Faculty of Civil Engineering

Czech Technical University in Prague

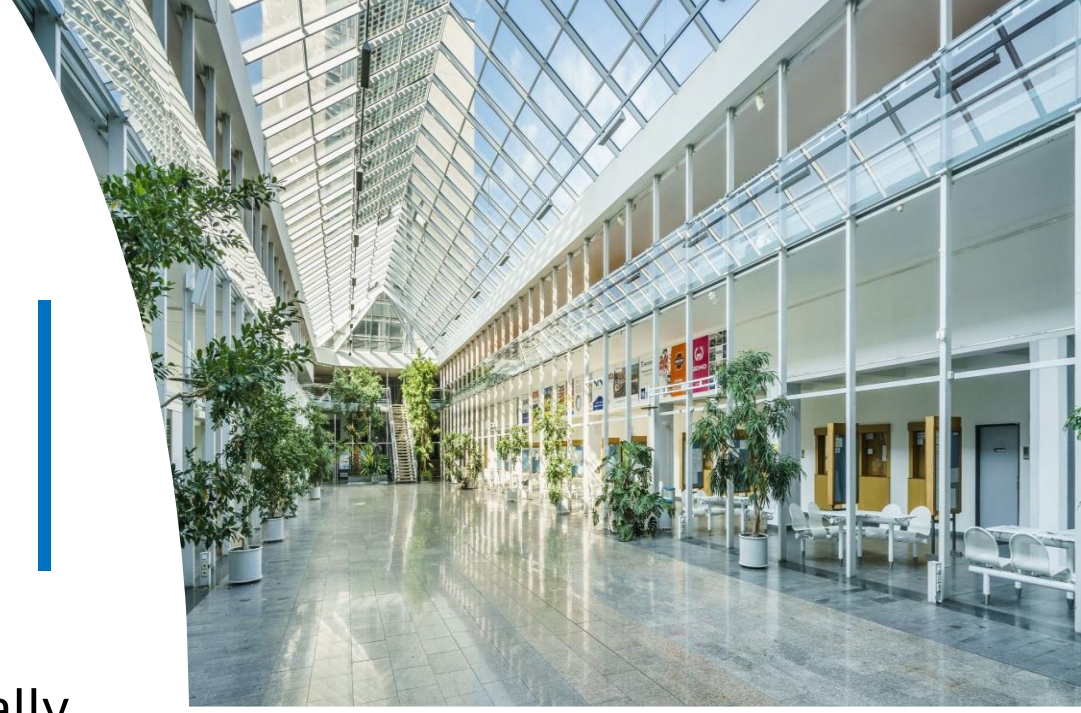
Jiří Máca
Dean of the Faculty

Bořek Patzák
Vice-Dean for science and research

Our Mission

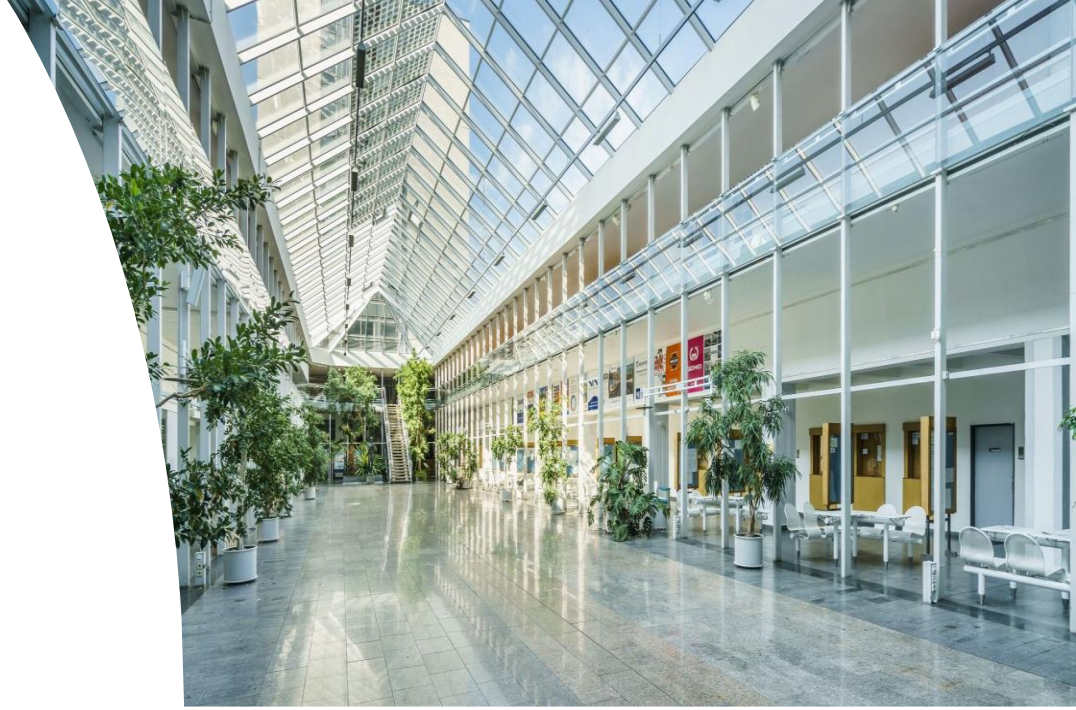
> Building on 300 years of tradition, guided by excellence, and focused on real-world impact, we educate future leaders of civil engineering, architecture, and geodesy.

- **About us**: The Faculty of Civil Engineering is one of Europe's oldest civil engineering schools and historically the first faculty of CTU in Prague, founded in 1707
- **Motto**: "Tradition-Quality-Perspective"
- **QS University Rankings**
  - CTU: **#420** (**#5** in Central and Eastern Europe)
  - Civil and Structural Engineering: **#151-200** (**#1** in Central and Eastern Europe)
  - Architecture and Built Environment: **#151-200** (**#1** in Central and Eastern Europe)

