

**Mission | Vision | Strategy  
in  
Science and Research  
of TUL between 2020 and 2030**

This strategic document is based on the 2015 *“Strategic Plan for the Development of the Technical University of Liberec until 2020 with a view to 2030”*, updated and specified for the period 2020-2030 with an expected interim evaluation and update in 2025. It serves as a central point for decision-making and formulation of future visions, which determine the development of the Technical University of Liberec. At the same time, this document serves as an official information overview for the needs of public authorities and Czech and foreign partner institutions.

## Introduction

Technical University of Liberec was founded in 1953 as the University of Mechanical Engineering and in 1960 extended to the University of Mechanical and Textile Engineering. Its primary objective was to train qualified professionals for the local and regional labor market. Gradually it was extended by several other faculties, which enriched its primary focus also in the field of non-technical fields. In 1995 it was renamed to Technical University of Liberec. In 1998 it was included among universities of the university type.

The original strongly technical oriented educational and scientific-research focus predetermines the direction of the university to a certain extent to this day. In the last three decades, the basic principles of the functioning of universities and the provision of academic freedoms for all members of the academic community have been prominently promoted and cultivated at the Technical University of Liberec. In accordance with Act No. 111/1998 Coll., The Higher Education Act, the Technical University of Liberec is today the center of education, independent knowledge and creative activity and plays a key role in the scientific, cultural, social and economic development of society. Its essential role is that:

- it enables equal access to higher education, the acquisition of appropriate professional qualifications, preparation for research or artistic work and other demanding professional activities, in accordance with democratic principles,
- it actively seeks out and addresses talented youth at national level, encourages and develops their interest in learning and creative activities,

- it provides other forms of education and enables the acquisition, extension, deepening or renewal of knowledge from different fields of knowledge and culture, thereby contributing to lifelong learning,
- it preserves and enhances the achieved knowledge and pursues scientific, research, development and innovative, artistic and other creative activities,
- it contributes to social development at national and regional level and cooperates with different levels of government and self-government, educational institutions and the business and cultural spheres,
- it plays an active role in the public debate on social and ethical issues, in fostering cultural diversity and mutual understanding, in developing a democratic society and preparing young people for life in it,
- it develops international, especially European cooperation, as an essential dimension of its activities, supports joint projects with similar institutions abroad and exchanges of academics and students.

Technical University of Liberec is now clearly profiled in the fields of technical, natural sciences, social sciences, humanities, pedagogy, health sciences and arts. It reflects the needs of the labor market and in educational activities it forms and develops study programs in relation to the society-wide demand for key professions and in close relation to the realized results of basic and applied research. It is based on a modern scientific background, accentuates interdisciplinarity in teaching, research and development and exploits the synergic effect of cooperation between individual parts of the university. It purposefully strengthens cutting-edge laboratory workplaces and teams in scientific fields where it achieves world-class results. It builds relationships with university and scientific institutions in the Czech Republic and abroad. It has established itself in the international environment through project collaboration, creative work by academics and student and employee mobility.

## TUL'S MISSION

The mission of TUL is to spread knowledge and push its boundaries, to cultivate Czech society and to contribute to social balance, well-being and sustainable development through all its activities.

## TUL'S VISION

In the spirit of European university traditions, TUL sets out a vision for 2020-2030 to **be an independent, internationally anchored education and research centre of European importance and a partner in seeking and addressing societal challenges.**

## **Starting points for scientific, research, development and innovation, artistic and other creative activities in 2020-2030:**

TUL builds on the freedom of scientific research, sharing of information and ideas, openness to various scientific opinions and critical thinking skills. It is based on the research tradition of European universities, i.e. in its activities, it systematically links the mission of the educational institution with scientific, research, development, innovation and artistic activities, it collaborates with renowned foreign partners and it strives for a significant international dimension of its activities. In the field of science, research and innovation, TUL has a strong tradition in material, mechanical, textile, electrical, information and environmental engineering and nanotechnology. It also focuses on research in the natural, social, humanities, economic and health sciences.

