. The college has its base in Mladá Boleslav, while selected specialization are also offered in its branch office in Prague. Students graduate with a Bachelor's degree including a compulsory semester work-practice in production plants in the Czech Republic and abroad, and can take advantage of scholarship programs as well as an extensive choice of courses at partner universities around the world. In 2012 ŠKODA AUTO University become a research organization, registered with the Czech Government Council for Research, Development and Innovation.

SUCCESS STORIES

Since 2017, ŠKODA AUTO University has helped to improve the quality of higher education at universities in Vietnam and China as part of the Joint Enterprise University Learning programme. In 2018, a project designed by a team of academics from the Department of Logistics and Automotive Technology in cooperation with Dynamic Future s.r.o. was successfully granted 3.5 million CZK. This success allowed them to take part in a unique application for logistics planning. ŠKODA AUTO University is also involved in projects with an international reach, the biggest advantage for students being the compulsory practice which can take place in foreign companies. The greatest goal of the University is to have succesfull graduates who, thanks to the practical focus of the University, have no problem to find jobs corresponding with their skills and knowledge. In 2018 the University also started a new MBA programme called "Global Management in Automotive Industry".

FOR THE PUBLIC

Open days, Sample lessons Training courses for the public, SIC LAB, SIC LAB ŠKODA AUTO University, Consulting-training workshop for all, who want to, validate their ideas in practice, Student festival „Majáles" in Mladá Boleslav

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TECHNOPARK KRALUPY OF THE UNIVERSITY OF CHEMISTRY AND TECHNOLOGY, PRAGUE

INTRO

Technopark Kralupy of The University of Chemistry and Technology, Prague is a research centre whose goal is to promote applied research and development in the field of construction chemistry and related disciplines. It is a respected institution especially in the fields of aluminium-silicate materials, heat-resistant materials, ceramics and corrosion engineering. Under the auspices of the University of Chemistry and Technology Institute of Chemical Technology, which Technopark Kralupy is a part of, it also acts as a bridge between academia and practical application, through knowledge transfer. Technopark Kralupy was built by the Prague Institute of Chemical Technology between 2013-2014, by converting an abandoned industrial mill in downtown Kralupy nad Vltavou.

SUCCESS STORIES

One notable service offered in terms of research activities at the Technopark are corrosion tests. Atmospheric corrosion adversely affects the utility and aesthetic qualities of products, equipment and structural assemblies. Accelerated corrosion tests are a necessary aid in the selection of optimal materials with the desired lifespan, for the quality control and forecasting of total and residual service life of metallic, polymeric and combined materials. These are used primarily for applications in the automotive, aerospace, engineering and mining industries and in construction. The most widely used test is that of corrosion resistance in salt spray.

FOR THE PUBLIC

Occasional open days
Guided tours and excursions for the public

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INSTITUTE OF INORGANIC CHEMISTRY OF THE CAS

INTRO

The Institute of Inorganic Chemistry undertakes basic as well as applied research in inorganic chemistry and fields spanning inorganic chemistry, material sciences and other disciplines. In addition to its research work the Institute is involved in teaching undergraduate and postgraduate students and guiding their diploma theses and dissertations, as well as courses at numerous colleges and universities. The research is focused on five main areas: photoactive inorganic molecules and materials, borane compounds chemistry, new materials for environmental sustainability, cultural heritage preservation, and geochemical sediment analysis. In cooperation with industrial partners, the Institute also carries out development in the area of construction materials and special boranes.

FOR THE PUBLIC

Open day – for the general public
„Michael's experiments" – Michael Londesborough's show popularizing science on Czech TV,
Materials chemistry shows as part of the 'Czech Heads' programme series on Czech TV
concerning decontamination of chemical warfare agents or the use of ultrasound
The practical use photocatalytic titanium dioxide
Materials analysis of works of art

SUCCESS STORIES

One of the workplaces shared with the Academy of Fine Arts in Prague is the Academic Materials Research Laboratory of Painted Artworks (ALMA) Work here encompasses the microanalysis and non-destructive analysis of artworks and studying the degradation processes in painted works. Experimental research into painting pigments focuses not only on the properties, but also on the historical preparation methods and degradation processes within the pigment layer. The applied research of the Institute in cooperation with a number of companies has a very wide scope: from inorganic materials for water stabilization, facade treatment against algae and fungi to shielding of cosmic, neutron and UV radiation and capture of radionuclides and pollutants.

