

CZECHIMPLANT



ABOUT CLUSTER

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CZECHIMPLANT, z.s. was founded at the end of 2016 as the first medical cluster in the Czech Republic with a focus on implantology. The cluster was formed in an effort to provide a functional platform that unites leading domestic manufacturers, universities, and physicians in a combined effort to further develop the field of implantology. The fundamental mission of the CZECHIMPLANT, z.s. cluster is to encourage the development of implantology in the Czech Republic and provide optimal conditions for cluster member collaboration. Cooperation among cluster members is primarily realized via research, development, and the implementation of developmental results into clinical practice. Additional cluster activities include finding suitable means to support member activities, such as: grant programs for joint research and development; economic diplomacy projects to support member companies in penetrating new markets; support for cluster marketing activities; and developing international collaboration, including cooperation with foreign cluster organizations, programs with a regional nature, and more.

CLUSTER CONTENS

MEMBERS OF CZECHIMPLANT

ADM, a.s.	7
BEZNOSKA s.r.o.	8
Bioinova, s.r.o.	9
COMTES FHT a.s.	10
3D Tech spol. s.r.o.	11
ELLA-CS, s.r.o.	12
GALVAMET spol. s r.o.	13
GAMA GROUP a.s.	14
IKVAA s.r.o.	15
ING MEDICAL, s.r.o.	16
LASAK s.r.o.	17
MEDIN, a.s.	18
NANOPHARMA, a.s.	19
ProSpon, s.r.o.	20
SILROC CZ, a.s.	21
SOGGIORNO, s.r.o.	22
TESCAN Medical	23
UJP PRAHA a.s.	24

UNIVERSITIES

ČVUT Praha	26
OU Ostrava	27
VŠB-TUO Ostrava	28
VŠCHT Praha	29
VŠP Jihlava	30
UK Praha	31

CLUSTER STRATEGY

The basic strategy of the CZECHIMPLANT, z.s. cluster is to support the development of a significant medical field and provide members with optimal conditions for collaboration. The primary goal of the cluster is to facilitate collaboration among its members in the fields of research and development, and then introduce the results of that research and development into practice; including in areas that

may be legislatively challenging for medical devices. Intensive mutual collaboration, support, and experience sharing can produce unique, innovative results within the industry with high applicability potential, especially in foreign markets.

An additional focus of the cluster is the effective use of all suitable means through which member activities can be supported, such as: grant programs for research and development; support for cluster marketing activities.

INTERNATIONAL COLLABORATION DEVELOPMENT, INCLUDING COOPERATION WITH FOREIGN CLUSTER ORGANIZATION, PROGRAMS OF A REGIONAL NATURE, AND MORE.

CLUSTER VISION AND BENEFITS

As a medically-focused cluster, we pursue a vision to create a broad platform for collaboration between manufacturers, universities, physicians, and other research / professional institutions via activities that support further developments in the field of implantology. This platform will also simultaneously ensure support for development innovation, research and development, and the transfer of knowledge and research results.

In terms of competitive ability and health care standards in the field of implantology, the primary cluster benefits are as follows:

- › Developmental support in the field of implantology can contribute significantly to: improvements in health care quality; increased life expectancy; improved quality of life for patients; and reduced health care costs, including aftercare costs.
- › Greater international prestige for the Czech Republic in terms of implantology quality and standards, with great potential for practical applications of scientific and research results.
- › Joint research and development projects in the field of implantology with a focus on: innovative, minimally invasive surgical procedures and methods; new, advanced materials using the latest findings, including nanotechnology; 3D technology, chip technology, etc.

- › Increased competitiveness (particularly among small and mid-sized enterprises (SMEs)) in the fields of research, development, and subsequent production of new materials, new technologies and unique products, and the standards of corporate research centers.
- › Increased intensity and quality of collaborations among academic, medical, and application spheres with top scientific and medical centers and institutions.
- › Increased potential for cluster member involvement in international research and development projects; establishing contacts with prestigious foreign medical and research institutions; mutual exchange of experiences.
- › Increased exports, especially from SMEs that supply innovative, competitive products resulting from mutual collaborations among cluster members, and/or the results of successful research and development projects in the field of implantology.
- › Represent members' interests abroad via collaboration with foreign clusters of a similar nature; aid in the establishment of direct relations between Czech and foreign entities in the field of implantology; promote mutual experience exchanges, collaboration, and joint projects.

RESEARCH, DEVELOPMENT, AND INNOVATION

One of the primary cluster activities is to support and promote cluster member cooperation in the areas of research and development, and the collaborative deployment of these results into clinical practice. The cluster is an intermediary, or the sole custodian, of projects involving research, experimental development, and innovations supported by public funds. An inherent component of cluster activities is support for the commercialization and implementation of research and development into clinical practice.

Topics of research and development projects for which we are looking for other partners and co-investigators:

DEVELOPMENT OF NEW MEDICAL DEVICES FOR SOLVING LIFE-THREATENING AND ACUTE CONDITIONS OF PATIENTS.

NEW MEDICAL DEVICES LEADING TO IMPROVING THE TREATMENT AND PREVENTIVE CARE OF PATIENTS IN CRITICAL CONDITIONS, IMPROVING THE TREATMENT OF COMPLICATIONS.



New medical devices solutions can include:

- › Nano-technology.
- › New osteosynthetic materials.
- › New materials for regeneration of bone tissue, composites of ceramics and organic polymers.
- › Resorbable materials made of knit or nanofibrous structures
- › Anti-adhesive materials or ways of functionalization of polymeric formations.
- › New polymers for implantology and surgery.
- › Virtual planning of operations.
- › Implants with chips and other medical devices to monitor patient status and other processes (course of treatment, complications, etc.).
- › Other innovative practices:
- › Functionalization of orthopedic and other implants with nanofibrous layers / inserts with controlled release of active substances or to promote the formation of new tissues.

RESULTS OF THIS PROJECTS WILL BE IN FASTER AND MINIMALLY INVASIVE PROCEDURES FOR TREATING THE PATIENT, REDUCING THE NUMBER OF PERMANENT CONSEQUENCES IN PATIENTS, REDUCING THE NUMBER OF LIFE-THREATENING CONDITIONS, REDUCING THE COST OF TREATMENT AND SUBSEQUENT REHABILITATION, A FASTER RETURN TO NORMAL LIFE.

PROJECT CONSULTANCY

The CZECHIMPLANT, z.s. cluster monitors grant opportunities for its members, with a particular focus on grants from national funding programmes and European operational programmes. We offer cluster members the following:

- › Finding suitable subsidies.
- › The selection and evaluation of grant opportunities.
- › Consultation and advice during project realization and budget preparation.

EDUCATION AND TRAINING

The CZECHIMPLANT, z.s. cluster prepares and implements specialist training seminars or workshops in the field of implantology with a focus on:

- › Knowledge transfer between academia and professional practice;
- › Gathering and summarizing new information and sharing experience pertaining to legislative processes;

- › Technological collaboration and experience sharing among cluster members;
- › Establishing collaborations with foreign partners and clusters;
- › Employee education and training based on the needs of companies associated within the cluster.

