



# **Unavoidable challenge: from regional activity to global reach**

## **Universities' Role and Ability to Handle Grand Societal Challenges**

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Rector of the Lodz University of Technology

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## Questions?

- Is it worth it to invest in science?
- Is it possible to do research at higher level?
- What doing reasearch means today as we have been practicing it for many years ?



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# Paradigms in Science & Technology - How do we do it at TUL



# Lodz province – the **center** of Poland - the **geographic center** of Europe

**Lodz University of Technology** is situated in the centre of Lodz – one of Poland's biggest cities

- City of unique historical and cultural heritage.
- Over 740 000 inhabitants.
- Flourished as an industrial town (textile Industry) in 19th and 20th centuries.

Lodz has always been the city of **innovative technology**

- The first steam engine, electrical trams, telephones.
- Laid ground for the development of industrial technology in Poland (biofuels, bioethanol), bioprocesses: antibiotics, citric acid, dextran.
- Electric machinery and electric .
- High power transformers.



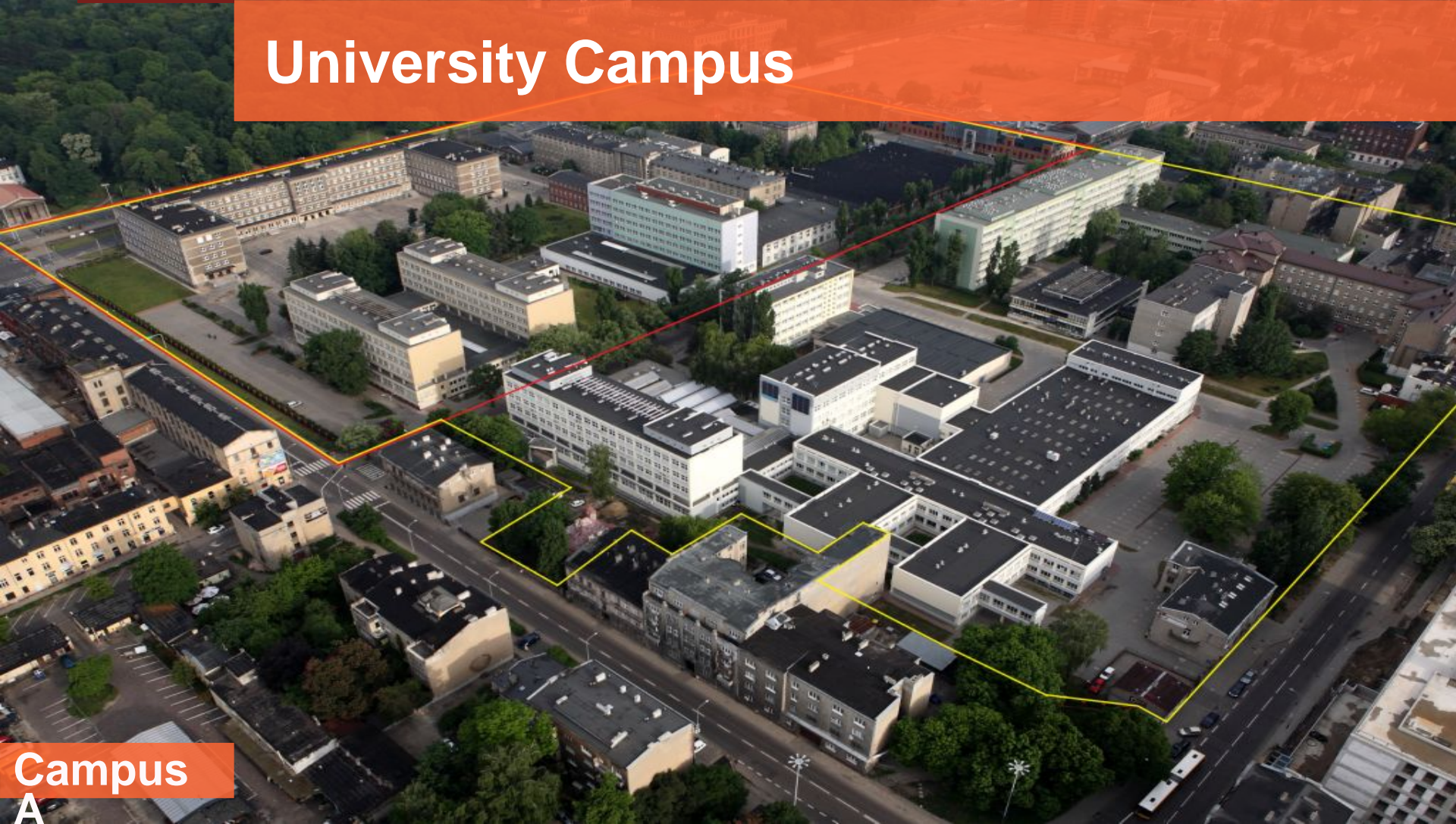


TUL's campus covers the area of about 32 hectares

red line – campus area in the year  
1945

yellow line – present campus area

## University Campus



Campus

A



It has its own park, a few historic villas, and revitalised factory buildings adapted to the needs of the university

red line – present campus area

## University Campus



Campus

B



# Facts and Numbers

Established in **1945**

Today:

- **3 000 staff members** (including about 1400 academic staff and 240 professors)
- **20 000 students** and **670 PhD students**
- **4 000 non-degree postgraduate students**
- **3 200 graduates** every year
  
- **9 faculties** and **75 departments**