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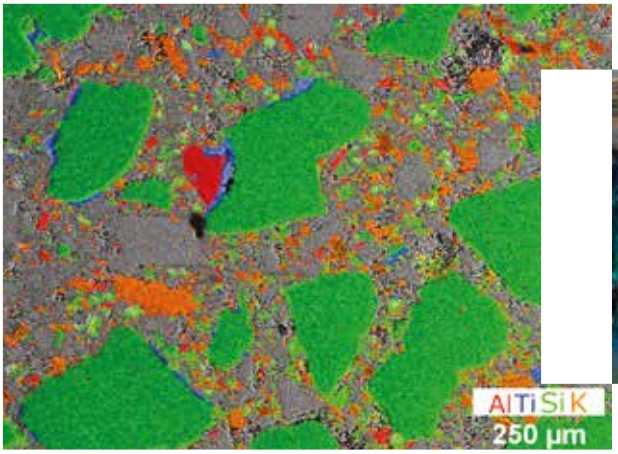

NUCLEAR PHYSICS INSTITUTE OF THE CAS

INTRO

The Nuclear Physics Institute of the CAS is the largest institution focused on basic and applied research in the field of nuclear physics in the Czech Republic. One of the Institute's prime tasks is to cooperate with colleagues and universities to train upcoming experts in the field. Its core facilities are four accelerators and neutron diffractometers using the neutron channels of the LVR-15 reactor, operated by the Research Centre Řež (CVŘ s.r.o.). In cooperation with a number of international institutions it is engaged in studying nuclear materials and transitions between their various stages by using of heavy ion collisions, focusing on experimental low-energy nuclear, theoretical and mathematical physics. In the area of applied nuclear physics its focus is on prospective use in the energy sector; in addition, on the development of nuclear analytical methods used in archaeology, ecology, and using neutron diffraction for the study materials. The most important aplications include the development and production of radiopharmaceuticals and use of ionizing radiation dosimetry.

SUCCESS STORIES

The NPI's research findings have found application in archaeology and elsewhere. For example, a team led by Prof. J. Kucera has in cooperation with Danish institutions been engaged in a long-term project examining the mortal remains of the famous astronomer Tycho Brahe. Determination of the mercury content in his hair and bones has dispelled the widespread supposition that he was poisoned by the mercury-containing substance. The NPI department of radiation dosimetry has organized (with participation of ABS Jets airline service) the world´s largest comparative test of instruments to measure cosmic radiation, in a nine-nation joint endeavour. The NPI has also been conducting food analysis by nuclear methods (e.g. measuring the silicon content in beer using the MT-25 accelerator), measuring the radiation resistance of crystals for the Crytur company, or determining the origin of a variety of materials.

FOR THE PUBLIC

Open days, Participation in the Science Fair, Lectures by V. Wagner and other INP staff, research hot air balloon flights with instruments to measure cosmic rays, excursions – for secondary schools and the general public

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NUCLEAR RESEARCH INSTITUTE

INTRO

The INP at Řež focuses on applied research together with project and engineering services in the fields of energy, industry and healthcare. For more than 60 years it has held its place among the top technological institutes in the Czech Republic and in Europe. It is a member of many international organizations and runs a number of accredited laboratories. In addition to the Czech Republic and Slovakia, it handles contracts and projects for other countries in Europe and on other continents. It collaborates with business partners from Ukraine, Turkey, China, South Korea, Italy, Finland as well as the USA. The company is primarily geared toward the project design and support of safe and efficient energy source operation, and nuclear power plants in particular.