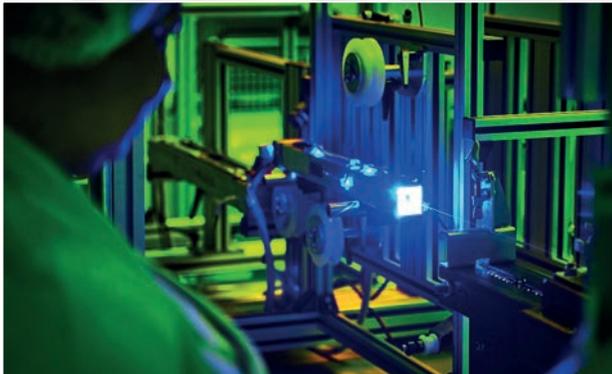


MARKETING AND PROMOTION

The CZECHIMPLANT, z.s. cluster promotes member companies, as well as the entire field of implantology itself, at national and international levels. To support member companies in penetrating new markets and increasing export volume, the cluster collaborates with the Ministry of Foreign Affairs in the preparation and implementation of projects in

an effort to promote economic diplomacy, and also cooperates with the Ministry of Industry and Trade and its institutions (e.g. CzechTrade, etc.). Further, the cluster prepares presentation materials and participates in trade events, fairs, and exhibitions, as well as other promotional cluster and member activities.

ADM, a.s.



Dentapreg

constructive composites

Advanced Dental Materials (ADM, a.s.) was founded in 1995.

ADM founders explored ways of adapting strong and dependable aeronautic materials and pioneered their use in dentistry. It took years of research to perfect and in 2004 they were finally satisfied with the result.

Product line Dentapreg® is a new class of fiber reinforced composite material suitable for building structures such as dental splints, temporary bridges and large restorations. Adapting cutting-edge technology from the aerospace industry, Dentapreg® combines the best of two worlds: technology and dentistry. The unique properties of Dentapreg® are achieved thanks to perfectly balanced highest-class components and advanced manufacturing technologies. It is composed of glass fibers, which were originally developed for the strength requirements of a space shuttle, and a special blend of light-curing resin that is compatible with all light-curing composites.

They believe they have a superior product that would bring dentists new minimally invasive opportunities to treat their patients more effectively. To properly serve the US market, they founded Dentapreg America Inc. in 2010. Today, Dentapreg® continues to grow with customers worldwide. Europe, Israel, South Africa, and Australia - dentists, lab technicians and their patients all across the globe now enjoy the advantages of Dentapreg®."



Zbyněk Šedivý, CEO

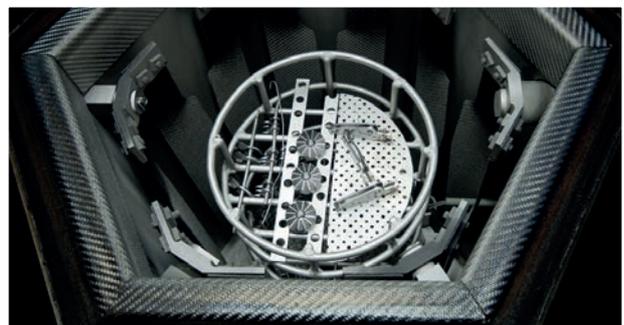
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BEZNOSKA s.r.o. is a Czech family establishment that has been operating without a single share of foreign capital for all of the 27 years of its existence. It has the legal status of a limited liability company with the partners' general assembly as the supreme statutory body. The company's business agenda is managed and controlled by its executive manager.

Although company is a medium-sized enterprise, based in the area of Kladno, conduct business operations nationwide in the Czech Republic, as well as abroad. Largest trading partner is the Slovak Republic, where is opened a subsidiary in Banská Bystrica, named BEZNOSKA SLOVAKIA s.r.o. Key trading partners are Russia, Ukraine, Portugal, Germany, Bulgaria, Estonia and other member countries of the European Union.

Company manufactures implants, tools, and surgical utensils for orthopedic surgery and traumatology. Production's highly specific specialization requires a very broad scope of expertise, both in



terms of technical and medical proficiency, and therefore cooperate closely with leading specialists ranging from orthopedists and traumatologists to metallurgists.

Thanks to many years of collaboration with numerous clinical facilities in the area of design development, constant innovation of manufacturing technologies, and updating of production programs, company has successfully realized several patents, e.g., Patent 295413 Hip Joint TC or Patent PV-2006-411 for ligament apparatus, and Patent 297700 for UHMWPE modification, jointly with the Institute of Macromolecular Chemistry of the Czech Academy of Sciences (AV CR).



Petr Milata, CEO

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Bioinova, s.r.o. is a biotechnology company that is engaged in research, development and implementation of innovative approaches to cell therapy.

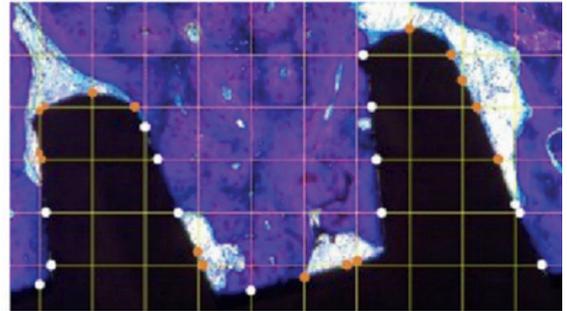
It develops stem cell based products as well as other cell types isolated mainly from bone marrow and adipose tissue. As part of efforts to develop new therapies for regenerative medicine, the company combines cellular products with commercially available and proprietary biomaterials. It commercially deals with the preparation of autologous stromal vascular fractions of adipose tissue for soft tissue regeneration.

Bioinova works closely with academic research institutes both in the Czech Republic and abroad.

The company is a certified manufacturer of advanced therapy medicinal products in good manufacturing practice.

