



Polymers are close to our hearts

CENTRE OF POLYMER SYSTEMS

2 June 2021



Tomas Bata University in Zlín
Centre of Polymer Systems



CPS STRUCTURE RESEARCH DIRECTIONS



Polymers Processing



Rubber Technologies



Biomaterials



**Nanomaterials and
Advanced technologies**



**Environmental
Technologies**

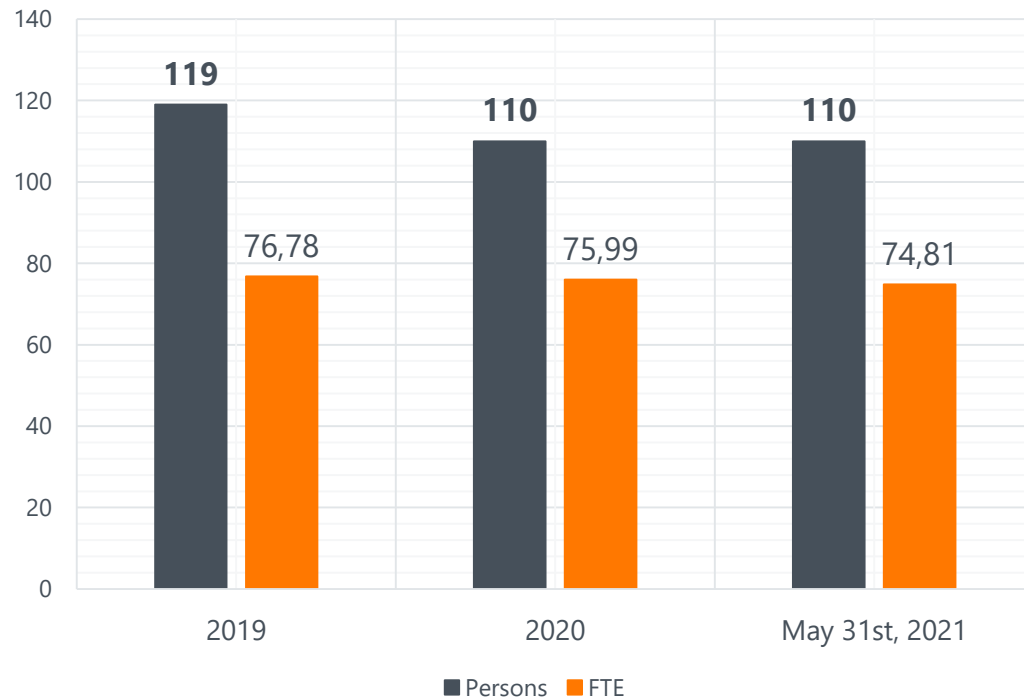


**Energy and Composite
Materials and Devices**

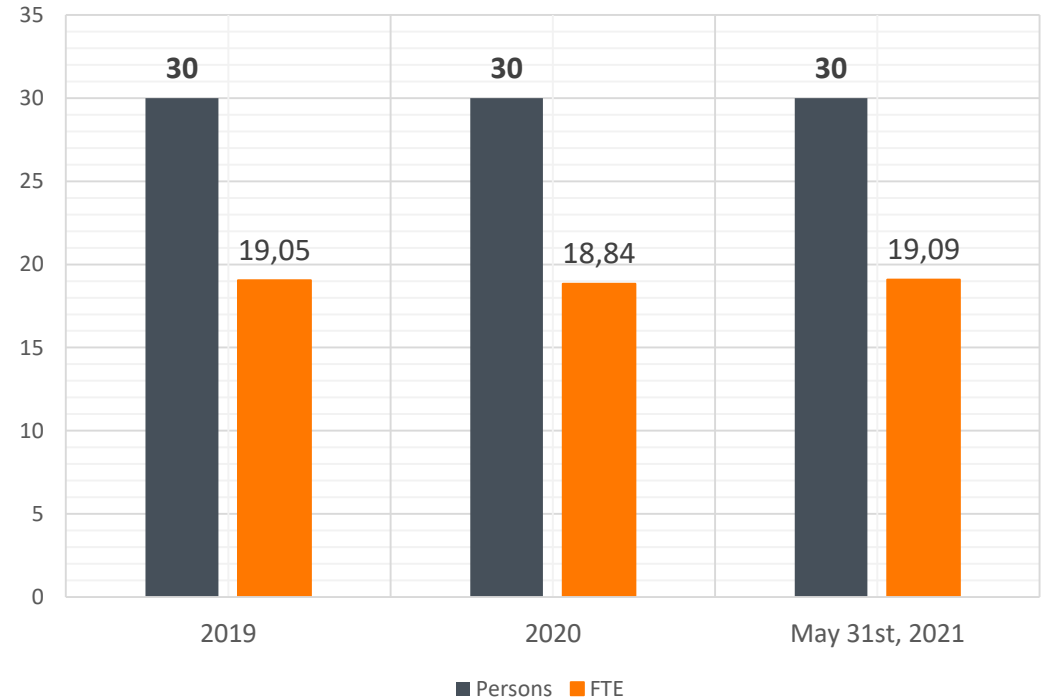
CPS STAFF 2019 – 31 May 2021

	2019	2020	31 May 2021
Total number of employees	149	140	140
Total number of FTEs	95.8 (0.64 per employee)	94.8 (0.68 per employee)	93.9 (0.67 per employee)

