Annual Activity Report 2018

Technical University of Liberec
Approved by AS TUL FTE
Date 24 May 2019

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1. General information about the Faculty

Technical University of Liberec, Faculty of Textile Engineering (abbreviated as TUL FTE/ FTE)
Studentská 2, 461 17 Liberec www.ft.tul.cz
The key activities of the Faculty of Textile Engineering of Technical University of Liberec in the year 2018, primarily in the areas of educational and creative work, took place in keeping with the Strategic Plan of TUL FTE– defined in the documents entitled The Long-Term Plan of Educational, Scientific, Research, Development, Innovation, Artistic and Other Creative Activities of TUL FTE for 2016 – 2020 – and the Strategic Plan Fulfilment Roadmap for 2018.

1.1 Organisational structure of the Faculty

The Faculty's organisational structure is shown the following table:

Table 1: Organisational structure of FT

Department	Abbr.	Location
Department of Technologies and Structures	KTT	Liberec
Department of Nonwovens and Nanofibrous Materials	KNT	Liberec
Department of Clothing Technology	KOD	Liberec
Department of Design	KDE	Liberec, Jablonec nad Nisou
Department of Material Engineering	KMI	Liberec
Department of Textile Evaluation	KHT	Liberec

The structure of the Faculty (as at 31st December 2018) is shown in the following chart:

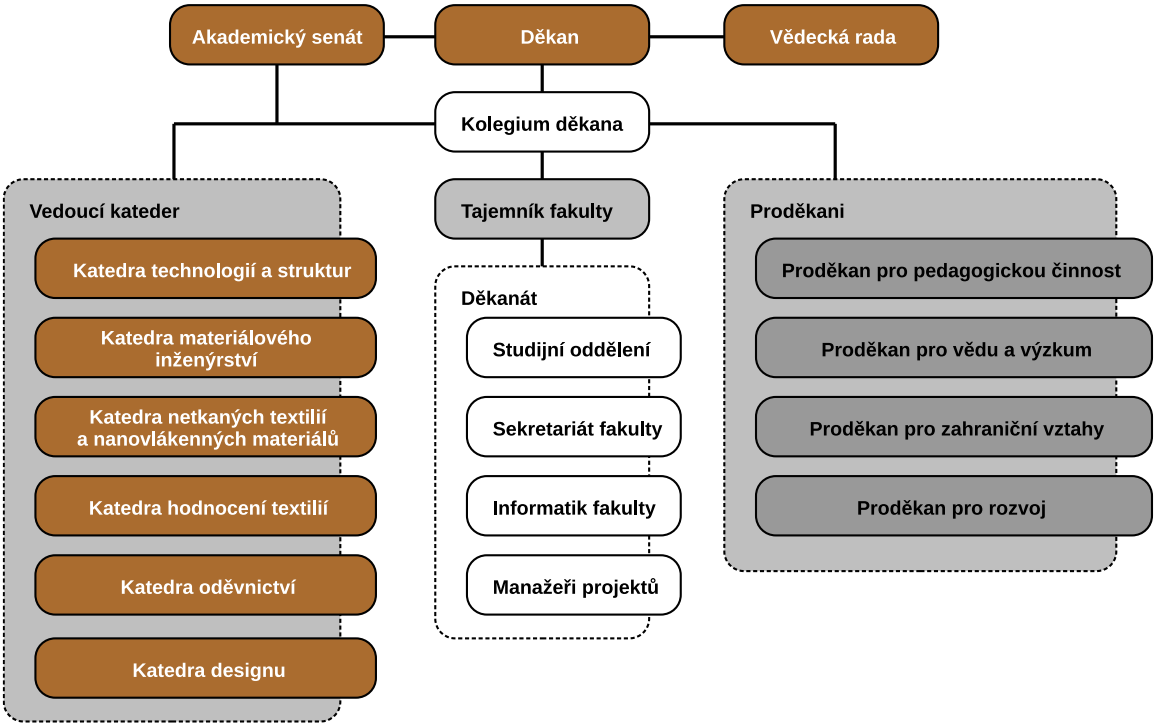


Fig. 1: Organisational structure of TUL FTE as at 31st December 2018

1.2 Bodies of the Faculty

This chapter provides information on the personnel structure of the Faculty's management, Academic Senate, Scientific Board and Branch Council.