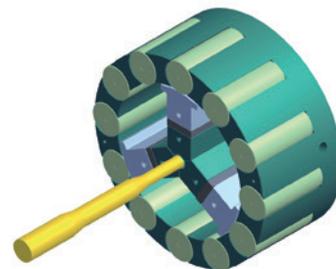
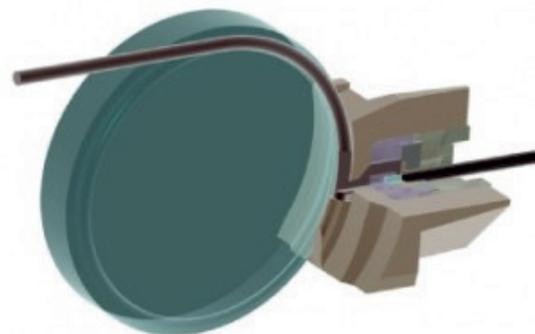


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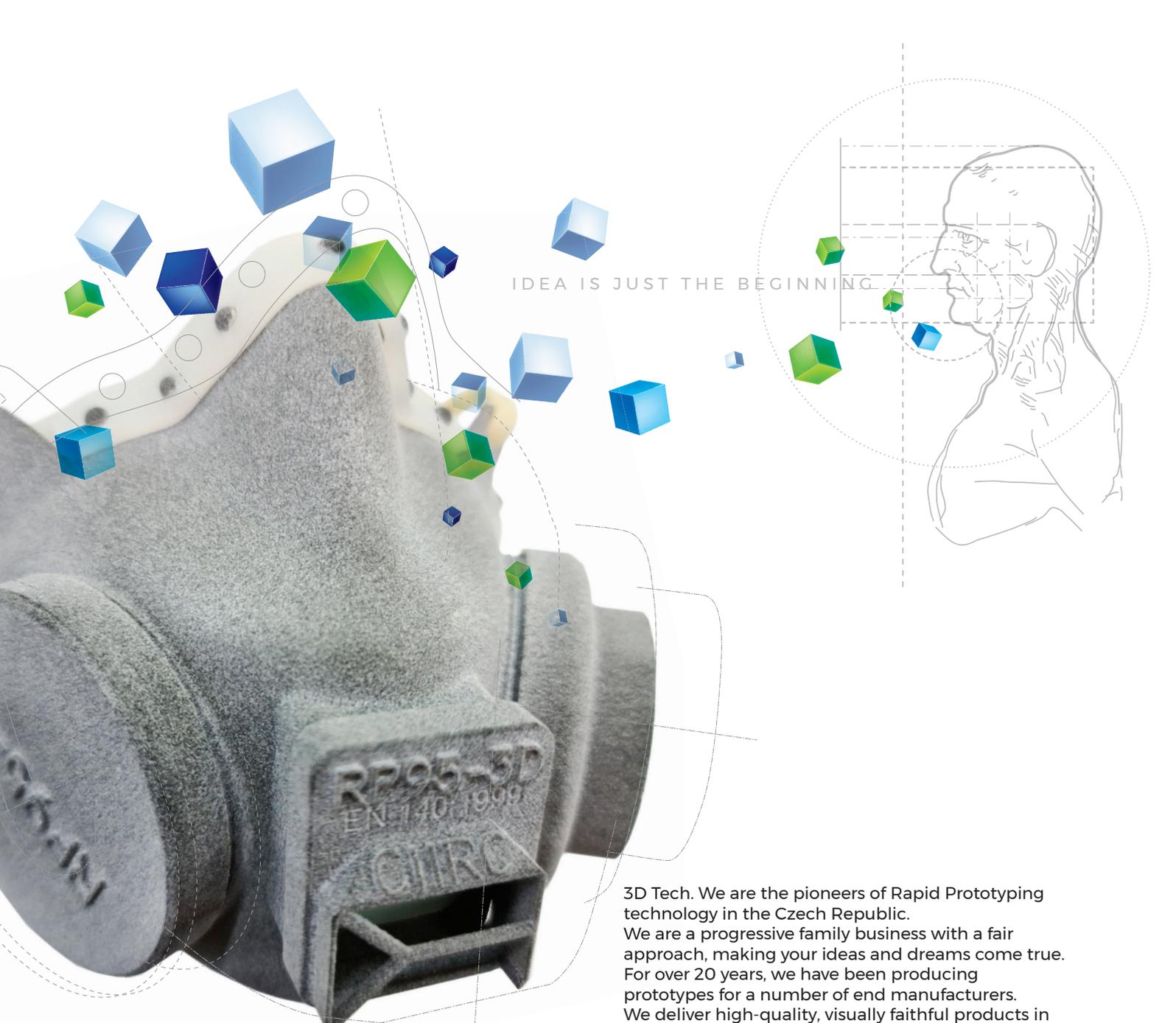


COMTES FHT is a private research company dealing with development of metallic materials, optimization of materials related technologies and testing. The company provides industrial enterprises with tailor made solutions improving the end-use properties of machine parts, lifetime of tools etc. Complex technological procedures are optimized using computer simulation and physical modelling, the mechanical properties, material failures etc. are tested in accredited laboratories.

In the field of biomedical applications, COMTES FHT offers engineering solutions in several fields. Traditional one is based on improving of implants' materials properties by modified severe plastic deformation processes developed by COMTES FHT during which the strength is enhanced by more than 100% based on the grain refinement (mainly Titanium alloys -Ti gr. 2 and gr. 4, or other relevant metals). Combining this technology with special surface treatment processes can also significantly improve the biocompatibility of implants. The next field of technological processes development are forming and heat treatment processes for beta-titanium alloys. In recent years, a lot of effort is invested in additive manufacturing technologies development for bio implants production using Powdered Bed and Direct Energy Deposition processes. The last field of COMETS FHT expertise in biomedical applications are complex mechanical tests of bio-materials or implants itself.



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IDEA IS JUST THE BEGINNING.

3D Tech. We are the pioneers of Rapid Prototyping technology in the Czech Republic. We are a progressive family business with a fair approach, making your ideas and dreams come true. For over 20 years, we have been producing prototypes for a number of end manufacturers. We deliver high-quality, visually faithful products in short delivery times, and we have almost unlimited finishing possibilities. Our offer for healthcare begins with processing data from CT, X-ray and MRI scanners, and continues until physical models or medical aids are made. We can provide a number of successful references, such as knee replacement models for the Beznoska company, participation in demanding lower jaw surgeries and models of hearts with defects for paediatric patients.



3DTECH
ADDITIVE
MANUFACTURING



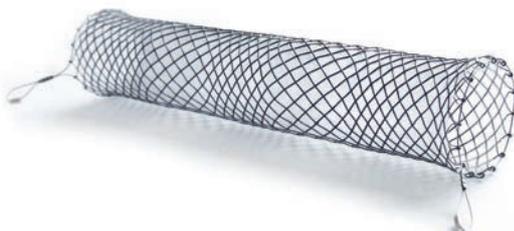
Business activities of the company began in 1991 focusing on manufacturing medical devices. ELLA-CS is a purely domestic company without any foreign ownership. At present it has 120 employees.

The company came into existence as a logical continuation of production activity dating back to 1986, under the auspices of the Faculty of Medicine of Charles University, through the Institute of Experimental Oncology in Hradec Kralove. Export activities began with special thermocouple probes for radiothermotherapy that were developed at the above-mentioned institute.

Since the company was established, it has been expanding its product range to include the production of implantable stents, extractors and other special devices. Its core business is the development of original products in close cooperation with eminent clinical centres.



