# Annual Report 2021

Technical University of Liberec
Approved by AS FT TUL 24.6. 2022

## CONTENTS

# 1. Basic information about the faculty

Technical University of Liberec, Faculty of Textile Engineering (FT TUL, FT) *www.ft.tul.cz*
Studentská 2, 461 17 Liberec *https://cs-cz.facebook.com/fakultatextilni*

The main activities of the Faculty of Textile Engineering of the Technical University of Liberec in 2021, especially in the field of pedagogical and creative activities, were implemented in accordance with the Strategic Plan of the Faculty of Textile Engineering of the Technical University of Liberec (which is formulated in the document Strategic Plan of Educational and Creative Activities of the Faculty of Textile Engineering of the Technical University of Liberec for the years 2021-2030) and the Plan of Implementation of the Strategic Plan of Educational and Creative Activities of the Faculty of Textile Engineering of the Technical University for the year 2021

## 1.1 Organisational scheme of the faculty

The departments that are in the faculty are listed in the following table.

*Table 1. Departments at FT*

| Locations | Abbreviation. | Location |
|---|---|---|
| **Department of Design** | KDE | Liberec, Jablonec nad Nisou |
| **Department of Textile Evaluation** | KHT | Liberec |
| **Department of Materials Engineering** | KMI | Liberec |
| **Department of Nonwovens and Nanofibrous Materials** | KNT | Liberec |
| **Department of Clothing** | KOD | Liberec |
| **Department of Technology and Structures** | KTT | Liberec |

The structure of the Faculty as of 31 December 2021 is shown in the following diagram.

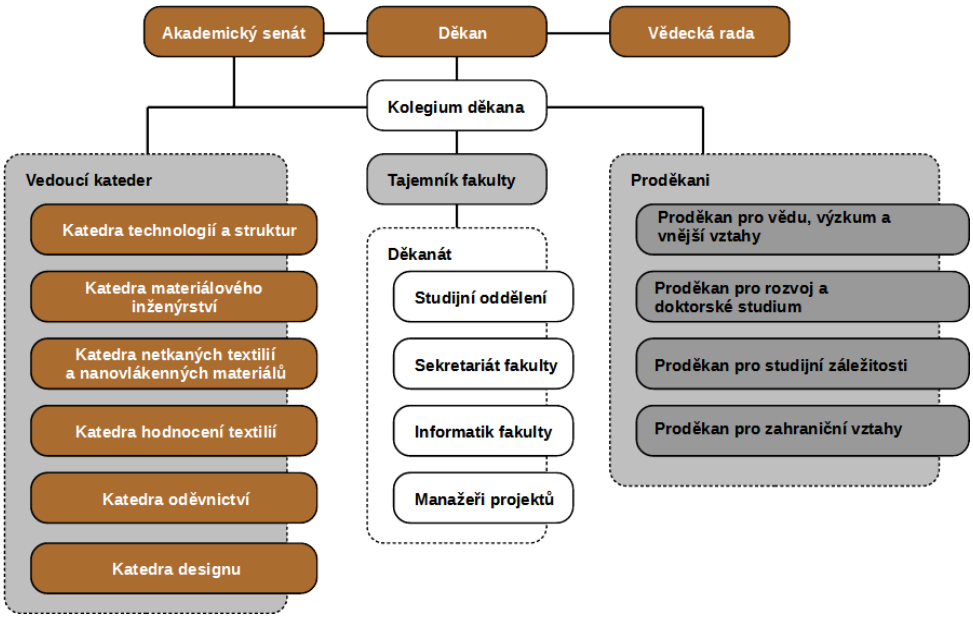


*Fig. 1.: Organizational chart of the Faculty of Arts of TUL as of 31 December*

## 1.2 Composition of the faculty bodies

This chapter lists the personnel composition of the faculty management, the Academic Senate, the Scientific Council and the Disciplinary Council.

***Faculty Management***

| | | |
|---|---|---|
| **Dean:** | doc. Ing. Vladimír Bajzík, Ph.D. | |
| **Vice Deans:** | Ing. Jana Drašarová, Ph.D. | for Science, Research and External Relations |
| | Ing. Jindra Porkertová | for Student Affairs |
| | prof. Ing. Michal Vik, Ph.D. | for Foreign Relations |
| | Ing. Iva Mertová, Ph.D. | for Development and Doctoral Studies |
| **Head of Dean's Office:** | Ing. Daniela Brzezinová | |

***Academic Senate***

| | |
|---|---|
| **The Chair:** | Ing. Jiří Chaloupek, Ph.D. (KNT) |
| **1st Vice-Chairman:** | Ing. Alžbeta Samková (KMI) |
| **2nd Vice-Chairman** | Ing. Vlastimila Bergmanová (KDE) |
| **Chamber staff:** | Ing. Miroslava Pechočiaková, Ph.D. (KMI) |
| | prof. Ing. Jakub Wiener, Ph.D. (KMI) |
| | Bc. Ondřej Ludín (KDE) |
| | Ing. Petra Komárková, Ph.D. (KOD) |
| **Chamber of Students:** | Ing. Radek Jirkovec (KNT) until 26.10.2021 |
| | Ing. Michal Martinka (KOD) from 27.10.2021 |
| | Ing. Ivana Céeová (KOD) |
| **Head of Dean's Office:** | Ing. Daniela Brzezinová (DFT - not a member of the Senate) |

***Members of the Academic Senate of TUL for FT TUL***

| | |
|---|---|
| **Chamber staff:** | doc. Ing. Brigita Kolčavová Sirková, Ph.D. until 10.11.2021, |
| | doc. Ing. Pavel Pokorný, Ph.D., from 27.11.2021 |
| | Ing. Ondřej Novák, Ph.D. |
| **Chamber of Students:** | Ing. Markéta Klíčová |

***Scientific Council of the Faculty of Textile Engineering, TUL***

| | | |
|---|---|---|
| **Dean of FT TUL:** | doc. Ing. Vladimír Bajzík, Ph.D. | FT TUL |
| **Internal members:** | prof. Ing. Luboš Hes, DrSc. | FT TUL |
| | prof. RNDr. Oldřich Jirsák, CSc. | FT TUL |
| | Prof. Dr. Ing. Zdeněk Kůs | FT TUL |
| | Doc. Ing. Brigita Kolčavová Sirková, Ph.D. | FT TUL from 1.7.2021 |
| | doc. Svatoslav Krotký, ac.mal. | FT TUL |
| | prof. Ing. Jiří Militký, CSc. | FT TUL |
| | prof. Ing. Bohuslav Neckář, DrSc. | FT TUL |
| | doc. Ing. Maroš Tunák, Ph.D. | FT TUL |
| | Prof. Ing. Michal Vik, Ph.D. | FT TUL from 1.7.2021 |

| | | |
|---|---|---|
| | prof. Ing. Jakub Wiener, Ph.D. | FT TUL |
| **Faculty of TUL:** | doc. RNDr. Miroslav Brzezina, CSc. | FP TUL |
| | prof. Ing. Jiří Kraft, CSc. | EF TUL |
| | prof. Ing. Zdeněk Plíva, Ph.D. | FM TUL |
| | prof. Ing. Tomáš Vít, Ph.D. | FS TUL |
| **External members:** | prof. RNDr. Jaromír Antoch, CSc. | MFF UK Prague |
| | prof. RNDr. Vladimír Čech, Ph.D. | FCH Brno University of Technology |
| | prof. Ing. Roman Čermák, Ph.D. | FT UTB Zlín |
| | prof. RNDr. Gejza Dohnal, CSc. | FS CTU Prague |
| | Ing. Libuše Fouňová | CLUTEX, o.s. Liberec |
| | doc. Ing. Zdeněk Horák, Ph.D. | VŠP Jihlava |
| | prof. Ing. Radim Hrdina, CSc. | FCHT University of Pardubice |
| | doc. Ing. Tomáš Novák, Ph.D. | FEI VŠB-TU Ostrava |
| | doc. PhDr. Filip Suchomel, Ph.D. | AMU Prague |
| | prof. Ing. Michal Šejnoha, Ph.D., DSc. | FSv CTU Prague |

On 1.9.2021 doc. Filip Suchomel, PhDr., Ph.D. became an employee of the Faculty of Science of the TUL and thus an internal member of the Scientific Council of the Faculty of Science of the TUL.

***Branch Councils for Doctoral Study Programmes***

*Board of DSP Textile Engineering (P0723D270002), Textile Engineering (P0723D270003)*

| | | |
|---|---|---|
| **The Chair:** | prof. Ing. Jiří Militký, CSc. | FT TUL |
| **Members:** | Prof. RNDr. Jaromír Antoch, CSc | IFF UK |
| | doc. Ing. Lukáš Čapek, Ph.D. | FT TUL |
| | prof. RNDr. Oldřich Jirsák, CSc. | FT TUL |
| | Prof. Dr. Ing. Zdeněk Kůs | FT TUL |
| | prof. Ing. Michal Šejnoha, Ph.D., DSc. | FSv CTU |
| | doc. Ing. Maroš Tunák, Ph.D. | FT TUL |
| | prof. Ing. Jakub Wiener, Ph.D. | FT TUL |

***DSP Textile Engineering (P3106) in ČJ and AJ***

| | | |
|---|---|---|
| **The Chair:** | prof. Ing. Jakub Wiener, Ph.D. | FT TUL |
| **Members:** | prof. RNDr. Jaromír Antoch, CSc. | IFF UK |
| | doc. Ing. Lukáš Čapek, Ph.D. | FT TUL |
| | prof. RNDr. Oldřich Jirsák, CSc. | FT TUL |
| | Prof. Dr. Ing. Zdeněk Kůs | FT TUL |
| | prof. Ing. Jiří Militký, CSc. | FT TUL |
| | prof. Ing. Michal Šejnoha, Ph.D., DSc. | FSv CTU |
| | doc. Ing. Maroš Tunák, Ph.D. | FT TUL |

***DSP Industrial Engineering (P0723D270001)***

| | | |
|---|---|---|
| **The Chair:** | doc. Ing. Maroš Tunák, Ph.D. | FT TUL |
| **Members:** | doc. Ing. Vladimír Bajzík, Ph.D. | FT TUL |
| | doc. RNDr. Miroslav Brzezina, CSc. | FP TUL |
| | prof. RNDr. Gejza Dohnal, CSc. | FS CTU |

| | |
|---|---|
| prof. RNDr. Oldřich Jirsák, CSc. | FT TUL |
| Ing. Karel Kupka, Ph.D. | TriloByte, s.r.o. |
| prof. Ing. Jiří Militký, CSc. | FT TUL |
| prof. RNDr. Jan Picek, CSc. | FP TUL |
| prof. Ing. Michal Vik, Ph.D. | FT TUL |

***College of the Dean***

| | | |
|---|---|---|
| **Dean:** | doc. Ing. Vladimír Bajzík, Ph.D. | |
| **Vice Deans:** | Ing. Jana Drašarová, Ph.D. | |
| | prof. Ing. Michal Vik, Ph.D. | |
| | Ing. Iva Mertová, Ph.D. | |
| | Ing. Jindra Porkertová | |
| **Chairman of AS FT:** | Ing. Jiří Chaloupek, Ph.D. | |
| **Secrets:** | Ing. Daniela Brzezinová | |
| **Heads of Departments:** | Ing. Brigita Kolčavová Sirková, Ph.D. | KTT |
| | Ing. Jiří Chvojka, Ph.D. | CNT |
| | Prof. Dr. Ing. Zdeněk Kůs | CODE |
| | Ing. Blanka Tomková, Ph.D. | KMI |
| | Ing. Renata Štorová, CSc. | WHERE |
| | Ing. Pavla Těšinová, Ph.D.until 30.6.2021 | KHT |
| | Ing. Roman Knížek, Ph.D. from 1.7.2021 | KHT |

***FT TUL representative in the Council of Universities***

The faculty representative in the RVŠ (Working Commission for Scientific Activities and Working Commission for External and Foreign Activities) in 2021 was prof. Ing. Michal Vik, Ph.D.

## 1.3 Change of regulations

***Internal regulations***

Rules of Procedure of the Academic Senate of TUL, effective from 9.2.2021
Rules of Procedure of the Scientific Council of TUL, effective from 9.2.2021

***Directive of the Dean***

1/2021 Recommended aspects of evaluation and criteria for habilitation proceedings and proceedings for appointment as professor at the Faculty of Textile Engineering of the Technical University of Liberec, effective from 3.3.2021

***Orders of the Dean***

1/2021 Modification of the conditions of the talent entrance examination for the study programme DRAFTING and evaluation criteria, effective from 28.1.2021

## 1.4 Activities of FT TUL in connection with the impact of the pandemic

*Like society as a whole, the activities carried out at TUL FT in 2021 were significantly affected by the impact of the pandemic. The TUL FT has acted in accordance with the government measures coordinated by TUL. For each chapter of this report, the activities of the FT in relation to the impact of the pandemic are highlighted (in italics).*

# 2. Educational activities

This chapter summarizes the main parameters related to the first role of the faculty as part of the university, namely educational activities.
These are mainly performance parameters related to the implementation of teaching:

- accredited study programmes
  - Students
  - Alumni
  - Candidates

and descriptive parameters indicating other educational activities:

- linking educational activities with creative activities
  - realization of final student theses
  - involvement of students in research projects of various external providers
  - Involvement of students in specific research projects in the form of Student Grant Competition (SGS)
  - organizing the Student Scientific and Professional Activity Competition (SVOČ)
  - Organizing the International Ph.D. Students Day Workshop
  - support for student participation in competitions and exhibitions
- linking educational activities with internationalisation
  - study programmes in a foreign language
  - lecture traineeships of foreign experts
  - participation of FT students in foreign internships, placements, conferences, summer schools
- linking educational activities with the third role of the faculty
  - cooperation with future employers
  - experts from the application sphere teaching in accredited study programmes
  - consultation and guidance of bachelor and master theses in cooperation with the corporate sector
  - professional lectures and seminars for students in cooperation with the corporate sector and graduates
  - excursions to companies
  - professional practice for students
  - motivational events for prospective students / cooperation with secondary schools.

## 2.1 Accredited study programmes

In 2019**, all submitted FT study programmes received NAU accreditation for a maximum period of ten years.** All study programmes are also accredited in English (with the exception of the DSP Industrial Engineering). In the academic year 2021/2022, all students will study exclusively according to the newly accredited study programmes. In 2021, accreditation was obtained for the follow-up Master's programme Design - Textiles, Clothing, Glass, Jewellery, also for a period of ten years. Students in this programme are now in their first year. A potential problem is students who have interrupted their studies (e.g. due to a recognised period of parenthood) in a degree programme on completion ("old accreditation"). These students are monitored and provided with ongoing information to optimise their progression through the programme in accordance with the

current regulations. They are informed in the interruption decision about the duration of the accreditation and the rules laid down in the Higher Education Act (§ 56, § 80).

*Table 2. Newly accredited study programmes*

| Stud code. program | Name of study programme (or specialisation) | | Stand. period | Form of study |
|---|---|---|---|---|
| **B0212A270001** | **Design** | Textile technology and patterning | 3 | P |
| | | Textile and clothing design | | |
| | | Glass and jewellery design | | |
| **B0212A270002** | **Design** | Textile Technology and Patterning | 3 | P-AJ |
| | | Design of Textiles and Clothing | | |
| | | Design of Glass and Jewelry | | |
| **B0414A270001** | **Textile marketing** | | 3 | P, K |
| **B0414A270002** | **Textile Marketing** | | 3 | P-AJ |
| **B0723A270001** | **Textile technology materials and nanomaterials** | Design and creation of textiles | 3 | P, K |
| | | Nonwovens and nanofibres | | |
| **B0723A270002** | **Textile Technologies, Materials and Nanomaterials** | Construction and Production of Textiles | 3 | P-AJ |
| | | Nonwovens and Nanofibers | | |
| **B0723A270003** | **Manufacture of clothing and technical clothing** | | 3 | P, K |
| **B0723A270004** | **Production of Clothing and Technical Products** | | 3 | P-AJ |
| **N0723A270001** | **Textile Engineering** | Textile technology and materials | 2 | P, K |
| | | Clothing technology and materials | | |
| | | Nonwovens and nanofibrous materials | | |
| **N0723A270002** | **Textile Engineering** | Textile Technology and Materials | 2 | P-AJ |
| | | Clothing Technology and Materials | | |
| | | Nonwovens and Nanofiber Materials | | |
| **N0212A310012** | **Design - textile, clothing, glass, jewellery** | | 2 | P |
| **N0723A270003** | **Industrial Engineering** | | 2 | P, K |
| **N0723A270004** | **Industrial Engineering** | | 2 | P-AJ |
| **P0723D270001** | **Industrial Engineering** | | 4 | P, K |
| **P0723D270002** | **Textile Engineering** | | 4 | P, K |
| **P0723D270003** | **Textile Engineering** | | 4 | P, K-AJ |

*Table 3. Accredited study programmes for completion of existing students*

| Stud code. Program code | Name of study programme | KKOV | Name of field of study | Stand. period | Form of study |
|---|---|---|---|---|---|
| **B3107** | **Textiles** | 3107R006 | Textile and clothing design | 3 | P, A |
| | | 3107R007 | Textile marketing | 3 | P, K, A |
| | | 3106R016 | Textile technology, materials and nanomaterials | 3 | P, K, A |
| | | 3107R015 | Garment manufacturing and garment shop management | 3 | P, K, A |
| **M3106** | **Textile Engineering** | 3106T012 | Textile Engineering | 5 | P, A |
| **N3106** | **Textile Engineering** | 3106T017 | Clothing and textile technology | 2 | P, K, A |
| | | 3106T008 | Non-woven and nanofibrous materials | 2 | P, K, A |
| **N3957** | **Industrial Engineering** | 3911T023 | Quality control | 2 | P, K, A |
| | | 3901T073 | Product Engineering | 2 | P, K, A |
| **P3106** | **Textile Engineering** | 3106V015 | Textile Technology and Materials Engineering | 4 | P, K, A |

### 2.1.1 Students

An overview of the number of students as of 31 December 2021 in accredited study programmes is presented in the following table. This is the output from the central SIMS registry.