Researchers

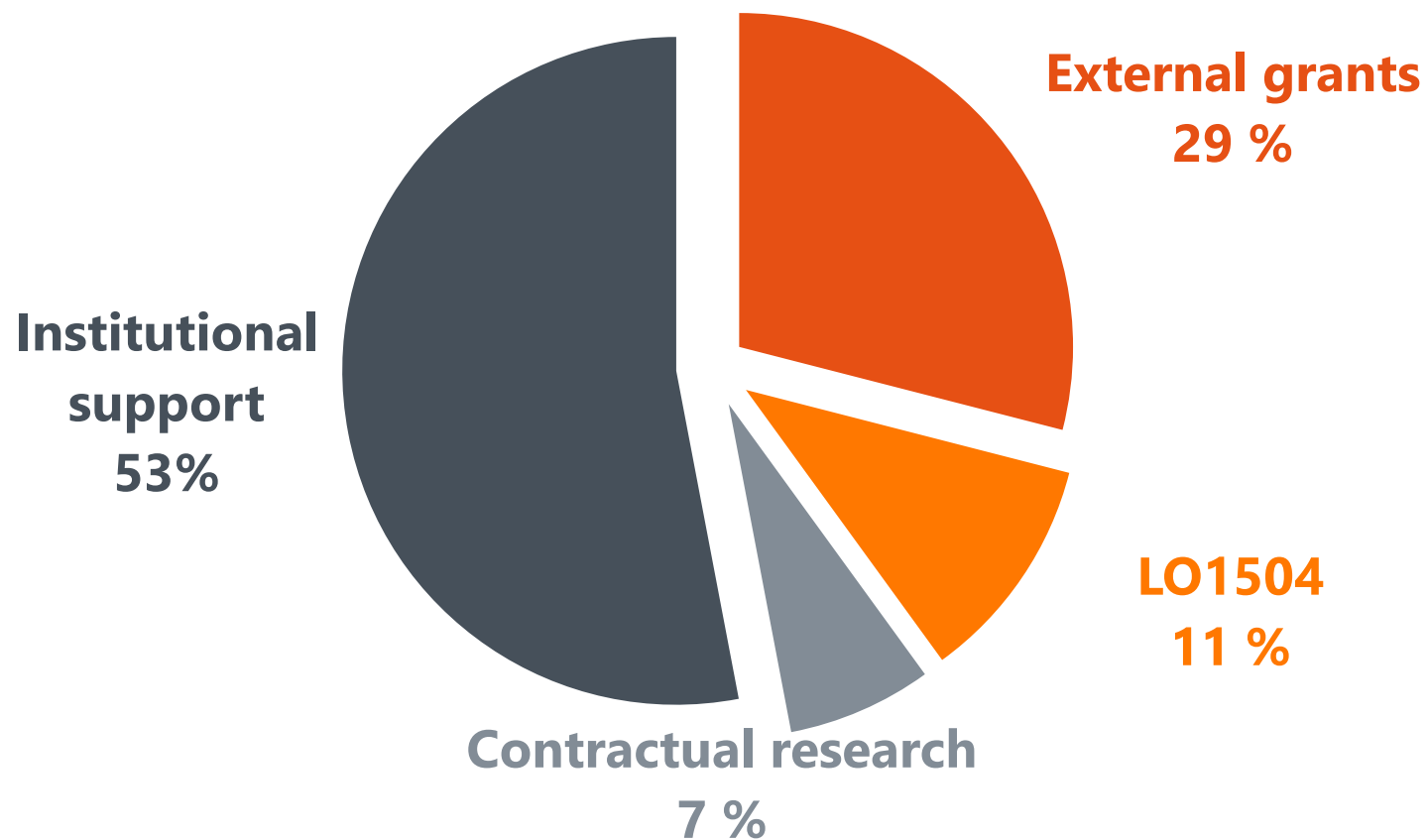


Office & Engineers



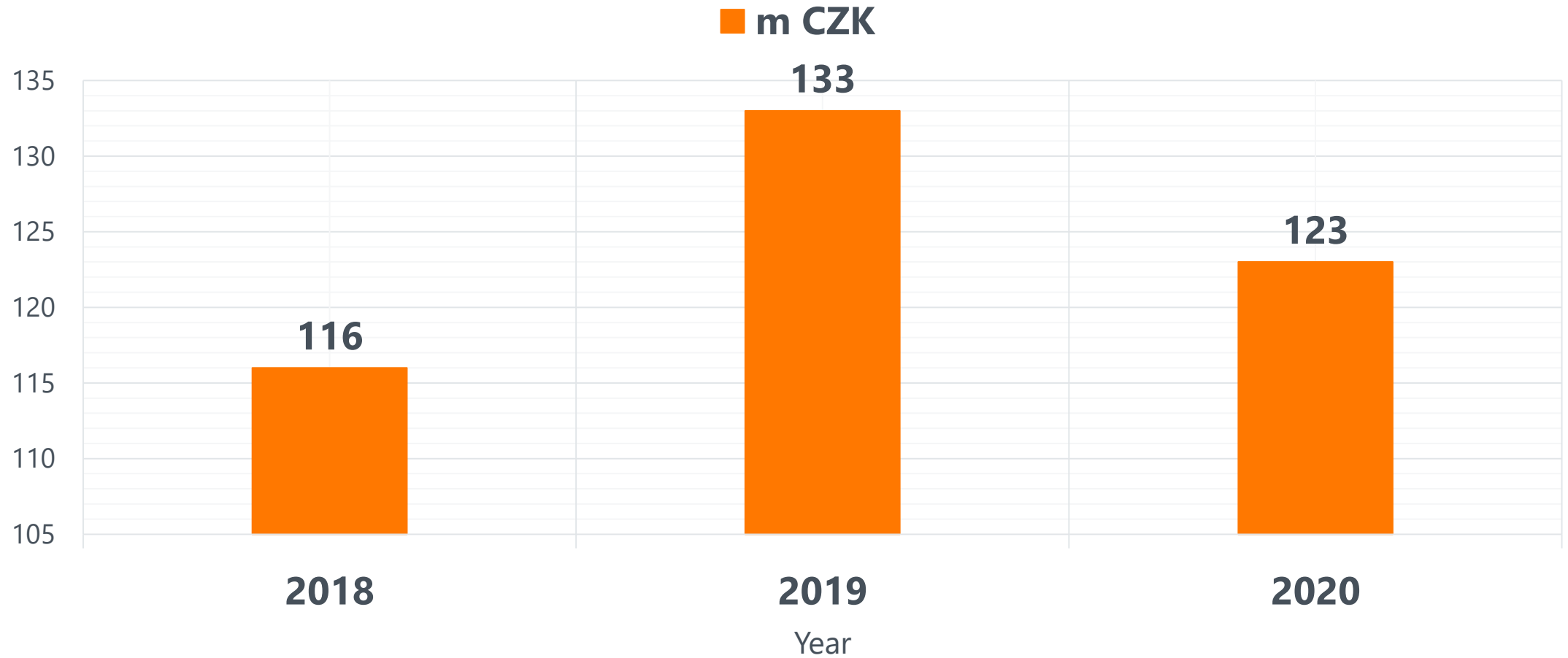
FUNDING

Total costs ~123 m CZK (2020)