Management of the Faculty

Dean:	Ing. Jana Drašarová, Ph.D.	
Vice-Deans:	Ing. Jindra Porkertová	Vice-Dean for Education
	Ing. Gabriela Krupincová, Ph.D.	Vice-Dean for Science and Research
	Ing. Pavla Těšinová, Ph.D.	Vice-Dean for International Affairs
	doc. Ing. Maroš Tunák, Ph.D.	Vice-Dean for Development
Head of Dean's Office:	Ing. Daniela Brzezinová	

Academic Senate:

Chairman:	Ing. Renáta Nemčoková (KOD)
1. Vice-Chairman:	Ing. Alžbeta Samková
2. Vice-Chairman:	Ing. Veronika Tunáková, Ph.D.(KMI)
Chamber of Employees:	Ing. Vlastimila Bergmanová (KDE)
	Ing. Irena Lenfeldová, Ph.D. (KTT)
	Ing. Miroslava Pechočiaková, Ph.D. (KMI)
	prof. Ing. Jakub Wiener, Ph.D. (KMI)
Chamber of Students:	Ing. Radek Jirkovec
	Ing. Stanislav Nevyhoštěný until 21st August, 2018
	Ing. Michal Martinka from 21st August 2018
Head of Dean's Office:	Ing. Daniela Brzezinová (DFT) – not a Senate member

TUL's Academic Senate members representing TUL FTE

Chamber of Employees:	doc. Ing. Vladimír Bajzík, Ph.D., Ing. Věra Jenčová, Ph.D.
Chamber of Students:	Ing. Zuzana Hrubošová

Scientific Council of TUL FTE

Dean of TUL FTE:	Ing. Jana Drašarová, Ph.D.	TUL FTE
Internal members:	prof. Ing. Luboš Hes, DrSc.	TUL FTE
	prof. RNDr. Oldřich Jirsák, CSc.	TUL FTE
	prof. Dr. Ing. Zdeněk Kůs	Rector, TUL FTE
	doc. Svatoslav Krotký, ak.mal.	TUL FTE
	prof. RNDr. David Lukáš, CSc.	TUL FTE
	prof. Ing. Jiří Militký, CSc.	TUL FTE
	prof. Ing. Bohuslav Neckář, DrSc.	TUL FTE
	prof. Ing. Petr Ursíny, DrSc.	TUL FTE
	prof. Ing. Jakub Wiener, Ph.D.	TUL FTE
	prof. Ing. Jaroslav Beran, CSc.	FS TUL
	doc. RNDr. Miroslav Brzezina, CSc.	FP TUL
	prof. Ing. Václav Kopecký, CSc.	FM TUL
	prof. Ing. Jiří Kraft, CSc.	EF TUL
	prof. PhDr. Tomáš Vlček, CSc.	FA TUL
External members:	prof. RNDr. Jaromír Antoch, CSc.	MFF UK Praha

prof. RNDr. Gejza Dohnal, CSc.	FS ČVUT Prague
Ing. Libuše Fouňová	CLUTEX - Technical Textile Cluster, o.s.
Ing. Petr Janák, CSc.	INOTEX spol. s r.o., Dvůr Kr.n. L.
prof. Ing. Lubomír Lapčík, Ph.D.	UTB Zlín
prof. RNDr. Miroslav Raab, CSc.	ÚMCH AV ČR Praha
doc. PhDr. Filip Suchomel, Ph.D.	AMU Praha
prof. Ing. Michal Šejnoha, Ph.D., DSc.	FSV ČVUT Prague from 6th October 2017
prof. Ing. Jaroslav Šesták, DrSc.	FyÚ AV ČR Praha
prof. Ing. Jaromír Šňupárek, DrSc.	FChT UPA
prof. Ing. Miroslav Václavík, CSc.	VÚTS, a.s., Liberec

Branch Council - Textile Engineering PhD programme

Chairman:	prof. Dr. Ing. Zdeněk Kůs	TUL FTE
Vice-Chairman:	prof. Ing. Bohuslav Neckář, DrSc.	FP TUL
Members:	doc. RNDr. Miroslav Brzezina, CSc.	FP TUL
	doc. Ing. Ladislav Burgert, CSc.	FCHT University Pardubice
	prof. Ing. Luboš Hes, DrSc., Dr.h.c.	TUL FTE
	prof. RNDr. Oldřich Jirsák, CSc.	TUL FTE
	doc. Ing. Eva Kuželová Košťáková, Ph.D.	TUL FTE
	prof. RNDr. David Lukáš, CSc.	TUL FTE
	prof. Ing. Jiří Militký, CSc.	TUL FTE
	Ing. Jiří Minster, DrSc.	ÚTAM AV ČR Praha
	prof. RNDr. Miroslav Raab, CSc.	ÚMCH AV ČR Praha
	prof. Ing. Petr Sáha, CSc.	UTB Zlín
	doc. Ing. Maroš Tunák, Ph.D.	TUL FTE
	prof. Ing. Petr Ursíny, DrSc.	TUL FTE
	prof. Ing. Miroslav Václavík, CSc.	VÚTS a.s. Liberec
	doc. Ing. Michal Vik, Ph.D.	TUL FTE
	prof. Ing. Jakub Wiener, Ph.D.	TUL FTE