*Table 4: Students in accredited study programmes*

| Study programme | Students in the study programme | | | | | | | | Total students |
|---|---|---|---|---|---|---|---|---|---|
| | BSP | | MSP | | NMSP | | DSP | | |
| | P | K | P | K | P | K | P | K | |
| B3107 Textile | 36 | 20 | | | | | | | 56 |
| B0212A270001 Design | 118 | | | | | | | | 118 |
| B0212A270002 Design | 1 | | | | | | | | 1 |
| B0414A270001 Textile marketing | 98 | 53 | | | | | | | 151 |
| B0723A270001 Textile technology, materials and nanomaterials | 40 | 36 | | | | | | | 76 |
| B0723A270002 Textile Technologies, Materials and Nanomaterials | 1 | | | | | | | | 1 |
| B0723A270003 Manufacture of wearing apparel and technical clothing | 25 | 23 | | | | | | | 48 |
| B0723A270004 Manufacture of Clothing and Technical Products | 1 | | | | | | | | 1 |
| N0212A310012 Design - textile, clothing, glass, jewellery | | | | | 10 | | | | 10 |
| N3106 Textile engineering | | | | | 2 | 3 | | | 5 |
| N0723A270001 Textile engineering | | | | | 44 | 28 | | | 72 |
| N0723A270002 Textile Engineering | | | | | 21 | | | | 21 |
| N3957 Industrial engineering | | | | | 0 | 3 | | | 3 |
| N0723A270003 Industrial engineering | | | | | 16 | 12 | | | 28 |
| P3106 Textile engineering | | | | | | | 25 | 7 | 32 |
| P0723A270001 Industrial engineering | | | | | | | 3 | 2 | 5 |
| P0723A270002 Textile engineering | | | | | | | 11 | 1 | 12 |
| P0723A270003 Textile Engineering | | | | | | | 10 | | 10 |
| **Faculty total** | **320** | **132** | **0** | **0** | **93** | **46** | **49** | **10** | **650** |
| **of which number of women** | **237** | **104** | **0** | **0** | **63** | **38** | **27** | **4** | **473** |

*Table 5: Students in accredited study programmes by nationality*

| Type of study | Students with Czech citizenship | Students with foreign citizenship |
|---|---|---|
| Bachelor's Degree Programme (BSP) | 360 | 92 |
| Continuing Master's Degree Programmes (NMSP) | 97 | 42 |
| Doctoral Study Programme (DSP) | 27 | 32 |
| **Total FT** | **484** | **166** |

The Faculty of Textile Engineering traditionally hosts a number of foreign students - from Russia (48), Slovakia (28), Ukraine (15), Pakistan (9), Kazakhstan (10), India (11), Poland (2), Egypt (1),

South Africa (1), Turkey (4), China (7), Belarus (2), Canada (1), Serbia (1), Nepal (1), Bangladesh (14), Palestine (1), Vietnam (2), Republic of Moldova (1), France (1), Ghana (1), Morocco (1), Kyrgyzstan (1), Uzbekistan (1), Spain (1). The number of students with foreign citizenship in the DSP is higher than the number of students with Czech citizenship, which is the result of the excellent international activities of the academic staff of FT TUL.

**Advice and support for students in accredited study programmes**

At the TUL FT, students in the first years of study mainly terminate their studies on their own initiative or due to failure to fulfil their study obligations. A higher failure rate is observed among students of the combined form of study, whose number is traditionally high at FT TUL. For some students in the combined form of study, it is not easy to combine their own teaching and study activities with their work and personal responsibilities, especially nowadays, when companies have a shortage of workers and stop supporting the qualification growth of their employees. The failure of full-time students is most often due to the low level of knowledge and understanding of science that they come from secondary schools with, which is often combined with low motivation to study and low individual diligence.

*Table 6. Unsuccessful students in accredited study programmes* in %

| Type of study programme | P [%] | K [%] | Total [%] |
|---|---|---|---|
| **BSP (all disciplines)** | 57 | 54 | 56 |
| **MSP (all disciplines)** | 0 | 0 | 0 |
| **NMSP (all disciplines)** | 59 | 56 | 57 |
| **DSP (all disciplines)** | 14 | 0 | 11 |
| **Total** | | | **56** |

*Note: * = Study failure rate is the ratio of the number of studies started in year n to the sum of failed studies of this cohort in year n and n+1.*

In 2021, the study pass rate has improved slightly. The problem remains both student motivation and the unusual form of distance learning during a pandemic.

FT TUL strives to reduce the academic failure rate of students. In agreement with the course guarantors, we try to compensate for the uneven entry knowledge of the students with a higher time allocation for exercises and seminars in core courses, where the beginning of the semester can be devoted to repetition without reducing the overall level of the course. In order to reduce the failure rate, support courses in mathematics and physics were organised for first year undergraduate students in the winter semester for a total of 2 hours per week. The course ran for 10 weeks in the months of October to December, with an average attendance of 8 students. Another course organised to help reduce academic failure was an Excel spreadsheet course which ran for 5 weeks. Consultation hours were available to students within each course. In addition, students are motivated by the possibility of receiving a merit scholarship. For the new NMSP (commencement of teaching ZS 2021) regular discussions with students are conducted. In selected subjects, study materials were used in full-time teaching, and video recordings (prepared and used during the period when teaching was online) were used for revision. Subjects with a high failure rate are also scheduled in the following year so that their teaching does not conflict with compulsory subjects and the student can fully re-attend them. As part of the ROLIZ project, study guides for high failure courses have been created in each department . *Thanks to the transition to*

*distance learning, the use of technical resources for online teaching (STAG - correspondence module, e-learning, online teaching, teaching recordings) has been expanded. Subjects were taught online, new types of study aids necessary to cope with an exceptional situation were created (tutorials, recorded lectures, tests). Teachers were increasingly involved in individual and group consultations, either on-line or (where rules allowed) face-to-face.*

We try not to encourage prolonged study by, for example, stipulating that only a student who is studying properly during the standard period of study can receive a merit scholarship. In order to prevent prolongation of studies, students are continuously consulted by the staff of the study departments and the vice-dean for pedagogical activities in case of difficulties (academic, health, social). Students are advised to find solutions on the basis of an individual approach. Fees for exceeding the standard period of study by more than one year are prescribed on the basis of the Dean's instruction.

Students of both full-time and combined forms of study can receive a merit scholarship for outstanding academic performance. They do not apply for it, it is awarded to them on the basis of their study results. Exceptional scholarships can be awarded for research activities or to support study abroad. Students can receive scholarship support in the framework of the annual competition announced by the Preciosa Foundation.

The Vice-Dean for Pedagogical Activities and the clerks of the Study Department work closely with the Academic Counselling Centre and the Support Centre of TUL. All teachers are informed about students with specific needs from the Academic Counselling Centre at the beginning of the semester and receive recommendations on how to work with these students individually. In 2021, 15 students with specific needs were registered in cooperation with the Academic Advice Centre.

Talented students have the opportunity to participate in scientific work at the departments, to go abroad within the Erasmus plus programme, to participate in a number of student competitions (SVOČ, company scholarships, competitions for the best final thesis).

*The pandemic and the restrictions resulting from it placed special demands on the flexibility of information flows in 2021, with information being transmitted by e-mail and telephone, in bulk and individually to students as necessary and appropriate. Special attention was paid to students on trips and also to foreign students (studying in both Czech and AJ study programmes, living in dormitories for long and short periods of time). For these students FT TUL provided information (translations of government regulations, TUL, FT), individual consultations, assisted in solving study, personal and health problems.*

## 2.1.2 Alumni

In 2021 (in the period from 1 January 2021 to 31 December 2021), a total of 122 students graduated from accredited study programmes. Of these, 87 were women and 24 were foreigners.

*Table 7. Graduates of accredited study programmes (period from 1 January 2021 to 31 December 2021)*

| Study programme / field of study | Graduates in the study programme | | | | | | | | Total Graduates |
|---|---|---|---|---|---|---|---|---|---|
| | BSP | | MSP | | NMSP | | DSP | | |
| | P | K | P | K | P | K | P | K | |
| BSP/TM | 20 | 5 | | | | | | | |
| BSP / TON | 28 | 0 | | | | | | | |
| BSP / VOTK | 5 | 4 | | | | | | | |
| BSP / TTMN | 5 | 3 | | | | | | | |
| **Total BSP** | **58** | **12** | | | | | | | **70** |
| NMSP / OTI - old | | | | | 5 | 1 | | | |
| NMSP / NNM - old | | | | | 7 | 1 | | | |
| NMSP / RJ - old | | | | | 0 | 2 | | | |
| NMSP / PI - old | | | | | 1 | 4 | | | |
| NMSP / TI - new | | | | | 15 | 2 | | | |
| NMSP / PI - new | | | | | 4 | 0 | | | |
| **NMSP total** | | | | | **32** | **10** | | | **42** |
| DSP | | | | | | | 8 | 2 | |
| **Doctoral total** | | | | | | | **8** | **2** | **10** |
| **Total FT** | | | | | | | | | **122** |

*Note: Numbers of graduates without successfully completed short-term stays (data - outputs of the central SIMS registry).*

**Faculty cooperation with alumni**

FT TUL supports cooperation with graduates at the departmental level. FT TUL organises tours of existing premises on the occasion of alumni reunions. The planned alumni reunions did not take place again in 2021. Due to the pandemic, they were cancelled and rescheduled for 2022. A *private* theatre performance was held as part of the 60th anniversary celebrations of the Faculty, about which alumni were informed.

**Graduates of the doctoral study programme**

In 2021, five State Doctoral Examinations (SDZ) were held, which were successfully passed by PhD students. Details of these examinations can be found on the Faculty's website under the *State Doctoral Examination* link.

**Ing. Jan Kovačičin;**
**Ing. Michal Martinka;**
**Ing. Bc. Jana Honzíková (nee Hlavatá);**
**Frederick Tungshing Fung, M.A;**
**Sundaramoorthy Palanisamy, M.Tech.**

**Defence of the dissertation**

In the same year, 10 students successfully defended their dissertations and received their Ph.D. degrees. Details of the doctoral procedures can be found on the faculty's website under the link *Dissertation defence.*

**Ing. Radek Jirkovec**
topic: Study of wetting of fibrous structures using biocompatible hydrogels
supervisor: doc. Ing. Jiří Chvojka, Ph.D.

**Abdelhamid Rajab Ramadan Aboalasaad, M.Eng.**
topic: Structure and Analysis of Woven Compression Bandages for Venous Leg Ulcers
supervisor: doc. Ing. Brigita Kolčavová Sirková, Ph.D.

**Mgr. Kateřina Strnadová**
topic: .Drawing: preparation of scaffolds for nerve tissue regeneration
supervisor: Ing. Věra Jenčová, Ph.D.

**Ing. Jana Novotná**
topic: Dielectric properties of epoxy composites filled with recycled carbon fibers
supervisor: Ing. Blanka Tomková, Ph.D.

**Ing. Tereza Heinisch**
topic: On the issue of drying curves as a comfort parameter
supervisor: doc. Ing. Vladimír Bajzík, Ph.D.

**Tariq Mansoor, M.Sc.**
topic: Modelling of Thermal Resistance and Some Other Comfort Parameters of Socks in Wet State
supervisor: prof. Ing. Luboš Hes, DrSc., Dr.h.c.

**Ing. Iveta Zvercová (née Danilová)**
topic: Development of nanofibrous carriers for biomedical applications
supervisor: doc. Mgr. Mgr. Irena Šlamborová, Ph.D.

**Muhammad Zaman Khan, M.Sc.**
Functional Properties of Superhydrophobic Textiles
supervisor: prof. Ing. Jakub Wiener, Ph.D.

**Azam Ali, M.Sc.**
topic: Surface Deposition of Metals on Textile Structures
supervisor: prof. Ing. Jiří Militký, CSc.

**Ing. Petra Jirásková**
topic: Evaluation of the appearance non-uniformity of flat textiles
supervisor: prof. Ing. Petr Ursíny, DrSc.

*The pandemic affected students' ability to meet the ISP Individual Study Plan primarily in the following aspects:*
*a) inability to carry out the planned internship/foreign trip*
*b) indisposition of teachers (especially from vulnerable health groups) when participating in examinations according to the ISP*

## 2.1.3 Interest in studying

The following table provides statistical data on the number of students enrolled for studies, the

number of students admitted for studies and the number of students enrolled for studies. This information is broken down by study programme.

The following table provides statistical data on the number of students enrolled for studies, the number of students admitted for studies and the number of students enrolled for studies. This information is broken down by study programme.

*Table 8. Number of applications*

| Study programme | Applications submitted [1)] | Number of applicants (natural persons) | Acceptance [2)] | Enrolled [3)] |
|---|---|---|---|---|
| **Total BSP** | **413** | **355** | **371** | **224** |
| **NMSP total** | **135** | **129** | **122** | **77** |
| **Total DSP** | **14** | **14** | **12** | **12** |
| **TOTAL on FT** | **562** | **498** | **505** | **313** |

*Note: 1) Applications received by the faculty, 2) successful applications, 3) enrolled students.*

**Nature of the entrance examination**
At FT TUL, admission examinations are provided exclusively by our own resources.

**Bachelor's Degree:** the Faculty of Textile Engineering accepts applicants on the basis of their high school results. Successful completion of the talent test was a condition for admission to the Bachelor of Design programme.
*In 2021, there were no talent tests with personal participation of candidates due to the pandemic. Both rounds of the talent test for the admission procedure were evaluated by an expert committee on the basis of the submitted presentations of artistic works.*
*Following a government decision, conditional enrolment was made available to students without a matriculation certificate.*

**Continuing Master's studies:** applicants were admitted to the continuing master's study programme without entrance examinations on the basis of an assessment of their previous university studies and the recommendation of the admissions committee until the vacant capacity was filled. The first semester of study is designed as an extended admission procedure, where applicants demonstrate their ability to study their chosen programme at the university.

Following the award of accreditation for the Design - Clothing, Textiles, Glass, Jewellery programme, additional talent tests were announced for the selection process, which took place in September. Talent tests for the selection process were conducted with the direct participation of the candidate based on the evaluation of a submitted portfolio of work of the required scope. The evaluation was carried out by an expert panel.

For foreign students who wish to study in Czech, a certificate of Czech language proficiency at B2 level is required.

**Doctoral studies:** the admission procedure for doctoral studies took place in three rounds last year. Applications were accepted until: 15 February 2021, 24 June 2021 and 10 October 2021. The admissions committee meetings were held on 23 February 2021, 6 July 2021 (per rollam) and 19

October 2021. The assessment of the applicant's overall qualifications for this type of study is based on documented successful completion of a university degree in engineering or master's studies, a structured CV describing the applicant's skills, knowledge and competences, including a motivation letter elaborating on the expected dissertation topic. In the case of foreigners, nostrification of previous educational qualifications was also a prerequisite for admission. Summary information on the number of applicants, admitted and enrolled students is given in the following table.

*Table 9. Admissions to the DSP*

| Admission procedure | CZECH REPUBLIC | FOREIGNERS | total/accepted/not accepted | | | ENTRY |
|---|---|---|---|---|---|---|
| Round 1 | 0 | 2 | 2 | 1 | 1 | 1 |
| Round 2 | 6 | 2 | 8 | 7 | 1 | 7 |
| Round 3 | 3 | 1 | 4 | 4 | 0 | 4 |
| Total | 9 | 5 | 14 | 12 | 2 | 12 |

## 2.1.4 Development of educational activities

In 2021, teaching activities were supported from other sources through MŠMT projects (2 development projects (MŠMT Institutional Support)).

In the field of education, the availability of study materials in electronic form in both Czech and English (using e-learning applications) has been and is being gradually improved. Participation in specialised trade fairs, where the offer of study programmes and cooperation opportunities was presented, was also important for increasing the reputation of the faculty. *Thanks to the transition to distance learning, the use of technical means for online teaching was expanded (STAG - module for correspondence, e-learning, online teaching, teaching records). Subjects were taught online, new types of study aids necessary to cope with exceptional situations were created (tutorials, recorded lectures, tests, videos of technological processes, virtual catalogues of textile materials).*

**EU operational programmes**

In 2021, the Faculty of Textile Engineering of TUL continued to actively participate in the university-wide project OP VVV RoLiZ 4.0 - Development of human resources of TUL for increasing relevance, quality and access to education in the conditions of Industry 4.0, reg. no. CZ.02.2.69/0.0/0.0/16_015/0002329.

The faculty is involved in the key activities KA01 - Project Management, KA02 - Improvement of Educational Activities, KA03 - Creation and Modernization of Study Programmes, KA04 - Labour Market Monitoring, Links to Graduates, KA05 - Internationalization, KA06 - Availability of Counselling and Assistance Services, KA07 - Adaptation of the Learning Environment and KA08 - Quality System and KA09 - Effective Management Principles.
The faculty also participated in the university-wide project OP VVV aimed at improving the material and technical equipment for bachelor and master study programmes / disciplines - Educational infrastructure of TUL for increasing relevance, quality and access to education in the conditions of Industry 4.0, reg. no. CZ.02.2.67/0.0/0.0/16_016/0002553.

**Development programmes**

In 2021, the following projects were co-addressed:

- Innovation of study programmes - investigator prof. Ing. Miroslav Žižka, Ph.D., co-supervisors for FT Ing. Renata Štorová, CSc., Ing. Jana Drašarová, Ph.D., Mgr. Šárka Krousová, doc. Ing. Brigita Kolčavová Sirková, Ph.D., Bc. Ondřej Ludín, doc. Ing. Ludmila Fridrichová, Ph.D. (the following activities were supported.
- Modernization of educational infrastructure of TUL - researcher doc. RNDr. Pavel Satrapa, Ph.D., Ph.D., co-supervisors for FT doc. Ing. Lukáš Čapek, Ph.D. and Ing. Innovation of the distance learning system for PC, Innovation of the environment and availability of forms of education (SW)
- Increasing the quality of doctoral studies - investigator prof. Ing. Pavel Mokrý, Ph.D., co-supervisors for FT Ing. Iva Mertová, Ph.D. and Ing. Daniela Brzezinová (the following activities were supported.)
- Integration of foreign students into the life of the university - investigator prof. Ing. Miroslav Žižka, Ph.D., co-supervisors for FT doc. Ing. Lukáš Čapek, Ph.D. and prof. Ing. Michal Vik, Ph.D. (the following activities were supported: international summer school.)
- Development of support services and career counselling - investigator prof. Ing. Miroslav Žižka, Ph.D., co-supervisor for FT Ing. Jindra Porkertová (the following activities were supported.)
- Support for particularly gifted students - investigator prof. Ing. Miroslav Žižka, Ph.D., co-supervisor for FT Ing. Maroš Tunák, Ph.D. (the following activities were supported.)