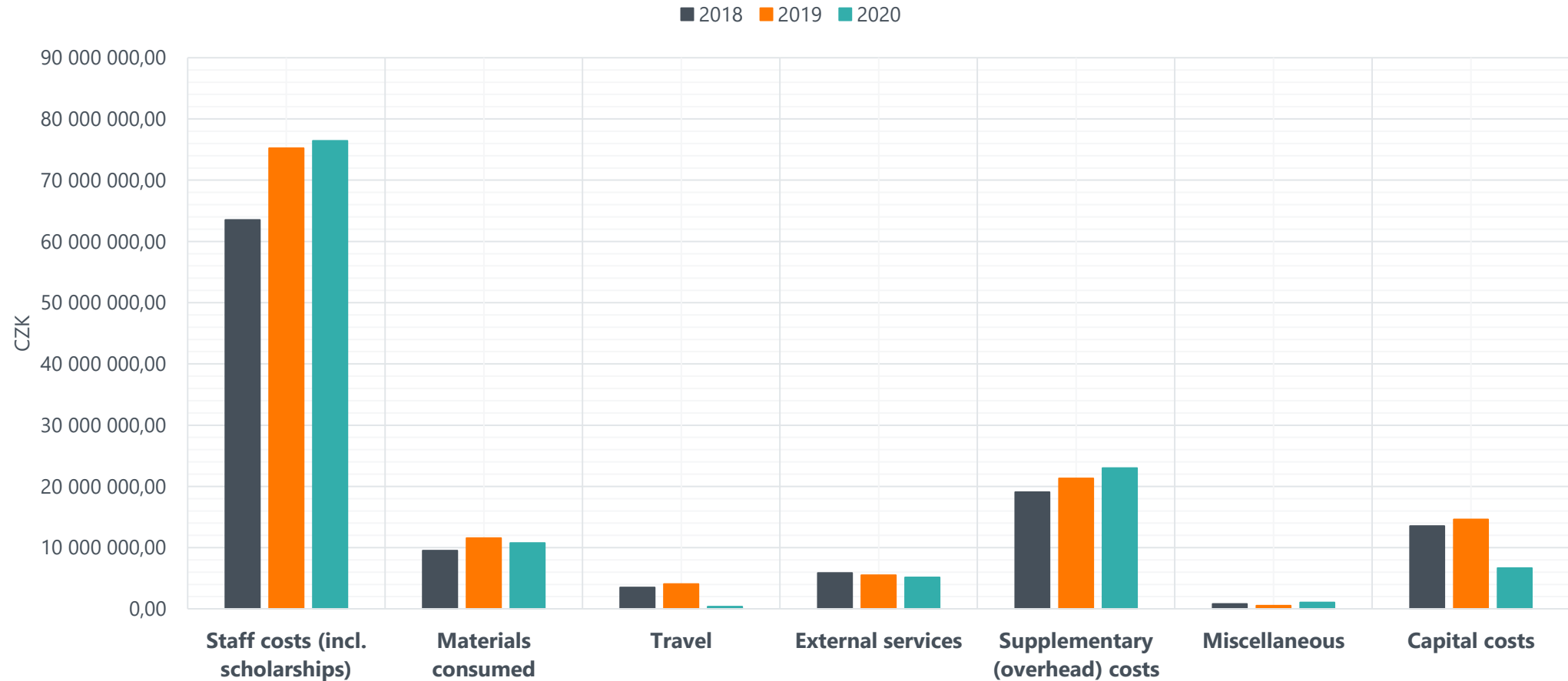
TOTAL COSTS 2018 – 2020





TOTAL COSTS 2018-2020

CPS spending per cost type in 2018–2020



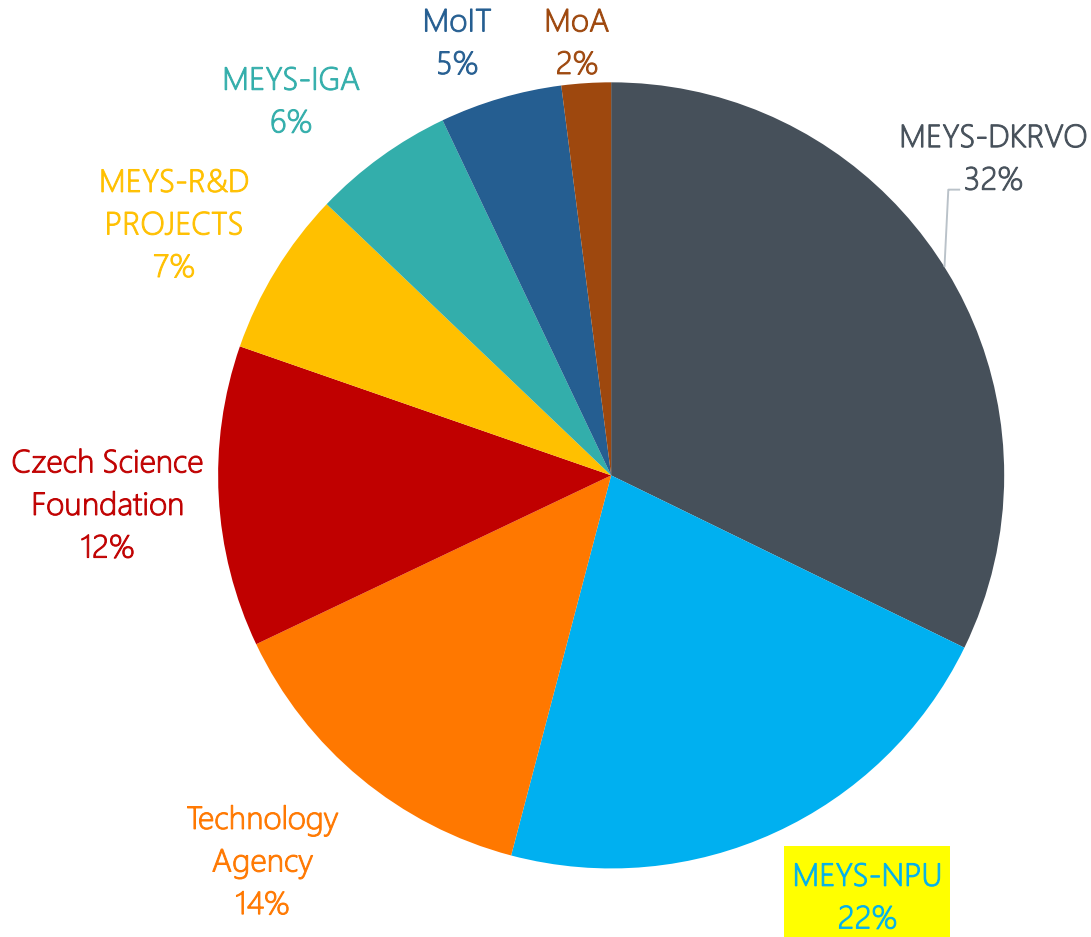
RESEARCH & DEVELOPMENT



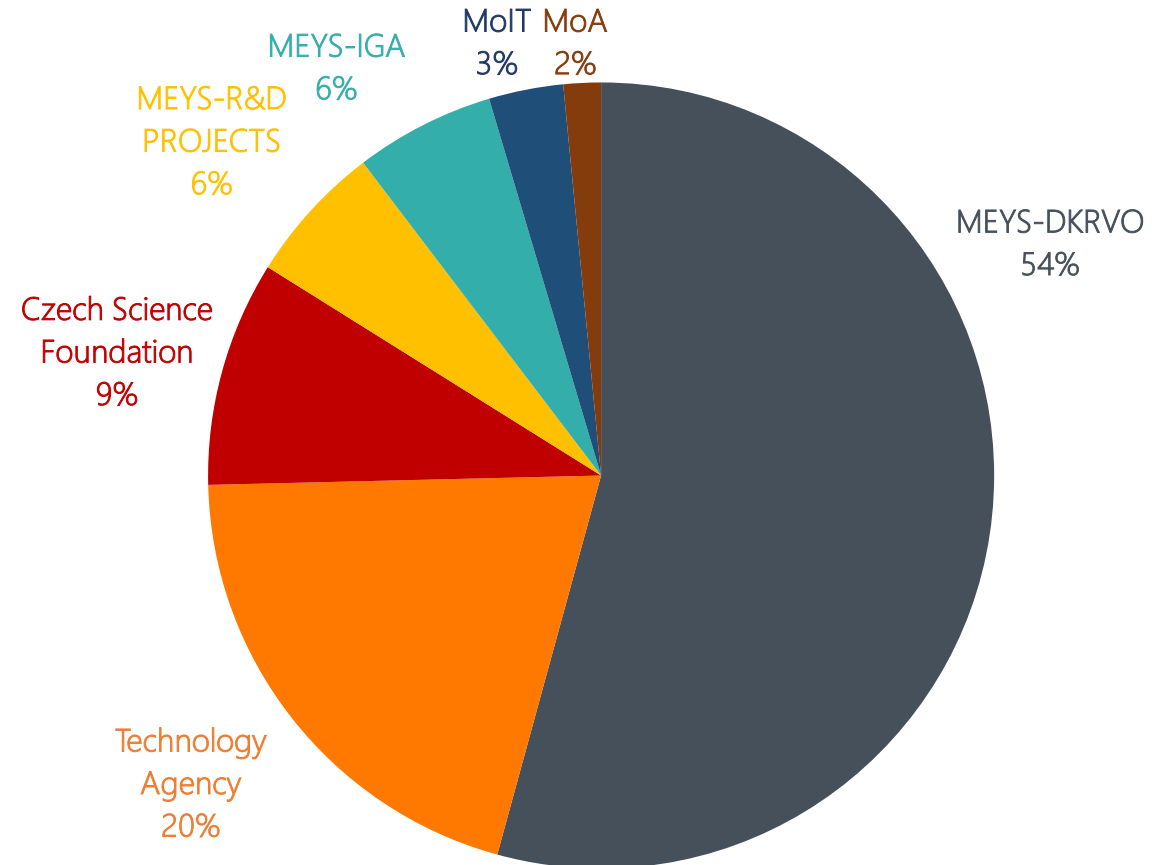
R&D PROJECTS IN 2020-2021*

FUNDS ALLOCATED

2020



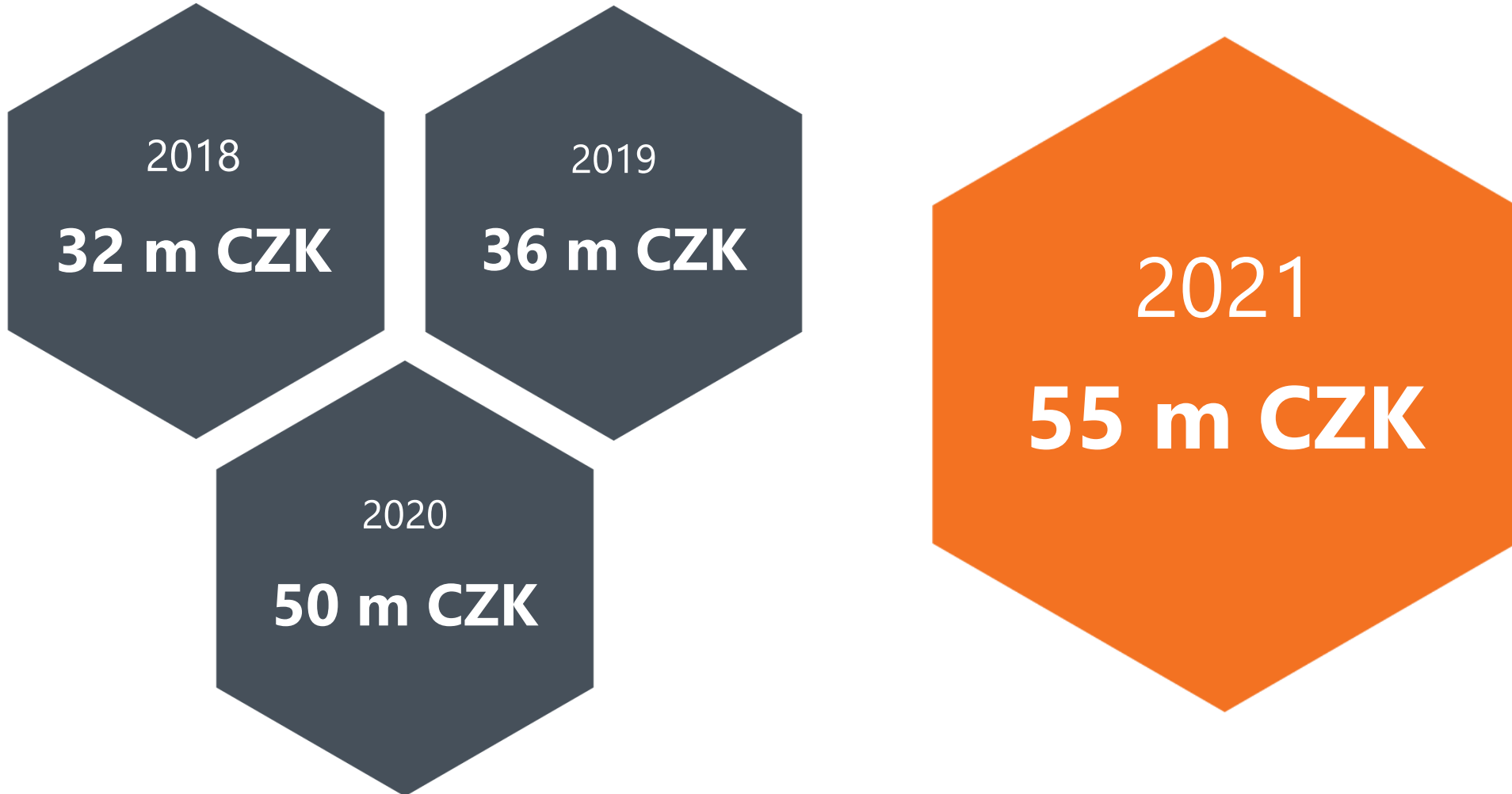
2021



*OP RDE projects are not included.
Internal development project and IGA projects are included.