The current product portfolio is primarily focused on stents for gastrointestinal tract, that are solely based on own R&D. Presently, the company is the sole manufacturer of three globally unique products – Biodegradable Esophageal Stent (BD Stent), Danis Stent to stop bleeding from oesophageal varices and ELLA Extractor for easy and safe removal of implanted stents in the oesophagus. The BD stent biodegrades completely within approximately 3 months and does not need to be removed like metallic stents. ELLA-CS also produces stents for other GIT parts and indications – esophageal, biliary, pyloroduodenal and colonic, including customized options for individual patient needs.



Clean room technology, utilizing GMP (Good Manufacture Practice) in ISO Class 7 (EN ISO 14644), was installed in two production facilities. GMP meets the highest criteria for production of implants and is validated for this kind of activity. In 2004, ELLA-CS received the EN ISO 13485 standard certificate and for more than 15 years the company has followed the standard principles in every aspect of its activities.



In 1996, the company obtained the ISO 9001, EN 46001 and the first CE Mark certificate. Since 2004, the company is certified and complies with the requirements of the EN ISO 13485 standard. In 2020, the EN ISO 13485 certificate was obtained from the BSI company in the process of Notified Body change. From the very beginning, the credo of the company has been to be a partner to physicians when solving their problems – either in experimental or clinical fields – and to react in a flexible way to their demands.

The company has also focused on solving development tasks in cooperation with prestigious foreign and domestic institutions. ELLA-CS intends to be a leader in the development of new types of medical devices in the Czech Republic and to be a direct commercial provider. In addition, the company intends to gradually expand the range of newly developed products and further extend exports outside the Czech Republic. Nowadays, as an exporter to more than 70 countries worldwide, ELLA-CS has become an important manufacturer in the highly competitive field of gastroenterology.

- Esophageal Biodegradable BD Stent
– worldwide unique product
- Danis Stent to stop acute variceal bleeding
– worldwide unique product
- Extractor for atraumatic removal of esophageal ELLA stents – worldwide unique product
- Esophageal HV Plus Stent with the lowest migration rate
- Gastrointestinal stainless steel and nitinol stents – full range

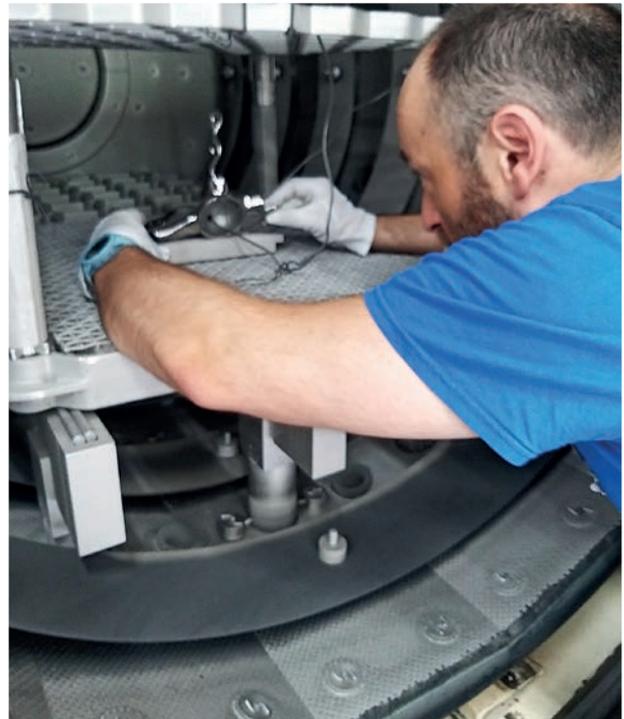


ELLA-CS, s.r.o.

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GALVAMET Ltd. is a company providing the so-called special processes of heat treatment of metals. The use of metallic materials based on metal alloys – such as titanium, magnesium, inconel, nickel alloys and many others, is becoming more and more common. For their safe properties, special heat treatment is required. This special heat treatment in technologies without access to air and under protective gases will allow then use of the materials in fields as healthcare, energy or the space industry. With the advent of 3D metal printing, the importance of such processing increases, due to the unstable structure after the printing itself. This ancient branch, previously called hardening, has been very strengthened since the time of blacksmiths and armourers until the third millennium, when it was shown, that specially heat-treated materials could fly all the way to Mars. Last but not least, these are activities that extremely prolong the life of various implants and contribute to human condition and health.



Aleš Šlechta / Director

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The main **specialization of GAMA GROUP a.s. company is shaping plastic materials**, focusing on **development and production of disposable medical products** with all of this going **under one roof in the Czech Republic**. The production under its own brand GAMA and OEM is realised in **the clean rooms of ISO 8 class in accordance to ČSN EN ISO 14644-1** while applying the quality management for medical detergents in accordance to ISO 13485 ed. 2-2016 including ES certification.

CONCEPT

- evaluating users' requests based on the demand
- economic evaluation of a new project
- market analysis
- technologies selection for the given project
- technical feasibility
- initial risk analysis

PROTOTYPE

- establishing product design
- specification of used materials
- production processes preparation and control procedures determination
- production and testing of samples
- management of risk analysis
- validation
- production, control and technical documentation development
- meeting the requirements in accordance to the labour code valid legislation
- product registration before the launch

PRODUCTION

- launching the serial production based on the order
- verification of the set procedures within the process qualification
- releasing the product for expedition based on the certification

WHAT CAN WE OFFER TO YOU?

- plastic materials injection technology
- plastic materials blow moulding technology
- plastic materials extrusion technology
- manual and automatic production
- manual packaging or Multivac machine packaging
- ethylene oxide sterilization
- in house EO sterilizer



MODULAR ONCOLOGICAL REPLACEMENT VARIANT

The IKVAA company, founded in 2001 as an exporter of medical equipment manufactured in the Czech Republic, has in the 20 years of its existence developed into a stable not only business but also research organization. The company focuses on Eastern markets and cooperates with specialists mainly from the Czech Republic and the Russian Federation on the development of high-end oncological implants. IKVAA participated, for example, in the development of a unique “smart” endoprosthesis with automatic detection of possible infection or modular knee and hip replacements for major revisions or oncological replacements for large bone resection together with a Czech company ProSpon.

IKVAA also provides foreign internships for doctors in the Czech Republic and mediates contacts for Czech manufacturers of medical devices at top workplaces in the Russian Federation and the CIS countries. The company organizes congresses and workshops in these countries for manufacturers and distributors of medical devices.





ING MEDICAL is a Czech technology company that specializes in the development of innovative products and technologies, especially for health-care. The main know-how of the company lies primarily in the use of nanotechnologies and knowledge of specific regulatory needs in the medical devices market.

The company's key products include nanofiber substrates, antibacterial surface treatments and unique wound care dressings.

The company has also been developing a long-term program of functional modifications of implant surfaces, especially to achieve a prolonged antibacterial effect and possibly support the healing process. In this matter, we cooperate with several leading Czech workplaces, including the 1st and 2nd Orthopedic Clinics of the Motol University Hospital. We further develop our know-how in the field of drug delivery systems also for applications in the field of implantable networks with encapsulated bioactive substances.