- **38 fields of study**, 10 major programmes taught in foreign languages



# TUL Structure

- Mechanical Engineering
- Electrical, Electronic, Computer and Control Engineering
- Chemistry
- Material Technologies and Textile Design
- Biotechnology and Food Sciences
- Civil Engineering, Architecture and Environmental Engineering
- Technical Physics, Information Technology and Applied Mathematics
- Organization and Management
- Process and Environmental Engineering

## SPECIAL EDUCATION UNITS

- Institute of Papermaking and Printing
- Logistics Collegium
- Spatial Economy Collegium
- Commodity Science Collegium







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## Lodz University of Technology

- **4<sup>th</sup>** among technical universities
- **4<sup>th</sup>** most chosen university in Poland
- **2<sup>nd</sup>** place in the student ranking (among 23 technical universities) and **3<sup>rd</sup>** place in the student ranking (among 90 universities)

\* according to prestigious journals and Ministry of Science and Higher Education resources



# TUL Financial data

In thousands PLN

<b>Income</b>	<b>384 232</b>
<b>Ministry of Science and Higher Education</b>	<b>204 256</b>



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## New ways of thinking are essential

- Partnership with local authorities
- Partnership with other local universities
- International collaboration within EU
- Global international collaboration
- Greater independence from public funding



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# One Entity, Two Missions, Three Tasks

**Research**

**SCIENCE**

**New  
Technologies**

**EDUCATION**

**Enterprise**

**INNOVATIONS**





## Research,- NCN, NCBR, FP, H2020

- Joint research and implementation projects
- Research and business center
- Involvement of best students in modern projects (examples: individual programs)
- Involvement of business partners in creating educational programs (examples; Civil Engineering Chemistry,...)