FUNDS ALLOCATED FOR LONG-TERM DEVELOPMENT (DKRVO)





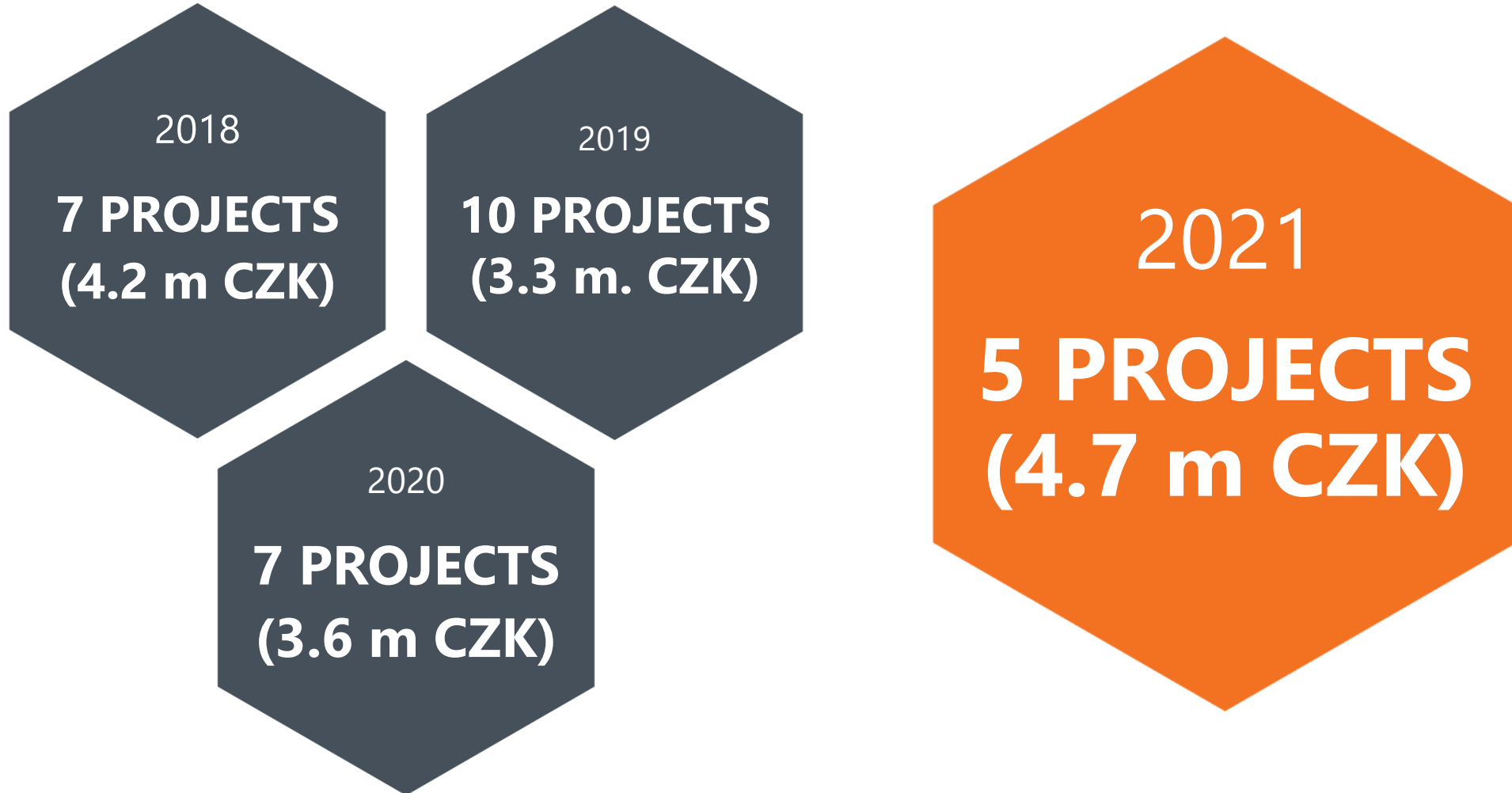
INTERNAL DEVELOPMENT PROJECTS (DKRVO)

Identification code	Title	Chief researcher	Funds allocated in 2020 (CZK)	Funds allocated in 2021 (CZK)
RP/CPS/2020/001	Smart scaffolds	Prof. Humpolíček	1,151,710	2,334,000
RP/CPS/2020/002	Environmental materials and technologies for safe and sustainable society	Prof. Sedlařík	2,371,353	6,792,000
RP/CPS/2020/003	Progressive processing technologies of polymeric materials and filled polymer systems	Assoc. prof. Sedláček	4,340,590	8,688,000
RP/CPS/2020/004	Experimental approach to the description of dissipation energy in the vicinity of the crack front or rubber during its loading	Assoc. prof. Stoček	2,617,554	5,760,000
RP/CPS/2020/005	Energy and composite materials and devices	Prof. Sába	3,841,291	7,800,000
RP/CPS/2020/006	Smart nanomaterials: from basics to application	Assoc. prof. Kuřitka	5,737,581	13,080,000

Total **20,060,079** **44,454,000**



INTERNAL GRANT AGENCY PROJECTS FUNDS ALLOCATED



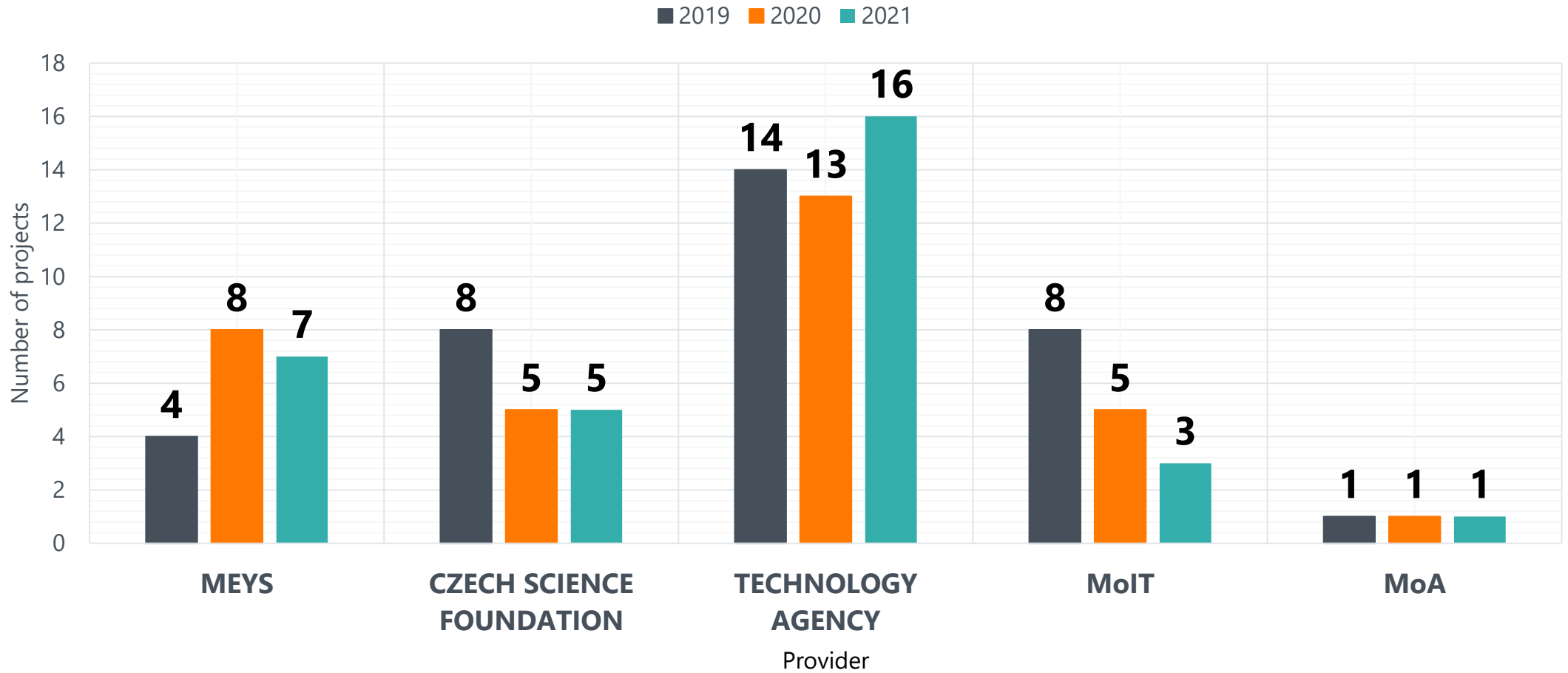


INTERNAL GRANT AGENCY PROJECTS IN 2021

Identification code	Project name	Chief researcher	Funds allocated
IGA/CPS/2021/001	Biocompatibility of materials	Ing. Káčerová (Prof. Humpolíček)	1,424,000
IGA/CPS/2021/002	Preparation and characterisation of nanocomposite systems	Ing. Muchová (Assoc. Prof. Kuřitka)	1,898,000
IGA/CPS/2021/003	Piezoresistance of advance materials	Ing. Ronzová (Assoc. Prof. Sedlačík)	616,000
IGA/CPS/2021/004	Preparation and characterisation of smart systems based on thermoplastic elastomers and magnetic particles prepared using 3D printing	Ing. Gorgol (Dr. Mrlík)	202,000
IGA/CPS/2021/006	Producing a database of values of initiation energy, T ₀ , based on the variation of primary rubber mixture ingredients	Ing. Machů (Assoc. Prof. Stoček)	172,000



NUMBER OF EXTERNAL R&D PROJECTS*



*OP RDE, IGA and internal development projects are not included.