Interdisciplinarity, the ability to build research teams and to find innovative, comprehensive cross-disciplinary solutions is a major strength of TUL. As a result, it achieves success in a number of scientific areas and is able to build on basic research by commercially applying the results of its research, development, innovation, design and artistic activities.

## **TUL's missions in science, research, development and innovation, arts and other creative activities for 2020-2030**

In terms of its creative activity, the mission of TUL is to contribute to the expansion of knowledge and to strive for practical application of new knowledge and its use in the development of society.

## **TUL's vision in scientific, research, development and innovation, artistic and other creative activities for 2020-2030**

In the current dynamically changing environment, TUL has set out a vision for 2020-2030 to **be an independent, internationally-anchored research, development and innovation institution of European importance, actively seeking key societal challenges and research challenges and providing them with a comprehensive solution.**

### **The strategic objectives of TUL for increasing international or professional competitiveness of university research activities and its quality for 2020-2030**

- 1) To improve the quality of publications presenting the results of scientific and research activities, increase their international response and strengthen their impact in the relevant field.
- 2) To increase the number of working groups actively involved in international collaboration in science and research not only through bilateral collaboration, but also through participation in international consortia.
- 3) To continually (annually) increase the number of basic research grant projects supported by national or international providers.
- 4) To increase the number of doctoral degree graduates of TUL in post-doctoral positions at prestigious international workplaces.
- 5) To increase the volume of funds generated from license agreements with a defined profit of material or immaterial nature.
- 6) To ensure an internationally competitive level of key researchers to provide good quality teaching in undergraduate, graduate and doctoral degree programmes, with the indicator of meeting this objective being a continuous advance in bibliometric indicators of guarantors of individual fields.

### **Strategic institutional instruments and tools of TUL in scientific, research, development and innovation, artistic and other creative activities for 2020-2030**

Key tools for achieving strategic goals are defined to strengthen existing and, where appropriate, implement new science and research management processes, including human resource management, according to the successful principles and standards applied at the best foreign sites. These processes will be implemented or revised at all levels of the university's organisational structure. Their primary objective is to stimulate research performance and the quality of the achieved results, increase the social and economic impact of university research results and strengthen the position of TUL as a partner for searching and solving research tasks and societal challenges. The key principles on the basis of which these processes will be set up include direct managerial responsibility for defining and fulfilling the goals in the area of creative

activities, for efficient use of the university's technical equipment and for the management of intellectual property. Key strategic institutional instruments include:

- 1) Using a university-wide grant competition to support the excellence of academicians and researchers working in the field of basic research in order to maximise the potential for excellence and increase the success of research teams in obtaining basic research grant support from national (GACR) and international (ERC) providers.
- 2) Using a university-wide grant competition to support young talented academicians and researchers in strategic, promising and emerging areas of basic research to anchor them in university workplaces, increase their involvement in international collaboration, and make young research teams more successful in obtaining grant support for basic research from national (GACR) and international (ERC) providers.
- 3) Funding the university-wide grant competition by increasing the resources from funds of LCDRO.
- 4) Strengthening the elements of competition and improving the quality of Student Grant Competition projects.
- 5) Introducing incentive programmes to support internationalisation of science and research for the establishment of international teams.
- 6) Supporting publication in international journals through internal university grants.
- 7) Building multidisciplinary teams across faculties and strengthening synergic effects of collaboration within the university not only in solving the tasks of applied and contractual research, but especially in the field of basic research.
- 8) Implementing and strictly adhering to the career rules of academicians and researchers.
- 9) Implementing tools to increase efficiency in the planning, procurement and sharing of research infrastructure.
- 10) Optimising intellectual property management processes in order to improve the position of TUL in joint projects with the application sphere.
- 11) Providing systematic support to build and deepen relations with the commercial sphere.