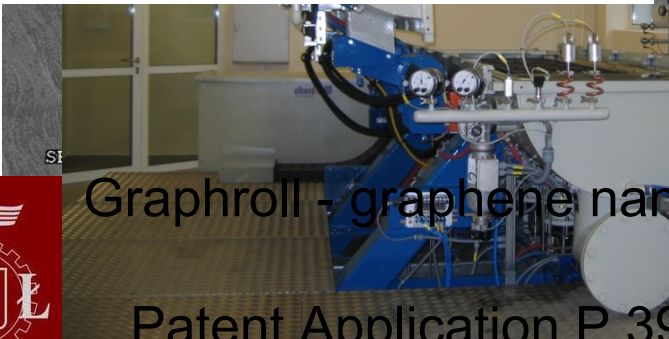
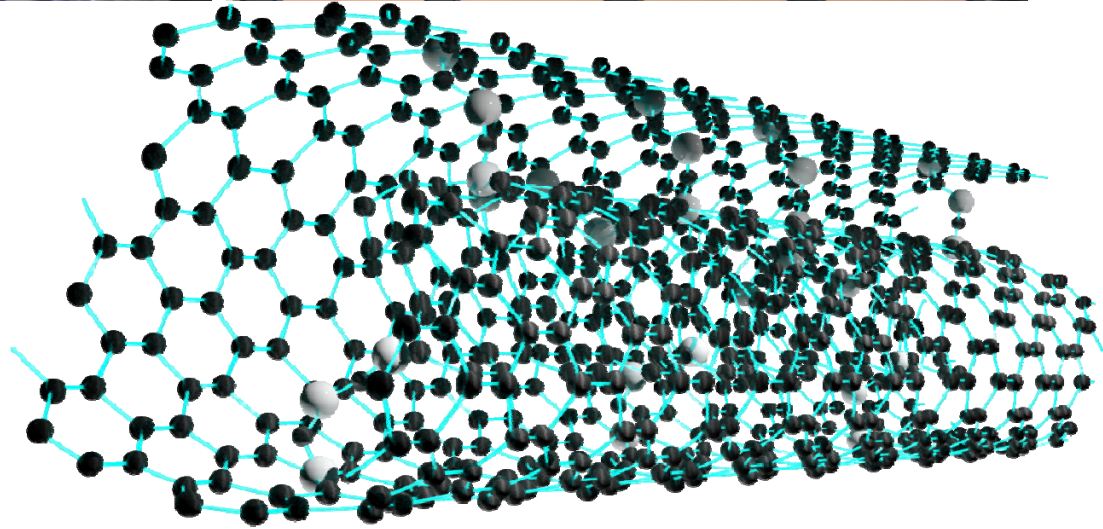
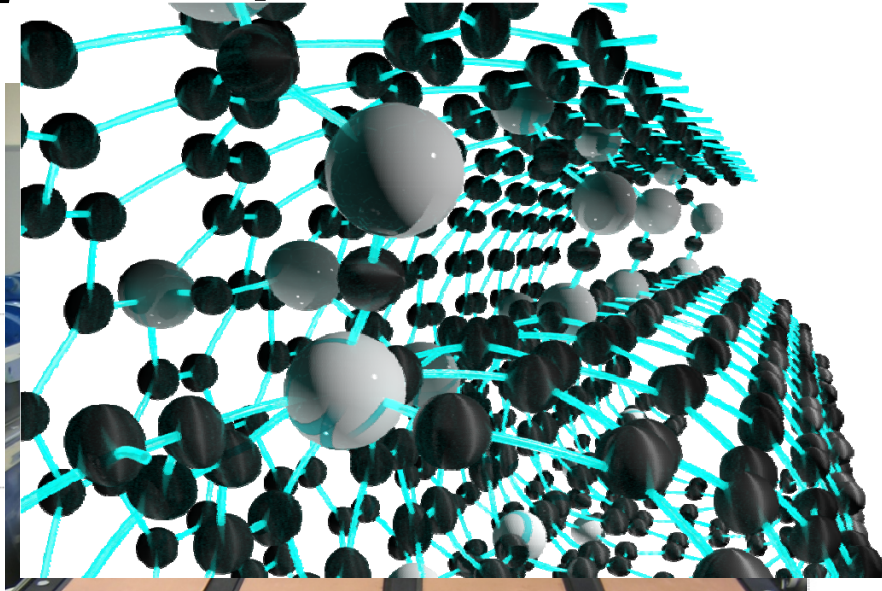
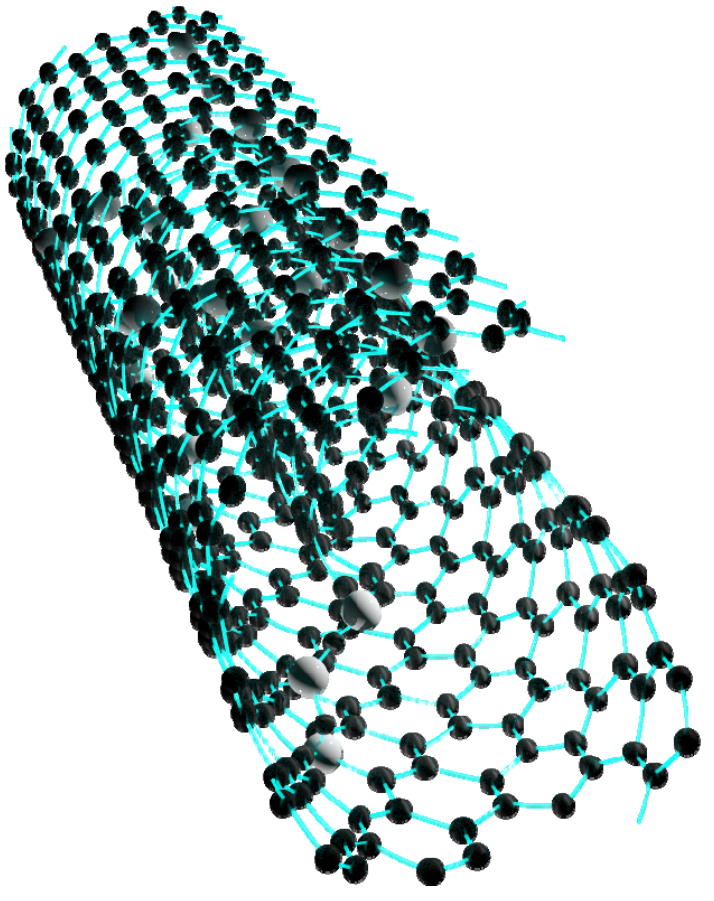
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## New Technologies