MEYS R&D PROJECTS IN 2021

	Identification code	Title	Chief researcher	Funds allocated in 2021 (CZK)
1	8JPL19031	Development of novel additives for thermoplastic processing of biodegradable polymers	Prof. Sedlařík	80,000
2	LTAB19019	Preparation of nano- and micro-structured materials using self-organized protein fibrillar systems	Dr. Minařík	390,000
3	LTAUSA19066	A study of polymeric memristors based on methacrylate polymers with pendant carbazole moieties	Assoc. Prof. Vilčáková	950,000
4	8J20PL026	Biodegradable polymer nanocomposite systems with improved thermal and mechanical properties	Dr. Pummerová	60,000
5	8X20041	Design and preparation of multifunctional magnetic nanoparticles for cancer cells detection	Assoc. Prof. Vilčáková	148,000
6	LTT20005	Cooperation with EASE on the development of a hybrid supercapacitor	Prof. Sába	1,766,000
7	LTT20010	Surface functionalized glass: Concept of heterostructured nanoparticles inspired by arteficial photosynthesis	Dr. Machovský	1,610,000



CZECH SCIENCE FOUNDATION PROJECTS IN 2021

	Identification code	Title	Chief researcher	Funds allocated in 2021 (CZK)
1	19-16861S	Interaction of stem cell biomaterials under simulated <i>in vivo</i> conditions	Prof. Humpolíček	1,526,000
2	19-23513S	Towards novel electroluminescent materials: Borane cluster compounds in thin polymer films within an electric field	Assoc. Prof. Kuřitka	1,762,000
3	19-17457S	Manufacturing and analysis of flexible piezoelectric layers for smart engineering	Dr. Mrlík	952,000
4	19-23647S	Investigation of correlation between cation distribution, particle size and physical properties of intelligent spinel ferrite nanomaterials	Dr. Yadav	1,614,000
5	20-28732S	Colloidal systems for topical formulations. Pickering emulsions and polymer based colloids	Prof. Humpolíček	1,742,000



TECHNOLOGY AGENCY PROJECTS IN 2021

	Identification code	Title	Chief researcher	Funds allocated in 2021 (CZK)
1	TH03020117	Conductive materials and their application for antistatic and dissipative treatment of the paper and polymeric products	Prof. Sedlařík	630,000
2	TH04020466	Longfiber composites for serial production	Assoc. Prof. Sedláček	596,000
3	FW01010588	Filters for removal of biologically active molecules from the drinking water	Prof. Sedlařík	1,552,500
4	FW01010620	Research and development of materials and technology of small batch production of structural and sealing elements	Dr. Machovský	1,238,625
5	FW01010327	Advanced polymer and composite materials for additive manufacturing	Assoc. Prof. Vilčáková	984,375
6	FW03010465	Technologic production waste as an innovative source of material in manufacturing non-woven fabrics	Assoc. Prof. Sedláček	2,925,000
7	FW03010006	Permanent protection of touch screens preventing deposition of organic pollutants on the surface of the screen	Dr. Pummerová	1,170,000
8	TK03030157	Next generation all-solid-state Li-ion batteries	Prof. Sába	3,886,767



TECHNOLOGY AGENCY PROJECTS IN 2021

	Identification code	Title	Chief researcher	Funds allocated in 2021 (CZK)
9	TH71020005	Bioactive injectable hydrogels for soft tissue regeneration after reconstructive maxillofacial surgeries	Assoc. Prof. N. Saha	293,358
10	TH71020006	Li-ion battery and supercapacitor hybrid device	Prof. Saha	417,081
11	TP01010006	Innovative design of micro-fibre optic cable protectors	Prof. Slobodian	523,125
12	TP01010006	The technology of processing plastic recyclates with mineral fillers for composites preparation	Ing. Císař	850,000
13	TP01010006	Novel biodegradable composition based on a degradable polymer and a material of natural origin	Dr. Pummerová	850,000
14	TP01010006	Recycling biologically degradable waste through processing for grower applications	Ing. Válková	296,250
15	TP01010006	Validation of a concept of testing equipment for accelerated analysis of rubber aging description	Assoc. Prof. Stoček	367,240
16	TJ02000269	Nano-structured filtration materials for removal of arsenic from water	Dr. Domincová	104,000



MINISTRY OF INDUSTRY AND TRADE

PROJECTS IN 2021

	Identification code	Title	Chief researcher	Funds allocated in 2021 (CZK)
1	FV30048	New additives for multifunctional modification of polymeric surfaces	Prof. Sedlařík	1,189,400
2	FV40377	Research and development of a biocompatible material for controlled drug release and transport into the cornea	Dr. P. Urbánek	754,400
3	CZ.01.1.02/0.0/0.0/20_321/0024533	Design lamp with potted LEDs and a homogenous radiating surface	Prof. Sába	563,470



MINISTRY OF AGRICULTURE PROJECTS IN 2021

	Identification code	Title	Chief researcher	Funds allocated in 2021 (CZK)
1	QK1910392	Environmentally friendly soil conservation materials for the crop production intensification based on renewable resource	Prof. Sedlařík	1,261,000