A number of activities were implemented in connection with the development programmes focused on educational activities:

- Development of competences directly relevant for life and practice in the 21st century - (Activities: events for the professional public - e.g. participation in Mercedes Benz Prague Fashion Week and other shows, promotional printed materials/materials/catalogues of FT TUL, Support of BSP and NMSP studies by providing internships, Providing practical experience with production, Practical support of Glass and Jewellery Design studies, Innovation of the subject Preparation and management of projects);
- Improving accessibility and relevance of flexible forms of education - (Activities: Innovation of distance learning system - PC, Innovation of environment and accessibility of forms of education - SW);
- Increasing the efficiency and quality of doctoral studies - (Activities: Laboratory innovation, DSP seminar);
- Internationalization - (Activities: Summer school Fabric patterning/on-line form, AUTEX meeting - *due to the persistent pandemic of covid-19 and related restrictions the conference was held online, part of the activity will be fulfilled by active participation in 2022*);
- Other measures falling under the areas listed in the Announcement - (Activities: Support course in Mathematics, SVOČ 2021).
- Within the framework of education, the Faculty of Education of the Technical University of Liberec participates in the project: implementation of the regional action plan for the development of education of the Liberec Region II CZ.02.3.68/0.0/0.0/19_078/0017282
- Project days were organized at KTT: Construction and design of textile structures. In 2021 there were 4 times

## 2.2 Linking educational activities with creative activities

The link between educational and creative activities is a condition for continuous curriculum innovation, where it is the duty of every academic to enrich the teaching in his/her field with new knowledge, which he/she contributes to in the framework of his/her R&D and artistic creative activities. Students (especially MSP and DSP) are involved in projects and problem solving in complementary activities. In 2021, FT TUL continued to support the involvement of students and young academics in the main activities based on the Strategic Plan of FT TUL. Bachelors, Masters and PhD students were involved in R&D projects, e.g. Students of FT TUL also benefit from the interconnection of R&D and artistic activities with teaching, where they have the opportunity to creatively use new materials and advanced technologies.

### 2.2.1 Implementation of final student theses

The bachelor's and master's theses are always linked to creative activities carried out by R&D teams or artistic personalities of the faculty. In 2021, the final theses of these students were awarded:

*Dean's Award:*

| | |
|---|---|
| Bc. Adéla Kdýrová | Possibility of creating effective skeins through the variability of the number of turns on the DirecTwist jumping machine |
| Bc. Inna Komendant | Movement in nature - collection of interior textiles |
| Bc. Kateřina Švecová | A touch of Art Deco - privacy in the interior expressed through textiles |
| Ing. Karolína Boňková | Strength analysis of selected tubular braided structures using finite element methods" |
| Ing. Anna Skopcová | Possibilities of processing and use of bast fibres at present |
| Ing. Kamila Suchá | Design of sandwich structure of absorbent medical pads |
| Ing. Matouš Vápeník | Application of the DMAIC method in Bombardier Transportation |

*Award of the Governor of the Liberec Region:*

| | |
|---|---|
| Bc. Revajová Kristýna | Luminiscence - jewellery inspired by legends |
| Ing. Műlerová Senta | Incorporation of antibiotics into biodegradable nanofibrous layers for new medical applications" |

*The Rector's Award:*

| | |
|---|---|
| Bc. Zuzana Havlíková | Evaluation of moisture management of absorbent textile materials after washing" |
| Ing. Anna Novotná | Nanofibrous skin covers for use in veterinary medicine" |

### 2.2.2 Involvement of students in research projects of external providers

FT TUL continued to take advantage of the possibilities of financing students' scientific research activities from scholarship funds. At the same time, the FT allowed students partial involvement in externally funded projects (see chapter 4.1 Projects addressed).

### 2.2.3 Involvement of students in Student Grant Competition (SGS) projects

In this year, 9 SGS 2021 projects were successfully defended and solved. These were small-scale projects led by PhD students. Supervisors of doctoral students were the guarantors of the substantive and formal level of the solutions and other members of the teams were mostly students, both of the doctoral study programme and master's study programmes of the TUL.

The outputs of the SGS 2021 projects are described in detail in the final reports, which are available on the TUL website in the SGS TUL application.

The 2021 Student Grants Competition met expectations despite the unfavourable situation in the context of the ongoing global pandemic of COVID-19. The project investigators were already prepared for this situation and therefore most of the papers were presented and published at the 20th International Conference Autex 2021, which was held online. A total of 6 papers were accepted at international conferences.

A number of researchers managed to publish actively. A total of 7 articles have already been published, mainly thanks to the researchers and co-investigators of the two-year projects. Three more articles have been accepted for print, and four journal publications are now under review. All papers are in journals with impact factor listed in the WOS or Scopus databases. Two more articles are being prepared for submission to the journal.

Two functional samples were prepared in the course of the project: a Smart sports jacket with automatic SMARTLIGHT signalling and a functional sample of clothing with heating elements to increase physiological comfort. In addition, one utility model "Heating and cooling unit" has been filed with the patent office.

Outputs include a chapter in a peer-reviewed book, ready for printing with an expected publication date of June 2022. A research report "Study on the use of polydioxanone surgical monofilament for 3D printing of absorbable orthopaedic implants" was also produced as an output of one of the projects.

The outputs include, of course, parts of the dissertations of the students involved in the projects and also one defended thesis.

**Specific Research Projects Student Grant Competition**

1. *Colour appearance of products under different lighting*, Azmary Akter Mukthy (21407);
2. *Garment with heating and cooling elements to increase the physiological comfort of the wearer*,
   Ing. Michal Martinka (21402);
3. *Doped carbon structures with increased surface area and joule heating by* Yuanfeng Wang (21446);
4. *Heat transfer of a multilayer fabric system embedded in a nanofiber membrane containing PCM* by Kai Yang *(21447);*
5. *Effect of geometry and concentration of fly ash and laponite on impact and dynamic mechanical properties of filled epoxy matrix* by Shi Hu *(21448);*
6. *Production of functional braided nanofibrous surgical threads,*

Divyabharathi Madheswaran (21449);

7. *Processing of surgical polydioxanone monofilament by 3D printing and injection moulding for the production of absorbable orthopaedic implants* by Jakub Erben (21450);
8. *Optimization of the properties of textile components in diffusely open timber buildings by* František Böhm *(21451);*
9. *Development of composite tubular scaffolds by needle-free electrostatic softening method by* Petra Honzejková (née Harciníková) (21452).

### 2.2.4 Organisation of the Student Scientific and Professional Activity Competition (SVOČ)

The Faculty of Textile Engineering, Faculty of Mechanical Engineering, Faculty of Mechatronics, Informatics and Interdisciplinary Studies and Faculty of Economics of the Technical University of Liberec regularly organize a competition in student scientific and professional activities (SVOČ) in order to find creative types of students at the technical faculties of TUL. One of the main objectives of the competition is to financially support creative types of students who have the prerequisites for scientific and development activities and to motivate them to further work in this field.

The 13th edition of the SVOČ competition at the technical faculties of TUL was announced in four sections (Textile, Mechanical Engineering, Mechatronics, Economics). Due to the epidemiological situation caused by the pandemic, the traditional student conference was not held, but the submitted competition works were assessed and evaluated by the expert committee for the given section.

A total of 47 students took part in the competition in the sections (Textile-NMSP-Textile Engineering, Textile-NMSP-Industrial Engineering, Mechanical Engineering, Mechatronics, Economics BSP and Economics NMSP+DSP). The results were announced electronically on 22 June 2021, where the individual committees announced the top 3 papers from each section. The winners received cash prizes.

In the section Textile-NMSP-Textile Engineering, the first prize went to Karolína BOŇKOVÁ for her work Strength analysis of selected tubular braided structures using the finite element method. The second place in the section was awarded to Tomáš POTŠTEJNSKÝ for his thesis Study of the possibilities of ozone generation using electrically charged fibre structures and its application in the decontamination of pollutants. The third place went to two students, Senta **MŰLLEROVÁ for her paper** Incorporation of antibiotics into biodegradable nanofibrous layers for new medical applications and Anna **NOVOTNÁ for her paper** Nanofibrous skin covers for use in veterinary medicine.

In the section Textile-NMSP-Industrial Engineering, the first place went to Adéla HAMPLOVÁ with her work Utilization of leather waste. Alžběta **HÔRECKÁ with the topic** Objective evaluation of fabric sheen with the help of image analysis won the second place and Matouš **VÁPENÍK with the contribution** Optimization of workplace by DMAIC methodology took the third place.

The results of the competition and other information about the SVOČ competition are published on the competition website (http://svoc.tul.cz/).

### 2.2.5 International Ph.D. Students Day

The next edition of the SGS Student Conference took place on 26 November 2021 online. The principal investigators presented the results of the projects and answered questions from the SGS committee members of the TUL FT and other invited guests (heads of departments, other members of the SGS project team, ...). Based on the vote of the evaluation committee composed of the members of the SGS FT TUL committee for 2021 and the Dean, it was decided to award the three best presentations, which were announced at the end of the conference. These presentations were awarded special scholarships (Jakub Erben, Azmary Akter Mukthy and Kai Yang). Detailed information is available at
http://www.ft.tul.cz/studenti/doktorske-studium/sgs-konference-2021

### 2.2.6 Support for student participation in competitions and exhibitions

BSP Design students have actively participated in a number of important activities:

- *Museum Night under Ještěd 2021.* Fashion show, Gallery N, Jablonec n. N.
- *BACCALAUREATES* 2021. Exhibition of the final year of BSP Design, Gallery N, Jablonec n. N.
- CAUTION SAHAT! Exhibition of student work in Textile Technology and Pattern Design, Gallery N, Jablonec n. N.
- *Mercedes-Benz Prague Fashion Week SS22 2021*. Fashion show, Prague-Holešovice, 2021.
- *Mercedes-Benz Prague Fashion Week May 2021*. Fashion show, Drive-in Cinema. Prague-Holešovice, 2021.
- MENŠÍKOVÁ, V., *National Student Design Award 2021*. Participation in the International Design Competition. Prague, 2021.
- *OGL 2021 gala.* Fashion show. Regional Gallery Liberec, Liberec, 2021.
- HAVLÍČKOVÁ, M., *Silver /still humen*. Participation in the collective International Travelling Exhibition. Gallery N, Jablonec n. N., 2021.

*Due to the pandemic situation, students were unable to participate in exhibitions abroad.*

## 2.3 Linking educational activities with internationalisation

The extent of internationalisation and international excellence of TUL is described in detail in Chapter 5 Internationalisation. The main impacts on educational activities are mentioned here. As part of the education and promotion of FT TUL study programmes internationally, KTT has been organising an international summer school on Fabric Patterning every year since 2017, where participants can experience working with woven and knitted structures during a week. Participation in 2021 was represented by participants from Poland, Germany, Serbia, Croatia and the Czech Republic. *Due to the Covid 19 pandemic, the 2021 edition was organized online.*

*Even in 2021, all activities were affected by the global pandemic. FT TUL focused mainly on information, communication and support for incoming and outgoing students (whether in Czech or English SP) and teachers, see chapter 2.1.1 Students, paragraph Advice and support for students in accredited study programmes. The impact of the epidemiological crisis caused by the spread of the covid virus on internationalisation is assessed in Chapter 5.*

### 2.3.1 Study programmes in a foreign language

The Faculty of Textile Engineering has accredited most of its study programmes (in bachelor's, master's and doctoral programmes) in both Czech and English. The study in English is conducted in the doctoral degree programme "Textile Engineering", and the newly accredited programme "Textile Engineering". In the follow-up master's programmes - second year students study the "Textile Engineering" postgraduate programme in the specialisations "Clothing and Textile Engineering" and "Nonwoven and Nanomaterials", and first and second year students study the newly accredited "Textile Engineering" programme, specialisations "Nonwovens and Nanofibre Materials" and Clothing Technology and Materials. There are no students in the Bachelor's degree programme at the moment. Although there is interest in studying in English, applicants have problems both in getting their previous education recognised and in obtaining visas. The Faculty cooperates with the Rector's Office of International Relations in recruiting self-paying students for selected courses of study.

*Table 10. Self-paying students*

| | Bachelor's Degree | | Master's studies | | Continuing Master's studies | | Doctoral studies | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| | P | K | P | K | P | K | P | K | |
| Self-replicators | 0 | 0 | 0 | 0 | 22 | 0 | 14 | 1 | 37 |

### 2.3.2 Lectureships of foreign experts

There was 1 attendance of a foreign expert from Poland:

Monika Bogusławska - Bączek, Katowice School of Technology, Poland, 06.- 10.12.2021 - lecture on "Sustainable Fashion" at KDE and lecture on "Smart Clothing" at KHT, both for Ph.D. students and employees of FT TUL, Erasmus+ teaching stay KA103.

*As a result of the pandemic, mobility has been severely restricted. The above mentioned stay was only carried out in the last quarter, the others were cancelled.*

### 2.3.3 Participation of students in foreign work experience, internships, conferences, summer schools

This participation is covered by the Erasmus+ mobility programme KA103, one practical placement was financed by the student herself.

In 2021, there were 7 study stays abroad during the summer semester of the academic year 2020-21, all within the Erasmus+ framework for a total of 31 months. There were also 10 study or work placements abroad in the winter term of the academic year 2021-22: 9 Erasmus+ students, 1 student in self-funded mode, for a total of 31.37 months in 2021. 7 Erasmus+ students continue their stay in 2022. In total, 17 students travelled for 62.37 person-months in 2021.

*As a result of the pandemic, the structure of stays has changed, with fewer students travelling overall than in 2020.*

## 2.4 Linking educational activities to the third role of the faculty

The main mission of the activities is to increase the field employment of graduates of TUL. The most important goal is to set up interdisciplinary cooperation. This goal is gradually achieved by innovations in the subject curriculum of accredited programmes with regard to the needs of practice, support for student mobility within the study, diversification of professional practice and soft-skills competences of students, based on feedback from students, graduates and employers. A great benefit for students is the possibility of excursions, study internships or work placements and thesis or bachelor thesis solutions, where the topics are based directly on the companies. Every year, FT TUL gives space to representatives of textile companies to present job opportunities in their companies, either in the framework of workshops in the companies associated with excursions or specialized seminars and job fairs. Job offers are advertised in front of the study department and on the faculty website or directly on departmental websites.

### 2.4.1 Collaboration in the development of study programmes

FT TUL in cooperation with industrial partners strives to ensure that experts from practice participate in the education of students. Cooperation with companies associated under the Clutex z.s. cluster, or ATOK, ČTPT is based on a long-standing basis, but these companies have also appreciated the more open approach of the faculty, the offer of joint research and development projects and also, for example, the opportunity to comment on newly emerging study programmes and fields of study so that the graduate better meets the requirements of the labour market and to participate in the possible revision of existing study programmes or professional courses in cooperation with FT TUL (involvement in the ROLIZ project). The link is implemented by staff.
Further professional discussions take place at other forums, which are convened for this purpose by regional governments or directly initiated by companies and the management of secondary schools in the textile sector. The discussions are held in accordance with the Sectoral Agreements already signed or under preparation.

### 2.4.2 Experts from the application sphere teaching in accredited study programmes

In 2021, a number of experts from practice participated in teaching in the accredited study programmes by leading and guaranteeing selected courses focused on project-based learning and the transfer of knowledge and R&D results into practice:

- doc. Ing. Václav Klička Ph.D. - Project
- Ing. Petr Štoček - Textile Sales Strategy, Innovative Marketing and Sales Management
- Prof. RNDr. Gejza Dohnal, CSc. - Planning of industrial experiments
- Mgr. Oldřich Palata -
- Mgr. Denisa Smetanová - Interior Design
- Ing. Jiří Koucký, CSc. - Glass and jewellery art
- Zdeněk Kindl - Computer Graphics 1,2
- MgA. Václav Řezáč - Fundamentals of glass and jewellery design (from 1 December 2021 internal teacher)
- MgA. Martin Hlubuček - Atelier 1
- Mgr. Lenka Patková - Contemporary Art and Design 1
- Ing. David Včeliš - Recycling of textile materials

### 2.4.3 Consultation and guidance for bachelor and master theses

Most of the cooperation is not formalized, it is necessary to add consultants from companies to the assignment of the final works. The current best practice, in the case of final student theses solved with a specific industrial enterprise, is the management of the thesis by an academic employee of the TUL FT with the cooperation of an expert from the company as a consultant or opponent of the thesis.

### 2.4.4 Professional lectures and seminars for students

Experts working in the application sphere (or distinguished graduates) or in other scientific research organisations in the Czech Republic or abroad (see Chapter 3.2.3) were involved in the educational activities of the TUL FT in the form of specialised seminars focused on selected topics in accordance with the main objectives of the TUL SZ and the TUL FT SZ. These seminars took place both in the teaching of individual subjects and separately for different groups of students across the disciplines studied.

- Lecture by Bc. Jiří Jiroutek, photographer
- 3 lectures assoc. Prof. Monika Boguslawska-Baczek, PhD. - Katowice School of Technology, Poland
- Lecture, Ing. Karel Boněk, RIETER CZ, s.r.o.

### 2.4.5 Excursions to companies

In 2021, an excursion to the company Knit-tex CS s.r.o. took place, which was intended for students of the subject Processes and systems in knitting and their teachers.
In the year 2021, professional excursions were continuously organized for students in the course of Contemporary Art and Design to various cultural institutions.
In 2021, an excursion to RETEX took place to define common R&D topics, including possible themes for diploma and bachelor theses.

### 2.4.6 Professional practice for students

At FT TUL, the DSP includes a compulsory internship for 6 months. A total of three students completed the compulsory internship or at least part of it in 2021. Two students completed the final presentation. Some DSP students have worked at foreign institutions in partial fulfilment of this obligation in accordance with the Individual Study Plan and completion is planned during the next year of study. Some students had their planned placements at foreign institutions cancelled again due to restrictions arising from the Covid-19 pandemic.

Professional practice is compulsory in all newly accredited bachelor's degree programmes. In each of the three years of study, students must complete a minimum of 80 hours of work experience. FT actively supports the placement of internships. The web interface related to the offer of internships, traineeships and employment is constantly updated (http://www.ft.tul.cz/studenti/praxe/praxe).

In the first year, 56 students participated in the internship.

*Table 11. BSP student internships in 2021*

| | Number of students |
|---|---|
| Total number of practices | 101 |
| Work experience in professional firms | 82 |
| Practice outside the field | 5 |
| Internships in the form of volunteering | 0 |
| Practice in written form (alternative) | 14 |

## 2.5 Motivational events for prospective students / Cooperation with secondary schools

An important activity is the search for and long-term work with gifted individuals in primary and tertiary education, especially those who are likely to become scientists in technical and natural science fields developed at the Technical University of Liberec. In 2021, the following activities were implemented to motivate secondary school students to further their studies in technical fields:

- TUL Open Days, FT (FT TUL held open days for prospective students in February and November 2021. The November DOD is organized university-wide and was held in person. *The February open day was organised by the FT and was held online for the first time - without direct attendance of prospective students).*
- Courses for secondary schools - 3 courses for secondary school students from the Liberec Region at the FT during the winter semester - visits with laboratory demonstrations
- Educa Kids at TUL - presentation of KTT research
- virtual promotion - facebook, instagram etc.
- direct presentation for students from Ukraine - at KNUTD Kiev
- FT presentation at Gaudeam (online in 2021)
- presentation of the faculty in the form of advertising (portal vysokeskoly.cz)
- realization of catalogues for the promotion of the study programme Design (Catalogue of student work across specialisations, Catalogue of the course Textile Patterning)
- Open Day
- participation in the key activity Promotion of the HR Award project
- promotion of R&D results (see chapter 7.5 Transfer of knowledge into practice)
- excursion for primary schools - demonstration in laboratory B3 for children from 4th grade
- *In September 2021 a regular competition Clothing and Textile, Liberec 2021 (7th year) was planned. However, this year's competition was postponed again for another year. The reason for this was the closing of the students' attendance in the second semester, because the participants could not prepare their collections within the school activities. The competition is organized by the Association for organizing the Clothing and Textile Competition, Liberec in cooperation with the Secondary School of Textile Industry and FT TUL*. The cooperation will be resumed when the situation permits.
- In connection with the preparation and increased interest of applicants, a *Memorandum of Cooperation* between the Secondary School of Glass Arts, Železný Brod and the Faculty of Fine Arts of TUL (cooperation with the Department of Design) was concluded in 2021.