- Partnership with existing companies
- Development of new methodologies
- Technology transfer system
- Research facilities and academic staff in industry
- Certified laboratories network

# Highly Efficient Hydrogen Storage Graphene



Graphroll - graphene nanocomposite for the reversible hydrogen storage use crystalline graphene.

Patent Application P.399126, [WIPO/SY) 10/C PL PL399126]





## Electric city bus

Lodz University of Technology scientists have designed the prototype of the vehicle in cooperation with AMZ Kutno Ltd. – leading Polish company specializing in design and production of special purpose vehicle conversions.

The bus attains the speed of 70 km/h with the distance travelled per battery charge ranging from 250 to 350 km. It is 9 –meters long and weighs 18 000 kg.







# Bionanocellulose produced by bacteria

## CelMat<sup>®</sup> family of products

- Apart from regular production of standard dressings ITB TUL is specialized in production of large area dressings as well as customized ones:





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## 50 laboratories equipped by industry

- Open dialogue
- Building a competitive advantage
- Participation in creation, absorption and diffusion of innovations
- Cost effective investment projects instead of research projects



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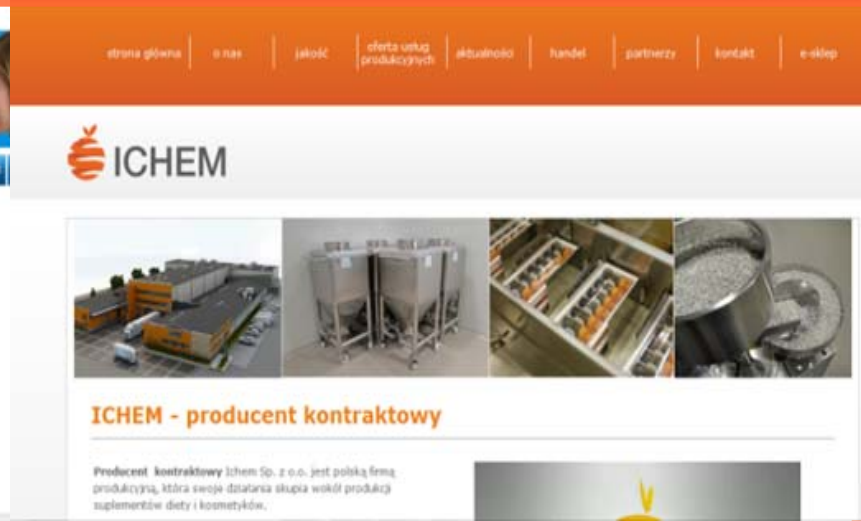


## Enterprises

- Investment in knowledge and intellectual property
- Financial participation in research
- Spin-offs
- Start-ups



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## Academic Entrepreneurship

- **Pharmena**

Cited as a model Polish spin-off. Winner of the Special Prize of the President of the City of Lodz, "Leader of New Technologies" 2005

Pharmena North America (PNA) was registered in 2005 (USA)

- **ICHEM**

Established in 1988 as a joint venture of Lodz University of Technology and Pharmaceutical Plant "Polfa,,. Most of the company's shares belong to private individuals



# Effective business cooperation with companies

**Lodz University of Technology has implemented professional knowledge and technology management system.  
This important task is carried out by the first commercial company in Poland dedicated to the commercialization of technology:**



- TTC TUL LLC commercial technology offer includes:
- over 500 technologies (inventions, know-how, software, etc.)
  - over 300 types of research services
  - over 1000 items of professional apparatus
- which is available to more than 1000 entrepreneurs!

TTC also manages a portfolio of shares in spin-off companies that successfully implement innovations on the international arena.





