

Strategic Plan of the Central European Institute of Technology at Masaryk University for 2021–2028

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INTRODUCTION

Mission

CEITEC MU is a research institute of Masaryk University and a member of CEITEC consortium that aims to improve quality of life and human health through scientific research and innovations.

Vision (2028)

- Leading European research institute in life sciences, known for its discoveries
- Centre for using and developing cutting-edge technologies as drivers for interdisciplinary research
- Strong scientific community with open and interactive internal culture and governance that gives recognition to all its people
- Active voice in public awareness and debate on societal consequences of life science discoveries and trends underpinned by them
- Recognized player in knowledge sharing by bridging major European life science alliances (EU-LIFE and Alliance4Life)

Values

- Excellence based on curiosity-driven research
- Scientific independence
- Interdisciplinarity and collaboration
- Open science and knowledge sharing
- Integrity, ethics and social responsibility
- Equal opportunities, inclusiveness, transparency, openness, fairness

Strategic priorities

- Excellent research
- Supporting future leaders in research
- Research infrastructure
- Governance and human resources
- Societal relevance and recognition

FUNDAMENTAL PRINCIPLES

Curiosity-driven research performed by independent research groups

CEITEC MU conducts basic research in the area of life sciences and delivers each year over 350 publications, of which more than 55 % are published in Q1 journals. **To fulfil institutional vision and become the leader in the European context in the area of life sciences (in particular, molecular and structural biology), CEITEC MU will continue building an attractive, research-oriented environment combined with state-of-the-art infrastructure and transparent, progressive governance.**

A fundamental unit of the institute is a research group headed by a group leader, who formulates research directions. **We believe that unrestrained curiosity-driven research is the best path towards scientific excellence. Therefore, academic autonomy and scientific freedom of each research group are paramount principles at CEITEC MU.** In such a strategy, the success of the institution depends on the success of its research groups. The main managerial instruments for implementing such a strategy are: 1) selection and hiring of top-quality candidates for group leader positions, 2) providing the best possible support and conditions for curiosity-driven research, and 3) regular peer-evaluations by renowned international experts to provide feedback on research group performance.

CEITEC MU will keep its current pace of opening one new research group approximately every two years, which is a reasonable pace considering the constraints on institutional funding and physical space. By 2028, CEITEC MU will have appointed 3–4 new research groups. The focus will continue to be on junior group leader hires, with a high chance of acquiring external funding through a major individual grant. New hires will be selected based on scientific excellence and with regards to complementarity to current research programs/disciplines and benefits from the existing instrumentation and core facilities expertise.

CEITEC MU will, in particular on the basis of independent scientific evaluation by ISAB, aim to ensure the international competitiveness of research groups at the institute. CEITEC MU will, following each evaluation by ISAB, reconsider the position of senior research groups that are relatively underperforming within the institute as reported by ISAB evaluation (below grade 3 of the Evaluation of Research Excellence at CEITEC MU methodology).

Profile topics

Profile topics are research activities that combine the efforts of several research groups and provide CEITEC MU with high national and international visibility, competence in frontier technologies, or lead to a tangible socio-economic impact and innovative applications. Formulation of such topics is important for shaping the profile and visibility of the institute, showing its

impact on society, guiding future infrastructural developments and strategic partnerships, and providing a frame and topics for future large-scale institutional projects.

RNA/nucleic acids in health and disease

RNA/nucleic acid biology is a research topic that includes many research groups and in which CEITEC MU has reached critical mass for becoming a leading European centre in this field. The particular strength of CEITEC MU in this area is in the variety of approaches and questions addressed by the research groups, spanning from basic research to clinics, bridging atomic resolution to molecular functions and whole organisms, connecting molecular principles with disease and therapy. Excellence and the critical mass of CEITEC MU is further demonstrated by its track record in major individual and institutional grants, recognition of its people by scientific bodies, and by its record of being host to international research conferences. With the support of the H2020 Twinning project, CEITEC MU has also established a consortium with four leading European institutes with the aim to further integrate knowledge and expertise in the area of RNA biology.