## 3. Academics, staff

In 2021, there were 119 employees working at the TUL Faculty of Science, of which 101 were academic staff, including staff for science and research. There were 7 professors, 14 associate professors, 27 assistant professors, 3 assistant professors and 17 lecturers. An overview of the number of staff is given in the following tables. In 2021, six academic staff with foreign citizenship (number of natural persons) worked at the TUL Faculty of Science.

*Table 12. Academic, scientific and other staff (headcount)*

| | **Academic staff** | | | | | | | | **Scientific and professional staff** | | | Other employees | **TOTAL staff** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TOTAL academic staff | Professors | Associate Professors | Professional assistants | Assistants | Lecturers | R&D staff involved in pedagog. Č. | Extraordinary professors | Postdocs ("postdoc") | Researchers not falling into other categories | Other VV staff | | |
| **Total** | 70,51 | 5,50 | 14,68 | 30,48 | 3,99 | 15,86 | | | | 5,31 | 19,23 | 19,40 | 114,45 |
| **of which women** | 45,39 | | 4,90 | 24,65 | 2,33 | 13,51 | | | | 3,73 | 12,57 | 16,52 | 78,21 |

*Table 13: Age structure of academic, scientific and other staff (natural persons)*

| **years** | **Academic staff** | | | | | | | | | | | | | | | | **Scientific and professional staff** | | | | | | Other employees | | **TOTAL** | **of which women** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total academic staff | | Professors | | Associate Professors | | Professional assistants | | Assistants | | Lecturers | | VV staff involved in pedagog. Č. | | Extraordinary professors | | Postdocs ("postdoc") | | V Workers not falling into other categories | | Other VV staff | | | | | |
| | TOTAL | Women | TOTAL | Women | TOTAL | Women | TOTAL | Women | TOTAL | Women | TOTAL | Women | TOTAL | Women | TOTAL | Women | TOTAL | Women | TOTAL | Women | TOTAL | Women | TOTAL | Women | | |
| **up to 29** | 1 | *0* | | | | | 1 | | | | | | | | | | | | | | 2 | *2* | | | **3** | **2** |
| **30-39** | 12 | *7* | | | | | 7 | *4* | 2 | *1* | 3 | *2* | | | | | | | 5 | *3* | 5 | *4* | 2 | *2* | **24** | **16** |
| **40-49** | 31 | *24* | 1 | | 4 | *1* | 19 | *17* | 1 | *1* | 6 | *5* | | | | | | | 1 | *1* | 4 | *1* | 7 | *6* | **43** | **32** |
| **50-59** | 13 | *10* | 1 | | 3 | *2* | 3 | *3* | | | 6 | *5* | | | | | | | | | 4 | *3* | 7 | *7* | **24** | **20** |
| **60-69** | 11 | *8* | 1 | | 5 | *3* | 3 | *3* | | | 2 | *2* | | | | | | | | | 4 | *2* | 2 | *2* | **17** | **12** |
| **over 70** | 6 | *0* | 4 | | 2 | | | | | | | | | | | | | | | | 2 | *1* | | | **8** | **1** |
| OBJECTIVE. | **74** | *49* | **7** | | **14** | *6* | **33** | *27* | **3** | *2* | **17** | *14* | | | | | | | **6** | *4* | **21** | *13* | **18** | *17* | **119** | 83 |

*Table 14. Number of academic jobs by range of working hours and highest qualification attained*

| | Academic staff | | | | | | | | | | Researchers | | TOTAL | of which women |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | prof. | | doc. | | DrSc., CSc., Dr., Ph.D., Th.D. | | Other | | | | | |
| Time ranges | TOTAL | Women | TOTAL | Women | TOTAL | Women | TOTAL | Women | TOTAL | Women | TOTAL | Women | | |
| up to 0.3 | 4 | 3 | 1 | | | | 1 | 1 | 2 | 2 | | | 4 | 3 |
| 0,31-0,5 | 4 | 4 | | | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 6 | 5 |
| 0,51-0,7 | 3 | 1 | 2 | | | | 1 | 1 | | | | | 3 | 1 |
| 0,71-1 | 63 | 41 | 4 | | 13 | 5 | 29 | 23 | 17 | 13 | 4 | 3 | 67 | 44 |
| more than 1 | 0 | 0 | | | | | | | | | | | 0 | 0 |
| TOTAL | 74 | 49 | 7 | 0 | 14 | 6 | 33 | 27 | 20 | 16 | 6 | 4 | 80 | 53 |

In 2021, Ing. Jiří Chvojka, Ph.D. and Ing. Brigita Kolčavová Sirková, Ph.D. At the first meeting of the VR FT TUL, a lecture by doc. Ing. Martina Viková, Ph.D., the professorship procedure was referred to the VR TUL.

This year, selection procedures were held for the positions of department heads in all departments of the Faculty. On 11.6.2021, the selection committee recommended the current heads for 5 departments, and the selection committee recommended a new head for the KHT department.

In 2021, 3 competitions for academic and other staff positions were held.

- On 3 August 2021, the selection committee recommended the admission of 1 candidate for the position of associate professor for KDE FT TUL (1 position) and 2 candidates for the position of assistant professor for KHT FT TUL (1 position).
- On 22 November 2021, the selection committee recommended the admission of 1 candidate to the position of lecturer for KDE FT TUL (1 position).
- On 14 December 2021, the selection committee recommended the admission of 1 candidate for the position of assistant professor for the KMI FT TUL (1 position) and 1 candidate for the position of assistant professor for the KNT FT TUL (1 position).

*Table 15: Number of staff by department as of 31 December 2021 - natural persons*

| Work. | Prof. | Doc. | OA | assistant. | lect. | TOTAL ac. work. | Scienc es. work. | TOTAL ac.+scientific work. | OT | HSP | I mean. | Total | of which women |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KTT | 1 | 2 | 6 | 1 | 1 | 11 | 0 | 11 | 2 | 1 | 0 | 14 | 10 |
| KMI | 3 | 2 | 7 | 0 | 3 | 15 | 3 | 18 | 7 | 1 | 1 | 27 | 22 |
| KHT | 1 | 2 | 6 | 0 | 1 | 10 | 1 | 11 | 0 | 1 | 0 | 12 | 9 |
| CODE | 1 | 1 | 6 | 0 | 2 | 10 | 2 | 12 | 3 | 1 | 1 | 17 | 11 |
| CNT | 1 | 3 | 5 | 2 | 0 | 11 | 3 | 14 | 0 | 1 | 0 | 15 | 6 |
| WHERE | 0 | 3 | 3 | 0 | 10 | 16 | 0 | 16 | 4 | 1 | 0 | 21 | 14 |
| DFT | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 6 | 0 | 8 | 6 |
| SFT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 5 |
| **Total** | **7** | **14** | **33** | **3** | **17** | **74** | **9** | **83** | **17** | **17** | **2** | **119** | **83** |

*Table 16: Academic and scientific staff with foreign citizenship (average numbers)*

| | Academic staff | | | | | | Scientific and professional staff | | | Other employees | TOTAL staff |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Academic staff TOTAL | Professors | Associate Professors | Professional assistants | Assistants | Lecturers | Postdocs ("postdoc") | not falling into other categories | Other | | |
| | ***4,40*** | ***0,00*** | ***1,00*** | ***3,40*** | ***0,00*** | ***0,00*** | ***0,00*** | ***2,91*** | ***0,00*** | ***0,83*** | ***8,14*** |
| *Slovakia* | *2,00* | | *1,00* | *1,00* | | | | | | *0,02* | *2,02* |
| *other EU countries* | *0,00* | | | | | | | | | | *0,00* |
| *other non-EU countries* | *2,40* | | | *2,40* | | | | *2,91* | | *0,81* | *6,12* |
| *Women out of total (regardless of nationality)* | *2,40* | | | *2,40* | | | | *2,33* | | *0,30* | *5,03* |

## 3.1 Education and training activities for employees

*As a result of the pandemic and the need to limit meetings to an online format, the structure and format of training has changed, especially in the first half of the year. The majority was conducted online and staff made increased use of in-house training to support distance learning.*

During the year, educational and training activities for employees were carried out at TUL.

- extensive individual participation in training events within the Roliz and HR Award projects
- Jana Ornstová: work placement (10 days) at Novia Fashion Krásná Lípa
- training of KTT and KDE staff in the use of the Digital Stitch Control System (DSCS)
- professional excursion of KHT employees to Jitex and Tibex
- training aimed at improving pedagogical skills (internal language school, e-learning, creation of videos, tests, etc.).

## 3.2 Motivational tools for rewarding employees

FT TUL does not have a Career Code for its academic staff, but there are Framework Criteria for Habilitation and Appointment to Professor Procedures, which were amended in 2021. The presented criteria can be considered as general recommendations representing the framework requirements for candidates for habilitation and promotion to professor procedures at TUL FT. The opinion of the habilitation or evaluation committee is considered to be a decisive element in the procedures.

Publication activities of individual faculty members are of great importance in the scientific research and innovation activities of the faculty and are a reflection of its scientific and pedagogical potential. This activity is an important criterion for evaluating the quality and effectiveness of R&D&I activities in general. The evaluation of publication activity serves as a criterion for the allocation of funds to the faculty, for accreditation procedures, for the career development of individual staff members, etc. Therefore, academic staff are partially evaluated on the basis of publication activities in journals and on the basis of patents received over a certain period. The evaluation takes into account interruptions due to parenthood and long-term illness - interruptions are not counted in the evaluation period, the evaluation period is extended by one year.

As of 2021, full-time associate professors and professors will have part of their personal evaluation derived from their publication activities.

The personal evaluation (according to performance, on a project, monthly, semi-annually) is determined by the head of the department (or faculty department) depending on the results achieved by individual employees.

FT TUL employees take advantage of the opportunities offered by TUL, such as: the possibility of placing a child in the university kindergarten ŠKATULKA and in the children's corner of TUL, accommodation in accommodation facilities (dormitories, hostels, start-up apartments), use of sports and rehabilitation offers of TUL.

## 3.3 Support for DSP students and young academics

Young researchers and, as prospective future colleagues, DSP students are especially supported. The following activities are financially supported:

- R&D activities from scholarship funds and specific research carried out in the form of Student Grant Competition (SGS);
- workshop for students of the doctoral programme of the Faculty of Textile and Mechanical Engineering of TUL;
- participation in competitions and exhibitions;
- participation in student scientific and professional activities (SVOČ);
- professional practice;
- Publication grants;
- International mobility (internships, placements, summer schools, conferences, teaching stays) is supported under the Erasmus+ university mobility programme.

**Motivational tools for rewarding students**

FT TUL pays merit scholarships to successful BSP and NMSP students. In 2021, scholarships in the total amount of 502 thousand CZK were paid. Of the total scholarships paid, scholarships including the red diploma scholarships were paid in the amount of CZK 50,502. To support students in doctoral study programmes, the FT TUL pays scholarships from the contribution of the Ministry of Education and Science, which amounted to CZK 2 447.8 thousand in 2021. CZK. In 2021, the faculty paid accommodation scholarship in the amount of CZK 1 498.5 thousand. CZK and social scholarship in the amount of 38 thousand CZK. CZK.

# 4. Scientific research, development, innovation, artistic and other creative activities

FT TUL carries out creative activities according to §1 of Act No. 111/1998 Coll., on higher education in the following areas:

- basic research (funded by a grant, from GAČR funds)
- Applied research (funded by a contribution, TAČR funds, projects of ministries of the Czech Republic, collective research, contract research
- innovation activities (in the framework of complementary activities, in the form of contracts)
- artistic creative activity.

The creative activities of the Faculty of Textile Engineering are based on the document STRATEGIC INTENT OF EDUCATIONAL AND CREATIVE ACTIVITIES OF THE FACULTY OF TEXTILE TECHNICAL UNIVERSITY OF LIBERIA FOR 2021-2030. Support is given in particular to those research activities that are in line with rapidly developing research trends. The scientific and research work is mainly related to those directions in which the faculty has traditionally had a high level and quality personnel background and where there is a high probability of obtaining financial support from various grant competitions. The development of the Faculty of Science in the field of science and research is mainly oriented towards these areas:

1. **New materials**
2. **Metrology and new quality assessment methods**
3. **Advanced textile technology**
4. **Application of nanotechnology**
5. **Applying the results of artistic creativity in product design and innovation**

The following are monitored as the main performance parameters of creative activities:

- projects solved
- publishing activity
- exhibition activities.

*The pandemic did not significantly affect the research activities of the faculty. Thanks to their expertise and experience in textile materials engineering, they took the opportunity to actively expand their portfolio of R&D projects in the search for solutions and design of new materials for public health protection.*

## 4.1 Solved projects

Scientific research projects focused on basic and applied research including experimental development are an integral part of the Faculty's activities. Funded projects enable extensive development of R&D activities and form a significant part of the Faculty of Science budget. In 2021, the projects of the following providers were addressed: the MIT 4, TAČR 5, MZ 1, MŠMT 11 (including 9 SGS), GAČR 2. The special-purpose funds received in 2021 amounted to EUR 26.6 million. (excluding SGS).

### 4.1.1 EU Operational Programme Projects - Science and Research

In the period of sustainability are the following projects of OP PIK: project CZ.01.1.02/0.0/0.0/15_019/0004528 SENIOR - Special clothing and textile products of high utility properties based on a new generation of intelligent materials that will increase the efficiency of health and social care for the elderly and project CZ.01.1.02/0.0/0.0/15_019/0004588 Sky Paragliders a.s. - research and development of new technical fabric for air rescue systems. The projects were completed in 2019, the sustainability of the projects OP PIK is monitored for 3 years.

The Faculty actively participates in the project OP VVV Educational infrastructure of TUL for increasing relevance, quality and access to education in the conditions of Industry 4.0, reg. no. CZ.02.2.67/0.0/0.0/16_016/0002553, thanks to which a number of new devices are purchased. The activities of the faculty are mainly implemented within KA03 - Material and technical equipment.

The implementation of the project Hybrid Materials for Hierarchical Structures, reg. no. CZ.02.1.01/0.0/0.0/16_019/000843, continues. The project is carried out in cooperation with the Faculty of Engineering and the Institute for Nanomaterials, Advanced Technologies and Innovations. The aim of the project is interdisciplinary research that will help to achieve excellent results.

### 4.1.2 MIT projects

The following MIT TRIO projects were addressed in 2021:

1. FV40323 - Vidtex - smart textiles and garments with high performance properties to increase safety in transport, especially visibility. Principal investigator: the Faculty of Textile Engineering, doc. Ing. Antonín Havelka, CSc.
2. FV40025 - Processing of waste and recycled textile fibres - Principal investigator: Rieter CZ s.r.o., co-principal investigator: the Faculty of Textile Engineering, Ing. Gabriela Krupincová, Ph.D.
3. FV20287 - Texderm - Textiles and clothing with increased comfort for the specific needs of children with skin problems. Principal investigator: the Faculty of Textile Engineering, doc. Ing. Antonín Havelka, CSc. This project was completed in June and has entered the sustainability phase.

In April, a new OP PIK project VIRATEX - Textile structures combining virus protection and comfort, reg. no. CZ.01.1.02/0.0/0.0/20_321/0024467, was launched. SINTEX, a.s., co-supervisor: Faculty of Textile Engineering, do. Dr. Ing. Dana Křemenáková, Ph.D., INOTEX spol. s r.o. and Research Institute of Veterinary Medicine, v.v.i.

### 4.1.3 TAČR projects

1. TF06000048 - SMARTTHERM - Intelligent thermoregulating fibres and functional textile coatings based on heat resistant encapsulated PCM. Principal Investigator: INOTEX spol. s r.o., Co-investigator: Faculty of Textile Engineering, prof. Ing. Jiří Militký, CSc.
2. TH04030390 - Complete removal of nitrogen and phosphorus from wastewater using

purpose-made textile biomass carriers. Principal investigator: TUL - Faculty of Textile Engineering, Ing. Brigita Kolčavová Sirková, Ph.D., Institute for Nanomaterials, Advanced Technologies and Innovations, co-investigator.

3. TH04010031 - Hollow polymer fibre heat exchangers for the automotive industry. Principal investigator: Brno University of Technology, co-principal investigator: TUL - Faculty of Textile Engineering, Ing. Brigita Kolčavová Sirková, Ph.D.
4. TL04000150 - R-DETI - Improving the care of children with skin problems from an ethical, social and health care perspective in times of pandemic crises. TUL - Faculty of Textile Engineering, doc. Ing. Antonín Havelka, CSc., co-supervisor.
5. FW03010095 - MultiTex - Advanced smart textiles with multifunctional effects to improve professional and functional clothing in hazardous environments. Principal investigator: the Faculty of Textile Engineering, doc. Ing. Antonín Havelka, CSc., University of West Bohemia in Pilsen

### 4.1.4 Projects of the Ministry of Education, Youth and Sports - Mobility Programme

1. 8J19UA011 - Research and development of nanoparticle modified textiles for the protection of human health and electronic devices. Principal investigator: TUL - Faculty of Textile Engineering, doc. Ing. Vladimír Bajzík, Ph.D.
2. 8JCH1064 - Design of multilayer micro/nano fibre structures for air filtration. Principal investigator: TUL - Faculty of Textile Engineering, prof. Ing. Prof Jiří Militký, CSc

### 4.1.5 Projects of the Ministry of Health

NU20J-08-00009 - Prevention of intestinal anastomotic leak and postoperative adhesions using nanofibrous biodegradable materials. TUL - Faculty of Textile Engineering (RNDr. Jana Horáková, Ph.D./Ing. Jiří Chvojka, Ph.D.) Other participants: Charles University, Faculty of Medicine in Pilsen.

### 4.1.6 Projects of the Grant Agency of the Czech Republic

1. 20-19297S - Nanofibrous polymers with restricted access material function for on-line chromatographic extraction of complex matrices. Researcher: Charles University, Faculty of Pharmacy in Hradec Kralove. Other participants: TUL - Faculty of Textile Engineering (Ing. Jiří Chvojka, Ph.D.)
2. 21-32510M - Advanced structures for thermal insulation in extreme conditions. Principal Investigator: TUL - Faculty of Textile Engineering, Mohanapriya Venkataraman, M.Tech., M.F.Tech, Ph.D.