# Responsibility to integrate basic and applied science



**The Technology Transfer, Ltd.**, the first transfer technology company in Poland operating within the University serves as a **bridge between the university and business community**, identifying collaboration opportunities in the local, regional and international markets based on TUL's research strengths.



**The International Doctoral School (IDS)** operating at TUL offers doctoral programmes in science and technology. Each student enrolled in the IDS follows an **individual doctoral programme**, including scientific courses, additional courses such as academic writing in English, scientific communication, project management and a foreign language course

**Interdisciplinary School of Innovation (ISI)** - its objective is to engage scientific community in the process of creating and developing new enterprises based on innovative ideas. The ISI is one of the latest initiatives undertaken by the University to **support, encourage and promote academic entrepreneurship** among researchers, doctoral candidates and students.



## Lodz University of Technology in clusters

Cluster: Centre of Biomedical Engineering

Cluster of Aerospace and Satellite Engineering

Advanced Technology Cluster ECOENERGY

Cluster of Industrial Biotechnology

Lodz Construction Cluster - Your House

Advanced Technology Cluster in Textile - Clothing Industry

Linux Cluster

Cluster Bioenergy for the Region

Polygraphic Cluster

Centre for Advanced Technologies BioTechMed

Lodz Media Cluster

ICT Central Poland Cluster

Fruit and Vegetables Cluster

Fashion Incubator

E-Health Cluster



# IP Potential

TUL is the leading centre of education and research in Poland which has become one of the most recognized landmarks of the Lodz region and in the entire country.

TUL has always ranked high in press university rankings:

**2th position in licenses selling**

**among the universities in Poland**

according to the ranking published by *Perspektywy* magazine in  
2014

Lodz University of Technology has been involved (2011-2014) in

**>450 R&D projects**

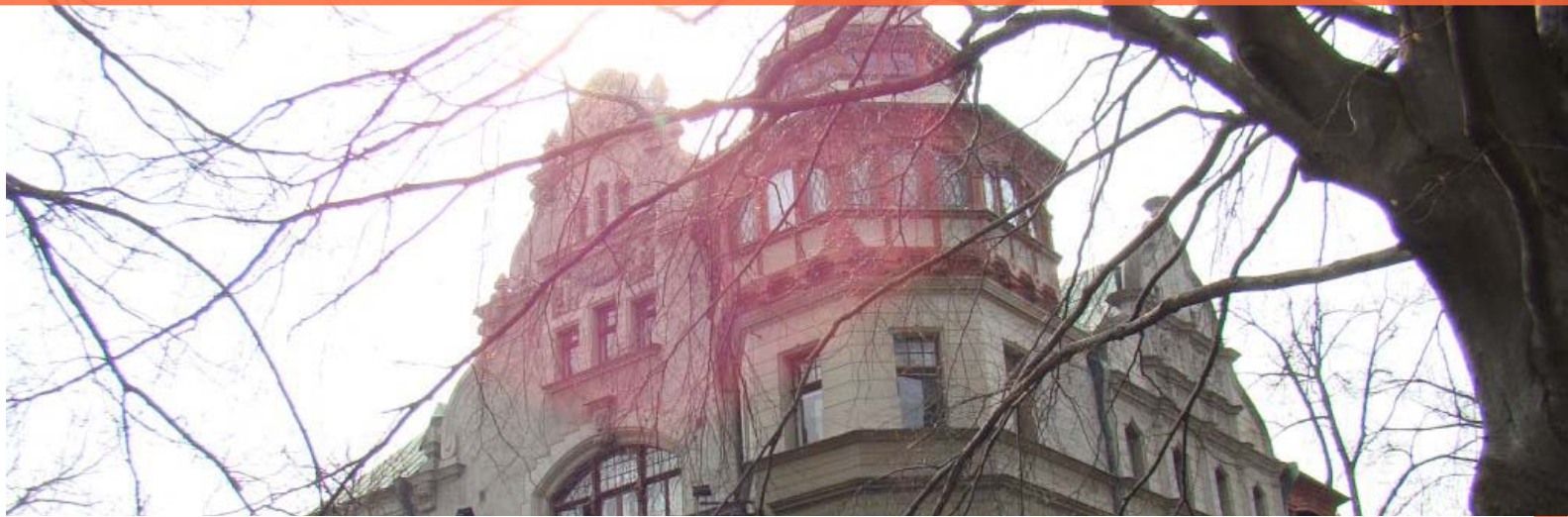
in cooperation with

**>230 business partners**





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## Lodz University of Technology among the best technical universities in Poland