Taking into consideration the enormous applied potential of RNA/nucleic acid biology as exemplified by CRISPR-Cas9 technology or the development of diagnostic tools and vaccines during the COVID pandemic, as well as its integrative aspect within the institute, CEITEC MU will aspire to become a leading European research centre in this area.

Cancer biology

Cancer biology is a key topic at the department of molecular medicine that includes the development of diagnostic tools for blood and solid tumours, using next generation sequencing approaches, mechanistic research on blood malignancies with the aim of developing new methods for therapeutic interventions, as well as basic research of molecular pathways contributing to tumorigenesis. Research that is relevant to cancer biology is not limited only to the department of molecular medicine. Approaches developed by computational chemists and structural biologists are important for drug design and their specific delivery, and several research groups work on the development of pharmacological compounds with applications in cancer treatment. In addition, a number of groups working on mechanistic aspects of gene regulation and genome stability consider the impact of their research primarily in cancer. Part of the cancer-related research at CEITEC MU will be integrated into the **National Institute of Oncology**, whose features are currently being negotiated.

Brain disorders

CEITEC MU is currently well positioned and internationally acknowledged in neurodegenerative diseases, epilepsy, stress and behavioural disorders research. These topics are carried out in the neuroscience department, which has been actively engaged in the search for early diagnostic and prognostic markers, using multimodal MRI imaging, EEG and neurostimulation methods. The groups also work on the deep characterization of distinct phenotypical profiles and study their underlying neural correlates and mechanistic pathways, all of which are important for the development of drugs and drug trial designs, and identification of optimal candidates and targets for invasive (deep brain stimulation surgery) and non-invasive brain stimulation approaches. Some groups also have expertise in animal research of various animal models of brain diseases such as Parkinson's disease or epilepsy. This could be developed further with **The Bio Pharma Hub** in cooperation with other faculties of MU and with core facilities at the campus. In the long-term perspective, however, keeping this capacity may require a strategic arrangement towards better consolidation of the field across Masaryk University.

Infectious diseases

An emerging profile topic at CEITEC MU is infectious diseases. **The COVID-19 pandemic reminded us of how devastating infectious diseases are for human society and demonstrated the importance of research in this field.** The major threats are posed not only by the emergence of new zoonotic viruses, but also by antibiotic-resistant strains of pathogenic bacteria. As a reaction to the current situation, the Czech government decided to establish the **National Institute of Virology and Bacteriology (NIVB)**. The institute will be based on several CEITEC MU

research groups working on structural aspects of virus biology, phage-based antimicrobial therapies, and development of new antibiotics. We plan to recruit several new research groups with expertise in this area to support of NIVB, which will help to shape the profile of CEITEC MU in this direction. This initiative may establish CEITEC MU as a **national leader** in this highly relevant research topic.

Harnessing knowledge of plant biology for crop improvement

The research profile of CEITEC MU is unique at a national level due to a strong plant sciences department, whose research is relevant for sustainable primary production, agriculture and food security. **Due to climate change and an increasing human population, achieving sustainable agricultural production is an important societal task and its solution will require major innovations.** One approach is a rational design of new breeds of crops with better yields, nutrition value, and more eco-friendly cultivation. Genome editing enables the knowledge obtained in plant model species to be applied to crops. This creates an unprecedented opportunity to exploit the vast knowledge we gained on molecular underpinnings of plant physiological processes for crop improvement. CEITEC MU aims to **organize a national network focused on exploiting genome editing in crop research and breeding.** This could result in the establishment of a technology pipeline focused on nationally important crops that would greatly facilitate experimental work with crops and promote collaborations between basic and applied sectors.