Faculty Council

Dean:	Ing. Jana Drašarová Ph.D.	
Vice-Deans:	Ing. Jindra Porkertová	
	Ing. Pavla Těšinová, Ph.D.	
	Ing. Gabriela Krupincová, Ph.D.	
	doc. Ing. Maroš Tunák, Ph.D.	
Chairman of AS FT:	Ing. Renáta Nemčoková	
Head of Dean's Office:	Ing. Daniela Brzezinová	
Heads of Departments:	Ing. Brigita Kolčavová Sirková, Ph.D.	KTT
	Ing. Jiří Chvojka, Ph.D.	KNT
	prof. Dr. Ing. Zdeněk Kůs	KOD
	Ing. Blanka Tomková, Ph.D.	KMI
	Ing. Renata Štorová, CSc.	KDE
	doc. Ing. Vladimír Bajzík, Ph.D.	KHT

TUL FTE's representative with the Council of Higher Education Institutions

The Faculty's representative with the CHEI (Legislative Working Commission) is doc. Ing. Vladimír Bajzík, Ph.D.

2. Educational activities

This chapter summarises the main parameters of the Faculty's role within the University - its educational activities.

These primarily include performance parameters with regards to tuition:

- Accredited programmes of study
  - Students
  - Graduates
  - Applicants

and descriptive parameters outlining other educational activities:

- Links between educational and other creative activities
  - Thesis writing
  - Students' involvement in research projects run by various external providers
  - Students' involvement in specific research projects through the Students' Grant Competition (SGC)
  - Students' Science and Scholarly Activity Competition (SSSC)
  - Students' workshops - International Ph.D. students day
  - Supporting students' participation in competitions and exhibitions

- Links between education and internationalisation
  - Programmes of study in a foreign language
  - Lecture stays of foreign experts
  - Participation of the FT's students in industry placement programmes, internships, conferences and summers schools abroad

- Links between education and the Faculty's third role
  - Collaboration with prospective employers
  - Joint work on the design of programmes of study
  - Professionals from the application area teaching in accredited programmes of study
  - Consultation for and supervision of Bachelor's and Master's theses in collaboration with businesses
  - Scholarly lectures for students in association with businesses and graduates
  - Company excursions
  - Specialist work training for students
  - Motivational events for prospective students / cooperation with high schools

2.1 Accredited programmes of study

Since the academic year 2012/2013, starting from their first year, students have studied following unified accredited programmes of study. The Master's programme of study did not open again in 2018 due to a low number of applicants. All courses are also accredited for instruction in English. As a result of the dissolution of the Accreditation Commission the accreditations were automatically renewed for the period of three years before a new accreditation authority, currently in the process of formation, becomes fully functional. **The period of accreditation of the PhD programme of study Industrial Engineering was extended by ten years** in 2018, while in June accreditation applications for all the remaining programmes of study were submitted for approval to the National Accreditation Bureau (NAB).

Table 2: Study programmes prepared for accreditation and submitted to the NAB in 2018

SP type	Study programme name	Standard time	Form of study
BSP	Design	3	P,A
BSP	Textile Marketing	3	P,K,A
BSP	Textile Technologies, Materials and Nanomaterials	3	P,K,A
BSP	Production of Clothing and Technical Products	3	P,K,A
NMSP	Textile Engineering	2	P,K,A
NMSP	Industrial Engineering	2	P,K,A
DSP	Textile Engineering	4	P,K,A

Table 3: Accredited study programmes

SP code	Study programme name	KKOV	Course name	Standard time	Form of study
B3107	**Textile**	3107R006	Textile and Fashion Design	3	P,A
		3107R007	Textile Marketing	3	P,K,A
		3106R016	Textile Technologies, Materials and Nanomaterials	3	P,K,A
		3107R015	Production of Clothing and Management of Clothing Trade	3	P,K,A
M3106	**Textile Engineering**	3106T012	Textile Engineering	5	P,A
N3106	**Textile Engineering**	3106T017	Clothing and Textile Technologies	2	P,K,A
		3106T008	Nonwoven and Nanofibre Materials	2	P,K,A
N3957	**Industrial Engineering**	3911T023	Quality Management	2	P,K,A
		3901T073	Product Engineering	2	P,K,A
P3106	**Textile Engineering**	3106V015	Textile Techniques and Materials Engineering	4	P,K,A
P0723D270001	**Industrial Engineering**	-	Industrial Engineering	4	P,K

2.1.1 Students

The following table provides an overview of the numbers of students in accredited study programmes as at 31st December 2018. It is an output from the centralised SIMS registry.