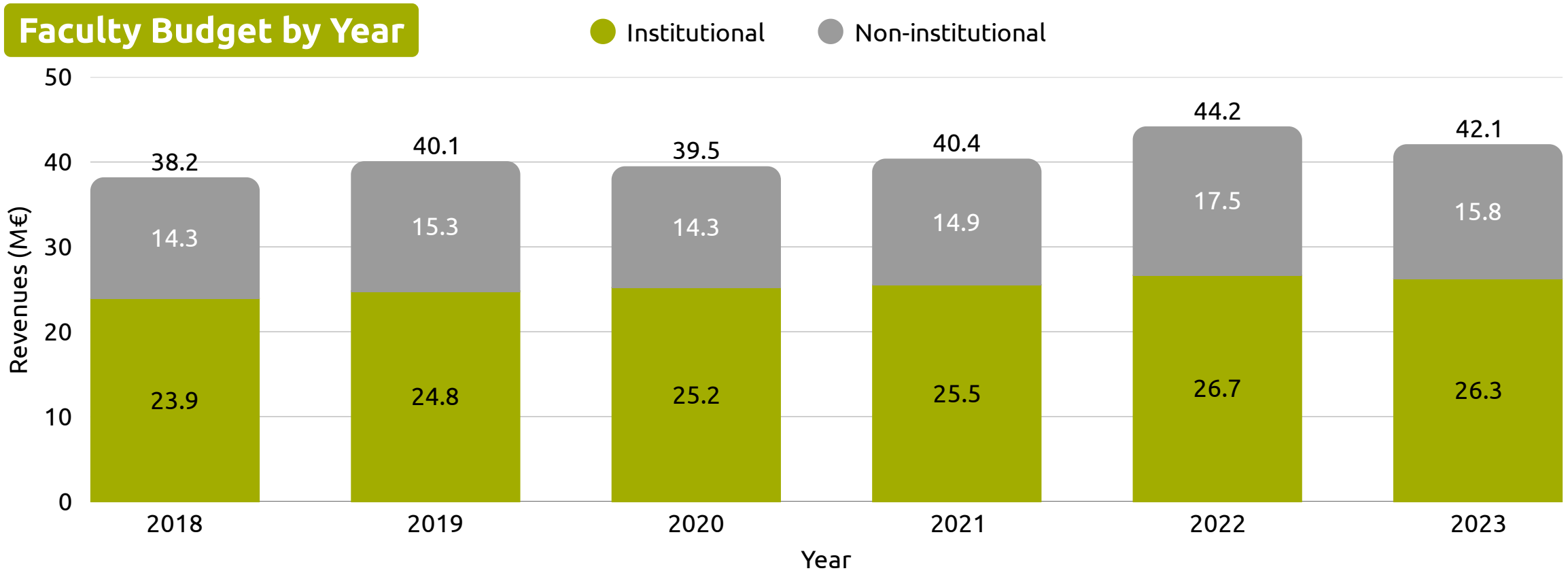


FCE at a Glance

- **Main education areas**
  - Architecture and Building Sciences
  - Civil and Environmental Engineering
  - Geodesy and Cartography
- **Student community (2025)**
  - 2,771 bachelor students in 7 programs
  - 722 master students in 18 programs
  - 415 doctoral students in 14 programs ➡️
- **International programs**
  - Advanced Erasmus Mundus Master in Structural Analysis of Monuments and Historical Constructions
  - Joint degree programs with ENPC Paris, KTH Stockholm, or TU Munich
- **≈ 8.3 students per academic FTE**



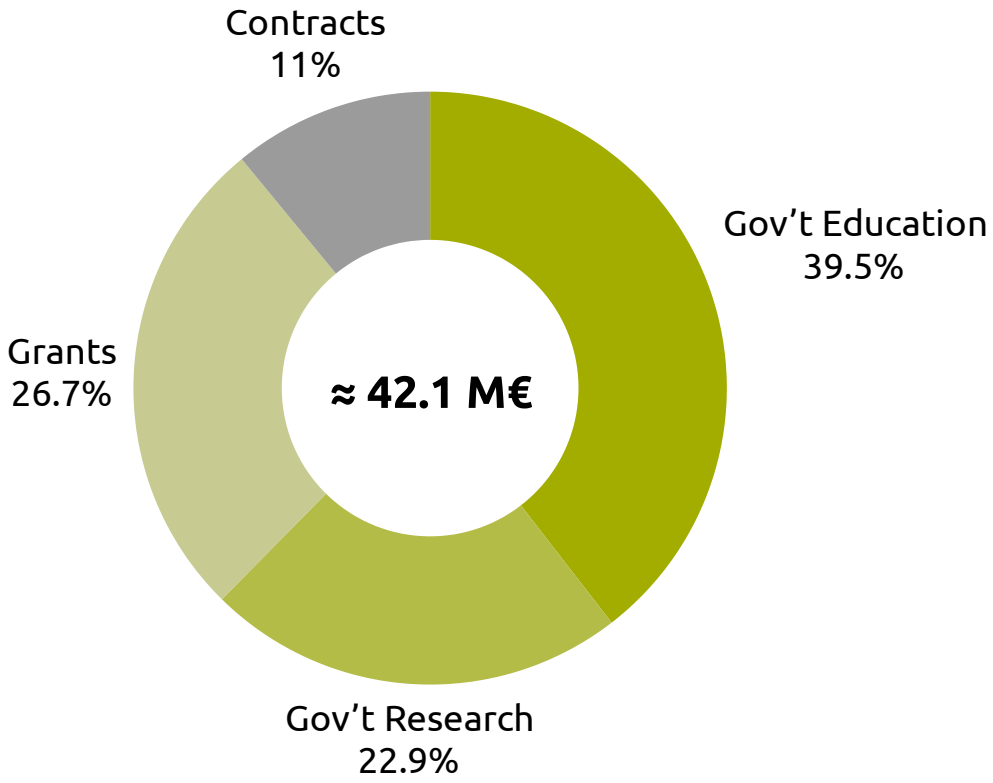
Budget Overview (2018–2023)



2018–2023 Financial Reports of the Faculty of Civil Engineering (FCE) .

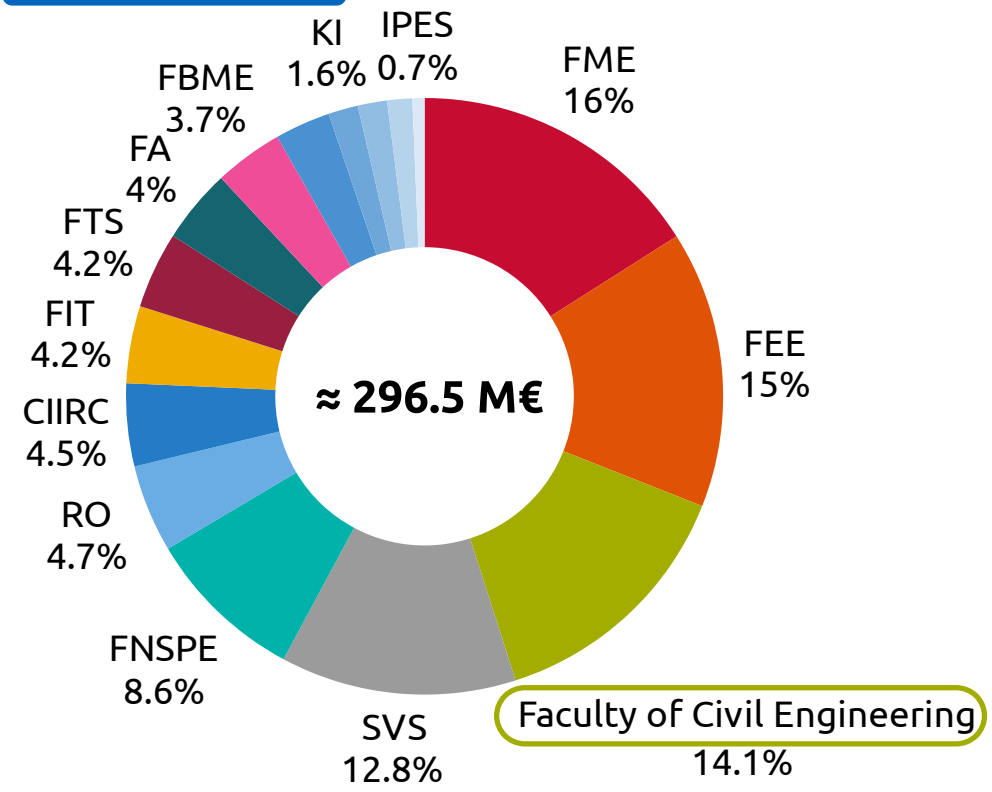
Sources of Income (2023)