At the frontiers of technology: correlative approaches to connect dynamics and structure of living systems

Advances in microscopy have been an important driving force for discoveries in life sciences. On one hand, we can study cell ultrastructure at near-atomic resolution by electron microscopy (EM), on the other hand fluorescence microscopy and atomic force microscopy (AFM) enable the observation of dynamic processes and biochemical changes in living cells. The combination and correlation of these different readouts from one specimen opens opportunities to understand structure–function relations in living systems. However, this approach is still far from being routinely applied in life sciences. Correlative microscopy requires customized instrumentation and poses technical challenges concerning sample preparation and handling and data analysis.

Development of correlative microscopy is a great opportunity to accelerate research at CEITEC and to gain unique advantages in technology. Cryo-EM is already one of CEITEC's technology strongholds, we also possess expertise in AFM, and during the past five years we have managed to concentrate capacities in light microscopy by establishing Cellular Imaging Core Facility (CELLIM). Brno is a world-wide centre of electron microscopy production with important companies based in the region. Therefore, it is natural that **CEITEC MU in cooperation with CEITEC consortium partners will aspire to establish an R&D platform in correlative microscopy.**

Research infrastructure

The large research infrastructure at CEITEC MU is operated by core facilities (hereinafter also referred to as 'CF') that focus primarily on serving CEITEC researchers, who form the core of their user base, but also support scientists from Masaryk University and the Brno region. **The state-of-the-art equipment enables our scientists to perform ground-breaking research. Anticipating and keeping up with technology development is a necessary precondition for the success of CEITEC MU in producing excellent research.**

The majority of CEITEC core facilities are associated with Large Research Infrastructures for Research, Experimental Development and Innovations on the Roadmap of Czech Republic for the years 2016-2022 and with ESFRI Roadmap. **We aim to have all core facilities being included in research infrastructure consortia both at national and international level.**

The Institute will continue improving its core facilities and will prepare a strategy to optimally employ the resources available for their further development. Great attention will be paid to the **re-investment strategy** for key instruments, principles for allocation of new equipment to core facilities, and mechanisms to involve researchers in defining the needs for new infrastructure. CEITEC will develop its IT resources and connected services in data management and software support by establishing an **IT core facility**.

Core facilities will undergo the evaluation procedure with a similar periodicity as research groups. The aim of the regular evaluation is mainly to increase the quality of provided services and to provide management with the information required for the formulation of the re-investment plan as well.

Independent scientific evaluation

The evaluation of research groups, performed approximately every four years, remains a very powerful and necessary tool for the management and development of the institution that has a direct impact on the continuation of research groups at the institute. At the same time, it provides space for individualized, highly qualified feedback on the performance and possible development of each research group. Both of these aspects support the excellence and long-term prosperity of the institute.

CEITEC MU takes advantage of the consortial evaluation of scientific excellence, and uses an international panel of experts chaired by the International Scientific Advisory Board (ISAB) members for informed peer-review evaluation based on scientific performance and other criteria which constitute high quality research.

Grant strategy

National grant schemes are at present, and most probably will be in future, the single most important type of research funding available. CEITEC MU must keep the current rate of acquiring national grants.

However, CEITEC MU fully supports, and will strongly encourage, group leaders aspiring for prestigious individual grants, which bring holders incomparably greater international visibility and reputation. Major individual research grants (such as ERC, ERC-CZ, GAČR EXPRO, etc.) represent optimal convergence between scientific excellency and financial sustainability. A decision by an external funding provider to place a bet with a significant amount of money (approximately 10 mil CZK a year) on a scientific plan strongly demonstrates credibility, viability and competitiveness of a research group's plan, and represents an additional form of independent external evaluation. **CEITEC MU should aspire to achieve the level where cumulatively about one half of its research groups would hold such major individual grants by 2028**, perhaps by stating a formal expectation that a senior group leader should regularly submit a proposal for a major individual grant every five years.

Institutional grants are essential in supporting research infrastructure and strategic development initiatives. CEITEC MU will have the ambition to undertake large scale projects towards the fields of virology and bacteriology, as well as within the Masaryk University's aim of establishing The Bio Pharma Hub at the university campus.