## 4.2 Project applications prepared and submitted

*Table 17: Project applications ready in 2021*

| Provider | Beneficiary and co-beneficiaries | Name | Solver |
|---|---|---|---|
| TAČR - EuroNanoMed | [P] Technical University of Liberec<br>[D] Regional Hospital Liberec, a.s.<br>[D] Tel Aviv University, Israel<br>[D] Myoton AS, Estonia | 3D - Inflammatory Drug Release Antimicrobial Customized Materials | doc. Ing. Lukáš Čapek, Ph.D. |
| GP TUL - RISING STARS | [P] Technical University of Liberec | Theoretical Model of thermal performance of protective clothing under extreme ambient conditions: focus on Radiation protection and steam burns | Ing. Adnan Ahmed Mazari, Ph.D. |
| GP TUL - PURE | [P] Technical University of Liberec | Research of nanofibrous materials for the treatment of glaucoma disease | doc. Ing Jiří Chvojka, Ph.D. |
| GACR - Standard | [P] Jan Evangelista Purkyně University<br>[D] Technical University of Liberec | Investigating the molecular principles of electrostatic softening | doc. Ing. Pavel Pokorný, Ph.D. |
| MINISTRY OF THE INTERIOR OF THE CZECH REPUBLIC - IMPACT | [P] CHVUT - FBMI<br>[D] Technical University of Liberec<br>[D] ZČU - FEL<br>[D] SÚJCHBO | MOSENZ - Modular multisensory professional clothing for risk management, health and safety protection of members of the IZS using artificial intelligence methods | Doc. Ing. Antonín Havelka, CSc. |
| TAČR - ERA-NET | [P] Fraunhofer IKTS<br>[D] Technical University of Liberec<br>[D] Fraunhofer IWU | MeTexA - Material and process hybrids through Metallic Textile Anchor Structures | doc. Ing Jiří Chvojka, Ph.D. |
| TAČR - ERA-NET | [P] Kompetenzzentrum Holz, Austria<br>[D] Technical University of Liberec<br>[D] Hochschule Austria<br>[D] Alpex Technologies<br>[D] NOX Cycles Austria<br>[D] Standortagentur Tirol | Green Bike - Sustainable composites from hemp for lightweight applications | Ing. Blanka Tomková, Ph.D. |
| TAČR - ERA-NET | [P] Technical University of Liberec<br>[D] Centre for Hydraulic Research<br>[D] TU Dresden<br>[D] Miroslav Popov, Plastic | Green Impact - Green resin prepregs for high impact resistant laminates | Ing. Blanka Tomková, Ph.D. |
| Min. of Health - AZV | [P] UK, 3RD FACULTY OF MEDICINE<br>[D] Technical University of Liberec | Intraocular nanofibre implant for the treatment of glaucoma | doc. Ing Jiří Chvojka, Ph.D. |

| | | | |
|---|---|---|---|
| Min. of Health - AZV | [P] UL, Faculty of Medicine Pilsen<br>[D] Technical University of Liberec | Functional nanofibrous patches reducing the activity of bacterial and endogenous collagenases for the prevention of infection-induced colorectal anastomotic leak | Ing. Markéta Klíčová |
| HORIZON-CL4-2021-RESILIENCE-01 | [P] ECOLE NATIONALE SUPERIEURE ARTS INDUSTRIES TEXTILES, France<br>[D] FUNDACIO INSTITUT D'INVESTIGACIO SANITARIA PERE VIRGILI (IISPV), Spain<br>[D] PRONEEM, France<br>[D] THE UNIVERSITY OF MANCHESTER, UK<br>[D] INOTEX SPOL SRO, Czech Republic<br>[D] EESTI MAAULIKOOL, EE<br>[D] Color Center, S.A., Spain<br>[D] RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN, Germany<br>[D] TECHNICKA UNIVERZITA V LIBERCI, Czech Republic<br>[D] LONDON ADVANCED MATERIALS & PROCESSES LTD, UK<br>[D] GRADO ZERO ESPACE SRL, Italy<br>[D] L - UP SAS, France | ANAT - Advanced Nano Antimicrobial Textiles | prof. Ing. Jiří Militký, CSc. |
| HORIZON-CL4-2021-TWIN-TRANSITION-01 | [P] UNIVERSITY OF HUDDERSFIELD, UK<br>[D] ACONDICIONAMIENTO TARRASENSE ASSOCIACION, ES<br>[D] NEXT TECHNOLOGY TECNOTESSILE SOCIETA NAZIONALE DI RICERCA R L, IT<br>[D] HOEGSKOLAN I BORAS, SE<br>[D] NUEVAS TECNOLOGIAS PARA EL DESARROLLO DE PACKAGING Y PRODUCTOS AGROALIMENTARIOS CON COMPONENTE PLASTICA EN, ED<br>[D] MODUS RESEARCH AND INNOVATION LIMITED, UK<br>[D] BANTRY MARINE RESEARCH STATION LIMITED, IE<br>[D] TECHNICAL UNIVERSITY IN LIBEREC, CZ<br>[D] AS B'ZEOS, NO<br>[D] CRODA EUROPE LTD, UK<br>[D] MOLNLYCKE HEALTH CARE AB, SE<br>[D] FUCHS SCHMIERSTOFFE GMBH, Germany | NEXUS-M - GreeN EXtraction of biobased material for SUStainable manufacturing | Mohanapriya Venkataraman, M.Tech, M.F.Tech, Ph.D. |
| **2021 TOTAL** | | **12 ready-made project proposals** | |

## 4.3 Publication activity - R&D outputs

Publication activities of individual faculty members are of great importance in the scientific research and innovation activities of the faculty and are a reflection of its scientific and pedagogical potential. This activity is an important criterion for evaluating the quality and effectiveness of R&D&I activities in general. The evaluation of publication activity serves as a criterion for the allocation of funds to the faculty, for accreditation procedures, for the career development of individual staff members, etc. The publication activity of the staff is reported annually in CEP, the RIV database.

Materials Science - Textiles is one of the research subareas of the Web of Science, in which FT TUL

is active and is a key area for the faculty in the field of R&DaI. There are 25 journals indexed in Journal Citation Reports for 2021 in the Materials Science - Textiles subfield. In seven journals FT TUL has representation on the editorial board (according to JIF 2×Q1, 3×Q2, 2×Q3, 1×Q4), i.e. the faculty has representation of academic staff on the editorial boards of prestigious international textile journals covering the whole breadth of the textile field.

**The evaluation of selected outputs** by the Council's Research, Development and Innovation Department through Expert Panels using remote reviews is one of the bases for the evaluation of research organisations according to the M17+ Methodology under **Module 1**. The published reports summarising the findings of this evaluation on a sectoral basis are complemented by detailed comments from the chairs of the Expert Panels and an accompanying list of results.

Authors or co-authors from the Faculty of Textile Engineering at TUL were involved in the evaluation of selected results in the evaluation period H18+H19+H20 for 14 submitted results (13 in Engineering and Technology and 1 in Natural Sciences; of these 9 results in the criterion "Social relevance" and 5 in "Contribution to knowledge"). 4 results were rated at level 2 (excellent), 4 results were rated at level 3 (very good), 2 results were rated at level 4 (average), 4 results were rated at level 5 (below average).

**Publications (as of 8 April 2021)**

FT TUL proceeded to a detailed evaluation of the results in international rankings. Thomson Reuters' InCites analytical tool (https://incites.clarivate.com), based on citations of publications indexed in the Web of Science (WoS), enables advanced analysis of publication activities and the impact of research work at the level of individuals, teams, departments, institutions and individual disciplines.

***year 2021***

The Technical University of Liberec has 354 outputs recorded in the Web of Science database for the year 2021. Figure 2 shows the 10 most important fields in which it publishes. Materials Science - Textiles is one of the WoS research sub-areas in which TUL and especially the Faculty of Textile Engineering of TUL is active. InCites offers the opportunity to compare the scientific outputs of the Faculty of Textile Engineering of the Technical University of Liberec in this research sub-area with organisations not only in the Czech Republic, but also in Europe and the world. In 2021, 42 documents (all authored or co-authored by FT TUL) are recorded for TUL in this sub-area, which ranks FT TUL 22nd in the number of documents compared to other (c. 2010) organizations in the world.

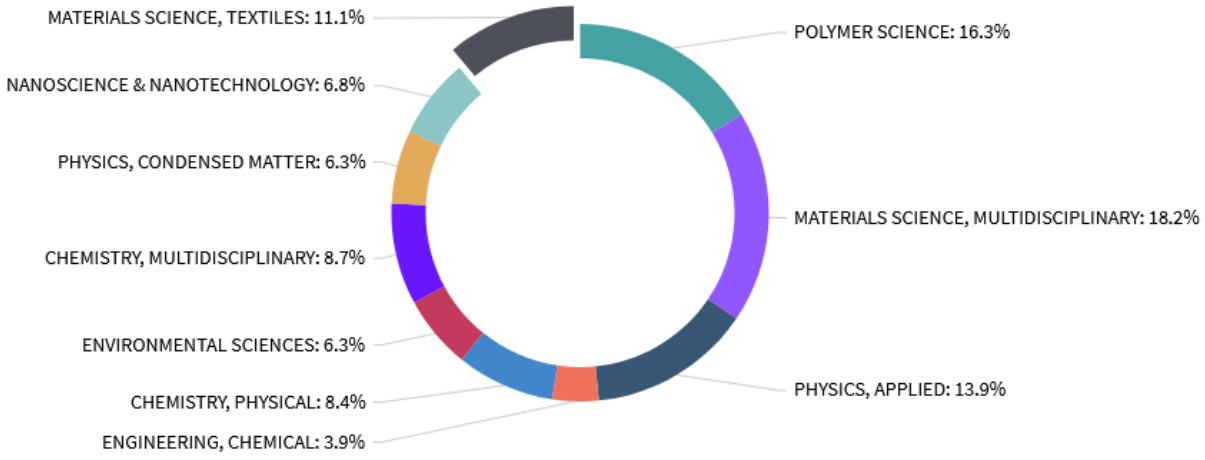


*Fig. 2: Share of documents in WoS fields in 2021 of the TUL organisation (top 10).*

***2017-2021***

The Technical University of Liberec has 1904 outputs recorded in the Web of Science database in 2017-2021. Figure 3 shows the share of the top 10 fields in which it publishes. In 2017-2021, TUL (FT TUL) with a total number of 291 documents in the research subfield Materials Science - Textiles ranks 9th compared to other (approx. 3603) organizations in the world (43.8% of documents in Q1 and 27.in Q2 according to JIF).

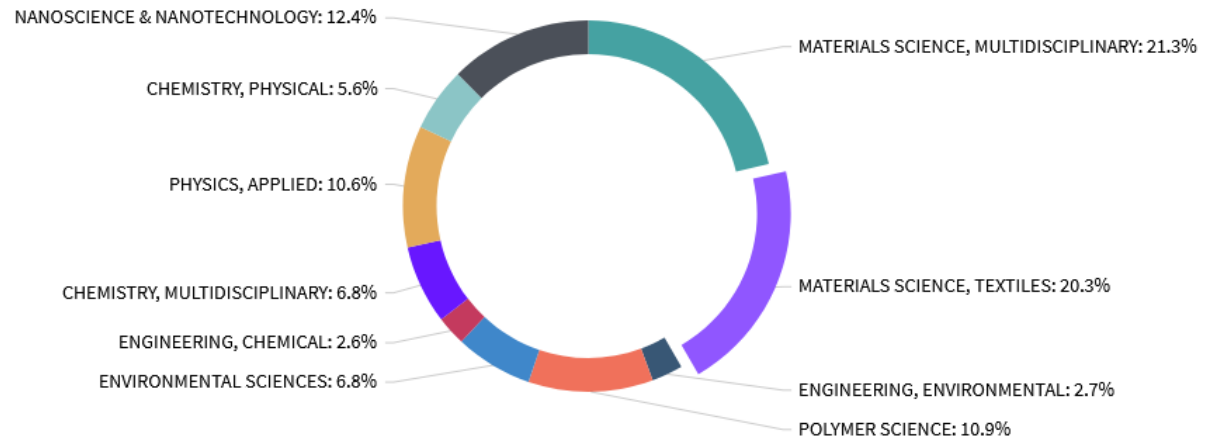


*Fig. 3: Share of documents in WoS fields in 2017-2021 TUL (top 10).*

***1980-2021***

The Technical University of Liberec has 5080 outputs recorded in the Web of Science database between 1980 and 2021. Figure 4 shows the share of the 10 most important fields in which it publishes. The total number of papers in Materials Science - Textiles for the Technical University of Liberec in 1980-2021 is 646, ranking the university 20th out of 4618 organizations (32.4% of papers in Q1 and 30.2% in Q2).

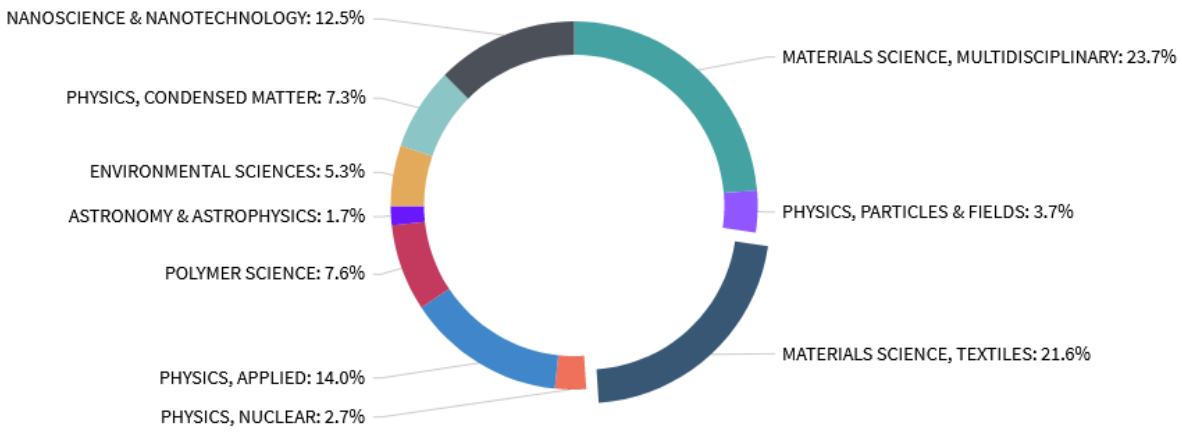


*Fig. 4: Share of documents in WoS fields in 1980-2021 TUL (top 10).*

***The world's most cited scientists***

On January 12, 2021, a list of the 2% most cited scientists in the world for 2019, which includes the SCOPUS database, was published in a summary article on the portal Vědavýzkum.cz. At the Technical University of Liberec, 5 scientists were listed, two of whom were from the Faculty of Textile Engineering at TUL (prof. Ing. Jiří Militký, CSc. and doc. Rajesh Mishra, B.Tech. Ph.D. - currently no longer active at the Faculty of Arts of TUL)

## 4.4 Exhibition activities - artistic outputs

The success of the TUL Faculty of Arts and the staff of the Department of Design is obtaining the status of an acceding faculty with the possibility of applying the results of artistic creative activity in the RUV (register of results of creative artistic activity). For the period 2021, 15 artistic outputs in two segments have been submitted for certification: Design (sub-segments: fashion, textiles, jewellery and glass, porcelain, ceramics) and Fine Arts (sub-segment: fine arts). Thanks to the broad disciplinary focus of the study programmes of the Department of Design, the faculty can apply its outputs in several sub-segments. Information about the outcomes of the various institutions involved in this project is available from www.iruv.cz. The artistic activities of academic staff are both original, collective, or act as guarantors of more extensive collective student activities.

Within the framework of artistic creative activities, the Faculty of Design of the Technical University of Ljubljana guarantees the activities of the university's Gallery N in Jablonec nad Nisou, where it organizes exhibitions of its own work, student work and many invited guests. Design Department staff also participate as exhibitors in other exhibition activities. The programme of Gallery N includes various artistic trends, Czech and foreign works and presentation of both well-known authors and student works of other art colleges.

As part of the activities of Gallery N, the Department of Design of the Faculty of Design of the Technical University of Liberec held 8 exhibitions in the field of design, applied arts and crafts and a presentation at the Festival of Museum Nights in the Liberec Region in 2021. Gallery N presented:

- January - SEMESTRALS Textile/Clothing 2021, exhibition of student work BSP Design
- February/April - SEMESTRALS Glass/Sperk 2021, exhibition of student work BSP

- June - SEMESTRALS 2021, exhibition of student work BSP Design
- June - Museum Night under Jested 2021
- June - Baccalaureates 2021, BSP Design Final Year Exhibition
- September - 100 years since the foundation of SUPŠ Železný Brod, exhibition
- October - ATTENTION SAHAT!, exhibition of student work in Textile Technology and Patterning
- November - STILL HUMEN, Legnica Jewellery Festival SILVER 2021
- December - Svatopluk Klimeš, IMAGES

Creations from the fields of design and visual arts were applied by KDE academic staff and BSP Design students as outputs of the RUV for the year 2021. These are specifically 13 activities in the Czech Republic and 2 abroad, namely:

- ŠIKOLOVÁ, L., *ON THE GAME,* Collective exhibition. DOX Gallery, Prague, 2021.
- *Museum Night under Ještěd 2021*, Jablonec nad Nisou, 2021.
- KADLECOVÁ, Z., *Painters of Pojizeří 2021*, Collective exhibition. Museum and Pojizerská galerie Semily, Semily, 2021.
- *Mercedes-Benz Prague Fashion Week SS22 2021*. Fashion show, Prague-Holešovice, 2021.
- *Mercedes-Benz Prague Fashion Week May 2021*. Fashion show, Drive-in Cinema. Prague-Holešovice, 2021.
- *BAKALAUREATS 2021.* Exhibition of student work from the final year of BSP Design. Gallery N, Jablonec n. N., 2021.
- *ATTENTION, SAHAT!.* Exhibition of student work in Textile Technology and Patternmaking. Gallery N, Jablonec n. N., 2021.
- *SEMESTRALS 2021*. Exhibition of BSP Design students' work. Gallery N, Jablonec n. N., 2021.
- MENŠÍKOVÁ, V., *National Student Design Award 2021*. International Design Competition. Prague, 2021.
- VÁLKOVÁ STŘÍLKOVÁ, J., *reGeneration 2021*. Collective exhibition. Museum of Bohemian Paradise in Turnov, Turnov, 2021.
- *OGL 2021 gala.* Fashion show. Regional Gallery Liberec, Liberec, 2021.
- HAVLÍČKOVÁ, M., *Silver /still humen*. International travelling exhibition. Gallery N, Jablonec n. N., 2021.
- ŘEZÁČ, V., *Thirty Years of Toyama Institute of Glass Art.* Collective exhibition. Toyama, Japan. 2021.
- ŘEZÁČ, V., *The Soul of Glass.* Collective exhibition. Museum of Glass and Jewellery in Jablonec n. N., Jablonec n. N., 2021.
- ŘEZÁČ, V., *Struck by Storm and Calm.* Collective exhibition. Museum of Glass Portheimka, Prague, 2021.