	ISI Master Journal List publications factor per employee
1. Technical University of Lodz	0,475
2. Wroclaw University of Technology	0,403
3. Gdansk University of Technology	0,401
4. Poznan University of Technology	0,369
5. Warsaw University of Technology	0,360

	EU structural projects implementation factor per employee
1. Technical University of Lodz	0,046
2. Poznan University of Technology	0,045
3. Gdansk University of Technology	0,044
4. Warsaw University of Technology	0,031
5. Wroclaw University of Technology	0,028



## International Faculty of Engineering

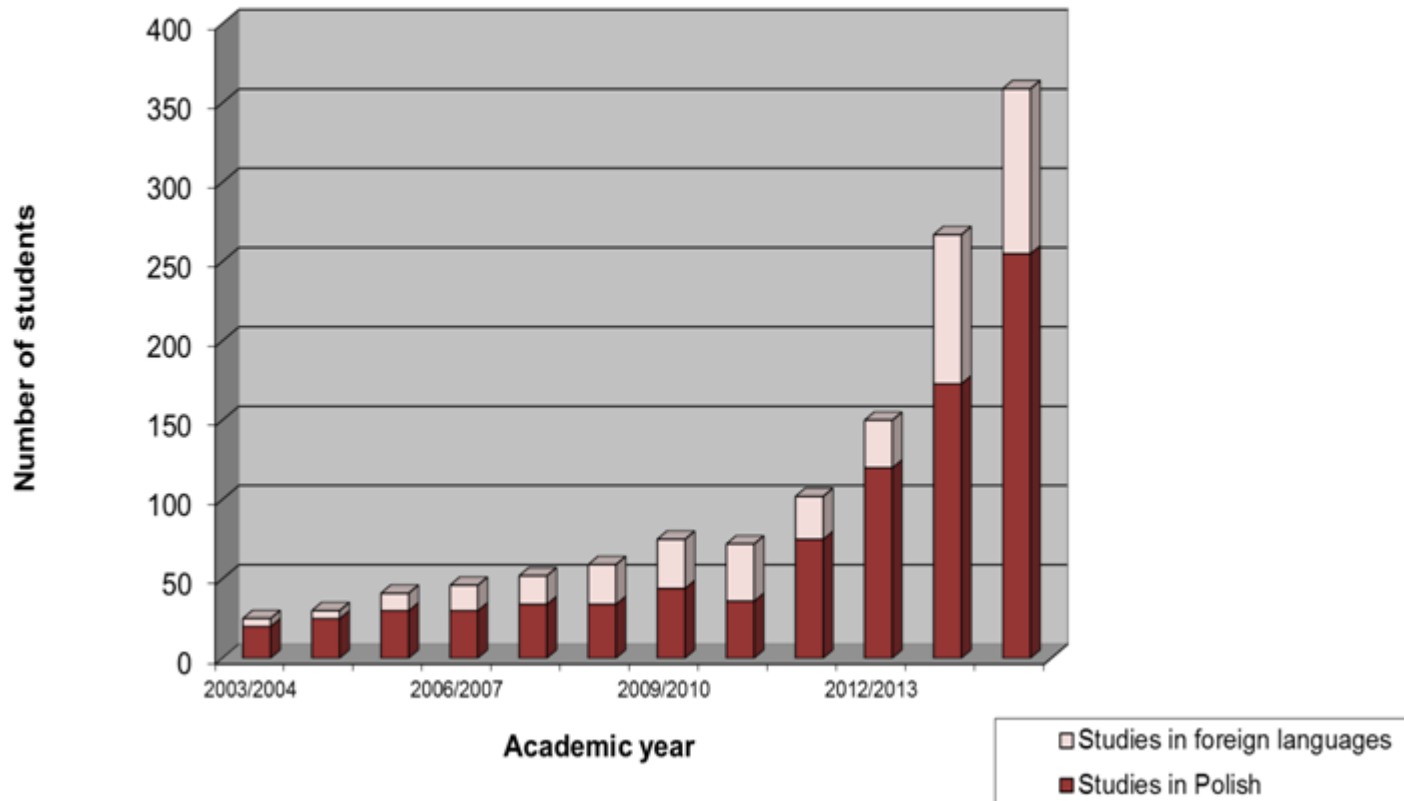
The International Faculty of Engineering (IFE) is a TUL's unit that offers programmes held in English and French, which is a unique offer among studies provided by technical universities in Poland.