Investing in people (HR Excellence in Research)

Since its establishment, CEITEC MU has considered people the most important factor for building a successful research centre and carrying out high-quality research. CEITEC MU keeps the trend as stated in its [HR strategy and HR Excellence in Research Award action plan](#) that fully implements the principles of the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers. Notably, further attention will be paid to strengthening group leaders and core facility leaders in their managerial and supervision role.

It is our responsibility to **increase the employability of early-stage researchers** that spend their PhD or postdoc stay at CEITEC MU before they leave the institute or change their career trait according to the career system. We aim to further reinforce our **training program for early-stage researchers** to provide them with the crucial skills to become future scientific leaders. Besides having established thesis advisory committees as a standard of the CEITEC PhD School for PhD students, postdocs should have the opportunity to take advantage of working closely with a mentor. Continuing in close and systematic discussion and cooperation with the Faculty of Sciences and Faculty of Medicine on common standards of PhD programmes is essential, aiming to ensure the same quality of PhD experience to all CEITEC MU PhD students.

One of the important tools of human resources management will be a **retirement and outplacement policy**. It is not expected that CEITEC MU could grow above its current size of 31 research groups (as of 1 January 2021) in the period up until 2028. Dissolution of research groups will be realized on performance-based evaluation or due to the departure (outplacement or retirement) of a group leader. During the implementation period of this strategic plan, a number of CEITEC MU research group leaders will be eligible for retirement under relevant legislation. The challenges arising from this fact will need to be addressed as part of a **broader process of generational change of science leaders at the institute**.

In the previous period of 2016–2020, the institute began structural changes aimed at the elimination of the so-called “inbreeding” practice by changing the career system and formulating a new recruitment policy following the OTM-R principles. In the following period, the challenge of proper implementation of the recruitment policy and managerial evaluation of head group leaders is ahead of us.

Governance and organisational structure

The current size of no more than about 30 research groups gives the opportunity to consider flattening the structure and re-organizing institutional governance so that the role of the research group leaders’ meetings increases. The interaction between group leaders, core facility heads and the management might be supported by a few select committees (a successful case currently is the IT committee). Consideration will be given to the role of departments (research centres) as the intermediary organizational level, and their organizational model. A model of departmental leaders (heads of centres) holding their positions on a basis of rotation among senior research group leaders might be considered, so that departments could better function as platforms facilitating collaboration among groups rather than as part of the line-management structure.

CEITEC MU research groups are currently organized in four **research departments**: Centre for Structural Biology, Centre for Molecular Medicine, Mendel Centre for Plant Genomics and Proteomics and Centre for Neuroscience. This stratification reflects the structure of the four life science research programs that jointly formed CEITEC. Originally, these research programs formed semiautonomous units with their own budget that was further allocated to research groups. Because the budget is now directly allocated to individual research groups, the internal organization of CEITEC MU into departments is no longer tied to finances and has become more flexible. CEITEC MU departments can currently be perceived as units that organize research groups with similar research interests and infrastructural needs. Such stratification facilitates the organization of field-specific seminars and PhD studies, management of joint infrastructure, or presentation of the field to outside stakeholders. Many researchers at CEITEC MU are active in the area of molecular and cellular biology, but this is not reflected in the current departmental structure. Therefore, we are considering the **establishment of a department of molecular and cellular biology** in the near future. We may also establish a new **department for infectious diseases**, due to the participation of CEITEC MU in the National Institute of Infectious Diseases.

Space availability is the main limiting factor not only for CEITEC MU development but also for keeping its performance at the current level. The institute will address this issue using a variety of approaches, some of which were already stated above, such as keeping the size of the institute at the level of approximately 30 research groups, optimizing use of the current premises through space re-allocations (with a **priority allocation to internal groups**). The issue of space availability needs to be accordingly discussed with the university management.

Societal relevance and recognition

We aim to be an active voice in public awareness campaigns on the **importance of basic research for society**; and to participate in the debate on **societal consequences of life science discoveries**, and trends underpinned by them. Using recruitment policy and campaigns focused on building a **strong employer brand**, we aim to improve the visibility of CEITEC as an employer of choice, and of the prestige of the CEITEC PhD School and postdoc program.

