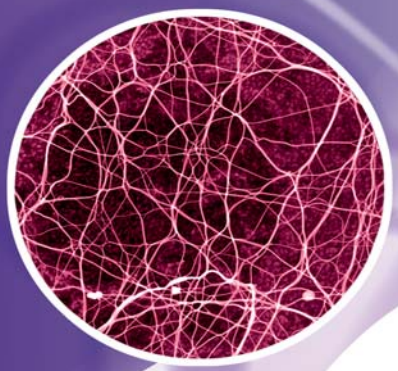
CZECH REPUBLIC

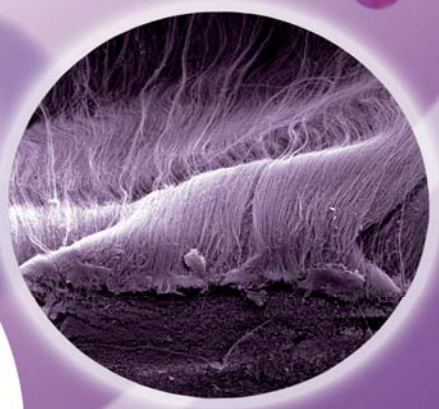
CZECHINVEST
Investment and Business Development Agency

Nanotechnology & Advanced Materials

"In terms of the individual quality criteria within the Presence of Industrial Clusters category, industry specialisation of Czech nanotechnology is the third highest ranked in the world followed by South Korea (No. 4), Germany (No. 5) and Japan (No. 6). The top three countries are Switzerland (No. 1), the United States (No. 2) and the Czech Republic (No. 3)."

fDi Benchmark 2013





INTRODUCTION

Thanks to growing interest in the area of nanotechnology in recent years and the Czech Republic's skilled workforce and high-quality education system, many Czech institutions are able to operate with unique technologies, achieve remarkable research findings and employ excellent researchers. Altogether, this allows them to internationalise, find suitable business and research partners, and cooperate on top-level projects with various entities worldwide.

New materials and nanotechnologies stand at the top of the priorities for both the Czech and EU Governments and thus a wide range of public support programmes has been made available.

Horizon 2020, the biggest EU Research and Innovation programme ever, brings new possibilities for 2014 onwards. An important part of the overall budget of the nearly €80 billion of funding available over 7 years focuses on the areas of nanotechnology and advanced materials in order to promote new technologies.

EDUCATION SYSTEM

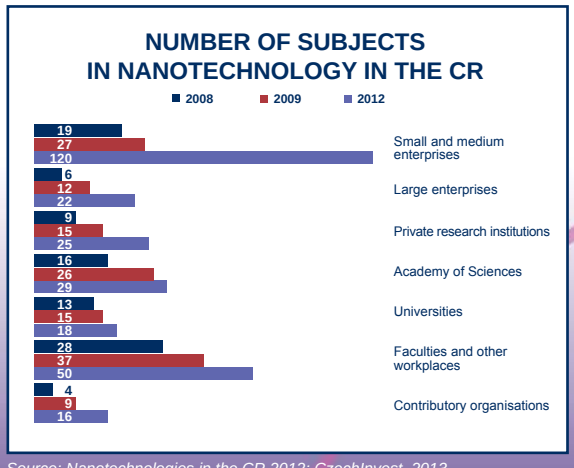
Education in the field of nanotechnology is provided in a range of scientific disciplines, such as physics, chemistry, materials, mathematics and engineering. In the Czech Republic there are eighteen universities performing nanotechnology research and development in addition to their pedagogical activities. Apart from the **Technical University of Liberec,** which holds a worldwide patent for nanofibre production (electrospinning technology), we can also mention **Brno University of Technology, Czech Technical University in Prague** and **Palacký University in Olomouc,** among others.