- 1200 students,
- 300 exchange students per year.





**Number of foreign full-time students  
at Lodz University of Technology in the last 12 years**





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## International cooperation

- We are the first among Polish technical universities in the number of outgoing students under the LLP Erasmus Programme and in the number of exchanged students under IAESTE.
- Our students who complete part of their programme abroad can obtain double diploma: one from Lodz University of Technology and the other from a partner university in France, Holland, Great Britain, Denmark or elsewhere.
- Lodz University of Technology has been awarded the **ECTS Label** by the European Commission and is the **first university in Poland** to have received this prestigious certificate which **acknowledges high quality**





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## International cooperation

- Lodz University of Technology cooperates with over 400 universities, research centres, institutes and companies in 40 countries of the world.
- Lodz University of Technology coordinates the activities of the National Centre of the Baltic University in Poland (180 universities from 14 countries of the Baltic Sea region).
- Lodz University of Technology is a member of **European Consortium of Innovative Universities**





# From Knowledge into **Learning Community**

- open to students of all ages

## Life Long Learning

- **TUL Children's University** (since 2008)
- **TUL secondary school** (since 2007).
- **TUL Third Age University** (since 2006)
- **Three levels of studies** ( Bachelor, Master, PhD)
- **Postgraduate studies**
- **Distance learning**
- **Project Based Learning** (IFE )
- **Design Thinking Laboratory** (in the XXI Century Factory)
- **Fast track programme** for the best students
- **Quality of education**





# Distinctions for TUL

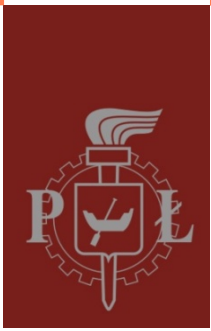
Lodz University of Technology was awarded **ECTS Label** and **DS Label** by the European Commission. TUL is the only technical university in Poland to have obtained these honorary distinctions.



TUL has been listed on the prestigious both 2012 and 2013 **Forbes Diamonds** list. Forbes Diamonds is a ranking of enterprises which most rapidly increase their value.

**Preferred by students** - TUL is the fourth most frequently selected university according to a Ministry for Science and Higher Education report.





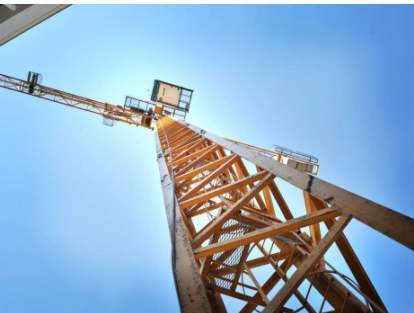
# Open access and development meet at research infrastructures



**INFORMATION TECHNOLOGY  
CENTER**



**21<sup>ST</sup> CENTURY ENGINEER  
FACTORY**



**RENOVATION OF OLD  
FACTORY BUILDINGS**  
of the Faculty  
of Technical Physics,  
Computer Science and  
Applied Mathematics.



**NEW FACILITY**  
of The Faculty Of  
Process  
And Environmental  
Engineering



## ECBNT consists of following laboratories:

- Industrial Biotechnology
- Nano-structured Biomaterials and Biochemical Products
- Biomaterials and Nano-structured Polymers
- Inorganic Nanomaterials
- Nano-structured Materials for Electronics and Optoelectronics
- Molecular Dynamics, Simulation and Modeling

**TEAMING**  
International Center for  
Innovative Research of  
BioBased Materials



## BIONANOPARK - Research Centre for Business

- Laboratory of Industrial Biotechnology
- Laboratory of Molecular and Nanostructural Biophysics
- Four laboratory modules for start-up biotechnology companies
- Fifty office spaces for start-ups





# Inter-University cooperation

- Warsaw University of Technology, Military University of Technology and Lodz University of Technology signed an agreement on cooperation to consolidate **teaching, research and innovation potential of the three universities.**
- Six technical universities and two institutes have joined their forces to create a new consortium - **Polish Institute of Technology (PIT)**. PIT provides expert services in the area of innovation, knowledge transfer, consulting and training.





# The Mission of the TUL

„Innovative technological  
research university  
with the established  
international position“



**Thank You for your attention**