CEITEC MU is striving to build a **strong CEITEC brand** and maintain good relations with all stakeholders at national and international levels. **Building a strong CEITEC brand has a synergic effect and strengthens the university's visibility and prestige as well.** The communication strategy of the institute is based on its values and strategic goals. Our values are not only being communicated outwards but are also alive within our organisation. CEITEC is proud to be an international research institute and therefore puts a great emphasis on communication in the English language.

CEITEC MU pursues the strategy of a strong institutional profile successfully through strengthening the international recognition. The position of CEITEC MU is visible on the European research map primarily through two strategic alliances: [EU-LIFE](#) and [Alliance4Life](#). CEITEC joined EU-LIFE in 2013 as one of the founding members, and founded Alliance4Life in 2018. **Based on systemic work in these alliances and gained work done in the previous period, CEITEC MU strives to become a bridge for transferring good practice and governance experience between both alliances,**

interconnecting in this way the western and eastern parts of Europe, and meeting the societal role of a truly Central European institute.

KEY PERFORMANCE INDICATORS

Indicator	Target value (2028)
Share of top-quality publications (T10)	<i>20 % of publications in T10</i>
Number of newly awarded prestigious individual grants	10
Number of large scale institutional projects	5
Number of newly appointed group leaders	<i>3–4 new research groups by 2028</i>
Total number of research groups	<i>30 research groups</i>

LIST OF ABBREVIATIONS

CEITEC	Central European Institute of Technology
CF	core facility
ISAB	Independent scientific advisory board
MU	Masaryk University
NIVB	National institute for virology and bacteriology
OTM-R	open, transparent and merit based recruitment
RG	research group
RI	research infrastructure

ANNEX: IMPLEMENTATION PLAN

The implementation plan is to be specified and updated regularly as part of annual management planning and reporting.

Goals	Key implementing measures	Indicators / Outcomes
1. Attract and hire talented excellent scientists with the ambition and potential to obtain prestigious individual grants in the area of life sciences	Recruitment (Hiring) strategy Headhunting Grant strategy – individualized approach in providing grant office services	Number of newly appointed group leaders <i>Target value: 3–4 new research groups by 2028</i> Number of newly awarded prestigious individual grants <i>Target value: 10</i>
2. Keeping the size of the Institute and managing the outplacement and retirement of senior group leaders	Retirement policy Outplacement policy and negotiation with faculties	Total number of research groups <i>Target value: Total number of 30 research groups</i>
3. Strengthening of Institute's profile topics: <ul style="list-style-type: none"> • RNA/nucleic acids in health and disease • Cancer biology • Brain disorders • Infectious diseases • Crop improvement by genome editing • Correlative approaches to connect dynamics and structure of living systems 	Preparation/Implementation of large scale institutional projects in the defined profile topics Specific PR campaigns focused on strengthening the profile topics	Number of large scale institutional projects <i>Target value: 3</i> Number of international conferences promoting Institute's profile topics organized by CEITEC MU <i>Target value: 2</i>
4. Becoming a national leader in specific research areas	National institute for virology and bacteriology National oncology institute	Number of other large scale institutional grants <i>Target value: 2</i>