FCE Budget



2023 Financial report for the FCE

CTU Budget



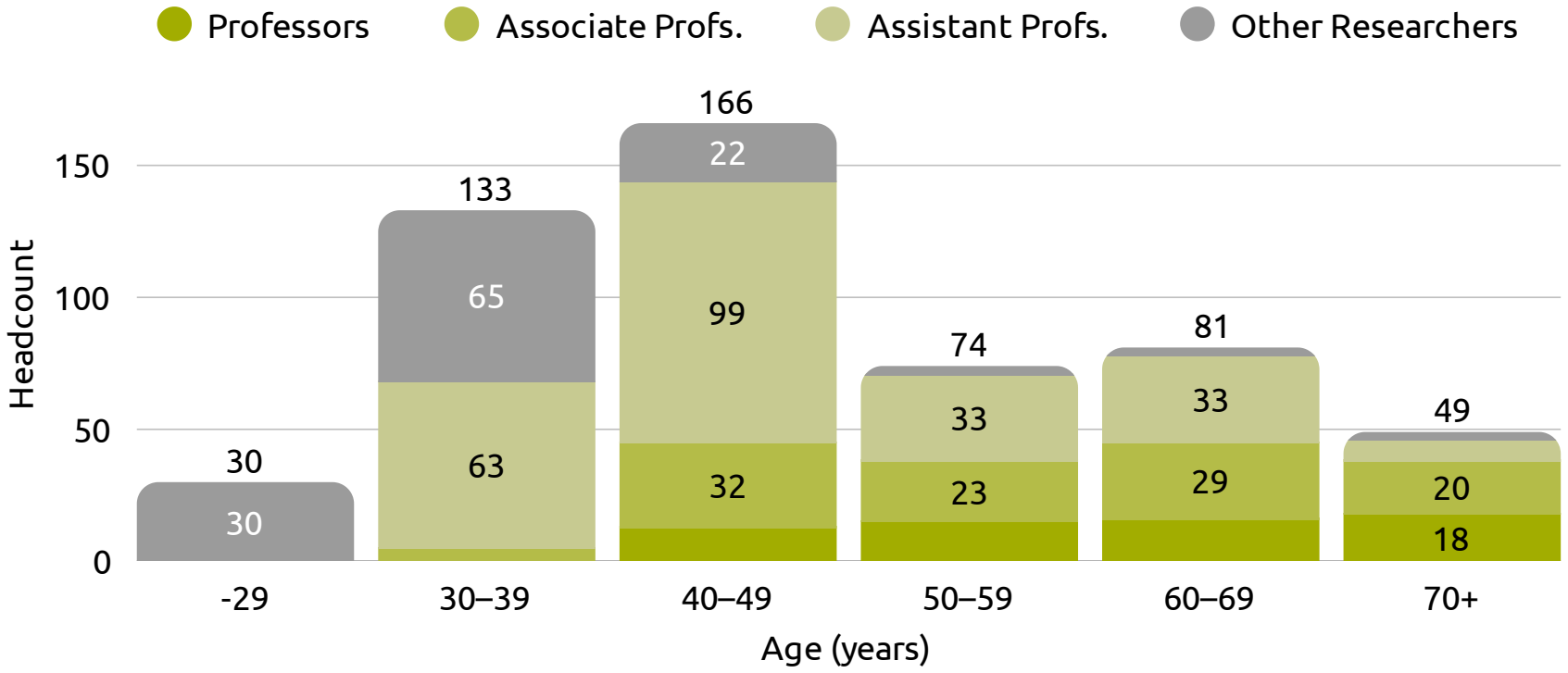
2023 CTU Budget

Competitive grants: 26.7%, government support (education + research): 62.4%

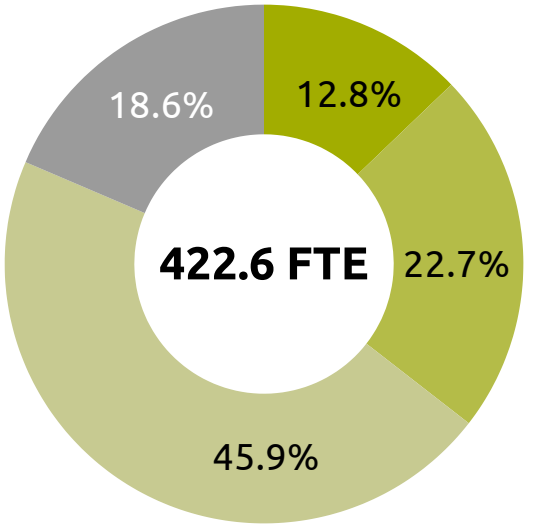
Human Resources: Academic Staff (2023)

488 Staff Members (**422.6** FTE): **58** Professors | **103** Associate Professors | **201** Assistant Professors | **126** Other Researchers

Academic Positions by Age



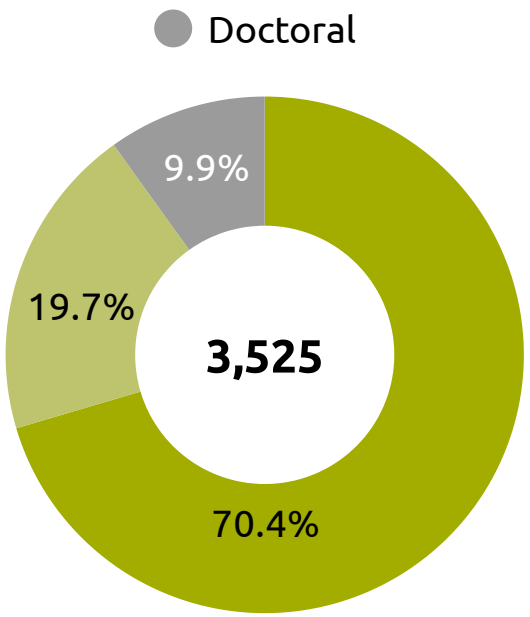
Academic Positions by FTE



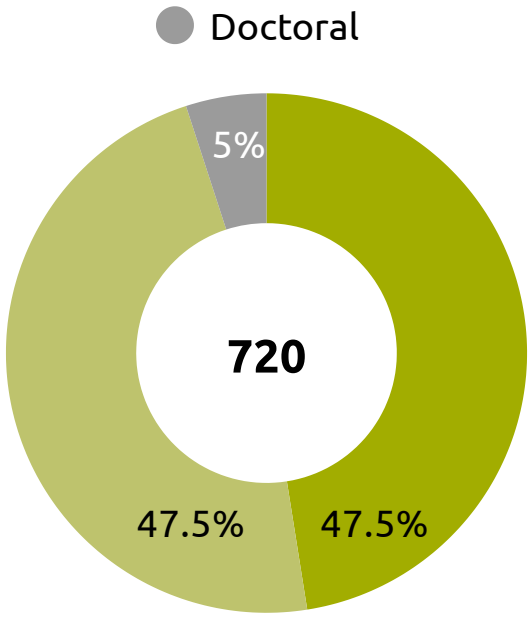
Women representation: Average 30% (Professors 15% | Associate Profs. 17% | Assistant Profs. 35% | Other Researchers 30%)