Table 4: Students in accredited study programmes

Study programme	Students in a study programme								Students in total
	Bachelor's		Master's		Follow-up Master's		PhD		
	P	K	P	K	P	K	P	K	
B3107 Textile	389	137							526
N3106 Textile Engineering					81	24			105
N3957 Industrial Engineering					26	41			67
P3106 Textile Engineering							52	15	67
Faculty in total	**389**	**137**	**0**	**0**	**107**	**65**	**52**	**15**	**765**
Women out of the total	**281**	**100**	**0**	**0**	**75**	**42**	**20**	**7**	**525**

Table 5: Students in accredited study programmes by citizenship

Type of study	Students - Czech nationals	Students - foreign nationals
Bachelor's study programme	429	97
Follow-up Master's study programme	133	39
PhD study programme	31	36
FT in total	**593**	**172**

Traditionally, there are a number of students from abroad studying at the Faculty. The majority are from Russia (49), Slovakia (25), Ukraine (24), Pakistan (16), Kazakhstan (8) and India (12), while other countries include Egypt, Thailand, Turkey, China, Belarus, Vietnam, Poland, Canada, Uzbekistan, Mongolia, Azerbaijan, Georgia, Nepal, Syria, Bangladesh, Colombia and Kyrgyzstan. The number of foreign nationals studying PhD courses is higher than that of Czech citizens, which is the result of excellent international activities of TUL FTE's academic staff.

Consultancy and support for students in accredited study programmes

The majority of students who leave TUL FTE courses either by their own decision or due to a failure to meet their study obligations do so in their first year. Part-time students, whose numbers are traditionally high at TUL FTE, have higher failure rates. Some part-time students find it difficult to combine their learning and study activities with work-related and personal obligations; that is especially true at present as companies struggle with a shortage of workers and no longer support their employees' qualification growth. Full-time students most frequently fail because of an inadequate level of their knowledge and understanding of natural sciences acquired at high schools, often in combination with low motivation to study and lack of individual effort.

Table 6: Students' failure rates in accredited study programmes in %

Type of study programme	P %	K %	Total %
Bachelor's (all courses)	46	67	52
Master's (all courses)	0	0	0
Follow-up Master's (all courses)	48	62	53
PhD (all courses)	0	38	15
Total			**51**

*Note: * = "Students' failure rates" means a started course to failed course ratio of this cohort in year n and n+1. See Methodology.*

The TUL FTE strives to lower its students' failure rates. We make an effort to compensate for reduced starting knowledge by arranging with subject guarantors to increase the time devoted to tutorials and seminars for key subjects, with the beginning of the semester dedicated to reviewing without any detrimental effect on the overall quality of the subject. Tutors also provide group as well as individual consulting. Subjects with high failure rates are scheduled also for the year that follows in such a way so that instruction would not collide with compulsory subjects and students could regularly attend lectures.

We try not to encourage the extension of study time for instance by providing merit scholarship only to students who study according to the standard schedule. To prevent students from extending their time of study they regularly receive counselling from the Department of Studies' staff and the Vice-Dean for Education in the event they experience any difficulty with regard to their study, health or social situation. Students are recommended individually-tailored solutions. Extended study time fees are stipulated as decided by the Vice-Rector.

The Vice-Dean for Education and the Department of Studies' staff work closely with TUL's Academic Counselling and Support Centre. The Academic Counselling Centre informs all tutors about special-needs students, providing recommendations as to how to work with such students on an individual basis.

Talented students have the opportunity to get involved in research work at the departments, travel abroad as part of the Erasmus programme and take part in a range of student competitions (SVOC, scholarships provided by businesses, best thesis awards).

2.1.2 Graduates

In 2018 (between 1st January 2018 and 31st December 2018) a total of 136 students graduated from accredited study programmes. Of the total, 102 were women and 21 foreigners.