SUCCESS STORIES

In addition to the Czech power plants at Dukovany and Temelín, ÚJV Řež provides services to nuclear power blocks in other countries and also deals with conventional energy generation, heating plants and renewable energy sources. The company handles nearly 90% of institutional radioactive waste in the Czech Republic. It also runs the first hydrogen fuel station in the Czech Republic and is a pioneer in the use of hydrogen in transportation. Specialist teams take care of international transport of highly-enriched fuel from research nuclear reactors around the world, to Russia and China. A very prominent role is played by the ÚJV Řež in the field of nuclear medicine. It runs three centres for Positron Emission Tomography and supplies most of the relevant sites with PET radiopharmaceuticals.

FOR THE PUBLIC

Open days for schools and the public , Popular science seminars , Specialized tours and excursions, Higher education studies competitions in the field, Nuclear days, Videos for the public

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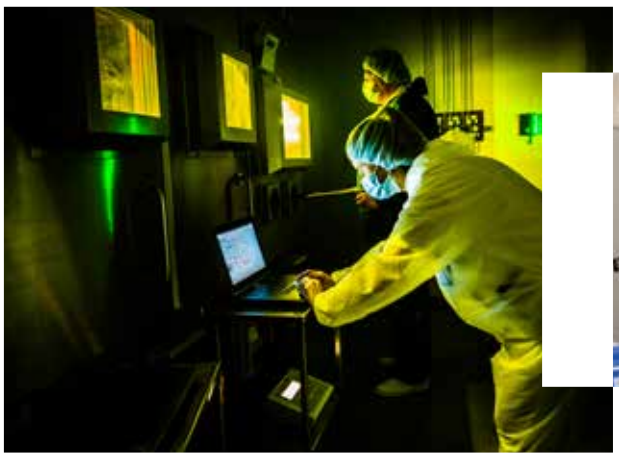

INSTITUTE OF ANIMAL PHYSIOLOGY AND GENETICS, CAS

INTRO

The activities of the Institute of Animal Physiology and Genetics, CAS (IAPG), whose history dates back to 1954 are at the leading edge of fundamental research in the fields of physiology, genetics, ecology and evolution. They cover a broad range of topics, from the purely biomedical to biodiversity-related, studying the unique characteristics of domestic, wild and laboratory animals. Their research findings bring novel insights, particularly for understanding physiological functions, genetic structures, interactions inside the genome of organisms and how animals interact with their surroundings. This most notably covers research into species/stocks of importance in medicine (model species), ecology (protected or otherwise significant species), or agriculture (livestock) as well as research into food quality and safety.

SUCCESS STORIES

Studies undertaken at the Institute include animal models, in particular the miniature pig; various serious human diseases such as Huntington's chorea, which is a systemic disease of the nervous system; also cancer, in particular malignant melanoma; DNA quality disorders and e.g. their influence on infertility as well as repairing damaged DNA, especially through neurodegeneration and ageing. Further areas of study include the formation of the mammalian ovum, its fertilization by the sperm and the subsequent development of the offspring in utero. The focus here is on obstacles that nature can put in the way, leading to developmental disorders at all levels; of DNA, chromosomes, the ovum, embryo or the foetus inside the mother.

FOR THE PUBLIC

Open days CAS Science and Technology weeks, Open days as part of Spring excursions into the world of Science, Student internships under the Science unbarred project, Lectures at universities and secondary schools throughout the Czech Republic, Participation in the Science Fair