Human Resources: Students (2023)

Students

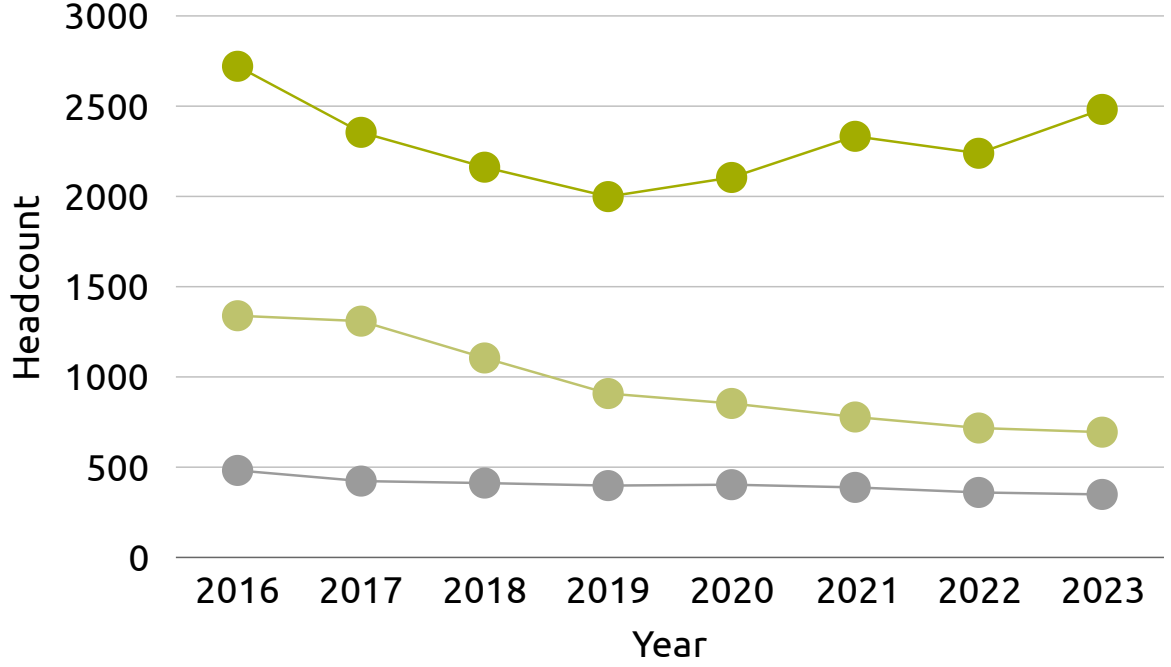


Graduates



Self-evaluation Report for Module 3

Students by Year

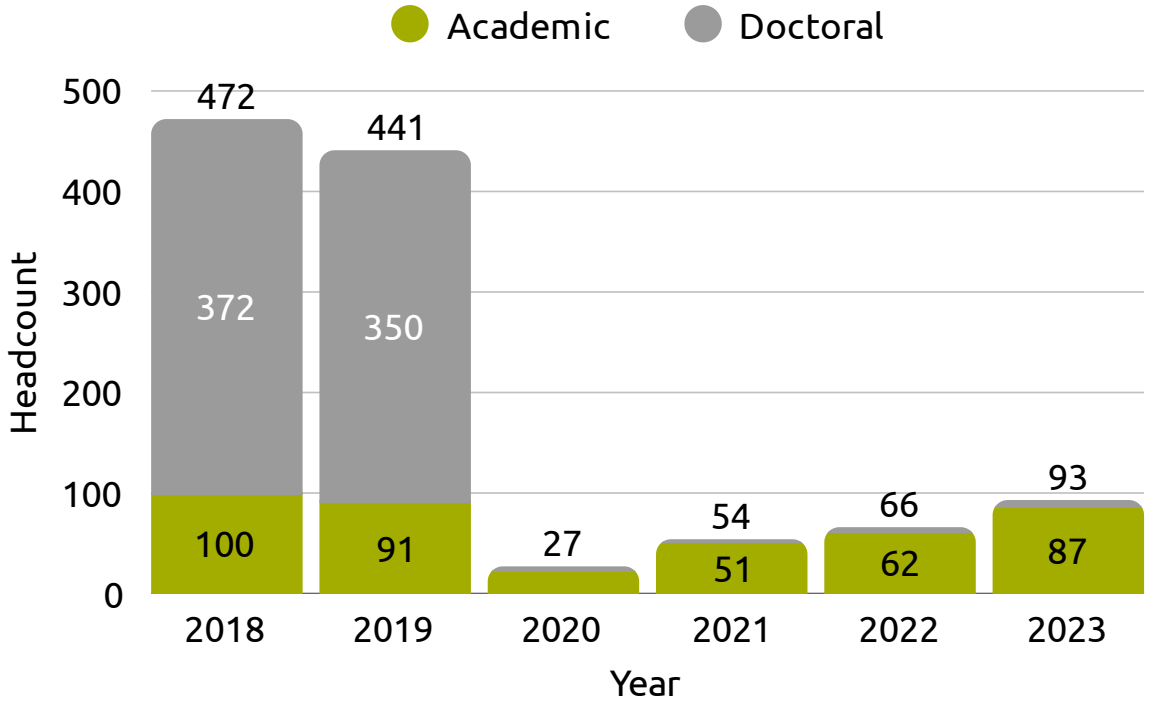


Self-evaluation Report for Module 3, 2019 Annual FCE Report

- Women representation (2023): 40% of bachelor, 41% of master, and 33% of doctoral students
- 349 doctoral students (2023), average length of study 6.9 years (including 1-year COVID extension)