The main services provided by ING MEDICAL include the design and manufacture of specialized equipment for production with increased demands on the cleanliness of the facility, especially medical devices, and customized research and development in the field of medical technologies.

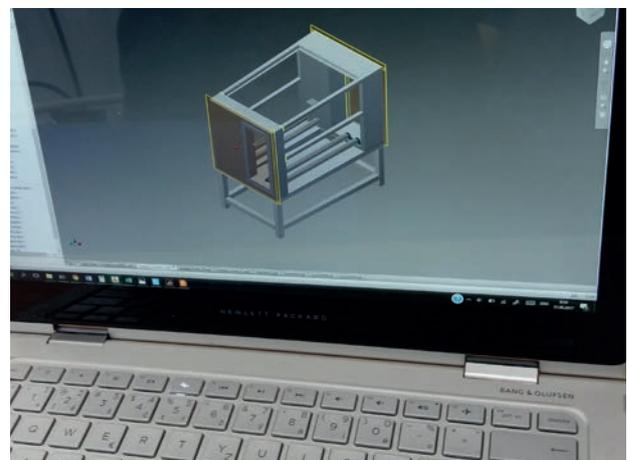
There are currently two permanent development centres in operation next to the Prague headquarters. The cornerstone of the development of medical devices based on nanofibers and antibacterial surface treatments is in the shared research and development centre of ING MEDICAL and the Technical University of Liberec (TUL), specifically the Institute for Nanomaterials, Advanced Technologies and Innovations TUL.

Main ING MEDICAL products

- nanofiber substrates
- antibacterial treated textiles and other materials
- solutions using drug delivery systems

Main services of ING MEDICAL

- design and manufacture of specific production equipment to clean facilities
- customized research and development



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LASAK s.r.o. is a research-oriented medical technology company, established in 1991 in Prague, Czech Republic. The mission of the company is the development, production and sale of innovative healthcare products.

Currently LASAK is the leading Czech company in the field of dental implantology and bone tissue regeneration. The products are appreciated in more than 20 countries.

Over 25 years, the research and development of bioactive materials for bone-tissue replacement has been carried out systematically at LASAK in co-operation with universities, research institutes and major clinics in the Czech Republic and abroad. Results of the research have then been used in the development of new products, which successfully entered the market.

These products are now widely used in clinical practice, especially in the fields of dental implantology, maxillofacial surgery, orthopedics, neurosurgery, as well as in other fields. An important product line consists of resorbable and nonresorbable materials for bone regeneration, under the brands PORESORB-TCP and OssaBase-HA.

Significant progress has been achieved by the development of surface treated bioactive titanium, which exhibits unique properties enabling faster, safer and more predictable implant healing. The first hydrophilic, bioactive surface treatment of implants was launched to the European market by LASAK in 2000. This new biomaterial has been successfully used in the production of dental (BioniQ and IMPLADENT) and spinal (IMPLASPIN) titanium implants.



LASAK s.r.o.

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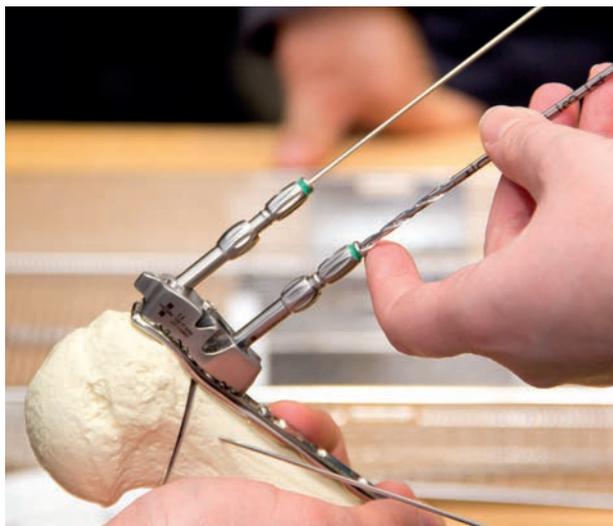
MEDIN, a.s.



MEDIN, a.s., is a Czech company with the head office in Nové Město na Moravě focusing on the production and distribution of medical instruments and implants. The company tradition started with the production of dental instruments seventy years ago. Currently the portfolio comprises four main product groups – traumatology, surgery, orthopaedics, and dentistry. MEDIN ranks amongst the largest European manufacturers of medical instruments as regards the product range. Over one half of the turnover results from export, in particular to European countries, Latin America and Near East.

The development of the company's products includes a close cooperation with the recognized Czech and foreign physicians as the products' users and customers, and also with the research employees at recognized universities.

The comprehensive product offer of MEDIN products includes the professional seminars, workshops, and certified courses for physicians, nurses, and other medical employees in the training centre in MEDIN premises.



Marek Holeček / Sales Director

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Nanopharma is a Czech nanomaterial company introducing products and technologies to both industrial and consumer markets. The product portfolio involves topical and transdermal drug delivery technologies, 2D and 3D scaffolds for drug discovery and cell culture, as well as a brand new line of dry sheet nanofiber masks called [n]fibrecare.

Nanopharma is looking for distribution as well as co-development partners looking to innovate with innovative and patented nanofibre solutions. The company offers contract research services at all product development stages with special focus on regenerative medicine, drug delivery, wound healing and implantology.



Technology solutions

- › Innovative technology solutions for costumers
- › Development of advanced materials
- › Innovation of the customers technology
- › Analytic services

Cosmetic and pharma materials

- › Incorporation of active ingredients into nanofibers
 - › Delivery system with control release of active ingredients
 - › The first Dry sheet nanofibrous mask [n]fibrecare
- www.nfibrecare.com**

Advanced materials

- › New applicable materials
- › Functionalized nanofibers
- › Nanofibrous membranes
- › Innovative solutions for filtration systems, automotive, electro industry, insulation, etc.