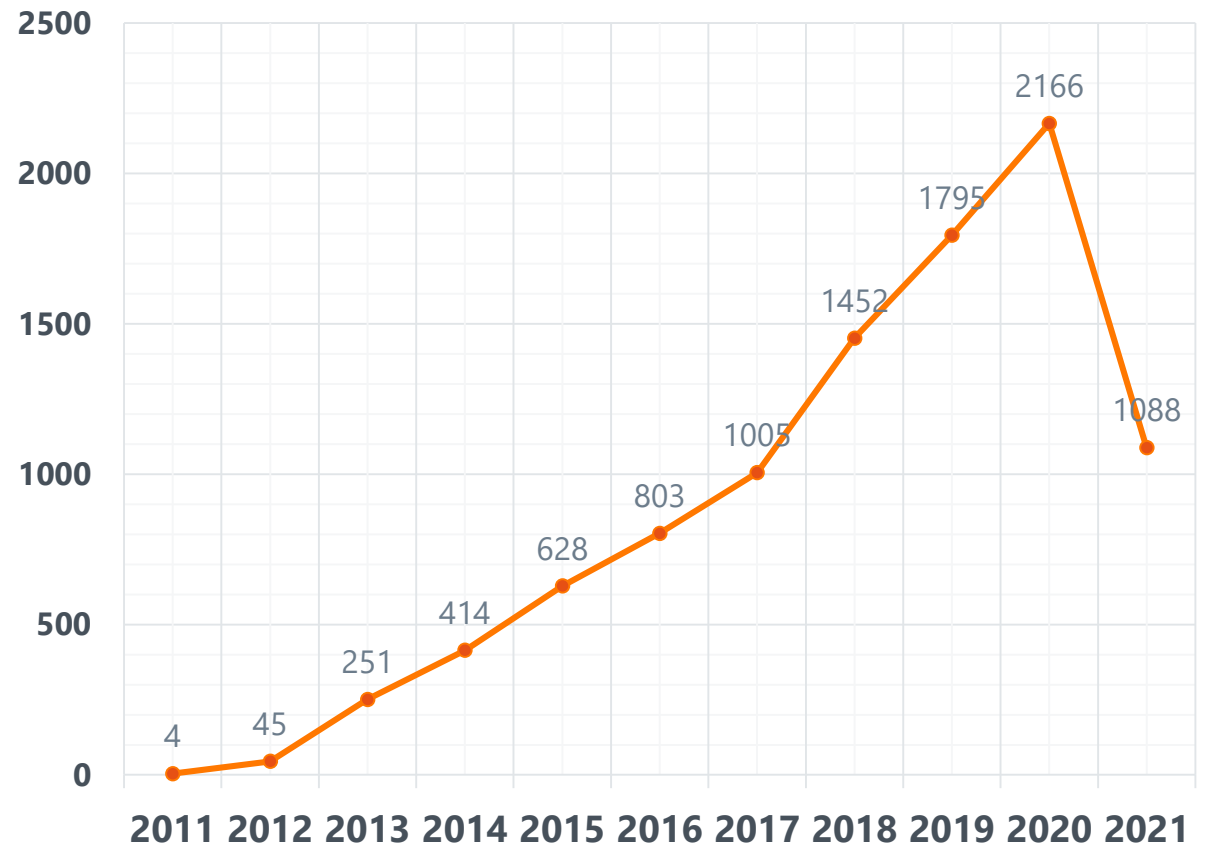
PUBLICATION OUTPUTS IN WoS

Web of Science | from 2011 to 31 May 2021

Citations per year

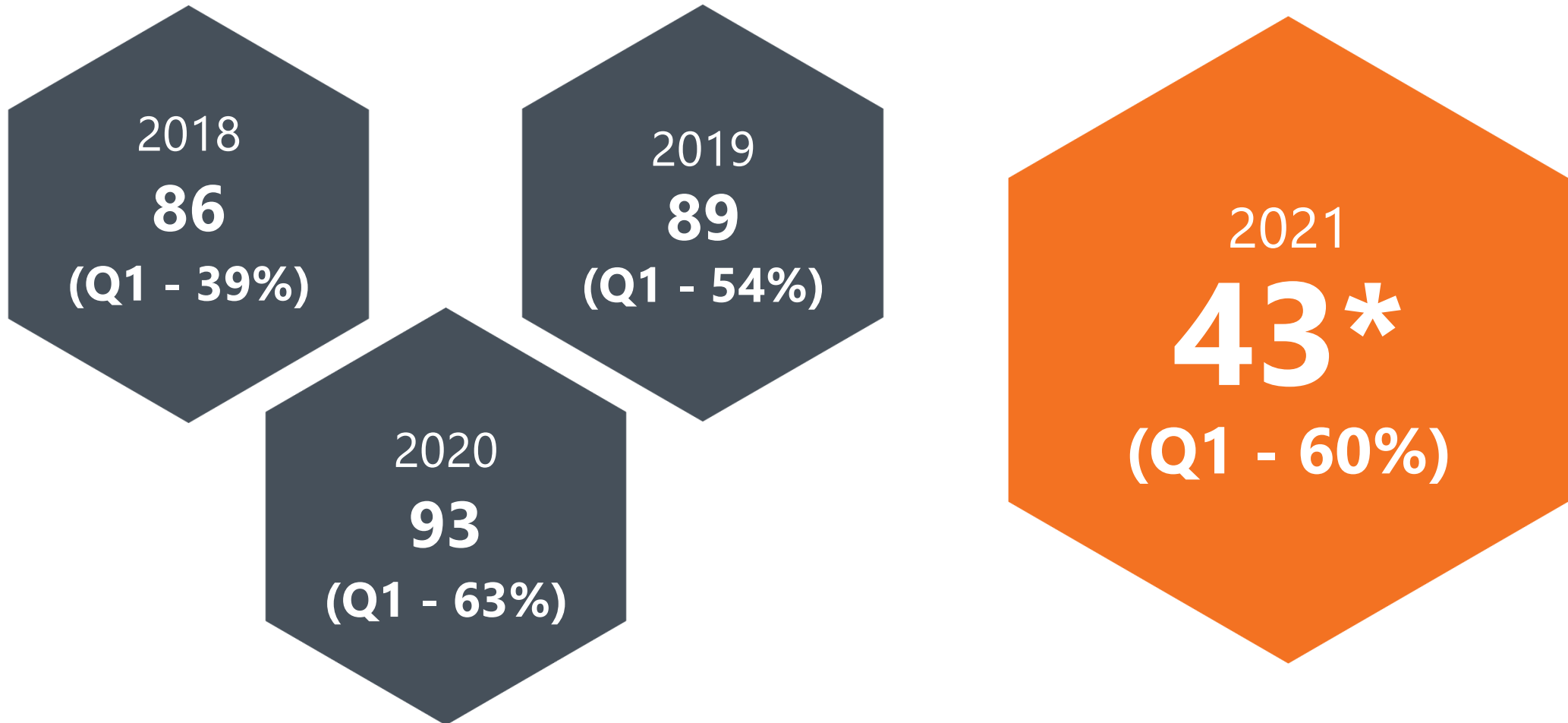
Selected document types	Number of documents
Article*	750
Proceedings paper*	180
Review	13
Book chapter	5

*Some of the outputs are both, articles and conference papers.



NUMBER OF ARTICLES IN WoS

Articles in Journals with Impact Factor



*Status as per 27 May 2021.

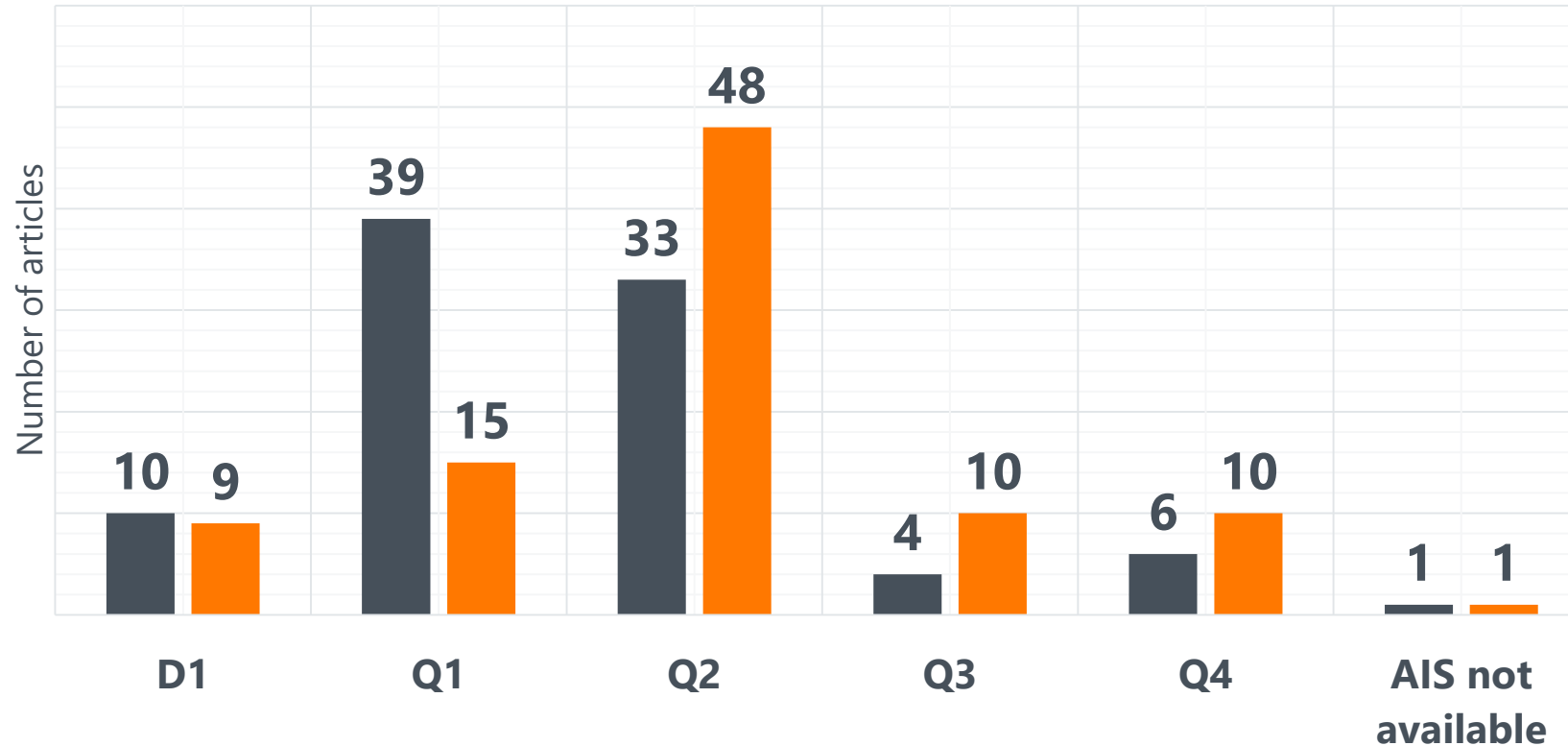


QUALITY OF PUBLISHED ARTICLES IN 2020

Impact Factor (WoS) vs Article Influence Score (FORD)