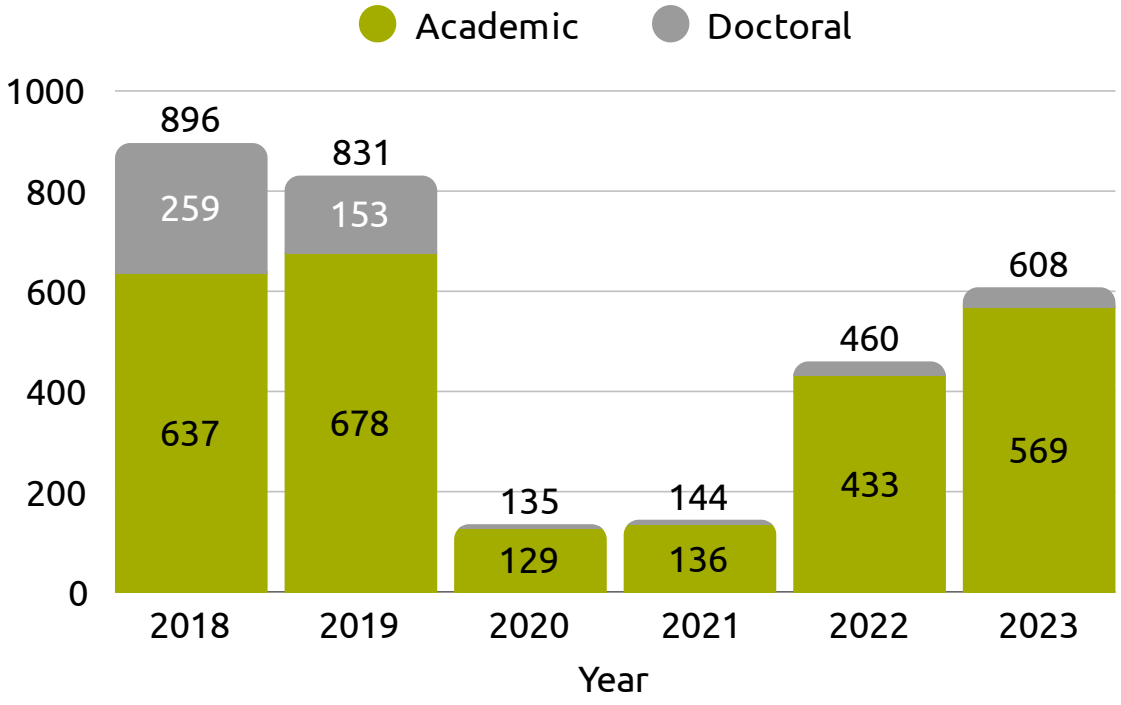
Human Resources: Mobility

Incoming Staff



2018–2023 Annual FCE Reports; Department of International Relations (private communication)

Outgoing Staff



2018–2023 Annual FCE Reports, Dept of International Relations

- Mobility fund (2019–) to support Erasmus+, ATHENS, and doctoral mobility
- Joint degree programs

Research Facilities

From nanoindentation to deep geological repositories

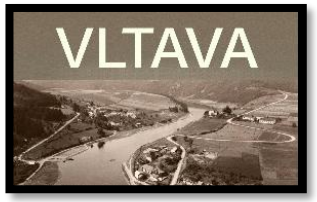
- **Specialized Laboratories**
  - *Josef Underground Laboratory* ➡️
  - Centre of Nanotechnology
  - Laboratory of Intelligent Buildings
  - Laboratory of Advanced Microscopy
  - Laboratory of Advanced Visualization Technologies
  - Microbiological Laboratory
- **Research Centers**
  - Experimental Centre
  - Centre of Experimental Geotechnics
  - *Water Management Experimental Centre* ➡️
- **Registered Expert Services**
  - Civil Engineering, Geodesy & Cartography, and Economics
- **Accredited Testing Laboratory**

Close cooperation with UCEEB and Klokner Institute

Research Project Highlights

GAČR EX|PRO	**PERFORM**: Non-periodic pattern-forming metamaterials: Modular design and fabrication	2019–24	🧩 Frontier research in modular materials and structures
Reconmatic	**RECONMATIC**: Automated solutions for sustainable and circular construction and demolition waste management	2022–26	♻️ Consortium coordinated by FCE
Open Data Science	**Geo-harmonizer**: EU-wide automated mapping system for harmonization of Open Data based on FOSS4G and machine learning	2019–22	🌐 Consortium coordinated by FCE
T A C R Programme National Competence Centres	**National Centers of Competence** in • Efficient & sustainable transport infrastructure • Advanced materials and efficient buildings	2019–22	🤝 Collaborative R&D for sustainable construction
T A C R Programme Epsilon	**ARBS**: Autonomous robotic construction system	2019–22	🏆 TACR Award 2023 (Business category)

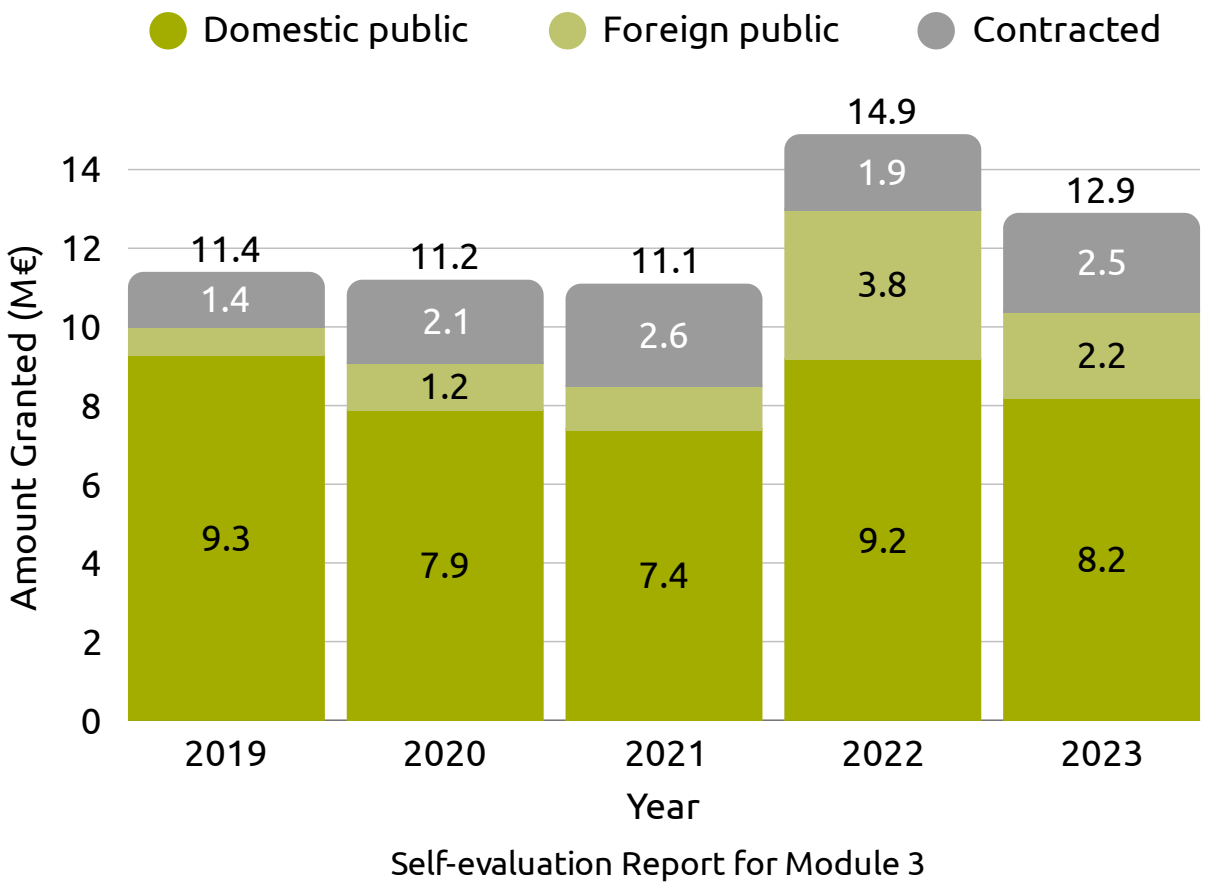
Applied Research and Collaboration Highlights