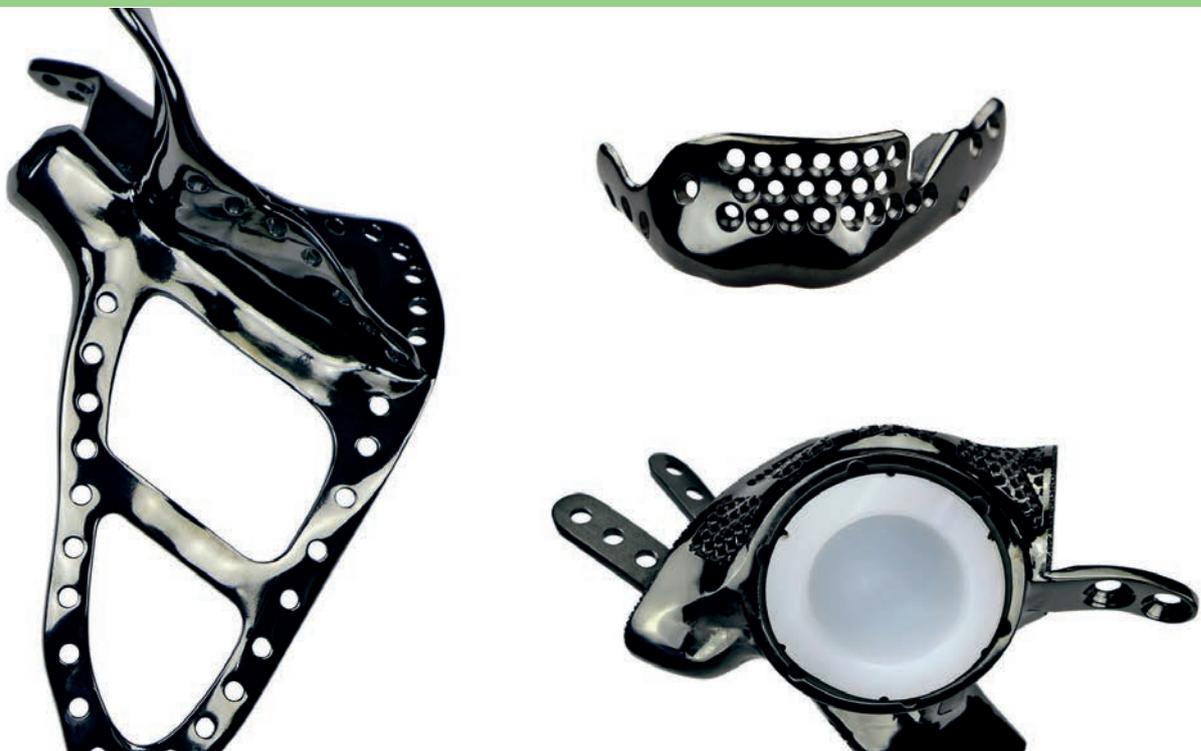
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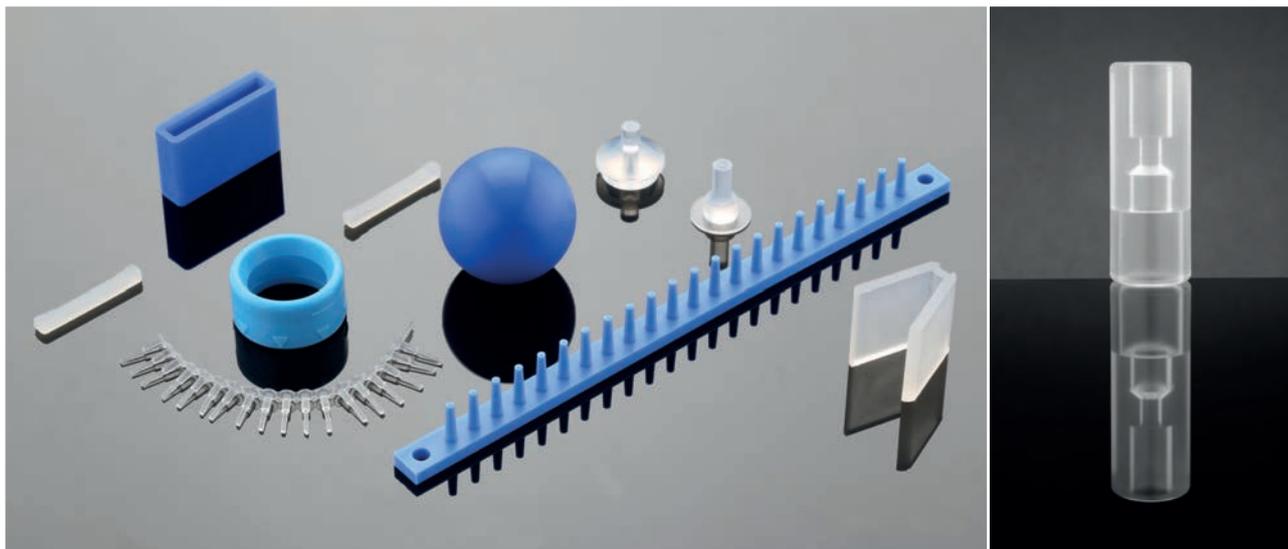
ProSpon is a Czech company with a long-term tradition. It focuses on the development, production and sale of medical devices of Class I, II B and III for orthopedics and traumatology. ProSpon manufactures orthopedic joint replacements for all major joints, top-class oncological replacements

of joints as well as parts of bones, external fixators, tools and implants for reconstruction of the anterior crossed ligament, spinal fixators, dental implants and also veterinary implants. It also uses unique titanium 3D printing. The company exports to many countries of the world, mainly to the EU and the CIS.

The Art of Technical Surgery



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SILROC CZ[®]

the world of silicone

SILROC CZ is a producer of silicone products for more than 25 years. We use injection molding to manufacture a wide variety of products and components.

Thanks to our know-how and experience we can also offer to our clients the combination of silicone with other materials such as stainless steel, printed

circuit boards, or plastics. Furthermore we offer design and production of custom made “ready to use” single use systems for pharmaceutical, biotech and other applications.

Production and packing is done in our certified clean room.



SILROC CZ

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Company SOGGIORNO, s.r.o. is mainly focusing on education and trainings in health care field. We put emphasis on hands-on experience during education process. Our events are interactive and tailor-made. Theoretical and practical part is balanced. Physician trainings are organized according Professional rule no. 16 and listed in Czech Medical Chamber.

Secondly we are able to manage and develop customer's marketing activities. Internal and external communication including professional societies.

Furthermore SOGGIORNO, s.r.o. is organizer of congresses, conferences, workshops and courses. We consider cross-border cooperation and experience sharing as crucial for innovation in various specialties.



Mgr. Magdaléna Veselíková / Director

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We specialise in individual operation solutions particularly in the areas of neurosurgery, traumatology, orthopaedics, oncology, maxillo-facial, and plastic surgeries. We help surgeons plan operations and enable a higher degree of precision in their performance. We reduce risks for both patients and surgeons.

We reduce costs and operation time. We bring innovative solutions to problems associated with the preparation and implementation of surgical procedures. We produce cranial, maxillofacial and oncological implants, as well as cutting and drilling templates.