INDUSTRY SPECIALISATION

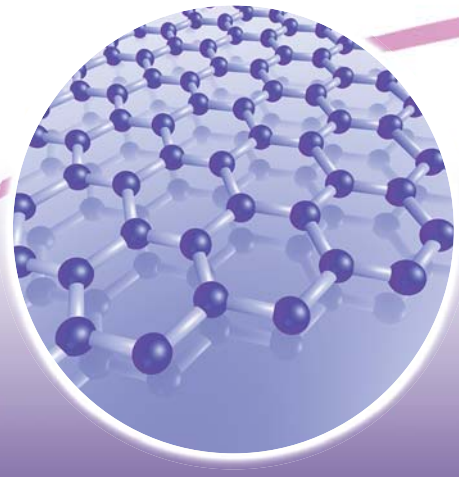
- Industrial production of nanofibres and derivatives thereof
- Production of monocrystalline materials for electron microscopy and laser applications
- Electron lithography used mainly for holography applications
- Wound healing, tissue regeneration, targeted delivery of drugs/treatments, gene therapy, instruments for detecting damaged DNA
- Production of laser interferometers for metrology and the machine-tool and microelectronics industries
- Water treatment
- Surface and antibacterial treatments
- Research of nanostructured and cross-linked polymeric materials

REASONS TO INVEST IN THE CZECH REPUBLIC

- World-class basic nanotechnology research
- Increasing number of research institutions, clusters and private companies working in nanotechnologies
- Excellent research and human-resources potential of Czech small and medium-size enterprises
- Primacy in industrial production of nanofibres with a broad range of applications
- Regulatory and patent environment in accordance with EU standards
- European funding and Czech investment incentives
- CzechInvest's tailored services – general assistance, information support, partner identification, etc.



Source: Nanotechnologies in the CR 2012; CzechInvest, 2013



1949

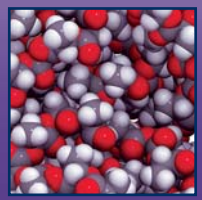
Czech professor Armin Delong introduces the first electron microscope into production

1985–1992

A range of original works on research of semiconductor colloids

1993

The Grant Agency of the Czech Republic is awarded the first grants supporting nanotechnology research



1995

Czech SHM Corporation begun with the industrial preparation of nanocomposite coatings as the first in the world

IF R&D IS WHAT YOU NEED

Among the Czech Republic's several success stories in the area of nanotechnology, the most remarkable is its primacy in industrial production of nanofibres. In cooperation with the **Technical University of Liberec, Elmarco** developed the unique Nanospider technology, which made it possible to manufacture a prototype machine for production of non-woven nanofibre textiles.

The **Global Nanofibres Gateway (Nafigate.com)** is a unique portal created in the Czech Republic. The portal provides information about nanofibres in a number of research fields as well as information concerning the sizes of markets for nanofibre products. The Nanofibres Gateway is accessed by companies and universities from all over the world and accelerates the introduction of new nanofibre applications while simplifying the process of bringing such applications to fruition.

The holding company **Contipro** has been involved in the research, development and biotechnological production of active ingredients for the cosmetics and pharmaceutical industries for over twenty years. With excellent production quality and extensive research facilities, Contipro is one of the world's leading manufacturers of hyaluronic acid and derivative applications.

The Czech company **Crytur**, which produces and exports monocrystalline materials for electron microscopy and lasers, received a USD 80,000 grant from the United States for a joint project with DR Technologies involving the further development of 3D lasers.

Nanofibre materials have great potential. Market analysts forecast 30-40% annual growth. That is probably the main reason why our current customers are ordering more production lines to meet their customers´ demand.