93 articles

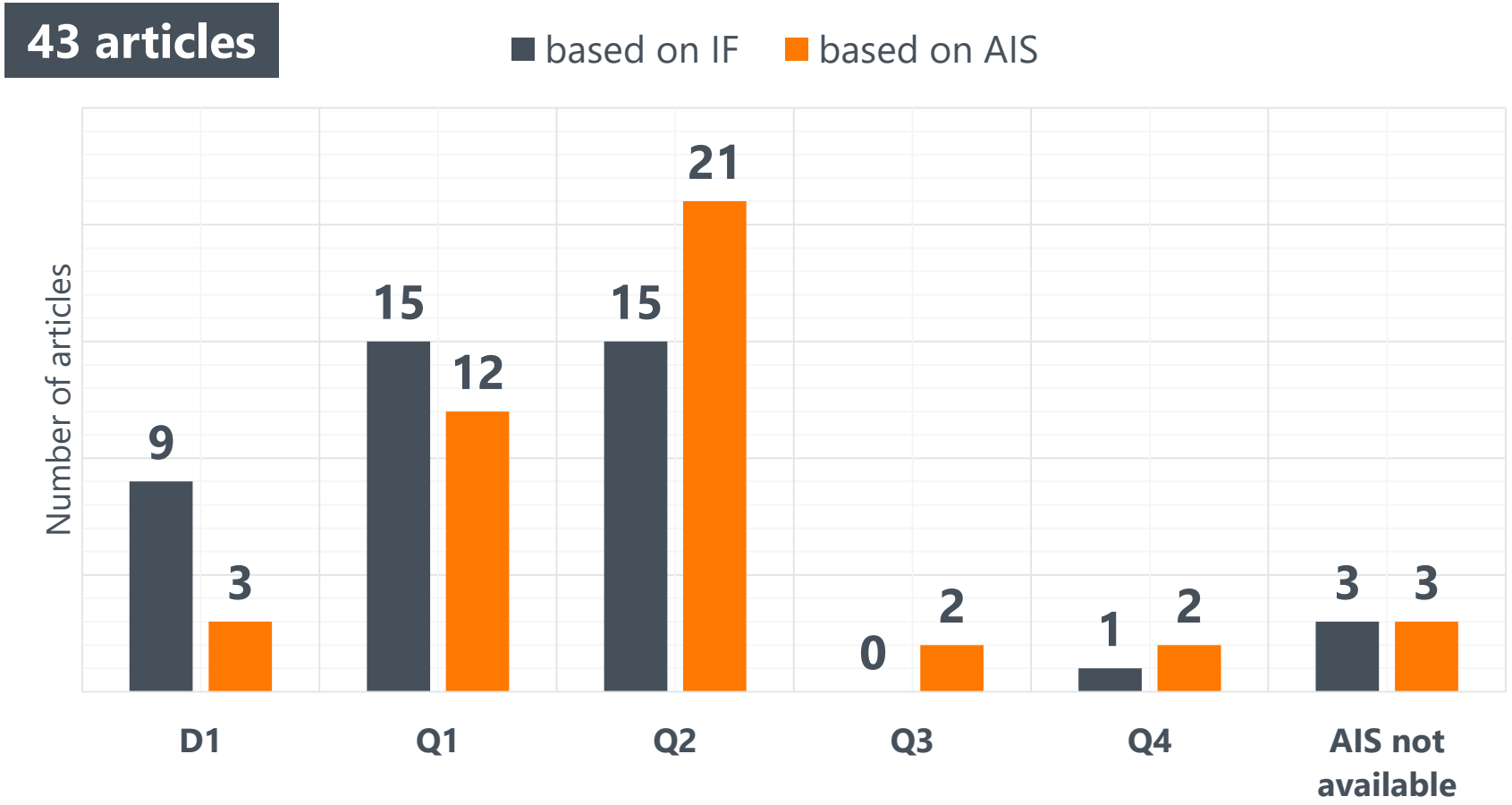
■ based on IF ■ based on AIS





QUALITY OF PUBLISHED ARTICLES IN 2021

Impact Factor (WoS) vs Article Influence Score (FORD)