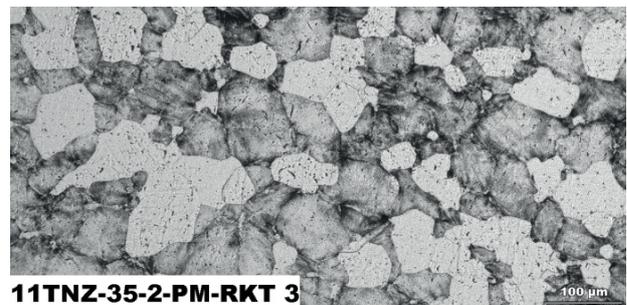
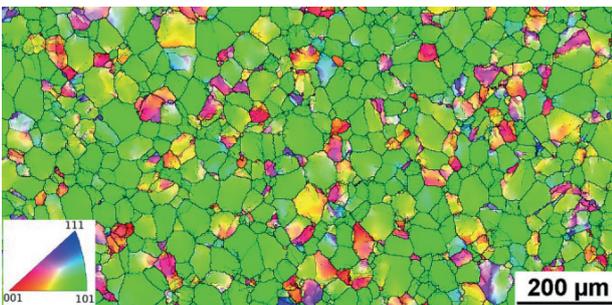
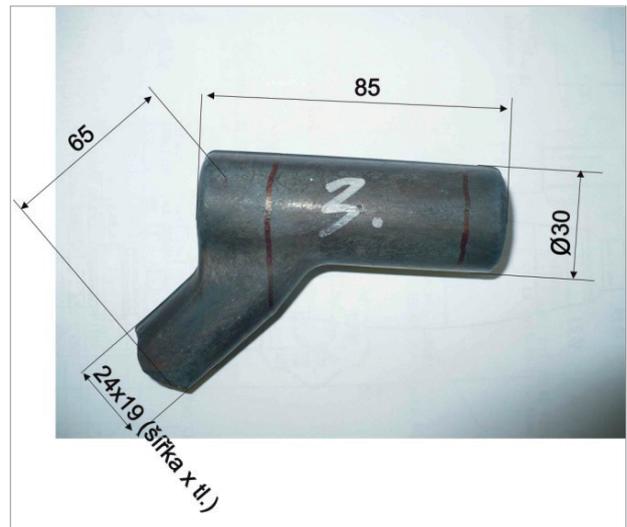
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The UJP PRAHA a.s. company is engaged in the research of β titanium alloys alloyed with Ta, Nb, Zr, Sn to be used in stomatology and orthopaedics implants. Vacuum arc melting and powder metallurgy are used on laboratory and pilot production scales with the aim to manufacture the alloys in sufficient amounts to satisfy the needs of researchers as well as of small and medium processing enterprises. Currently is UJP PRAHA a.s. involved in research of powder production of β titanium alloy powders for additive manufacturing.

The UJP PRAHA a.s. company is also a producer of radiotherapy systems and devices.



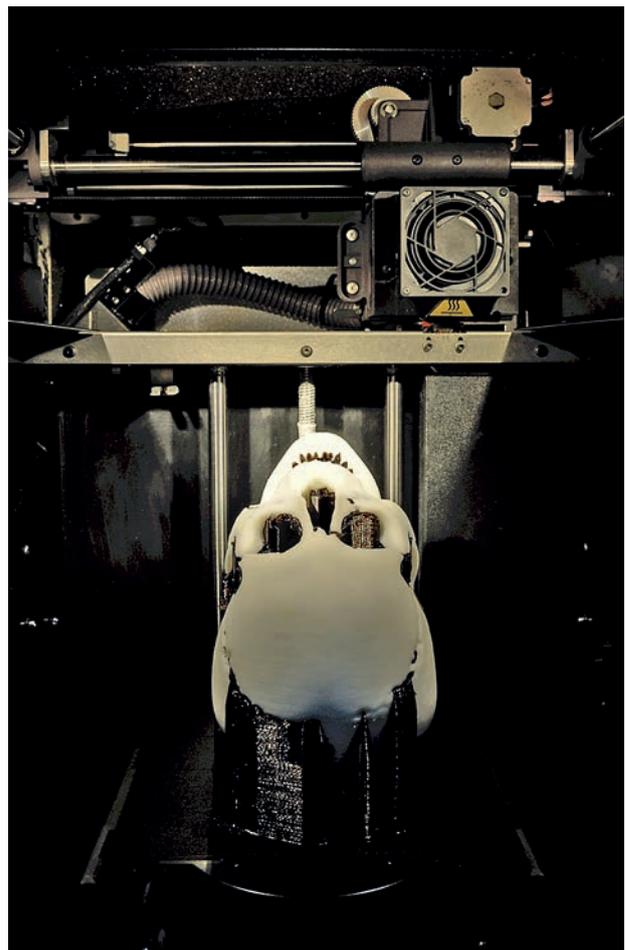
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UNIVERSITIES



**FACULTY
OF MECHANICAL
ENGINEERING
CTU IN PRAGUE**

The Faculty of Mechanical Engineering is part of the Czech Technical University in Prague, one of the oldest engineering schools in the Europe, founded in 1707. The research in the field of implantable medical devices is performed at the Division of Biomechanics. The Division of Biomechanics operates well-equipped laboratories dedicated to research and teaching. Specifically, we investigate fundamental mechanisms underlying mechanical functions of musculoskeletal and cardiovascular systems in the human body and how these principles can translate to improvements in the construction and the function of medical devices. With our state-of-the-art facilities and close collaboration with academic, clinical, and industrial partners, our research team conducts biomechanics and biomaterial research using both experimental and theoretical modeling approaches. Building on a history of innovation, biomaterials and biomechanics research at the Czech Technical University in Prague has led to the development of multiple healthcare solutions during the last 50 years.



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The University of Ostrava is a public research university educating nearly 9,000 students in six faculties. The Faculty of Medicine is the Czech Republic's youngest medical faculty, dynamic education provider and research institution offering a broad range of degrees. The Faculty of Medicine ranks among the most modern centres of medical teaching and research in the Czech Republic, with state-of-the-art technology and premises. The Faculty works in close conjunction with Ostrava's University Hospital on medical, biomedical and

health care-related research projects. The Institute of Emergency Medicine cooperates with a range of partners not only in the Czech Republic, but also abroad. Researchers at the Institute develop new treatment and operating techniques to deal with the consequences of such events and to reduce morbidity and lethality among those affected. The Institute also a centre for doctoral studies and post-graduate education in surgical specializations and disaster medicine.



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We are The Research Team of the Biomechanical Laboratory of The Center of Advanced Innovation Technologies at VSB - TU Ostrava.

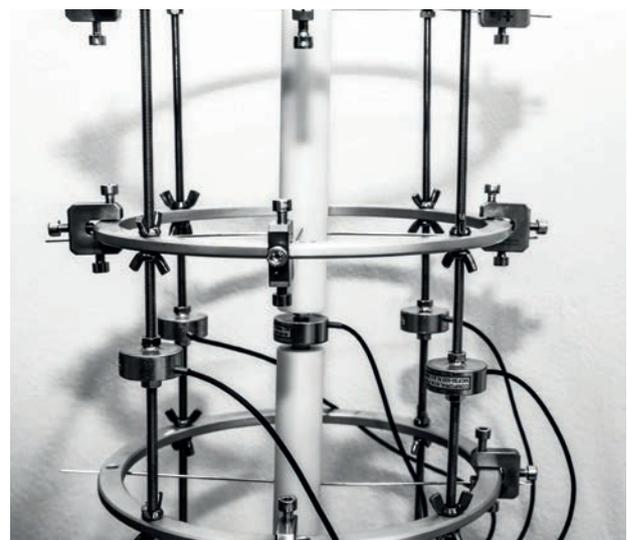
Our workplace deals with the design and optimization of medical devices used in both, surgical and rehabilitation processes. The material and mechanical characteristics of osteosynthetic and rehabilitation aids are verified with computational methods and mechanical testing.