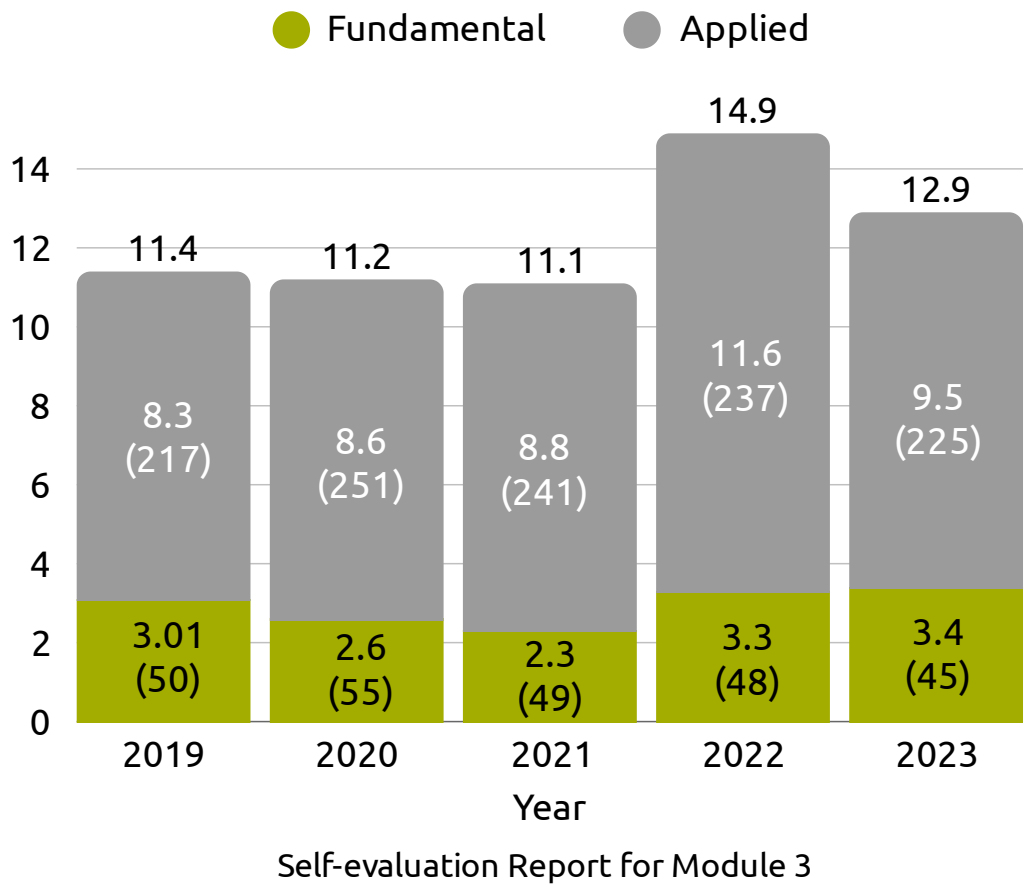
nanocem	**Nanocem**: Industrial-academic research consortium (including Heidelberg Cement DE, Lafarge-Holcim FR|CH, or Sika Group CZ)	2004–20	🔬 Nanoscale science for sustainable cement and concrete
	**Vltava–Changes in the Historical Landscape**: A study on landscape transformation along the Vltava River (with Charles University CZ)	2022	📚 Monograph and map portal on river changes via floods and dams
MINISTRY OF CULTURE CZECH REPUBLIC	**Methodology for 1960s–70s architectural heritage evaluation,** including open database and map (with National Heritage Institute CZ)	2020	🏛️ Modern heritage protection, certificate MK 25708/2020 OVV
OOFEM.ORG	**OOFEM.org**: Free open-source finite element platform for solving multi-physics problems	1997–	🌎 Worldwide community of 500+ users; 2x A-rated in national peer review
BALBAR	**BALBAR:** Portable composite and inflatable-water-bag ballistic/protective barrier with rapid deployment (with STRIX Chomutov CZ)	2019–	🛡️ Patent CZ 308880, certificates ČSN EN 1522 and V50 STANAG 2920

Outreach Highlights

INSPIRELI AWARDS	**Inspireli Awards**: The world's largest open and free student architectural competition with global jurors and community feedback	2015–	🎓Ă1,271 participants (87 countries) in 2024, 1,559 jurors (132 countries)
HALA ROKU	**Hall of the Year** in **Akademik** (bachelor & master students), **Junior** (secondary schools), and **Advanced** (doctoral) **categories**	1986– 2007– 2023–	💥 62 Akademik, 47 Junior, and 8 Advanced structures tested in 2025
CIVIL ENGINEERING JOURNAL	**Civil Engineering Journal** combining broad scope of Engineering disciplines with heritage of the oldest engineering journal in Czechia	1982–	💎 Diamond Open Access journal indexed in SCOPUS and ESCI
Galerie FSv	**FCE Gallery** Offering art, design, and photography exhibitions to inspire students, academic staff, and external visitors	2018–	🖼️ Over 30 exhibitions during the 2019–2023 period
SPŠ PRAHA 1	**Six partnerships with secondary schools of Civil Engineering** (starting with SPŠ Dušní in Prague)	2022–	🚀 Mentoring and teaching by FCE staff, one-week visits to FCE