Table 7: Graduates from accredited study programmes (period from 1st January 2018 to 31st December 2018)

Study programme /course	Graduates from study programmes								Graduates in total
	Bach.		Mast.		Follow-up Mast.		PhD		
	P	K	P	K	P	K	P	K	
BS / TM	14	18							
BS / TON	29	0							
BS/VOMO	6	5							
BS/TTMN	10	4							
BS total	**59**	**27**							**86**

MS-N / OTI					14	2			
MS-N / NNM					3	1			
MS-N / RJ					2	2			
MS-N / PI					10	12			
MS-N total					**29**	**17**			**46**
DS							4	0	
PhD total							**4**	**0**	**4**
FT total									**136**

Note: The numbers of graduates do not include successfully completed short-term stays (data - outputs from the centralised SIMS registry)

Collaboration between the Faculty and alumni

The TUL FTE supports collaboration with alumni at departmental level. TUL TUL FTE runs facility tours during alumni reunions.

- 9th November 2018 – To celebrate its 50th anniversary, the KNT (**Department** of Nonwovens and Nanofibrous Materials) organized a graduate reunion at TUL FTE which included lectures, presentations, a laboratory tour and a dinner party.
- 5. 12. 2018 The KTT (Department of Technologies and Structures) celebrated its 60th anniversary on 5th December 2018. Approximately 160 alumni and associated industrial partners took part in the celebrations. Some of the alumni gave short presentations, recalling their student days and highlighting their career accomplishments from graduation until the present.
- The KDE (Department of Design) supported the BS TON touring exhibition focusing on jewellery. The name of the exhibition is A Zone without Borders, Bratislava, Prague, Legnica/PL.

PhD study programme graduates

In 2018, thirteen final state doctoral exams were taken; eleven of the students passed their exams: Zuhaib Ahmad, M.Sc., Ing. Iveta Danilová, Tao Yang, M.Sc., Xiaoman Xiong, M.Eng., Abdur Razzaque, M.Sc., Promoda Kumar Behera, Ing. Iva Mertová, Muhammad Tayyab Noman, M.Sc., Nareerut Jariyapunya, M.Eng., Jawed Naeem, M.Sc. and Ing. Tomáš Kalous.

For more information see this link on the Faculty's website.

In the same year four students successfully defended their dissertation and received a PhD degree. For more information on doctoral proceedings see this link on the Faculty's website. These successful graduates are listed below.

Bandu Madhukar Kale

Topic: Multifunctional Cotton Fabric with Nano TiO_2Loaded Cellulose
Supervisor: prof. Ing. Jiří Militký, CSc.

Moaaz Ahmed Samy Moustafa Eldeeb

Topic: Different Approaches for Predicting Air Jet Spun Yarn Strength
Supervisor: Ing. Eva Moučková, Ph.D.

Ing. Martina Novotná
Topic: Influence of Inorganic Reinforcement on the Mechanical Properties of Composites
Supervisor: Ing. Miroslava Pechočiaková, Ph.D.

Hafiz Affan Abid, M.Sc.
Topic: Surface Hydrophilization of Polyester
Supervisor: Ing. Jana Šašková, Ph.D.

2.1.3 Interest in studying

The following table shows statistical data regarding the numbers of students who applied for a place, students who were admitted and students who enrolled. This data is divided by individual study programmes.

Table 8: Numbers of applications

Study programme	Applications submitted [1)]	Admitted [2)]	Enrolled [3)]
BS total	407	396	235
DS total	13	10	7
NMS total	155	155	98
MS total	0	0	0
FT total	575	561	340

Note: 1) Applications submitted to the Faculty 2) Admitted students 3) Enrolled students

Characteristics of entrance exams

The TUL FTE conducts entrance exams using solely its own resources.

Bachelor's courses: The Faculty of Textile Engineering admits students mostly based on their high school results. To be admitted to the Bachelor's course Textile and Fashion Design applicants must pass talent exams.

Follow-up Master's courses: Applicants were admitted to the follow-up study programme via a recommendation by the Admission Board, without having to take entrance exams.

Applicants are admitted without entrance exams after their previous high school / university studies and any other activates have been evaluated, and until the capacity of the course has been filled. The first semester of the course is designed to be run as extended entrance examination period for students to demonstrate their abilities to study their chosen university course.