We evaluate the biomechanics of load after osteosynthesis of the calcaneus, followed by a recommendation of the postoperative care methodology at the special unit at the University Hospital in Ostrava. Patient adaptation, after stable osteosynthesis of the lower leg and heel fractures, is accelerated with earlier start of exercising in connection with gait monitoring in the postoperative period.

Concurrently, we evaluate the effect of dosed compression and distraction during the treatment of open fractures by external fixators, where an early load and functional stability are key moments for successful fracture healing. The compression-distraction method carried out through an external circular fixator not only accelerates bone fracture healing, but it is also suitable for prolonged heal-

ing or for the treatment of non-union. The forces of compression and distraction, their correct timing and their effect on subsequent fracture healing are the focus of the research.

Finally, we use an orthopaedic walkway to control the physiological stereotype of walking, and we are able to diagnose a wide range of walking deformities in both static and dynamic modes. Teaching of proper walking, return of proprioception in the foot region concurrently with early rehabilitation care, leads to greater patient satisfaction, with no significant negative effects observed.



VŠB – Technical University of Ostrava
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University of Chemistry and Technology, Prague



The University of Chemistry and Technology (UCT Prague) is a natural center of first-rate study and research in the area of chemistry in the Czech Republic and is one of the country's largest educational and research institutions focused on technical chemistry, chemical and biochemical tech-

nologies, material and chemical engineering, food chemistry, and environmental studies. It cooperates with more than 100 academic institutions not only in Europe but also in the US, Canada, Japan, Vietnam, and many other countries.

UCT Prague is exceptional in the area of collaborations with industrial partners which results in over 70 million Czech crowns per year. The laboratories provide high-quality equipment for use by students, professors, and research staff members and are equipped with modern instrumentation.

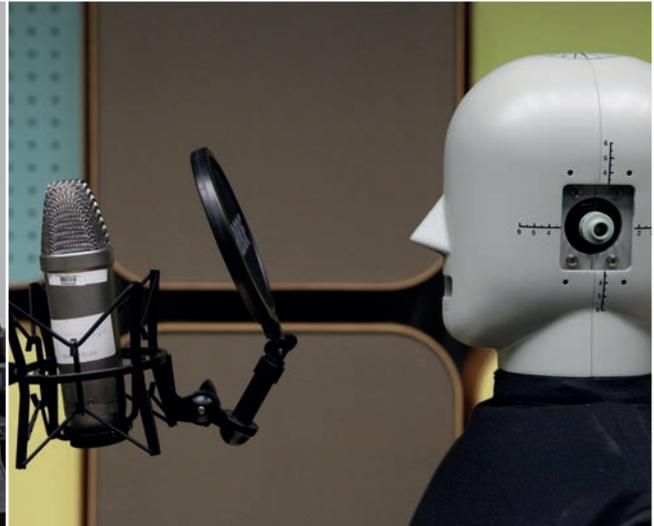


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College of Polytechnics Jihlava

The College of Polytechnics Jihlava is the only public higher education institution in the Vysocina Region. The study programmes provide a well-balanced combination of theoretical knowledge and practical skills in accordance with the needs of the regional labour market. The College of Polytechnics Jihlava provides education as well as applied research, development and innovation services in three fields of study: technical, economic and health. In the field of healthcare, the university offers cooperation in the Midwifery and General Nurse areas. For cooperation in the field of development and research of medical devices, the university offers:

- Experimental tests of implants, locomotor aids and furniture for healthcare
- Numerical simulations using FEM
- Motion video-analysis
- Video analysis of motion
- Hearing analysis
- Development of mobile applications
- Design and development of sensors



Equipment for experimental technology and simulation

- FE analyses Abaqus software
- 3D print (FDM, SLS)
- Testing system Instron 3345 for uniaxial tests
 - › Load cell 10 N, 100 N, 1 000 N a 5 000 N
 - › The ElectroPuls™ E10000 Linear-Torsion all-electric test instrument designed for dynamic and static testing
 - › ±10 kN dynamic linear load capacity and ±100 Nm dynamic torque capacity
 - › Non-Contacting Video Extensometer
 - › Environmental Chamber (-100°C / +350°C)
- Qualisys – Motion Capture Systems
 - › 12x 2MP camera Miquis M3 (340 Hz)
 - › 2x 3D force plate Kistler
 - › Qualisys Track Manager and Visual3D C-Motion

We offer

- uniaxial tensile or compressive tests
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- three or four-point bending tests
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- Analysis of material defects
- Video motion analysis



Assoc. Prof. Zdenek Horak, Ph.D. / Vice-Rector for Research and Project Activities

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Charles University is represented in the CZECHIMPLANT cluster by the Department of Physics of Materials, Faculty of Mathematics and Physics. The primary scope of the Department is a complex characterization of

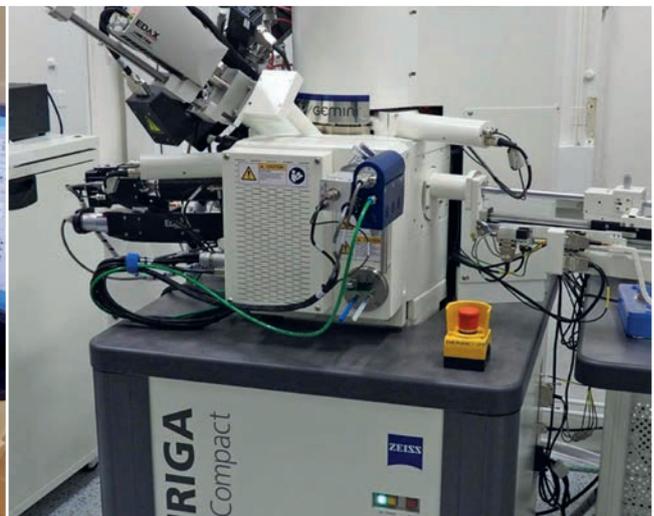
structural and functional materials, as well as the development of prospective materials for advanced applications. We focus on the relationship between microstructure and thermo-mechanical properties of metals, alloys, composites, ultra-fine grained and nanostructured materials, metallic foams, micro-pillars, and ceramics.

Research relevant to the cluster CZECHIMPLANT:

- development and characterization of new biomedical titanium alloys
- investigation of ultra-fine grained and nanostructured materials
- development and characterization of magnesium alloys for medical applications
- characterization of metallic and non-metallic materials

State-of-the-art experimental techniques for materials characterization include transmission and scanning electron microscopy, mechanical testing, laboratory of thermal analyses and corrosion testing.

Internationally competitive research benefits from broad domestic and international cooperation.



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