Ladislav Mareš, founder of Elmarco

INVESTMENT CASE STUDY

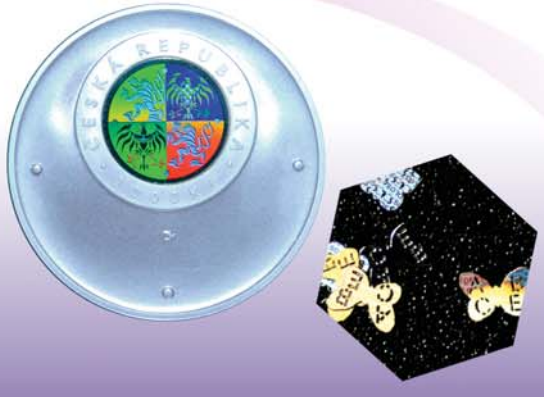
The company Czech Holography entered the holding company Optaglio, Ltd. in 2000, bringing about the formation of Optaglio, s.r.o. Since its establishment, **Optaglio, s.r.o.** has performed all research and development activities in the area of holography for the entire holding company. The Optaglio group operates a network of several permanent offices around the world and supplies products to more than 60 countries. The company is one of the world's top three providers of document protection (passports, IDs, stamps, etc.) and 70% of its overall production comprises government orders. The company is a member of the International Hologram Manufacturers Association holds several prestigious awards in the field of holography. The Optaglio group's product portfolio is protected by 18 patents.

R&D CASE STUDY

Another success story began with the Czech company **Pardam s.r.o.** and its project called "Industrial Production of Inorganic Nanofibres". In 2011 the company received a grant from the Czech and European governments in the total amount of USD 2.5 million for introduction of industrially produced inorganic nanofibres to the commercial market. The new production facility will be the first of its kind in the world where the development of final applications, new materials and products, and industrial production of nanofibrous materials (hundreds of kilograms annually) will be conducted in one place. Pardam is marketing and distributing its products through its exclusive partner, **Kertak Nanotechnology**. This relationship gives Pardam the unique opportunity to be a global leader in the area of development and production of inorganic nanofibres.

Our company has achieved many significant successes since 2009. Thanks to the marketing and business activities of Kertak Nanotechnology, we are currently testing samples with more than 150 partners globally and developing proprietary applications and new nanofibrous materials.

Daniel Možíš, CEO of Kertak Nanotechnology



2003

Professor Jirsak from the Technical University of Liberec developed a reliable method of spinning fibres measuring 200 nm in diameter

2007

Company Elmarco became the industry's first supplier of industrial scale nanofiber production equipment

2011

The 1st Global Nanofibres Gateway (Nafigate.com) was created in the Czech Republic