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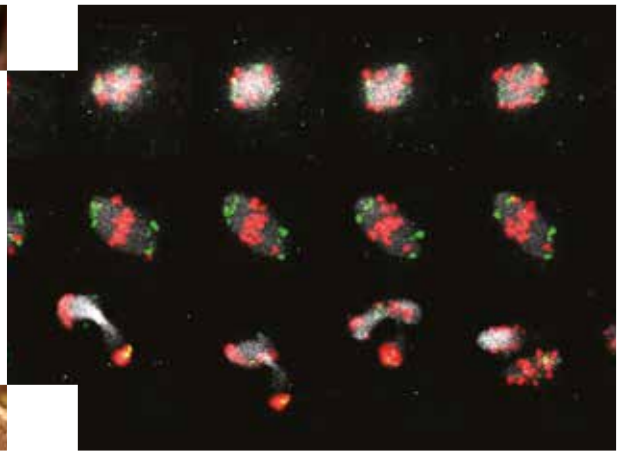

RESEARCH INSTITUTE OF GEODESY, TOPOGRAPHY AND CARTOGRAPHY

INTRO

The mission of the Research Institute is applied and fundamental research in the fields of geodesy, surveying and real estate cadastre registration. It deals with the development and testing of new methodologies, procedures and programme resources. It provides expert consulting in the following areas: establishing and managing a real-estate cadastral information system; geodesy and geodynamics; geodetic engineering; metrology and national standardization in the surveying and cadastre domains; photogrammetry; ground remote sensing; the creation and maintenance of charts and maps; the development and production of special tools; apparatus and measurement systems for geodesy and cartography.

SUCCESS STORIES

The Institute has since its inception provided a variety of activities to support the State Administration of Land Surveying and Cadastre. Among the tools developed here is the CIRKUMZENITAL, an apparatus with an artificial horizon for the concurrent determination of latitude and longitude by the method of fixed heights. This was a unique instrument in its time, much sought by leading international organizations. Notable among the current development achievements of the Institute is its mobile hydrostatic levelling kit, enabling the elevation between two points of interest to be determined to 50 micron precision. One example of this technology's application is the automated measuring systems situated at both blocks of the Temelín nuclear power plant.

FOR THE PUBLIC

A collection of virtual maps
Calibration of instruments and gauges
Surveying library
Professional training courses and seminars

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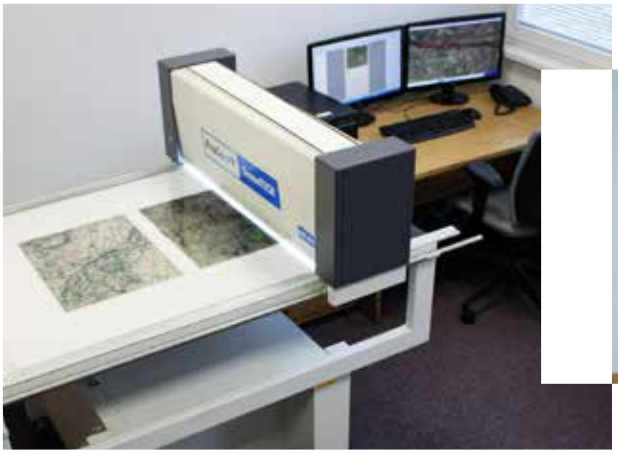

FORESTRY AND GAME MANAGEMENT RESEARCH INSTITUTE

Výzkumný ústav lesního hospodářství a myslivosti, v. v. i.

INTRO

The Forestry and Game Management Research Institute is engaged in finding solutions through research projects into forestry and wildlife management and helps put these project findings to practical use. It collaborates on international projects, provides expert and consulting activities for government bodies and forest owners, as well as field trials, publications, training courses and assessments. As part of the national programme for the protection and reproduction of the woodland genome it runs the National Forest Species Seed and Sapling Bank whose tasks include maintaining the biodiversity of forest ecosystems. The forestry research undertaken by the Institute also reflects topical and pressing issues, such as climate change and pollution stresses.

SUCCESS STORIES

As an example, researchers from the Institute recently addressed the issue of how weather patterns over more than 40 years have affected the seed quality of Scots pine and Norway spruce. Forest cultivation experts in their turn have established a utilization methodology for the birch tree, previously regarded as just an undesirable invasive species. In fact, the birch tree fulfils a number of important woodland functions. The methodology acquaints foresters with production procedures and methods of cultivating birch stands. The Institute is engaged in many other projects, such as research for the national forest management enterprise Lesy České republiky, for the Military Forests and Estates Management Enterprise as well as participating in projects run by the Forestry and Timber Chamber, a member of the Agrarian Chamber of the Czech Republic.