# 5. Internationalisation

In 2021, FT TUL continued its internationalisation, which is based on the long-term supported activities anchored in the Strategic Plan. The Faculty has developed long-term cooperation with most of the foreign universities dealing with textile issues from all over the world. International contacts are deepened by solving joint projects, preparing and organizing mutual meetings, seminars and conferences, preparing joint publications, exchange of students and teachers. Long-term cooperation exists with practically all major textile universities in the world. The following are monitored as the main performance parameters of creative activities:

- international excellence
- cooperation agreements (MOUs)
- organisation of international seminars and conferences
- mobility - departures, arrivals (according to funding - Erasmus+ KA103, Erasmus+ KA107, CEEPUS, Vysegrad funds, bilateral agreements between universities and interstate agreements)
- joint scientific research projects.

At FT, the guidance system has been developed so that students have information about the recognition of their activities in advance when they choose their trip. Students can study abroad for one or two semesters under the Erasmus+ programme. The credits awarded for courses successfully completed, i.e. successfully completed by examination, are counted towards the programme studied at FT.

## 5.1 International Excellence FT TUL

The Faculty of Textile Engineering is a full member of the International Association of Textile Faculties "AUTEX". A representative of the Faculty of Textile Engineering is a member of the committee for the revision of the accreditation of the joint study programme of the association Autex called E-Team NMSP "Textile Engineering" accredited in Ghent, Belgium.
As a member of the Association of Textile - Clothing - Leather (ATOK), it participates in EURATEX (European Apparel and Textile Confederation) meetings. FT TUL participates in activities related to international cooperation with the EU "European Technology Platform - Fibers Textiles Clothing".
In 2021, FT was again awarded international accreditation for the BS and NMS programmes by The Textile Institute for a duration of 5 years.
In 2021, FT actively participated in the preparation of the application for entry into the European Commission's New Eurepean Bauhaus project.

### Involvement in editorial boards of journals

Materials Science - Textiles is one of the research subareas of the Web of Science, in which FT TUL is active and is a key area for the faculty in the field of R&DaI. There are 24 journals indexed in Journal Citation Reports for 2021 in the Materials Science - Textiles subfield. In eight journals FT TUL has representation on the editorial board (according to AIS 2×Q1, 4×Q2, 2×Q3), i.e. the faculty has representation of academic staff on the editorial boards of prestigious international textile journals covering the whole breadth of the textile field.

FT TUL has been a **co-publisher of the professional journal** *Fibres and Textiles* (Slovakia), ISSN: 1335-0617 (http://vat.ft.tul.cz) indexed in the SCOPUS database (https://www.scopus.com/sourceid/17198) since 1994. Members of the editorial board - doc. Ing. Maroš Tunák, Ph.D., Ing. Veronika Tunáková, Ph.D., and honorary members of the editorial board - Ing. Jana Drašarová, Ph.D., prof. Ing. Jiří Militký, CSc.

Faculty members are **members of a number of scientific committees of various journals and conferences, professional organizations, and administrative committees**:

**doc. Ing. Lukáš Čapek, Ph.D.**

- Vice-President of the Czech Society for Biomechanics

**prof. Ing. Luboš Hes, DrSc.**

- Member of editorial boards of journals (Journal of Industrial Textiles (USA), Textile Research Journal (USA), Journal of Natural Fibers (USA), Fibers and Textiles in Eastern Europe (Poland), Journal of Engineered Fibers and Fabrics (GB), INDUSTRIA TEXTILA (Romania), Research Journal of Textile and Apparel (HK), Journal of Textile Engineering & Fashion Technology, Textilna Industria (Serbia), Journal of Leather and Footwear (Croatia)).
- Member of the Fiber Society, Princeton, (USA)
- Member of the Textile Institute, Machester (UK)

**Prof. Dr. Ing. Zdeněk Kůs**

- Member of VR FZS TUL, FT TUL, ZSF JČU
- Vice-Chairman of TAČR (until October 2021)
- Member of the Monitoring Committee of OP VAVpI
- Member of the OPIE Monitoring Committee
- Member of the Planning Commission of the OP JAK Programme
- Member of the Council of the Engineering Academy of the Czech Republic
- FT representative in SV CTPT

**Ing. Petra Komárková, Ph.D.**

- member of the editorial board of Tekstilec (Slovenia)

**Ing. Roman Knížek, Ph.D.**

- Court-appointed expert in Textiles and Engineering

**Ing. Gabriela Krupincová, Ph.D.**

- Vice President of the Administrative Committee CLUTEX - Cluster of Technical Textiles, o.s.

**doc. Dr. Ing. Dana Křemenáková**

- Member of the committee of the expert advisory body of the Ministry of Education and Science for mobility within bilateral and multiratelar scientific and technical cooperation

**Ing. Irena Lenfeldová, Ph.D.**

- President of the national Czech section of The International Federation of Knitting and Warp Knitting Professionals

**prof. Ing. Jiří Militký, CSc.**

- president of Czech Monitoring Committee of FEANI Brussels, Belgium
- Honorary Lifetime Contribution Award (TBIS) member
- Vice-Chairman of International Executive Committee, (TBIS)
- Member of editorial boards of journals (The Journal of the Textile Institute (England), Autex Research Journal (Poland), Research Journal of Textiles and Clothing (England), Fibers and

Textiles in Eastern Europe (Poland), Przeglad Wlokieniczny (Poland), Journal of Fiber Bioengineering & Informatics (Hong Kong), Journal of Textile Engineering (Hindawi), Vlákna a textil (Slovakia), The Information Bulletin of the Czech Statistical Society (Czech Republic).

**Ing. Jana Ornstová**

- Member of The International Federation of Knitting and Warp Knitting Professionals

**Ing. Hana Pařilová, Ph.D.**

- active work in TNK 31 (technical standardization committee), approval of adopted standards, revision of current standards
- external lecturer of the subject "Upholstery".
- professional cooperation with the Slovak Academy of Sciences - cooperation on the dictionary

**Ing. Jana Šašková, Ph.D.**

- Member of the Board of the Society of Textile Chemists and Colourists

**Ing. Renata Štorová, CSc**

- Member of The International Federation of Knitting and Warp Knitting Professionals
- Member of the working group (Identity, Promotion, Cooperation) of the project Liberec City Culture Development Strategy, taking into account the intention to be a candidate for the European Capital of Culture 2028.

**Ing. Pavla Těšinová, Ph.D.**

- FT representative for the meeting of the International Association of Textile Faculties "AUTEX"
- Member of the Governing Board of the International Association of Textile Faculties "AUTEX"
- Member of the Committee for the revision of the accreditation of the joint study programme of the Autex Association called E-Team NMSP "Textile Engineering"
- Member of the Editorial Advisory Board of Textile & Leather Review
- Member of the DZS Working Group on Bilateral and Multilateral Programmes
- Member of the Working Group on Entrepreneurship and Innovation, Research and Development for the preparation of the Development Strategy of the Liberec Region 2021+
- Member of the Working Group on Education, Entrepreneurship and Employment for the preparation of the Development Strategy of the Statutory City of Liberec 2021+

**Ing. Blanka Tomková, Ph.D.**

- Member of the Editorial Board of the Journal of Testing and Evaluation
- Member of the editorial board of Construction and Building Materials magazine,
- Member of the editorial board of the Journal of Engineered Fibers and Fabrics,
- Member of the Editorial Board of the International Journal of Adhesion and Adhesives

**Mohanapriya Venkataraman, M.Tech., M.F.Tech., Ph.D.**

- Editor of Polymers, special issue of Hybrid Polymer-Inorganic Nanocomposite

**prof. Ing. Michal Vik, Ph.D.**

- Representative of the Czech Republic in Division 1 Vision and Colour of the CIE (International Commission on Illumination)
- CIE TC 1-95 The Validity of the CIE Whiteness and Tint Equations
- member of the Czech National Committee of the CIE (CNK CIE)
- Vice-Chairman of the CSO (Czech Society for Illumination, z.s.)
- expert assessor CIA (Czech Institute for Accreditation, o.p.s.)
- member of the editorial board of the magazine Světlo

**doc. Ing. Martina Viková, Ph.D.**

- Member of the RSC (Royal Society of Chemistry)

- Member of AIC (International Colour Association)
- Vice-Chairman of the CSO (Czech Society for Illumination, z.s.)
- member of the editorial board of the magazine Světlo

**International evaluation of the university or its unit, including foreign accreditation**
All study programmes of FT TUL are accredited by the European Federation of Engineering National Associations "FEANI" (graduates can obtain the EURING degree after fulfilling other conditions (engineering practice). The professional organisation "The Textile Institute Manchester" accredits the BSP "Textile", NMSP "Textile Engineering" and DSP "Textile Engineering" study programmes until 2021.

**Invited lectures**

- prof. Ing. Jiří Miltký, CSc. Characterization and Ultimate Strength of Hybrid Glass Tapes. conference TBIS, 14th Textile Bioengineering and Informatics Symposium.
- Prof. Ing. Luboš Hes, DrSc. Thermal comfort Properties of Textiles in Wet State. international conference Recent Advancement in Textiles&Fashion, Nat. Inst. Of Fashion and Technology Delhi, India
- prof. Ing. Luboš Hes, DrSc. Algebraic Models of Thermal Resistance of Textile Fabrics in Wet State and Their Experimental Verification. International Conference On Sustainable Growth in Textiles, Kanpur India
- prof. Ing. Luboš Hes, DrSc. The Effect of Surface Structure of Cotton Knits on Their Water Vapour Permeability, Effusivity and Thermal Resistance. International Conference on Sustainability in Technical Textiles ICTS 2021. Bannari Amman Institute of Technology in South India. India

**Lectures for students abroad**
Faculty experts gave lectures to students abroad.

- prof. Ing. Michal Vik, Ph.D. gave a series of lectures on Lighting Engineering within Programa de Pós-Graduação em Engenharia Elétrica for UFSM students in Brazil
- prof. Ing. Luboš Hes, DrSc. He gave a lecture on Clothing Comfort for Master's students at ITM Dresden in Germany.

**Foreign internships at FT**
Internships of foreign workers were carried out at the faculty. A nine-month internship at the KTT was completed by Aleš Hrouda from KU Leuven, Belgium and six-month internships at the same department were completed by Marine Bourgeais and Lea Guerbe from Universite de Franche-Comté, France.

## 5.2 Cooperation agreements

Long-term cooperation exists with virtually all major textile universities in Europe and cooperation with major universities around the world is developing. The following table includes contracts exclusively with FT.

*Table 18: International cooperation agreements in force in 2021*

| The Continent | America | Europe | Asia | Africa | New Zealand |
|---|---|---|---|---|---|
| Contracting partners in the EU | - | 52 | - | - | - |
| Contracting partners worldwide | 1 | 24 | 22 | 6 | 1 |

New cooperation agreements (MOUs or Inter-institutional agreements) have been signed with the following institutions:

- ZHAW Zurich University of Applied Sciences, Winterthur, Switzerland
- Accademia di Belle Arti e Design Poliarte, Ancona, Italy
- Kyiv National University of Technologies and Design, Kiev, Ukraine.

**Contracting partners in the EU**

1. Pädagogische Hochschule Wien, Austria
2. Universiteit Gent, Gent, Belgium
3. KU Leuven, Faculty of Engineering Technology, Belgium
4. Technical University of Gabrovo, Gabrovo, Bulgaria
5. Trakia University, Stara Zagora, Bulgaria
6. University of Zagreb, Croatia
7. VIA University College, Denmark
8. TTK University of Applied Sciences, Estonia
9. Tampere University of Technology, Tampere, Finland
10. ENSISA, Mulhouse, France
11. ENSAIT, Roubaix,
12. Ecole Natinale d'Ingenieurs de Tarbes, France
13. Ecole Des Mines D'Ales, France
14. ESMOD Ecole Superieure des Arts de la Mode, Paris, France
15. RWTH Aachen University, Aachen, Germany
16. Albstadt-Sigmaringen University, Albstadt, Germany
17. Technical University of Dresden, Insitut for Textilengineering, Dresden, Germany
18. University of Applied Sciences, Zwickau, Germany
19. University of Applied Sciences, Monchengladbach, Germany
20. Fachhochschule Bielefeld University of Applied Sciences, Germany
21. Hochschule Hof, Germany
22. Hochschule Reutlingen, Germany
23. Kaiserslautern University of Applied Sciences, Germany
24. University of West Attica, Egaleo, Greece
25. Budapest University of Technology and Economics, Budapest, Hungary
26. Galway-Mayo Institute of Technology, Ireland
27. Kaunas University of Technology, Kaunas, Luthiania
28. Academy of Fine Arts in Warsaw, Poland
29. The E. Geppert Academy of Art and Design in Wroclaw, Poland
30. Strzemiński Academy of Fine Arts, Lodz,
31. Lodz University of Technology, Lodz, Poland
32. Kazimerz Pulaski University of Technology nd Humanities in Radom, Poland
33. Katowice School of Technology, Poland
34. University of Beira Interior, Covilha, Portugal
35. University of Minho, Guimaraes, Portugal
36. ESAD, Senhora da Hora, Portugal
37. Universidade da Madeira, Portugal
38. Gheorthe Asachi Technical University of Iasi, Iasi, Romania
39. Aurel Vlaicu University of Arad, Romania
40. Alexander Dubcek University of Trencin, Trencin, Slovakia
41. Academy of Fine Arts and Design Bratislava, Slovakia
42. University of Maribor, Maribor, Slovenia
43. University of Ljublajana, Slovenia
44. Universitat Politecnica De Catalunya, Spain
45. Escola Massana,

46. Universitat Politècnica de València, Spain
47. Barreira Arte y Diseño, S.L., València, Spain
48. Escuela de Arte y Superior de Diseno de Burgos, Spain
49. San Thelmo School of Art, Malaga, Spain
50. Universitat Autonoma de Barcelona, Spain
51. Textilhogskolan, Hogskolan I Boras, Sweden
52. Accademia di Belle Arti e Design Poliarte, Ancona, Italy

## Contracting partners worldwide

1. Polytechnic University of Tirana, Albania
2. Vitebsk State Technological University, Belarus
3. University of Science and Technology of China (USTC), Hefei, China
4. University of Science and Technology of China, Zhejiang, China
5. Zhejiang Sci-Tech University (ZSTU), Zhejiang,
6. Textile School, Wuhan Textile University, Wuhan, China
7. National Research Institure, Giza, Egypt
8. Bahir Dar University Institute of Technology for Textile, Garment and Fashion Design, Bahir Dar, Ethiopia
9. Indian Institute of Technology Delhi, India
10. Sardar Vallabhbhai Patel Insitute of Textile Management, Coimbatore, India
11. Anna University, Chennai, India
12. The Technological Institute of Textile and Sciences, Bhiwani, India
13. NIT Jalandhar, Jalandhar, India
14. Defence Bioengineerign and Electromedical Laboratory, Bangalore, India
15. DKTE Society´s Textile and Engineering Institute, Ichalkaranji, India
16. Kumaraguru College of Technology, Coimbatore, India
17. Department of Textile Technology, MLV Textile Engineering College, Bhilwara, India
18. Governmental College of Engineering and Technology, Serampore, West Bengal, India
19. Faculty of Textile Science and Technology, Shinshu University, Shinshu, Japan
20. Kyoto Institute of Technology, Japan
21. Auezov South Kazakhstan State University, Kazakhstan
22. University of Mauritius, Réduit, Mauritius
23. Waikato Institute of Technology, New Zealand
24. University of Bergen, Norway
25. National Textile University, Faisalabad, Pakistan
26. Balochistan University of Information Technology, Engineering and Management Sciences, Quetta, Pakistan
27. Durban University of Technology, Durban, South Africa
28. Rajamangala University of Technology, Krungthep, Thailand
29. Rajamangala Universtiy of Technology Thanyaburi, Thailand
30. Faculty of Science, Chulalongkorn University, Thailand
31. National Taipei University of Technology, Taiwan
32. National Engineering School of Monastir, Tunis
33. Hacettepe University, Ankara, Turkey
34. Istanbul Aydin University, Istanbul, Turkey
35. Uludag University, Bursa, Turkey
36. Cukurova University, Adana, Turkey
37. Dokuz Eylül University, Izmir,
38. Ege University, Izmir, Turkey
39. Erciyes Universtiy, Kayseri, Turkey
40. Mimar Sinan Fine Arts University, Guzel, Turkey
41. Gaziantep University, Sehitkamil/Geziantep, Turkey
42. Pamukkale University, Denizli, Turkey
43. Istanbul Technical University, Istanbul, Turkey

44. Atilim University, Turkey
45. Bursa Technical University,
46. Suleyman Demirel University, Turkey
47. Faculty of Engineering, Busitema University, Uganda
48. Birmingham City University, United Kingdom
49. The Scottish College of Textiles, Edinburgh, United Kindgom
50. Ukrainian Engineering and Pedagogical Academy, Kharkov, Ukraine
51. Kyiv National University of Technologies and Design, Kiev, Ukraine
52. The University of Alabama at Birmingham, Birmingham, USA
53. ZHAW Zurich University of Applied Sciences, Winterthur, Switzerland

## 5.3 Scientific conferences and seminars

*This part of the international activities was also greatly affected by the pandemic this year. International conferences were mostly postponed and rescheduled for later in the year, or held online. Academic staff and PhD students, on the other hand, were actively and promptly involved in both the organization and presentation of R&D papers on the topic - textile-based protective equipment in a pandemic.*

**Organisation of**

A number of members were part of teams that organized international conferences:

- International Conference **Clothing-Body Interaction 2021** - was organized by doc. Ing. Lukáš Čapek Ph.D. in cooperation with Prof. Dr.-Ing. Habil. Yordan Kyosev, TU Dresden, Germany, June 2-3, 2021, https://mt.webspace.tu-dresden.de/cbi/doku.php.
- Ing. Pavla Těšínová, Ph.D. was a member of the scientific board of the **7th International Symposium "Technical Textiles - present and Future Symnposium 2021**"
- prof. Ing. Luboš Hes, DrSc. was a member of a number of scientific councils
    - Conference on **Recent Advances in Textiles&Fashion**, Nat. Inst. Of Fashion and Technology Delhi, India
    - Conference **On Sustainable Growth in Textile**, Kanpur India
    - **International Conference of Applied Ressearch on Textile and Materials CIRAT 2021**, Monastir, Tunis
    - **The 10th international conference TEXTEH 2021**
    - Conference **IX Ukrainian-Polish Scientific Dialogues**, Khmelnytskyi National University, Ukraine

**Organisation of summer schools and courses**

**Summer School - International Summer School of Patterning 2021** - The Department of Technology and Structures organized the fourth edition of the full-time International Summer School of Patterning, which was postponed in 2020. *Due to the pandemic situation, it was conducted online*, .www.ft.tul.cz/fabric_patterning

**The course - International Course on Finite Element Method in Textile Engineering - was** organized **by** the Department of Technology and Structures. The main aim of the course was to provide the basic theoretical and practical aspects of the use of the Finite Element Method in Textile Engineering, http://www.ft.tul.cz/veda-a-vyzkum/course-on-fem/schedule.