PhD courses: Last year, entrance exams for PhD courses took place in two rounds. Application submission deadlines were 15th February and 24th June 2018, and the Admission Board convened on 13th March and 12th July 2018. For a course of this type, applicants' overall qualifications are evaluated taking into account their successful completion of a Master's course, a CV describing

their skills, knowledge and competence and a covering letter including a draft dissertation topic. A pre-requisite for the admission of foreign nationals is recognition of their previous qualifications. The overall data on the numbers of students who applied, were admitted and enrolled are shown in the following table:

Table 9: Entrance exams for PhD courses

Entrance exams	CR	FOREIGNERS	Total/admitted/not admitted			ENROLLED
1st round	2	3	5	3	2	3
2nd round	4	4	8	5	3	4
Total	6	7	13	8	5	7

2.1.4 Development of educational activities

Educational activities in 2018 received additional funding through MSMT (Ministry of Education, Youth and Sport) projects (12 development project (MEYS Institutional Support)).
In the area of education access to study material in English as well as Czech has been gradually improving (via e-learning applications). Of significance for the Faculty's enhanced reputation was also participation in trade fairs.

EU operational programmes
Projects conducted under OP VK are currently running through the period of sustainability. In 2018, sustainability was required for one OP VK project (*3P – Praxe pro praxi (Work Experience through Work)*).
The year 2018 saw the continued active involvement of the Faculty of Textile Engineering in the university-wide project OP RDI RoLiz 4.0 - *Development of human resources at TUL for increased education relevance, quality and accessibility under the conditions of Industry 4.0*, reg. No. CZ.02.2.69/0.0/0.0/16_015/0002329.
The Faculty is involved in investigating the following key activities: KA01 – Project Management, KA02 – Improved Quality of Education, KA03 – Design and Modernisation of Study Programmes, KA04 – Labour Market Monitoring, Contact with Alumni, KA06 – Availability of Counselling and Assistance Services, KA07 – Learning Environment Adaptation and KA08 – Quality System and KA09 – Efficient Management Systems.
Other projects the Faculty of Textile Engineering takes part in include the *Efficient Technology Transfer Process at TUL* project, reg. No.CZ.02.2.69/0.0/0.0/16_014/0000631. The project's activities focused on implementing an efficient TT system at TUL.
As part of the *International Mobility of Researchers at TUL* project, reg. No.CZ.02.2.69/0.0/0.0/16_027/0008493, started in April 2018, the Faculty held talks about hosting junior researchers from abroad in order to expand and improve international collaboration.
The Faculty was also involved in University-wide OP VVV projects focusing on improving material and technical facilities for Bachelor's and Master's study programmes / courses - E*ducational infrastructure at TUL for increased education relevance, quality and accessibility under the conditions of Industry 4.0*, reg. No.CZ.02.2.67/0.0/0.0/16_016/0002553, *TUL Learning Environment Development Support*, reg. No. CZ.02.2.67/0.0/0.0/17_044/0008541. Both projects provided funds for purchasing equipment and software for the Faculty's laboratories and classrooms.

Development programmes

The following projects were conducted in 2018:

1. Developing design methodology for the cuts of children's clothing from elastic materials – Ing. Blažena Musilová, Ph.D.
2. Completion of the non-flammability laboratory to make it ready for instruction. Exhaust equipment. – Ing. Michal Chotěbor
3. Prototyping of textile structures – Ing. Ondřej Novák, Ph.D.
4. Innovation of the subject Physics of Polymers – prof. RNDr. David Lukáš, CSc.
5. Innovation of subjects Design and Patterning Laboratory and Practical Design – doc. Svatoslav Krotký, ak.mal.
6. Celebrations of the 60th anniversary of the Department (fields of weaving, knitting and spinning) December 2018 - Ing. Brigita Kolčavová Sirková, Ph.D.
7. International Summer School of Textile Patterning 2018 - Ing. Brigita Kolčavová Sirková, Ph.D.
8. International School - Using the finite element method in textile engineering – doc. Ing. Lukáš Čapek. Ph.D.
9. Developing the relevance of Bachelor's courses at FT – Ing. Renata Štorová, CSc.
10. Equipment for comfort measurement according to JIS L 1099 – Ing. Ladislav Nagy, Ph.D.
11. STRUTEX 2018 - Ing. Brigita Kolčavová Sirková, Ph.D.
12. Innovation of laboratories for the preparation and testing of samples of fibrous materials and analysis of their elementary properties – Ing. Blanka Tomková, Ph.D.

2.2 Links between educational and creative activities

Linking educational and creative work is a condition for the continuous innovation of study plans, where each academic has an obligation to enrich instruction in their field by new knowledge gained through their R&D and creative work. Students (especially those in Master's and PhD courses) are involved in projects and issues dealt with as part of their supplementary activities. In 2018 the TUL FTE again continued to support the involvement of students and junior researchers in key activities based on TUL FTE's Strategic Plan. Bachelor's, Master's and PhD students participated in R&D projects such as specific research, were involved in instruction preparation and took part in other creative activities related to the presentation of results and promotion of TUL FTE. TUL FTE's students also benefit from links between R&D, artistic activities and instruction as this provides them with the opportunity to creatively use new materials and advanced technologies.