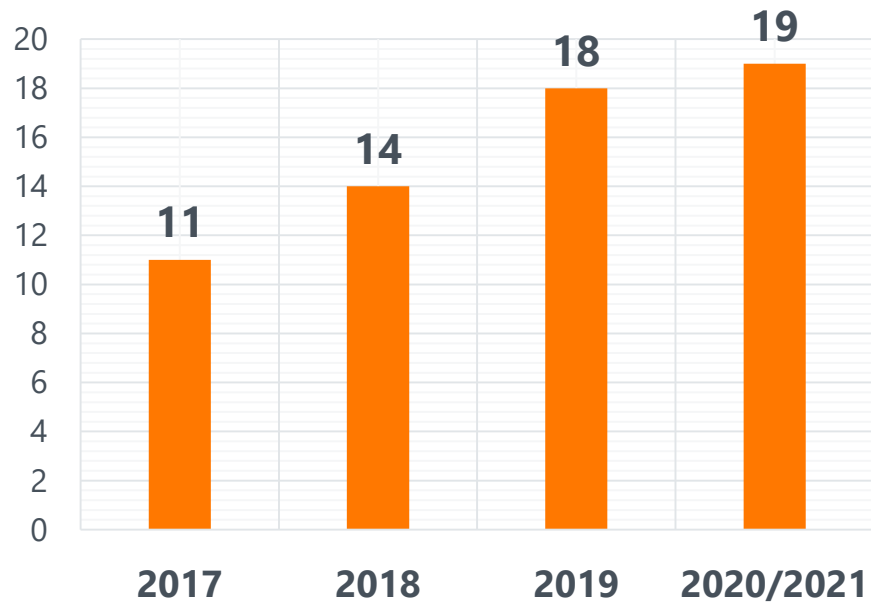
TEACHING ACTIVITY



PHD STUDY PROGRAMMES

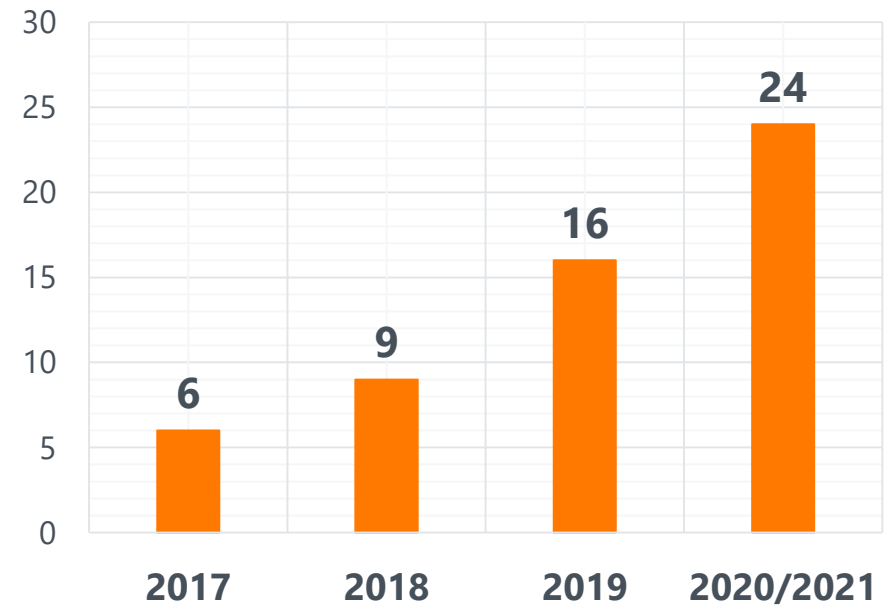
Biomaterials and Biocomposite

Number of students



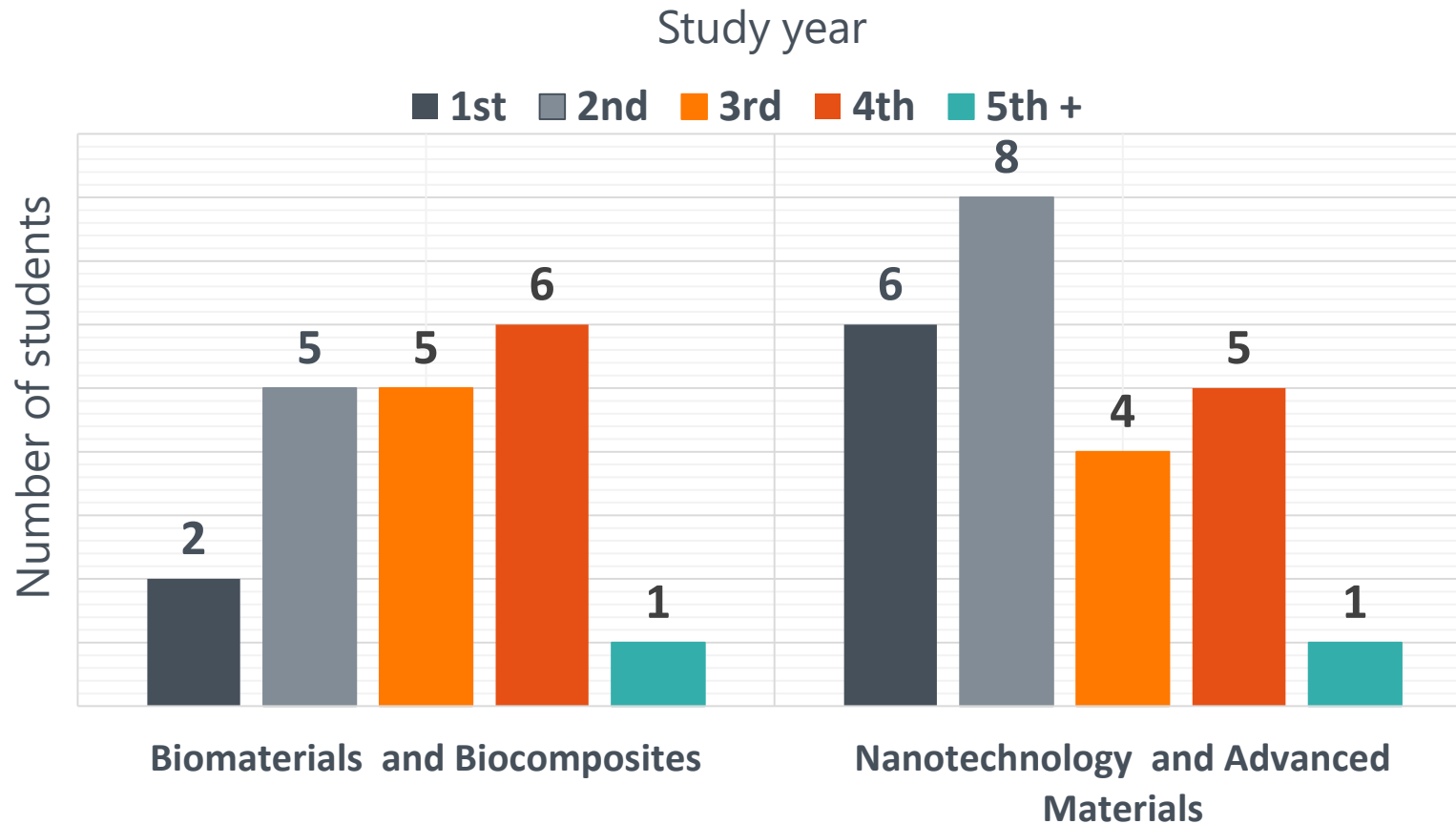
Nanotechnology and Advanced Materials

Number of students





NUMBER OF DOCTORAL STUDENTS IN 2021

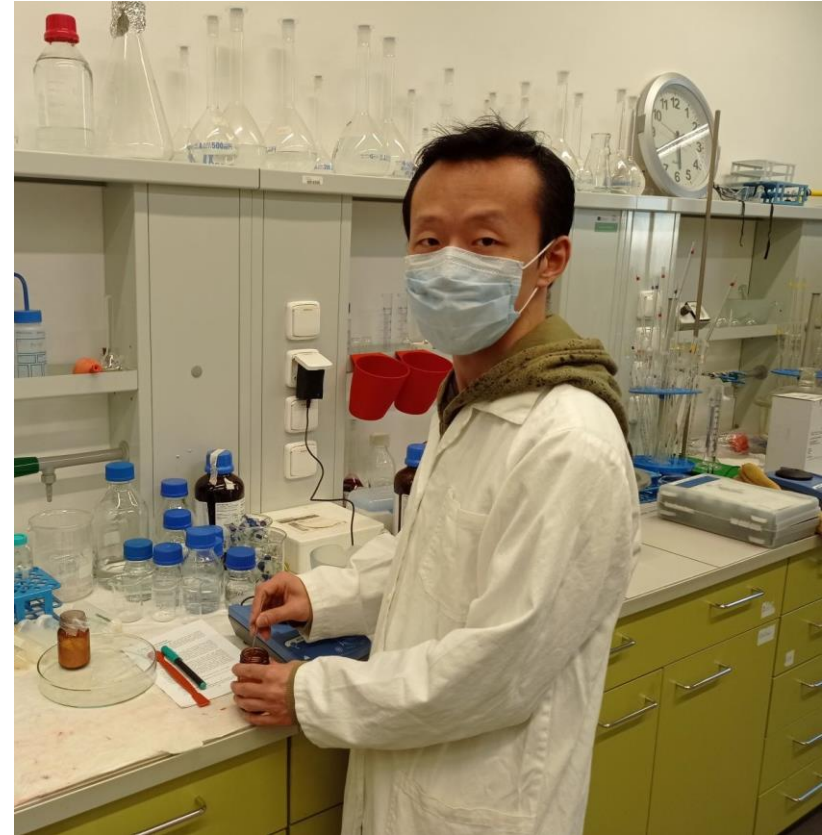


As at 31 May 2021, three more students were admitted – two of them conditionally – to study Biomaterials and Biocomposites.

Two more applications have been registered for the same course.

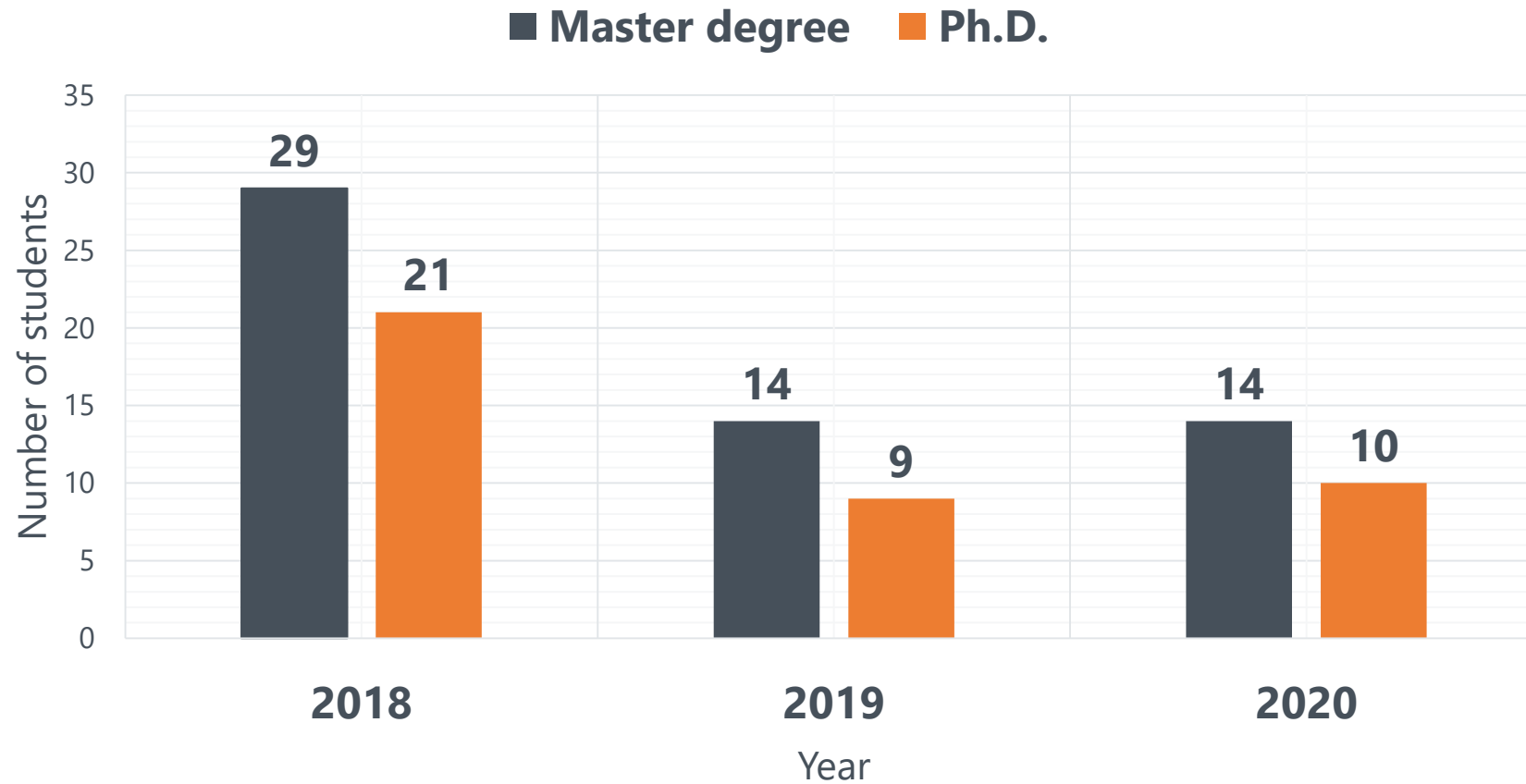
PHD GRADUATES

- ◆ **Dr. Haijun Xiao graduated in November 2020 (Biomaterials and Biocomposites) as the very first student as part of CPS-managed doctoral programmes.**
- ◆ **More graduation exams to take place in June 2021.**





STUDENTS FROM OTHER FACULTIES AT CPS



CONTRACTED RESEARCH



CONTRACT RESEARCH



THIRD ROLE

OUR RESPONSE TO COVID-19

- ◆ **Over 46,000 litres of Anti-COVID, a disinfection agent, produced by CPS.**
- ◆ **A nanomaterial capable of filtering coronavirus (developed by the CPS along with SPUR).**
- ◆ **Development of a methodology for testing the bacterial filtration efficiency of disposable surgical face masks (in cooperation with ITC).**





CPS' THIRD ROLE

- ◆ **Dissemination of news and results related to CPS' research activity in local and national media (Czech TV, Czech Radio, Czech News Agency, Seznam Zprávy, Hospodářské noviny, MF DNES, Blesk, Deník, MF DNES, Technický týdeník, Novinky.cz, Vědavyzkum.cz, Aktuálně.cz, Idnes.cz).**
- ◆ **Participation in trade fairs and at strategic events such as Live Science.**



UNI DIRECTOR'S GUIDELINES



UNI DIRECTOR'S GUIDELINE NO. 01/2021

Equal opportunities for men and women

Applicable as of: 01-06-2021

Links:

<https://uni.utb.cz/mdocs-posts/dg-01-2021-equal-opportunities-for-men-and-women/>

<https://uni.utb.cz/mdocs-posts/sr-01-2021-rovne-prilezitosti-muzu-a-zen/>





UNI DIRECTOR'S GUIDELINE NO. 05/2020

Research career development at UNI research centres

Applicable as of: 01-09-2020

Links:

<https://uni.utb.cz/mdocs-posts/dg-05-2020-researcher-career-development-at-uni-research-centres/>

<https://uni.utb.cz/mdocs-posts/sr05-2020-rozvoj-kariery-vedeckeho-pracovnika-na-vyzkumnych-centrech-uni/>



OTHER IMPORTANT INFORMATION



VACATION

Please note that it is necessary to use the vacation **from 2020 by 30 June 2021.**

We also point out that it is necessary to **use at least half of the holiday for the year 2021 during the summer holidays, ie by 31 August 2021.**

At the same time, we ask guarantors to send vacation plans with regard to the operation of the Center.



ESCAPE EXITS

IN CASE OF FIRE ALARM, PLEASE USE A STAIRCASE FROM THE SIDE OF THE BUILDING FOR EVACUATION.

THE MAIN STAIRCASE IS NOT AN ESCAPE EXIT.





THANK YOU!

Vladimír Sedlařík
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