**Project days -** 3 project days for secondary school students were organized by the Department of Technology and Structures. It was attended by pupils of the Secondary School of Fashion Design Kateřinky - Liberec, s.r.o., Gymnasium Turnov and Secondary School of Textile Industry in Liberec**.** The aim was to present the diversity of technical and clothing textile structures.

## 5.4 Mobility

Foreign mobility (internships, placements, summer schools, conferences, teaching stays) is supported within the Erasmus+ university mobility programme, Erasmus+ KA107 faculty projects outside the European Union, CEEPUS. Furthermore, mobility within the framework of inter-institutional agreements and inter-state agreements are implemented, which in some cases are supported by scholarships from the sending state or the receiving foreign university.

**Erasmus+ KA103, Erasmus+ KA107**
Students can study abroad for one or two semesters under the Erasmus+ programme. Credits awarded for successfully completed courses, i.e. successfully completed by examination, are counted towards the students' programme of study at FT. Information is provided in accordance with the organisational structure of FT (faculty management - departmental management) and coordinated with the University. Requests for trips are dealt with on an individual basis. FT allows all staff, both academic and non-academic, to take trips. International mobility (internships, placements, summer schools, conferences, teaching stays) is supported within the framework of the university Erasmus+ mobility programme, faculty Erasmus+ KA107 projects outside the European Union, CEEPUS. A staff member can go for a position that the programme allows.

Erasmus+ KA 103 projects are aimed at the mobility of individuals on the basis of inter-institutional agreements between institutions. It is possible to carry out study and work stays for students in the Programme Countries (the 28 EU Member States, the EEA countries Iceland, Liechtenstein and Norway, as well as Turkey and the former Yugoslav Republic of Macedonia). Academics can benefit from teaching stays and, together with research staff, can also be supported in training. Within the Erasmus+ KA107 project, teaching, study and training stays for students and staff can be implemented. All study visits are subject to credit recognition upon return to the home university in the framework of cooperation with Partner Countries (other non-programme countries).
A total of 31 courses were opened for foreign students with teaching in English, mainly for Erasmus+ students in the Textile Engineering field, and the Design field was also newly prepared with 11 courses including studio work.

*The 2019 Erasmus+ KA107 project application* for a two-year duration was submitted for mobility with Japan. The application was not approved for capacity reasons. Additional funds were approved to support international mobility for students not approved in the KA107 application under the same conditions of disbursement, including an open call for applications. Mobility with Japan was eventually not implemented in 2021 due to Japan's strict epidemiological measures. Therefore, the remaining funds were not used up and can no longer be drawn down.

*The Erasmus+ KA107 project application from 2020* for a two-year duration was submitted for mobility with Japan, New Zealand, Thailand and Albania. Except for New Zealand, all applications were accepted. Mobility has not yet started with any institution due to epidemiological measures.

The possibility to use this funding has been extended until 2023.

All outgoing students are given full credit for the credits they complete at the host institution abroad. Before arrival, students will already receive a proposal for future recognition within the university process managed in IS STAG by a "Learning Agreement for Studies" or "Learning Agreement for Traineeships" document. It is an established practice of FT to consult recognition with supervisors of disciplines, courses and relevant Vice-Dean. In particular, compulsory courses, compulsory electives and exceptional courses that are not compatible are recognised under their original designation as electives. The document proving the recognition in the IS STAG is called "The sending institution's transcript of records - proof of recognition" and is given to the student together with the record of the completion of the study abroad in the IS STAG.

All foreign students arriving for full-time study in the Czech language are seamlessly integrated into study groups together with Czech students. Short-term foreign students with teaching or training in English are mainly involved in projects in existing working groups in the departments and are also included in the studies of Czech students in subjects taught in English for Czech students, such as "Textile Engineering", "Fundamentals of Clothing Comfort". The university and the faculty provide administrative services throughout the study period and the ESN student club helps to provide leisure activities outside the classroom.

**Internships for incoming international students**

Based on negotiations with foreign organisations, FT has opened its laboratories to their students in 2021 for joint research projects in the form of summer work placements and internships organised individually, funded by Erasmus+ or other scholarships. The topics were announced on the basis of cooperation between the departments. Due to the epidemiological situation, only 4 work placements/internships of foreign students could be carried out for a total of 14 student-months.

**CEEPUS**

Another mobility programme that was valid in 2021 is CEEPUS, which is a Central European University Exchange Programme focused on regional cooperation within university networks. FT TUL is involved in the network "Ars-Techne: Design and Development of Multifunctional Products" CIII-SI-0217, which is sponsored by the University of Maribor. Other countries involved are Slovakia, Austria, Serbia, Croatia and Poland. In total, there are 13 universities. In 2021, due to epidemiological reasons, no stay was implemented.

**Teaching students in the WE-TEAM programme**

FT participates in regular teaching in the Master in Textile Engineering program sponsored by Ghent University, Belgium within the activities of the Autex Association. In 2021, two teachers were to go on a one-week teaching placement funded by an Erasmus+ contribution, due to the epidemiological situation, the teaching was carried out at a distance, namely:

- prof. Jakub Wiener - Subject: Advanced and Specialized Textile Processing - Dyeing & Finishing
- doc. Dana Křemenáková - Subject.

In 2021, FT students went on mobility abroad to Germany, Portugal, Spain, France, Slovenia, Croatia and Switzerland. Of the staff, 1 staff member was on mobility in Turkey in June 2021, 1

staff member was in Croatia in August 2021 and 1 staff member was in Poland in December 2021. Other staff mobility was postponed.

There was 1 full-time stay of a foreign expert from Poland. In addition, 2 online teaching weeks were held for students of the WE-TEAM study programme. These teachers were originally scheduled to go and teach for WE-TEAM on a full-time basis.

The students arrived in 2021 from Turkey, Poland, Belgium, Spain, France, Taiwan, Slovakia and the Netherlands. In addition, one student came as a self-paying student for a one-year study stay. One student arrived supported by an intergovernmental scholarship.

*Table 19a. Student outgoing*

| Provider of financial support | Number of months - request for support | Number of students *outgoing* | Number of months implemented |
|---|---|---|---|
| **Erasmus+ KA103** | 50 | 16 | 58,77 |
| **CEEPUS CIII-SI-0217-00-1718** | 13 | - | - |
| **Freemover mobility (without specific scholarship support)** | - | 1 | 3,6 |
| **Total** | - | 17 | 62,37 |

*Table 19b. Students*

| Provider of financial support | Number of months - request for support | Number of students *incoming* | Number of months implemented |
|---|---|---|---|
| **Erasmus+ KA103** | - | 15 | 47,87 |
| **CEEPUS CIII-SI-0217-00-1718** | 13 | - | - |
| **Freemover mobility (without specific scholarship support)** | - | 2 | 15,06 |
| **Total** | - | 17 | 62,93 |

*Table 19c. Staff outgoing*

| Provider of financial support | Number of days - request for support | Number of employees *outgoing* | Total number of days |
|---|---|---|---|
| **Erasmus+ KA103** | 90 | 3 | 9 |
| **CEEPUS CIII-SI-0217-00-1617** | 20 | - | - |
| **Total** | - | 3 | 9 |

*Table 19d. incoming employees*

| Provider of financial support | Number of days - request for support | Number of employees. *incoming* | Total number of days |
|---|---|---|---|
| **Erasmus+ KA103** | - | 1 | 5 |
| **CEEPUS CIII-SI-0217-00-1617** | 20 | - | - |
| **Total** | - | 1 | 5 |

# 6. The third role of the university / External cooperation processes

We understand the third role of the university as the intersection of the university world into the external world. The importance of the third role lies in the inseparability of science and education from the third role of the university.
It's being monitored:

- the supra-regional and national nature of cooperation
- cooperation with regional governments
- cooperation in R&D
- cooperation in education
- transfer of knowledge into practice
  - concluded contracts, implemented cooperation
  - professional training for companies
  - popularization and information events.

*The persistent epidemiological situation has in some cases led to the need to stay in online communication and establish cooperation in other forms, which was particularly the case in the first half of the year. At the same time, even in a relaxed mode, as part of the application of good practice, both FT TUL and company employees have incorporated crisis-tested practices into their communication where possible and appropriate and continue to use online platforms for partial negotiations. The purchase of protective equipment for FT TUL staff has been made.*

## 6.1 Supra-regional and national nature of cooperation

The Faculty of Textile Engineering of the Technical University of Liberec is the only one in the Czech Republic that provides higher education across the entire textile field. The faculty cooperates extensively with industrial enterprises and deals with a number of projects funded by various types of grants. In the long term, it creates conditions for successful cooperation with many universities and institutions oriented towards textile and material engineering.

The Faculty of Textile Engineering is a member of the Association of Textile, Clothing and Leather Industry ATOK (represented by Assoc. Ing. J.Chvojka, Ph.D.), the Czech Technological Platform for Textiles ČTPT z.s. (represented by Prof. Dr. Ing. Z.Kůs), the Technical Textiles Cluster Clutex z.s. (represented by Ing. G. Krupincová, Ph.D.) It cooperates with other members of these groups on a long-term basis.

In cooperation with Clutex, z.s., FT TUL tries to support and develop cooperation in the field of textile education also at the level of secondary schools and vocational schools within the framework of active participation in the meetings of working educational regional committees and within the framework of meetings of the management of secondary schools and vocational schools focused on textile and clothing issues.

## 6.2 Cooperation with regional governments

FT TUL together with Clutex z.s. participated and participates in updating the documents of the regional strategy RIS 3 in the Liberec, Hradec Kralove and Pardubice regions. FT TUL participates in the implementation of the Sectoral Agreement for the textile, clothing, leather and footwear industry in the Hradec Králové, Liberec and Moravian-Silesian regions and together with other actors seeks to expand activities to other regions.

A memorandum of cooperation was concluded with the Secondary School of Arts and Crafts in Železný Brod

*The event, which has been held for several years under the auspices of FT TUL, Clutex z.s. and the Society for Organizing the Clothing and Textile Competition, Liberec - a competition for young talents in several categories, where thematic designs and collections prepared by primary and secondary school pupils are selected - was cancelled after consultation with representatives of primary and secondary schools because the pupils could not prepare for it in the framework of on-line teaching.*

## 6.3 Cooperation in R&D

R&D cooperation focuses on searching for topics of possible cooperation in order to obtain joint projects, share research and development capacities, provide consultations, announce joint themes for bachelor and master theses, search for opportunities for internships and student placements, etc. (see chapter 4.1 Projects in progress).

Cooperation with companies associated under the cluster Clutex z.s., ATOK and ČTPT z.s. is based on a long-term basis, these companies appreciate the offer of joint research and development projects, internships for students, etc. The result is a positive perception of the faculty by the application sphere, more joint R&D projects and better use of R&D results in practice. The information and advisory service is focused on active meetings with potential cooperation partners from the application sphere.

## 6.4 Cooperation in education

The preparation and direction of the focus of the existing disciplines and study programmes accredited within the bachelor, master and doctoral study programmes implemented at TUL is regularly discussed not only with the members of Clutex z.s., but also with ATOK and CTPT z.s.

FT TUL in cooperation with industrial partners strives to ensure that experts from practice participate in the education of students. A great benefit for students is the possibility of excursions, study internships or work placements and the solution of diploma or bachelor theses, where the topics are based directly on textile companies. FT actively supports the mediation of work placements. The web interface related to the offer of internships, traineeships and jobs is constantly being updated (http://www.ft.tul.cz/studenti/praxe/praxe).

## 6.5 Putting knowledge into practice

The faculty staff actively develops mutual cooperation with the application sphere with the awareness of the necessity to comply with the implemented standards, especially with regard to IP and its commercialization. Methodological guidance is provided by the rectorate departments, which, in addition to providing advice, also provide legal services and interpretation of internal standards that regulate this issue. At the same time, the TUL FT is actively involved in professional sub-projects and is involved in projects such as TAČR Gama, and the TUL FT staff was actively involved in the OP3V project Effective Technology Transfer Process at TUL CZ.02.2.69/0.0/0.0/16_014/0000631, which aims to develop this part and actively introduce commercialization procedures into daily practice.

Within the framework of cooperation with industrial partners and R&D&I institutions from the Czech Republic and abroad, contractual cooperation is established related to the solution of contract research according to the partner's requirements, providing consultations and consultancy with regard to the partner's requirements and efforts to transfer knowledge and experience into practice, transfer of know-how and IP according to the partner's needs and requirements, solving specific tasks related to expertise and laboratory analyses according to the partner's current needs. For contract research, most companies prefer to use subsidy support instruments, e.g. innovation vouchers, TAČR projects. Funding from own resources is limited.

*Table 20. Transfer of knowledge and research results into practice*

| **Faculty of Textile Engineering** | | | | |
|---|---|---|---|---|
| | **IN THE CZECH REPUBLIC** | **Abroad** | **Number TOTAL** | **Total income CZK** |
| Number of new spin-off/start-ups* | 0 | 0 | 0 | |
| Patent applications filed | 4 | 0 | 4 | 0 |
| Granted patents** | 3 | 0 | 3 | |
| Registered utility models | 6 | 0 | 6 | |
| Licence agreements valid as of 31.12. | 3 | 0 | 3 | |
| Newly concluded licence agreements | 0 | 0 | 0 | |
| **Contract research, consulting and advisory services** | | | 3+ | 506 756 |
| **Paid training courses for employees of application** | 2 | 0 | 2 | 50 820 |

**Technology and know-how transfer**

In the framework of cooperation with industrial partners and R&D&I institutions from the Czech Republic and abroad, contractual cooperation is established related to the solution of contract research according to the partner's requirements, providing consultations and advice with regard to the partner's requirements and efforts to transfer knowledge and experience into practice, transfer of know-how and IP according to the needs and requirements of the partner, solving specific tasks related to expertise and laboratory analyses according to the current needs of the partner. Contract research is in most cases financed from the sponsors' own funds, only to a limited extent are instruments allowing the use of subsidy support, e.g. in the form of innovation vouchers, used.

The TUL FT prefers to conclude framework cooperation agreements, which allow to cover all possible forms of cooperation in general and then other agreements that correspond to the

specific form of cooperation (work contracts, service contracts, contracts for the provision of contract research, co-ownership agreements on joint IP, licensing agreements, lease agreements, agreements on joint project solutions, advertising and joint promotion agreements)
In 2021, 15 framework agreements for cooperation or for the provision of services and consultancy, work contracts, 1 contract research agreement, 2 co-research agreements, several operating agreements and 3 agreements for the exploitation of R&D results were newly concluded.

Another indicator of the success of the cooperation with the application sphere is the volume of income from additional activities (implementation of expert consultations, processing of laboratory tests including evaluation, provision of expert services, expert market research and news in selected areas) in the total amount of CZK 1 634 thousand. CZK.

**Contract research**
The societal contribution of the TUL FT has an impact across a wide range of companies and institutions with which the cooperation is implemented. FT TUL, in accordance with its mission and vision, focuses on cooperation with textile and clothing manufacturers as well as on cooperation with entities that apply fibre structures (e.g. healthcare, automotive, hygiene, security segments).
The benefits of contract research collaboration for FT TUL are:

- expanding opportunities for collaboration in new application areas;
- growth of opportunities to connect with companies on applied research projects (which companies prefer based on the strategy of the Czech Republic within the framework of the calls of TAČR and MIT);
- thanks to the prestige gained, FT TUL is actively involved in the creation of national strategies for the textile and clothing industry (see Cooperation with associations and platforms of manufacturers ATOK, Clutex, CTPT).
- From the point of view of the mission of the TUL Faculty of Arts, a significant benefit is the expansion of cooperation with future employers (innovation of the subject curriculum of accredited programmes with regard to the needs of practice, support for student mobility within the study, diversification of professional practice and soft-skills competences of students, the possibility of excursions, study internships or work experience and the solution of diploma or bachelor theses, where the topics are based directly on companies.

The scope of contract research is limited by the capacity of the faculty. The volume of funding is increasing slightly. In accordance with the strategy of FT TUL, the capacity is divided among activities ordered by the Czech sponsor (FT TUL carries out an average of 5 contract research activities per year). Due to its uniqueness within the world scientific community, FT TUL has also a long-term cooperation on activities commissioned by a foreign sponsor. The volume of resources is comparable to national activities and in accordance with the strategy and capacity of FT TUL, both directions of cooperation are coordinated with respect to the staff capacity of FT TUL.

Opportunities are sought on the basis of contacts of individual FT TUL staff in the national and international professional community. The administration of the TUL FT provides consultations and advice (support) for the creation of contracts and negotiation of contractual conditions (legal department, technology transfer department, vice-dean for R&D). The activities are recorded in the annual reports of the TUL FT and also in the central records of the TUL (HR, Accounts

Department). Profits are accumulated and used to finance the non-economic activities of the FT.

**Additional activities**
As revenues from non-public sources (other than grants or contract research), the TUL FT records revenues from the following activities (in order of frequency): expert analyses, consultations, testing, royalties and donations for R&D. The total amount of funds received is constant in order of magnitude and, in line with the TUL FT development strategy, proportionate to the size and capacity of the unit under evaluation. The most important benefit of this cooperation is the possibility of establishing new contacts with potential sponsors of contract research and subsequently planning joint projects.

Opportunities are sought on the basis of contacts of individual FT TUL staff in the national and international professional community. The administration of the TUL FT provides consultation and advice (support) for the drafting of contracts and negotiation of contractual terms and conditions (legal department, technology transfer department, vice-dean for R&D). The activities are recorded in the annual reports of the TUL FT and also in the central records of the TUL Profit is accumulated and used to finance the non-economic activities of the TUL FT.

**Professional training for companies**
In case of interest of industrial partners, tailor-made trainings are prepared as a part of the knowledge transfer, where the emphasis is placed on the needs of the target group, the priorities of the client and the capabilities of TUL's experts. The concept is prepared so that the interpretation can be supplemented with a practical part. The training takes place on the premises of FT TUL and the practical part is implemented in specialized laboratories and semi-processes of the faculty. Alternatively, the training is carried out at the partner's premises and the practical part is directed to the partner's own premises, taking into account the limitations involved. The aim is to refresh or supplement the professional terminology and selected technologies, to familiarize the trainees with new developments in the field and possibilities of mutual cooperation, and to obtain feedback related to selected activities of FT TUL. In 2021, the training was implemented:

- materials and technologies - JYSK
- dyeing and processing of ribbons - ELAS, ribbon production, s.r.o.