Research: Funding Acquisition

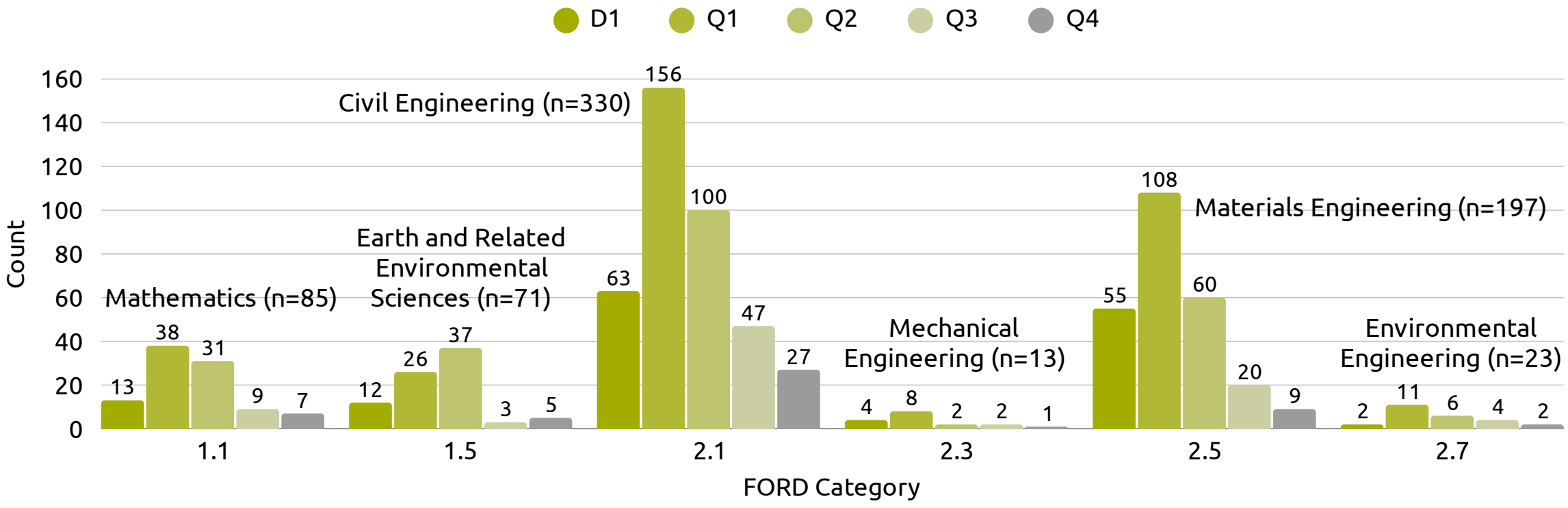




Total 1,458 Project-Years of 68,184 k€ in funding; minimum 0.04 k, average 46.8 k, and maximum 2,871.8 k€/year

Research: FCE Publications

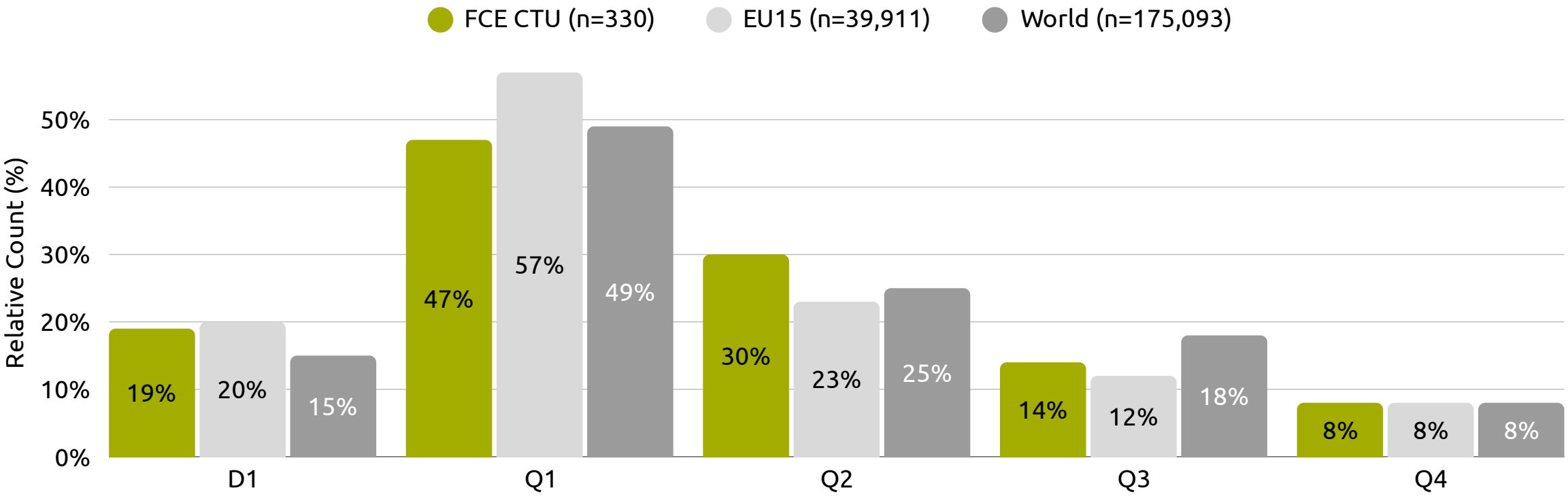
Publications by FORD Categories (2019–2023, WoS database, Article Influence Score)



V3S Publication Database, CTU in Prague

Research: FCE Publications in CE Category

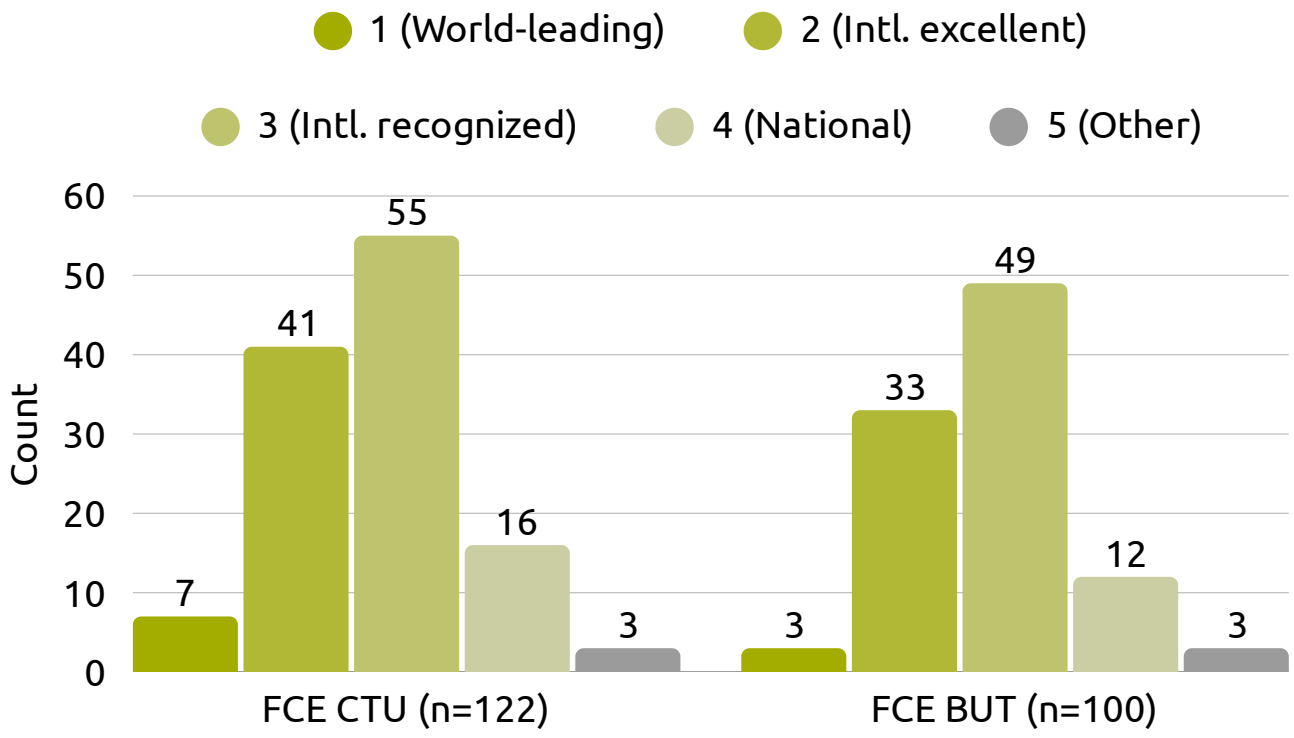
2.1 Civil Engineering FORD Category (2019–2023, WoS database, Article Influence Score)