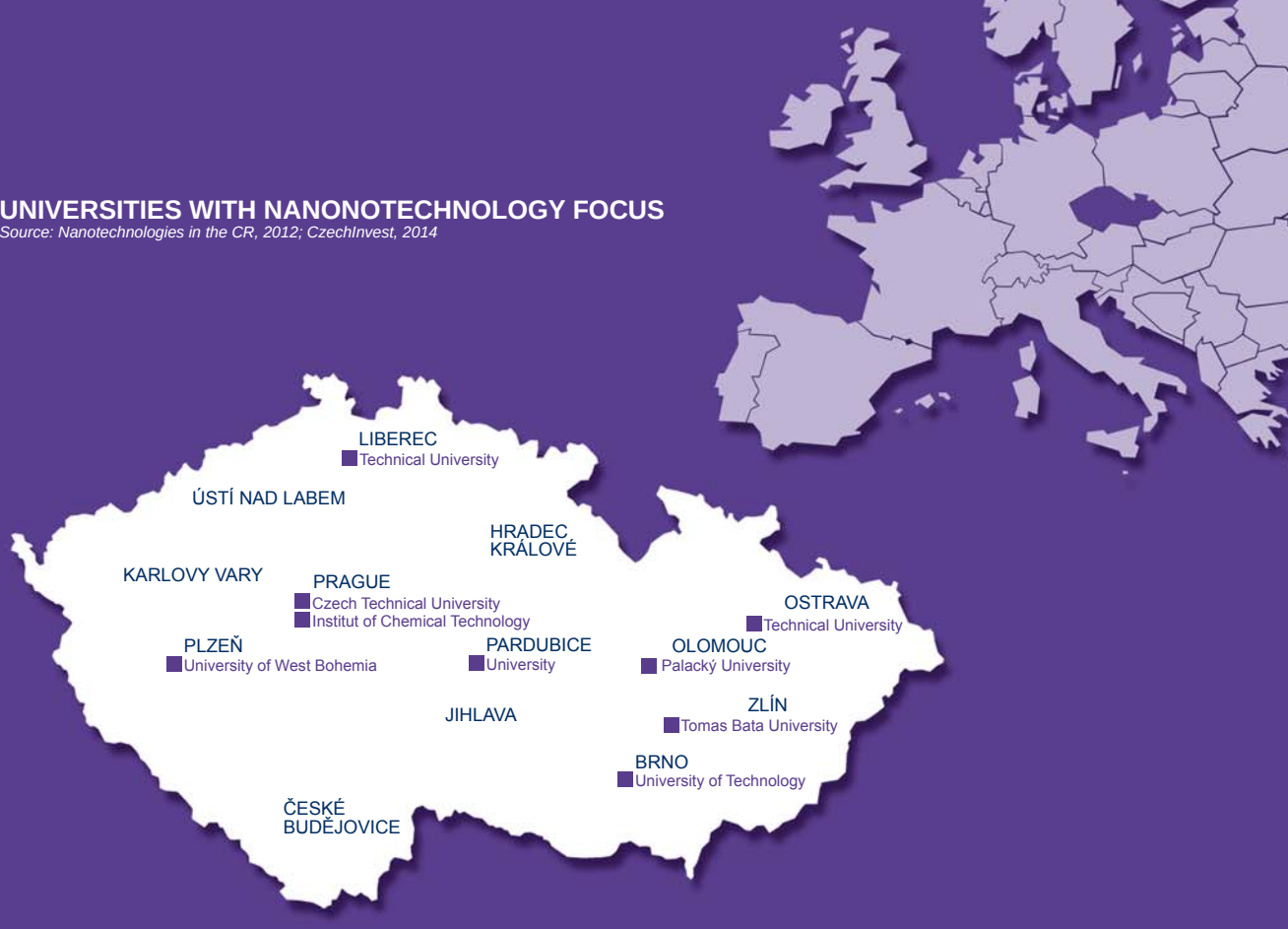
2013

Grand Opening of the new building – Regional Centre of Advanced Technologies and Materials

CZECH REPUBLIC

UNIVERSITIES WITH NANONOTECHNOLOGY FOCUS

Source: Nanotechnologies in the CR, 2012; CzechInvest, 2014



CEITEC

Central European Institute of Technology

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CEITEC is a multidiscipline science centre focused on life sciences and advanced materials and technologies whose aim is to establish itself as a recognised centre for basic as well as applied research. It is a consortium whose partners include the most prominent universities and research institutes in Brno, and it benefits from the support of the Region of South Moravia and the City of Brno. CEITEC offers state-of-the-art infrastructure for research divided into 64 groups and seven programmes. New, modern laboratories with an area of 25,000 m^2 and nearly 700 special instruments and unique facilities will arise in Brno in 2014.

www.ceitec.eu

REGIONAL CENTRE OF ADVANCED TECHNOLOGIES AND MATERIALS

Regionální centrum pokročilých technologií a materiálů

The main objective of the Regional Centre of Advanced Technologies and Materials (RCPTM) in Olomouc is the regular transfer of advanced technologies into medical, industrial and environmental practice and the centre's participation in prestigious international networks and consortia. RCPTM focuses predominantly on advanced research of metal oxide nanoparticles for catalytic and magnetic applications, carbon nanostructures, metal nanoparticles for antimicrobial and water-treatment technologies, coordination chemistry, photonics, new instrumentation in optics and analytical chemistry.

www.rcptm.com

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