## Strategic fields of science and research for 2020-2030

TUL is a strong application-oriented regional university with close links to important regional, national and foreign industrial partners. TUL educates future teachers who will shape and provide nationwide education. TUL also educates health professionals. The management of TUL and its organisational units are in daily contact with representatives of industrial partners, directors of elementary and secondary schools, officials of regional and municipal authorities and municipalities and they are continuously informed about the needs of the society and the market. Based on ongoing analyses of societal needs, TUL's 2020-2030 scientific, research and other creative activities will focus on addressing the following societal challenges, research themes and sustainability needs for the long-term development of human society for the 21st century:

- Smart interdisciplinary solutions,
- Modern technology,
- Development of advanced materials and technologies,
- Promoting entrepreneurship,
- Addressing socio-economic challenges,
- Polytechnic education.

Scientific, research and innovation activities at TUL focus on the fields of technical sciences and engineering, natural sciences, social sciences, humanities and arts and health sciences. Research directions in scientific fields that will be specifically developed at TUL in the next 5 to 10 years include:

- Technical sciences and engineering:
  - Materials, nanomaterials, composites and materials based on textile structures \*, \*\*.
  - Progressive technologies and nanotechnologies \*, \*\*.
  - Metrology and new methods of quality management \*, \*\*.

- Design of advanced machines and equipment \*, \*\*.
- Manufacturing systems, automation and robotics \*, \*\*.
- Sustainable transport and mobility \*, \*\*.
- Energy and renewable resources \*\*.
- Autonomous energy solutions with neutral impacts on climate change \*\*.
- Smart buildings, smart networks, smart infrastructure, smart cities \*, \*\*.
- Remediation, filtration and environmental technologies \*, \*\*.
- Information and communication technologies in personal and industrial use \*\*.
- Artificial intelligence, machine learning and signal and data processing \*\*.
- Optics, electro-optics and photonics \*, \*\*.
- Natural science:
  - Comprehensive protection of soil, groundwater and surface water.
  - Mathematical and stochastic modelling and statistics.
  - Biophysics
- Social Sciences:
  - Influence of quality of the institutional environment on economic policy in theory and practice.
  - Specific forms of business (small and medium-sized enterprises, family business, e-business).
  - Forms of business cooperation (clusters) with an impact on performance.
  - Business processes and innovation in the context of Industry 4.0.
  - Development of the didactics of teaching fields.
  - Pedagogy with a focus on its history.
  - Research in the field of human motor evaluation.
- Humanities and Arts:
  - Modern and contemporary Czech history.
  - Urbanism and populated landscape in the context of climate and demographic change. Use of data for more efficient urban and regional planning.

- Sustainable architecture responding to current societal, environmental and technological challenges.
- Art in public space.
- Application of new technologies in visual arts.
- Health Sciences:
  - Medical and biomedical applications of nanomaterials and nanotechnologies.
  - Challenges of sustainable health care, telemedicine, application of ICT and artificial intelligence in medicine.
  - Biomedical innovations in the context of circular economy.

The \* and \*\* symbols indicate the priority themes of RIS3 LK and the National RIS3 Strategy, respectively.

### **International context of TUL's activities in the field of science and research for 2020-2030**

TUL is an internationally-anchored and internationalised research organisation. In scientific fields where it achieves internationally excellent results, it collaborates with the world's leading institutions in the form of exchanges of students and academicians, creating joint publications and solving joint research projects. The further development of international activities, therefore, forms an integral part of the strategic objectives and instruments of science and research. The future of TUL is based on further expansion of collaboration with prestigious international institutions. Further improvement of management processes in science and research at TUL is based on the adoption and further development of successful models of good practice in the management and professional performance of research projects, which stems from collaboration with prestigious foreign organisations.

Collaboration between the workplaces at TUL and important foreign partners will be supported from the funds for internationalisation and from the funds from LCDRO. Within the Regional Contact Organisation, TUL provides administrative and methodological support to its students and staff in applying for mobility support projects, such as Marie Skłodowska-Curie events, Fulbright Foundation scholarships,

INTER-EXCELLENCE and INTER-COST project preparation, and in exceptional cases, support for the preparation of ERC projects.