V3S Publication Database + National and international comparison based on Web of Science data for 2018–2022, Module 2

Research: Peer Review of Selected Results

Module 1 Summary (2019–2023)



Evaluation of selected results by field and research organization for 2023, Research, Development, and Innovation Council CZ

Examples of FCE Excellent Results

Contribution to knowledge (Grade 1):

- Bažant, Z.P., Jirásek, Milan: Creep and Hygrothermal Effects in Concrete Structures, Springer
- Marx, A. et al.: A review of CO_2 and associated carbon dynamics in headwater streams: a global perspective, Reviews of Geophysics
- Kružík, M., Roubiček, T.: Mathematical Methods in Continuum Mechanics of Solids, Springer

Social relevance (Grade 2):

- Bareš, V. et al.: Great Fall Dearborn Diversion Long Bypass Reach Hydraulic Modelling Report
- Ungermann, D. et al.: European Design Guide for the Use of Weathering Steel in Bridge Construction
- Cajthaml, J. et al.: Vltava – Changes of historical landscape

Research: Ecosystem

	**Initiation fund**	2018–	🌱 Seed mini-grants for proposal preparations, mobility, and networking
	**HR excellence in research award**	2019–	🏆 Commitment to open, transparent, and merit-based recruitment
	**Reduced tuition fees** for English • Bachelor program • Master programs • Doctoral programs	 2023– 2023– 2020–	↘ • Up to 80% reimbursement • 2,500 € → 20 € / semester • 2,500 € → 20 € / semester + stipend
	**Project administration & support department**	2022–	📋 Proposal submission, budgeting, and project administration
	**Support for preparing competitive project proposals** FCE ↗ CTU	2022–	✨ 1:1 guidance for MCSA, ERC & Czech equivalents (5/7 funded, 1.5M € overall)
	**What my next project will be about?** Seminar series FCE ↗ CTU	2023–	💡 Open workshop on funding sources, project ideas, and peer feedback

Implementation of recommendations

R1: *A greater percentage of high-level research projects, funded e.g. by the ERC, would be beneficial to the international reputation of the Faculty of Civil Engineering. It is recommended to reduce the number of small industrial projects. At the same time, efforts should be made to attract larger projects. This would give more freedom to stimulate more research-oriented activities. It is also recommended to increase the percentage of revenues from EU-funded projects. The level of this percentage is frequently used as an indicator of the quality of research.*

- FCE has significantly increased its involvement in EU and other international research projects (6 → 22 as beneficiary, 13 → 37 as participant, 2.7 → 51.8 MEUR in funding, 2 as H2020 coordinator)
- Strategic incentives: Personalized grant support, “What will my next project be about?” activity started at FCE, now adopted at CTU, FCE Initiation fund

Implementation of recommendations

R2: *Starting already from a high level, the output would further increase in the coming years if the research profile was further sharpened by defining clear research foci. A necessary condition for this is a close link to industry, including fundamental research activities, serving as the basis for future application-oriented research.*

- Key strategic research directions defined in Strategic plan (Digitalization, advanced materials and green & blue technologies), aligned with national priorities
- At the same time supporting bottom-up culture to promote new topics and directions, young researchers and teams
- Actively establishing links to industry via National Centre for Construction 4.0 (FCE as founding member, 2022) and Czech Chamber of Authorized Engineers and Technicians (ČKAIT)
- FCE is a member of TACR National Centers of Competence, focused on long-term cooperation between research and application spheres:
  - Center for Efficient and Sustainable Transport Infrastructure (CESTI, 2012-2019)
  - Center of Advanced Materials and Efficient Buildings (CAMEB, 2019-2022)

Implementation of recommendations

R3: *The revenues from licences increased by a factor of about 2. The overwhelming majority of revenues from non-public sources in the period 2014-2018 comes from gifts. Altogether, these revenues are not very significant. Efforts are required to improve this situation. The output of filed and granted patents in the reported time period is very good. However, no spin-offs were launched in this time period. Moreover, the amount of revenues from sold licences is not known. It is recommended to develop a strategy for stimulating spin-offs from applied research activities.*

- New University Technology Transfer Unit, FCE established an incentive system for innovators
- Increased income from licenses (6.8→16.5 KEUR), absolute values are modest, further effort needed to scale-up these activities; FCE has one spin-out company Mob-bars.com
- Lack of players to bridge gap between academia and industry
- Leading construction companies in CZ are global enterprises that conduct significant research abroad

Implementation of recommendations

R4: *The better the quality of the research carried out by the evaluated research unit, the greater the probability of an increase in acknowledgments. In connection with this, personal acquaintances, made at international congresses and conferences, play a great role. The average duration of doctoral studies should be reduced. The same should be done with the involvement of researchers in administrative activities.*

- Reduced maximum time for PhD thesis submission (7->6 years, CTU)
- Incentives for supervisors whose students finish in 4 or less years
- Active (co)-organization (6 including IABSE Symposium, iiSBE Forum, Lightweight Structures Architecture 2000) and participation in numerous international events
- Established Project Administration and Support Department (2022, managing at preset over 45 projects, 13 international, transitioning period)

Thank you

Visit FCE virtually at https://www.fsv.cvut.cz/virtualvisit

Builders at Heart

SWOT analysis as a tool for strategic planning

Strengths

- Long-standing tradition as part of a renowned technical university
- Wide multidisciplinary scope, from architecture to materials modeling
- Top-level research in several departments, globally recognized
- Strong, lasting partnerships with academia, industry, and government
- Excellence in both basic and applied research

Weaknesses

- Limited success in EU projects, technology transfer, and industry ties
- Uneven departmental performance; weak internal collaboration
- Low internationalization in research and teaching
- Retention of early-career researchers remains challenging
- Underutilized potential of performance evaluation procedures

Opportunities

- High impact potential in infrastructure, energy, materials, and environment
- Funding opportunities for modernizing research and education facilities
- Promising early-career researchers with global engagement potential
- Stronger support for funding acquisition

Threats

- Declining interest of young people in engineering careers
- Low number of mid-career assistant and associate professors (ages 30–49)
- Research driven only by evaluation metrics
- Rising administrative burden on active researchers and on internal collaborations