*Due to the epidemiological situation, there was less demand for training from companies.*

**Further promotion**

- activities of the University Gallery N, Jablonec n.N. ,
- participation in Mercedes Benz Fashion week.

**Professional and expert opinions**
On the basis of their expertise, the employees carried out an expert assessment of the damage caused by the fire to the fabrics at CALEDON textilie s.r.o. in Semily and an expert opinion on the suitability of the materials used in the reconstruction of the municipal boiler room was prepared for the Ministry of Industry and Trade in Brno.

**Professional videos**
doc. Dr. Ing. Dana Křemenáková created a professional video for the Indian Embassy „The History and Present of Textiles“.

## 7. Quality assurance and evaluation of implemented activities

The Faculty strives to evaluate all its activities and uses established procedures and methodologies partially implemented in the internal regulations of TUL. Feedback is evaluated at all levels of management. To ensure the quality of the Faculty's activities, internal audit (specific research, management level) and external audit (evaluation of state final examinations, Bachelor's and Master's thesis defences, rigorous examinations and dissertation defences for all programmes accredited in English) were partly used. Issues related to the use of funds, compliance with management rules and related problems were discussed at meetings of the management, departmental representatives and the Dean's College. The impact of the covid on the quality of teaching was regularly assessed. The Faculty Senate was actively involved in activities related to the evaluation of the level of relations between the faculty units, quality control of the website and compliance with collegial relations between teachers or students.

On 12 January 2021, a list of the top 2% of the most cited scientists in the world for the year 2019 was published in a summary article on the portal Vědavýzkum.cz, which includes the SCOPUS database. At the Technical University of Liberec, 5 scientists are listed, one of whom is from the Faculty of Textile Engineering at TUL (prof. Ing. Jiří Militký, CSc.).

FT TUL annually carries out a detailed evaluation of results in international rankings. Thomson Reuters' InCites analytical tool (https://incites.clarivate.com), based on citations of publications indexed in the Web of Science (WoS), enables advanced analysis of publication activities and the impact of research work at the level of individuals, teams, departments, institutions and individual disciplines.

**Module 3**

On 20 - 21 October 2020, the evaluation of MODULE 3 - Social Relevance (Results with economic or social impact, applied research grants; transfer of results into practice, cooperation with the application sphere, technology transfer) was carried out by the International Evaluation Panel (MEP). Due to the epidemiological *situation, the MEP members did not visit the university premises, the evaluation of individual units of TUL was carried out online*. FT TUL was rated with an overall score of **4 - Very good** on a five-point rating scale (1-Inadequate; 5-Excellent).

FT TUL responded in its activities to the assessment of Module 3 (M3). It considers the external assessment to be of the greatest benefit in confirming the correct view of the self and the possible or necessary correction of this view. The external evaluation has helped to identify strengths of which she was not previously aware (during the internal evaluation). Based on the findings, the faculty is strengthening the strengths

- Uniqueness of professional focus (R&D&I, A&D, education)
- Work on modern and topical R&D topics
- Involvement in the development of national strategies
- Adequate volume of orders resulting from the link with industry

Another contribution of the M3 evaluation is the identification of weaknesses (which are included in the evaluation committee report) of which the TUL FT is aware. FT is also aware that these are long term issues and is working to eliminate them. The weaknesses detected are:

- Failure in European projects (faculty will continue to support and increase efforts for

preparation of projects with international participation)

- Lack of involvement of younger professionals in visible activities of the international community. The structure of the report did not allow for more experts to be presented, although it is true that the personalities mentioned stand out above the rest and the FT is aware of the need to ensure continuity and support in involving young and promising colleagues in these activities.

**Development of equipment**

FT is constantly striving to be a leader in R&D. In order to maintain this goal in 2021, it has acquired the following instrumentation and other equipment

KMI

The department paid for a DELL Latitude laptop and a DELL monitor. The rest of the instrumentation was paid for by projects.

From the project "Hybrid Materials for Hierarchical Structures" (CZ.02.1.01/0.0/0.0/16_019/0000843) the following instruments were purchased:

- Datalogger U3430 temperature, humidity and CO2 logger,
- laboratory dryer VENTICELL 22 ECO,
- heating plate GESTIGKEIT PZ, TYPE PZ-28-1,
- Hotwind hot air blower system,
- peristaltic pumps,
- Triac heat gun,
- tripod,
- 2 Datalogger temperature loggers,
- laboratory drying room,
- Levenhuk digital microscope.

From the project "Advanced structures for thermal insulation in extreme conditions" (21-32510M) the GOLDBRUNN 1000 melting furnace was purchased.

From the project "VIRATEX - Textile structures combining virus protection and comfort" (CZ.01.1.02/0.0/0.0/20_321/0024467) a BEKO TSE1284N sample refrigerator was purchased.

The composite laboratory in building T was put into operation.

CNT

The department paid for the Eclipse microscope.

PH electrodes were purchased from the project Prevention of intestinal anastomotic leakage and postoperative adhesions using nanofibrous biodegradable materials (NU20J-08-00009).

The project Research on nanofibrous materials for glaucoma treatment (PURE-2021-6005) provided the digital thickness gauge INSIZE, infrared thermometer and pipettes with holder.

The SGS projects paid for a digital thickness gauge and an Apple MacBook PRO.

The thermometer with data logger was purchased from the project Nanofibrous Polymers with Restricted Materials Functionality for Online Chromatographic Extraction of Complex Matrices (20-19297S).

From the project Retrofitting of departmental classrooms for on-line state examinations, exams, on-line teaching, 2 computers, a DELL laptop and an Optiplex PC were purchased.

The project Hybrid Materials for Hierarchical Structures (CZ.02.1.01/0.0/0.0/16_019/0000843) financed the purchase of a distance sieve, a SONET thickness gauge, CAS scales and a laboratory power supply.

KTT
The department paid for the electric winch and compressor station.
The project Hybrid Materials for Hierarchical Structures (CZ.02.1.01/0.0/0.0/16_019/0000843) provided a touch screen monitor.

CODE
The laboratories of the Department were continuously equipped with new instruments, renewal of existing ones or instruments that responded to the change in the research situation due to the epidemic situation - the instrument for the evaluation of protective masks TESTER PRODYŠNOST MD025 - was purchased in cooperation with the Institute CXI TUL. In addition, small equipment for teaching and project solutions was purchased - a scissor grinder, a digital camera (from the project Hybrid materials for hierarchical structures - CZ.02.1.01/0.0/0.0/16_019/0000843), a distillation machine, one sewing machine for testing, a micro drill, a miniature GoPro camera. Overall, the department is very well equipped and has in some cases unique equipment, for example, a set of KES instruments for the evaluation of the wetting and deformation properties of textiles or instruments for the evaluation of the comfort of clothing.

The project Hybrid Materials for Hierarchical Structures (CZ.02.1.01/0.0/0.0/16_019/0000843) provided a scissor grinder and a digital camera.

WHERE
The department paid for the purchase of a turntable for sculptural modelling and a set of equipment for the photo studio (studio flash, reflectors and stand)
*In view of the ongoing pandemic situation, software and hardware for online teaching were purchased to ensure the quality of teaching. The purpose was to provide audio and video transmissions of the teaching in the same quality as is realized for physical face-to-face teaching.*

## 7.1 Management and College meetings

The closer management of the TUL FT (dean, vice-deans, secretary) met usually once a week, more often if necessary. The Dean's College usually met once a month, more often as needed. The basic legal norms of TUL were demonstrably conveyed at the meetings. Minutes were taken of all meetings of the colleges. The Dean convened operational meetings directly with stakeholders when necessary and to address urgent tasks.

## 7.2 Meeting of the Faculty Scientific Council

As a rule, the meetings of the TUL FT SC are held twice a year in the physical presence of the members, but due to the ongoing pandemic, in 2021 the TUL FT SC meeting was held once in the physical presence of the members of the Scientific Council (June) and once online (November). Materials for discussion, including resolutions, are published on the FT TUL website.

The 1st meeting of the SC of the TUL was held on 23.6.2021.
Agenda

- proceedings for the appointment as professor doc. Ing. Martina Viková, Ph.D.
- result of the meeting PER ROLLAM 14.6.2021
- Habilitation proceedings Ing. Brigita Kolčavová Sirková, Ph.D.
- Habilitation proceedings Ing. Jiří Chvojka, Ph.D.
  - Plan for the implementation of the Strategic Plan of Educational and Creative Activities of the Faculty of Arts of TUL for the year 2021
  - experts with the right to examine at the SZZ
  - experts with the right to examine at SDZ
  - various

*The 2nd meeting of the SC of the TUL was held on 22.11.2021. on-line.*
Agenda

- pan implementation of the Strategic Plan of Educational and Creative Activities of the Faculty of Arts and Technology for the year 2022
- Opening of the habilitation procedure of Mgr. Veronika Máková, Ph.D.
- experts with the right to examine at the SZZ
  a) existing - approved for old programmes
  (b) newcomers
- DSP trainers and experts with the right to examine at SDZ
- various - suggestion by prof. Antocha

## 7.3 Session of the Academic Senate

During the year 2021 there were 6 meetings of the AS FT TUL and 1 electronic voting. The topics discussed and resolutions dealt with by the Senate result from the activities of the Faculty.

AS FT TUL approved:

- Changes to the Rules of Procedure of the SC FT TUL
- FT investment plan for 2021
- TUL FT budget for 2021
- completion of the investment plan for 2021
- Annual report on the activities of the Faculty of Law for 2020
- Annual Report on the Management of the Faculty of Textile Engineering for 2020
- Proposal for the addition of members of the Scientific Council of the Faculty of Science of TUL
- Plan for the implementation of the Strategic Plan of Educational and Creative Activities of the Faculty of Textile Engineering of the Technical University of Liberec for the year 2021
- adjustment of the TUL FT budget for 2021
- NMSP Design - Textile, Clothing, Glass, Jewellery
- Supplement to the TUL FT budget for 2021 (DKRVO incentive part)
- admission requirements for the academic year 2022/2023
- Plan for the implementation of the Strategic Plan of Educational and Creative Activities of the Faculty of Arts of TUL for the year 2022
- additional investment of FT TUL for 2021 with an overlap to 2022.

## 7.4 Branch Council

The branch council for the doctoral study programme Textile Engineering P3106, P0723D270002 and P0723D270003 and Industrial Engineering P0723D270001 carried out basic conceptual, control and evaluation activities for doctoral study programmes, usually using the per rollam voting procedure.

The joint meeting of the departmental councils of the doctoral study programmes Textile Engineering P3106, P0723D270002 and P0723D270003 took place on 8 June 2021. The meeting of the departmental council of the study programme Industrial Engineering P0723D270001 took place on 16 June 2021.

The disciplinary councils dealt with the status of the doctoral study programme, the overview of supervisors and experts with the right to examine at the PhD and dissertation defences, the conditions and organisation of doctoral studies, the admission procedure, proposals of committees for dissertation and PhD defences, as well as the possibility of accrediting the DSP Industrial Engineering in English.

## 8. Evaluation and conclusion

On the basis of the above information, it can be concluded that in 2021 the Faculty of Textile Engineering of the Technical University of Liberec worked in accordance with the Strategic Plan of the Faculty of Textile Engineering of the Technical University of Liberec for the years 2021-2030 and the Implementation Plan of the Strategic Plan of the Faculty of Textile Engineering of the Technical University for the year 2021.

**Educational activities**
As of 31 December 2021, there were 650 students (452 BSP, 139 NMSP, 59 DSP) studying at TUL. 340 applicants entered the first year. In 2021 (in the period from 1 January to 31 December), a total of 122 students graduated from accredited study programmes.

**Creative activities**
The scientific and research work is based mainly on those directions in which the faculty has traditionally had a high level and quality staff background.

In 2021, the projects of the following providers were addressed: the MIT 4, TAČR 5, MZ 1, MŠMT 11, GAČR 2. The special-purpose funds received in 2021 amounted to EUR 26.6 million. CZK 26 million (excluding SGS), 12 project applications were prepared. TUL FT evaluates the quality of the outputs of its R&D activities using both the M17+ Methodology within Module 1 and the international analytical tool InCites by Thomson Reuters (https://incites.clarivate.com) based on citations of publications indexed on Web of Science. The outputs of the artistic part of the FT's creative activity are evaluated through the RUV certification

**Academics, staff**
In 2020, there were 119 employees working at TUL, of which 101 were academic employees, including science and research employees (9 with foreign citizenship).

**Internationalisation**
FT TUL has long been actively developing a number of international relations and has an excellent prestige. For example, the list of the 2% most cited scientists in the world for 2019 (which includes the SCOPUS database) lists 5 scientists from TUL, two of whom are from FT TUL.

**The third role of the university**
FT TUL is the only one in the Czech Republic providing higher education across the entire textile field. The Faculty of Textile Engineering is a member of the Association of the Textile, Clothing and Leather Industry ATOK, the Czech Technological Platform for Textiles CTPT, the Technical Textiles Cluster Clutex o.s. It has been cooperating with other members of these groups for a long time. FT TUL has more than 50 active framework agreements on cooperation with partners, other follow-up contracts dealing with specific assignments according to the requirements of both parties and contracts related to day-to-day operations.

**Impacts of the pandemic on the areas:**

a. educational activities

*Also in 2021, especially in the first half of the year, like the whole society, the activities carried out at FT TUL were significantly affected by the impact of the pandemic. FT TUL acted in accordance with the government measures coordinated by TUL. FT TUL assesses the impact of the pandemic by activity as follows*

***Provision of teaching**: Thanks to the necessity to switch to distance learning in 2020 when the use of technical means for online teaching was expanded (STAG - module for correspondence, e-learning, online teaching, teaching records), the faculty was well prepared for online teaching. In the summer semester, students had limited access to laboratories. Therefore, students were given the opportunity to defend their theses and take the CAP in the fall term (September). Due to the spread of the pandemic in the fall of 2021, the winter term in the combined form of study was conducted in the form of online instruction. The reason for this was to reduce the rate of spread of the coronavirus and reduce the likelihood of transmission.*

***Ensuring information in a crisis situation**: the pandemic and the resulting constraints placed special demands on the flexibility of information flows. The students of FT TUL were immediately informed about all measures and helped to solve their study, personal and health problems.*

***Study success rate**: in 2021, the study pass rate remained approximately at the same level as in 2020. Since there was a significant decrease in the pass rate in 2020, this step change can be seen as a consequence of the crisis related to the impact of the pandemic and the inability to participate in direct laboratory instruction, which is designed, especially in the first year, also as a motivator for studying the field (technology and materials laboratories).*

***Faculty cooperation with alumni: The** postponed 2020 alumni reunions were planned for 2021 as part of the 60th anniversary celebrations of the Faculty, but were cancelled again due to the pandemic and rescheduled for 2022.*

***Entrance Examinations:** in 2021 there were no talent examinations for BSP with personal participation of candidates due to the pandemic. Both rounds of the talent examination for admission were evaluated by an expert committee based on the artwork presentations sent in.*

***Enrolment:** conditional enrolment has been made available to students without a matriculation certificate, following a government decision.*

***SZZ**: The autumn term of SZZ was newly included in the FT TUL, committees with a lower number of members were formed*

Changes in the objectives of ***the Development Programmes:** the impact of the pandemic has made some of the stated objectives irrelevant or unfeasible. After the Rector's approval, the indicators were changed.*

*SGS: The Student Grant Competition in 2021 met expectations despite the unfavourable situation related to the complications caused by the global pandemic of COVID-19. Some international conferences where the researchers wanted to present the results of their work were cancelled and postponed to the next year, some were held only online.*

***SVOC**: Due to the epidemiological situation caused by the pandemic, the traditional student conference did not take place, but the submitted competition papers were assessed and evaluated by an expert committee for the given section.*

***The SGS Student Conference** was held online*

***Lectureships by foreign experts**: the pandemic has significantly reduced mobility compared to previous years. Only a stay in the last quarter was made.*

***Motivational events for prospective students / Cooperation with secondary schools**: the open day was held on-line, the regular competition Clothing and Textiles for Primary and Secondary Schools was postponed. The reason for this was the closure of the students' attendance in the second semester, as the participants were unable to prepare their collections as part of the school activities*

***Staff training**: as a result of the pandemic and the need to limit meetings to an online format, the structure and format of training has changed. Most were conducted online and staff made increased use of in-house training to support distance learning.*

***Mobility in general: as a** result of the pandemic, the structure of stays has changed, with fewer students travelling overall*

***Internships of incoming foreign students:** based on discussions with foreign organisations, the FT planned to open its laboratories to their students for joint research projects in 2021 in the form of summer internships and internships organised individually, funded by Erasmus+ or other scholarships.*

*Some of the summer schools were held online.*
***CEEPUS:*** *Another mobility programme that was valid in 2021 is CEEPUS, which is a Central European university exchange programme aimed at regional cooperation within university networks. FT TUL is involved in the network "Ars-Techne: Design and Development of Multifunctional Products" CIII-SI-0217, which is sponsored by the University of Maribor. Other countries involved are Slovakia, Austria, Serbia, Croatia and Poland. In total, there are 13 universities.*
**Erasmus+** ***staff****: Due to the pandemic, mobility has been significantly reduced compared to previous years.*

b. research activities

*The impact of the pandemic is evaluated by TUL FT according to the following activities:*
***R&D projects:*** *the pandemic did not significantly affect the research activities of the Faculty. The staff has been actively involved in the development of materials for respiratory protection and, thanks to their expertise and experience in textile materials engineering, are actively expanding their portfolio of R&D projects in the search for solutions and design of new materials for public health protection.*
***Scientific conferences and seminars:*** *This part of the international activities has been greatly affected by the pandemic. International conferences were mostly postponed and rescheduled for a year later or held online. Academic staff and PhD students, on the other hand, were actively and promptly involved in both the organization and presentation of R&D papers on the topic - textile-based protective equipment in a pandemic.*

c. Third role of the university, including other activities (e.g. direct and indirect support for students outside the teaching field, psychological counselling, extension/adaptation of library services, etc.).

***Communication with partners:*** *especially in the first half of the year, it was necessary to adapt the standard communication to the current situation and to continue to virtual meetings in the online space. In the second half of the year, communication with partners gradually started to return to face-to-face meetings.*

***Popularisation and information events:*** *due to the pandemic, not all planned events were implemented. Of the postponed events for the 60th anniversary of the Faculty of Textile Engineering, only the theatre performance was held.*

In Liberec on 16. 6. 2022 doc. Ing. Vladimír Bajzík, Ph.D., Dean