FOR THE PUBLIC

Participation in trade fairs, Researchers' Night, Forestry Technology Day, Forest Week, Presentations for nursery and primary schools beyond the Institute grounds, The www.lesaktualne.cz forest science popularization website

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THE SILVA TAROUCA RESEARCH INSTITUTE FOR LANDSCAPE AND ORNAMENTAL GARDENING

INTRO

The Silva Tarouca Research Institute is a multidisciplinary research institute of ninety years' standing. Its activities include the study of long-term development and changes in land utilization, identifying the natural, cultural and historical heritage features of the cultivated landscape and monuments of landscape gardening, surveys of landscape fragmentation and research concerning natural temperate forests. The Institute also monitors the quality of the various elements making up the habitat, by means of selected biomarkers. It deals with landscape pathologies and investigates harmful agents in non-cultivated plants, studies urban green spaces, optimizes plant cultivation methodologies with the emphasis on plant nutrition, biotechnology and cross-breeding as well as research into biomass for energy use. The findings of the Institute are made use of by public administration bodies, as well as by public and private enterprises.

FOR THE PUBLIC

Seasonal exhibitions of plants
Thematic guided tours
Educational courses for nursery and primary schools
Specialist excursions-for secondary schools and colleges
Professional seminars and workshops

SUCCESS STORIES

The name Dendrological Gardens derives from the Greek words 'dendron' (tree, wood) and 'logos' (word, in the sense of learning, a doctrine) – a site, spanning some 72 hectares of public-access land hosting a collection of notable woody plants. Since the early 20th century the site has been progressively collating an extensive collection of rhododendrons, roses, ornamental apple trees, lilacs, meadowsweet shrubs, sakura cherry trees, and conifers. The collections include the cultivars of Průhonice-based cross-breeding, in particular of rhododendrons, roses, weigelas and cinquefoils. In the last decade attention has focused on the gene pool of tree species endemic to the Czech Republic, and of protected trees. Currently being established are reference areas for the study of species tolerant to drought and high temperatures.

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BEE RESEARCH INSTITUTE

INTRO

The Bee Research Institute was established in 1919 as a National Research Institute. The institute was established in a homestead known as 'Na Dole' in 1922 and remains based there to the present day, now with over 40 staff. The Institute owns some 1000 beehives sited throughout the Czech Republic in seven locations with a range of distinctive catchments and climatic conditions. The homestead encompasses vineyards and over 10 hectares of experimental plots. The Institute is pursuing a number of research projects supported by the Ministry of Agriculture and the Ministry of the Environment and Education, cooperating with the State Veterinary Administration, the Czech Union of Beekeepers and a number of international institutions. In addition to research the Institute also engages in development and production.

SUCCESS STORIES

Honey is one of the most often adulterated foodstuffs. Investigators from the Bee Research Institute can validate whether honey is indeed genuine, having established a strict honey quality control system complete with 'Proper Honey' ["Med jak má být®"] endorsement seals. Each seal of quality has a unique number, which the consumer, via the website 'www.medjakmabyt.cz' can use to find out all they need about their honey. It also supplies beekeepers with queen bees of a placid and mild temperament. Beekeepers can also take advantage of year-round control methods against the parasitic Varroa mite, with greatly efficacious low dosages of veterinary preparations against the parasitical mite Varroa.

FOR THE PUBLIC

Lectures and courses, for beekeepers, pupils of primary & secondary schools and the general public, Tours by appointment, for groups, from nursery schools to OAPs, Publications

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Central Bohemian Region SUCCESS STORIES –
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in the Central Bohemian Region

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Innovation in the heart
Central Bohemia Region

Central Bohemia Region