2.2.1 Theses

Bachelor's and Master's theses are always linked to creative work conducted by the Faculty's R&D teams or artists. The following students' theses received awards in 2018:

Dean's Award:

- Bc. Barbora Kolačná: "Designing and testing systems of signalling features for primary school children and their testing "(BT)
- Bc. Martina Vilímová: "Centrifugal spinning of bicompetent fibres" (BT)
- Bc. Alena Schmidová: "Dying nonwoven textiles using the process of sublimination" (BT)
- Bc. Anna Havlíková: "Protective casings - Fashion collection" (BT)
- Bc. Iveta Harcubová: "Clothing for senior citizens" (BP)

Liberec Region Governor's Award:

- Ing. Nikifor Asatiani: "Study of alaptide diffusion from nanofibrous layers" (MT)

Preciosa Foundation Award:

- Bc. Martina Fabiánová: "Pair compositions - Glass objects" (BT)

Rector's Award:

- Ing. David Vítovský: "Study of curvature of drawn fibres using image analysis" (MT)
- Bc. Maxim Lisnenko: "Effects of degradation on the mechanical properties of nanofibrous polyester materials" (BT)

2.2.2 Students' involvement in research projects run by various external providers

The TUL FTE continued to take advantage of funding scientific and research activities of students from scholarship funds and made it possible for students to work part-time on commissioned projects and supplementary activities (see Chapter 4.1 Projects).

2.2.3 Students' involvement in specific research projects through the Students' Grant Competition (SGC)

This year 17 SGC 2018 projects were investigated and successfully defended. They were small-scale projects run by PhD students and projects run by academics and involving large teams. The factual and formal level of the projects was guaranteed by PhD students' supervisors, with other project team members including primarily Master's as well as PhD students of TUL FTE.

The outputs of SGS 2018 are described in detail in their final reports. In total, 32 conference papers resulting from SGC 2018 projects were presented, of which at least 14 are expected to be D-type outputs in Scopus or Thomson Reuters databases, 34 articles were prepared for Jimp-type journals (nine of them have already been published, two published online first, two accepted, seven are undergoing reviews and the remaining ones are prepared for submission by the end of February 2018). The outputs include a working sample, a utility model proposal, parts of dissertations of all PhD students of TUL FTE involved and parts of Master's theses to be defended in 2019. Project results were also presented at partner universities abroad as well as in the Czech Republic in order to provide inspiration for further collaboration.
In addition, a conference paper publish under project 21249 at the Autex conference received the Best Student Paper Award (A. R. R. Aboalasaad, Brigita S. Kolčavová, and Gözde G. Berk. "Effect of compression bandages on muscle's behaviour". AUTEX 2018 - 18th World Textile Conference, June 20-22, 2018).

Specific research projects run under the Students' Grant Competition:

1. 21237 - Study of adhesion of proteins to microfiber and nanofibre carriers for tissue engineering (Ing. Kristýna Havlíčková)
2. 21238 - Development of electrically conductive expansive and compression elastomere composites with various fillers (Daniel Karthik, M. Tech.)
3. 21239 - Measurements using a 4-microphone impedance tube and models for predicting the sound absorption impedance on nonwoven textiles with a high base layer (Tao Yang, M.Eng.)
4. 21240 - Functionalisation of nanofibre structures for tissue engineering (Ing. Jakub Erben)
5. 21241 - Development and application of new types of environmentally friendly chemicals for non-flammable textiles and textile composites (Muhammad Sajid Faheem, M.Sc.)