<p>5. Improvement of research performance quality through international peer-review evaluation</p>	<p>Peer-review evaluation by independent external experts approximately every four years</p> <p>Regular evaluation of junior group leaders typically after four years from starting their group leader position</p> <p>Support measures aiming to increase the share of top-quality publications (T10)</p>	<p>Share of top-quality publications (T10)</p> <p><i>Target value: 20 % of publications in T10</i></p>
<p>6. Linking research at CEITEC MU with research activities at the university – Bio Pharma Hub</p>	<p>Teaching collaboration</p> <p>Sharing the infrastructure</p> <p>Infrastructure for preclinical studies</p> <p>Collaboration with life sciences faculties</p>	<p>Number of study subjects organized for the pharmaceutical faculty</p> <p><i>Target value: 2</i></p>
<p>7. CEITEC MU keeps the trend as stated in its HR strategy and HR Excellence in Research Award action plan</p>	<p>HR strategy and HR Award action plan</p> <p>Gender equality plan (GENDER+)</p>	<p><i>Target: HR Award re-awarded in 2023 and 2028</i></p>
<p>8. Systematic support for open science and responsible research and innovation principles</p>	<p>Open science strategy</p>	<p>Number of publications in open access mode</p> <p><i>Target value: 80 % publications are published in OA mode</i></p>
<p>9. Building bridges to industry</p>	<p>Cooperation with industry strategy and action plan(s)</p>	<p>-</p>
<p>10. Transformation of research departments role in organizing scientific community life</p>	<p>Field seminars</p> <p>PhD specializations</p>	<p>-</p>
<p>11. Covering the demand for educational programs in the areas of profile topics</p>	<p>Accreditation of new programs (virology, correlative microscopy) in collaboration with relevant faculties or else by decision of Masaryk University</p>	<p>Number of new study programs</p> <p><i>Target value: 2</i></p>

<p>12. Reinforce our training program for early stage researches (PhDs, postdocs) and junior group leaders to provide them with crucial skills and competencies essential for their future career</p>	<p>Early stage researchers training programme</p> <p>Mentoring for postdocs</p> <p>Thesis advisory committee as a standard of the CEITEC PhD School</p> <p>Unification of standards across PhD programs in close cooperation with the campus faculties</p> <p>Training academy for junior group leaders</p>	<p>-</p>
<p>13. Improving visibility of CEITEC PhD School programs and postdocs program to attract top talented and highly motivated candidates</p>	<p>Recruitment strategy</p> <p>Employer branding</p>	<p>Number of candidates per announced position</p> <p>Share of recruitment procedures that are successfully closed</p> <p>Evaluation of candidates' quality by hiring managers (subjective assessment)</p> <p><i>Detailed set of indicators is included in the annual HR report.</i></p>
<p>14. State-of-the-art equipment enables our research groups to perform ground-breaking research</p>	<p>National and international RI roadmaps participation</p> <p>Re-investment strategy to optimally employ available resources</p> <p>Open and transparent discussion of (re)investment plans</p> <p>Pricing policy</p>	<p>Number of core facilities involved in the RI roadmap</p> <p><i>Target: All CFs are involved in the national RI roadmap</i></p>
<p>15. Further development of the core facility model in planning, management and operation of research infrastructure</p>	<p>Defining principles for placement of research equipment into CFs/RGs</p> <p>Evaluation of CF management and operation</p>	<p>-</p>

	Training opportunities for CF personnel	
16. Bring the Institute and the campus faculties closer as stakeholders in the core facilities	CF user committees Systemic dialogue at the level of institutional management of CEITEC MU and campus faculties in respect of research infrastructure planning	-
17. Optimizing the use of laboratory and office space and aiming to increase the space available	Space allocation policy	Number of m2 of office and laboratory space
18. To ensure professional IT support for research groups and core facilities in close collaboration with ICS MU (“IT as Core Facility”)	Contract based on service price list with ICS MU IT Policy	-
19. To increase public’s awareness about CEITEC and to strengthen the CEITEC brand	Value-based communication of research results and institutional management through PR and communication strategy formulation and implementation Communication campaigns promoting importance of basic research and its transfer to application	<i>Details are set up in the PR strategy and action plans/reports.</i>
20. Serving as a bridge in transferring good practice and governance experience	Active knowledge sharing with MU and CEITEC consortium partners Active knowledge sharing with partners from EU-LIFE and Alliance4Life Knowledge sharing on national and international level	<i>Improvement in various aspects of institutional governance (CEITEC as well as all involved partners) based on annual action plans of EU-LIFE and Alliance4Life Activities in research policy fields on national and international levels based on annual action plans of EU-LIFE and Alliance4Life</i>