6. 21242 - Visibility in low-light conditions (Ing. Marcela Pechová)
7. 21243 - Study of composites from industrial yarns for wind turbine blades (Kasthuri Rajagopala Venkatesh/ Ing. Blanka Tomková, Ph.D.)
8. 21244 - Study of convective heat transfer using thermally-insulating materials with liquid closed-silicon air (Xiaoman Xiong, M.Eng.)
9. 21245 - New approaches to treating skin injuries (doc. Ing. Lukáš Čapek, Ph.D.)
10. 21246 - Improving application properties of special functional clothing (Ing. Adnan Ahmed Mazari, Ph.D.)
11. 21247 - Super-hydrophobic textiles with added functionality (Muhammad Zaman Khan, M.Sc.)
12. 21248 - Electric properties of epoxide composites filled with carbon fibres and nanofibres (Ing. Jana Novotná)
13. 21249 - Compression medical bandages (Ing. Brigita Kolčavová Sirková, Ph.D.)
14. 21250 - Alternative testing of layered materials with textile components in contact with moisture (doc. Ing. Ludmila Fridrichová, Ph.D.)
15. 21251 - Examining nonwoven structures using computer tomography (Smita Shamsunder Boob/ Ing. Vijaj Baheti, Ph.D.)
16. 21252 - Determining changes to physical properties of plaster coatings reinforced with fibrous material (Ing. Alžběta Samková)
17. 21253 - Analysis of PCL spinnability using AC electrospinning (Manikandan Sivan, M.Sc.)

2.2.4 Students' Science and Scholarly Activity Competition (SSSC)

In 2018, the Faculty of Textile Engineering was a co-organizer of the 10th edition of the Students' Science and Scholarly Activity Competition (SSSC) held at TUL's engineering faculties as part of the Institutional Programme for Universities for 2018 (announced by the MSMT (Ministry of Education, Youth and Sport)) and TUL's Institutional Plan for 2018, sub-programme "Support of Educational Activity Development". The competition was organized for four categories (Textile, Mechanical Engineering, Mechatronics, Economics) and had the form of a students' conference held on 24th May 2018 at Building G, Technical University, Liberec. Fifty-five students in total took part in the competition in the following categories: Textile, Mechanical Engineering (Bachelor's, Follow-up Master's), Mechanical Engineering (PhD), Mechatronics (Follow-up Master's), Economics (Bachelor's) and Economics (Follow-up Master's).

Conference proceedings Students' Science and Scholarly Activities 2018 were published (*Students' Science and Scholarly Activities 2018 - Textile*. Conference Proceedings, Technical University of Liberec, University Enterprise Liberec, May 2018, ISBN 978-80-7494-408-6), (*Students' Science and Scholarly Activities 2018 - Mechanical Engineering*. Conference Proceedings, Technical University of Liberec, University Enterprise Liberec, May 2018, ISBN 978-80-7494-412-3), (*Students' Science and Scholarly Activities 2018 - Mechatronics*. Conference Proceedings, Technical University of Liberec, University Enterprise Liberec, May 2018, ISBN 978-80-7494-410-9) and (*Students' Science and Scholarly Activities 2018 - Economics*. Conference Proceedings, Technical University of Liberec, University Enterprise Liberec, May 2018, ISBN 978-80-7494-406-2).

Each of the student contestants presented a short summary of their paper before an evaluation committee. After the presentations each committee announced the top three papers for each category. The winners received certificates, prize money and gifts. Nikifor ASATIANI came first in

the Textile category for his paper *Study of diffusion of alaptide from nanofibrous layers*, while Jan KOČÍB's paper *Analysis of the effects of milling recycled carbon fibres on the mechanical properties of epoxide composites* came second and the paper of Pavel KUŠNIERIK *Development of new methods of measuring the fineness of hyaluronic acid-base fibres* was third in the same category. The results of the competition and the gallery of photographs are published on the event's website at http://svoc.tul.cz/svoc_2018.

2.2.5 International Ph.D. students day

On December 5 - 7, 2018 the Faculty of Textile Engineering organized the 22nd edition of International Conference STRUTEX (Structure and Structural Mechanics of Textiles). As part of the conference an International Ph.D. Students Day (a workshop run by PhD students) was held on 3rd December 2018. Twenty-one students took part in the workshop. Fifteen papers were presented in the poster section of the workshop and six were selected for the poster section of the international conference (22nd International conference STRUTEX Structure and Structural Mechanics of Textile Fabrics, Conference book, Faculty of Textile Engineering, Technical University of Liberec, December 2018, ISBN 978-80-7494-430-7). A number of professors, docents and other experts from the Faculty and many conference guests including other PhD students (forty of them attended according to the attendance records) listened and talked to the presenting doctorands.

Guest lectures were given by professor Leonard Mwaikambo (University of Dar es Salam, Tanzania), professor Das Dipayan (Indian Institute of Technology Delhi, India), S. M. Ishiaque (Indian Institute of Technology Delhi, India) and Danas Sutula, Ph.D. (TUL FTE, CR). These guests were also members of the expert committee which alongside with TUL FTE's management's representatives evaluated the papers.

The expert commission selected three papers. Their principal authors received the Dean's Special Scholarship Award and gifts. The awarded papers included (in alphabetical order) PhD Student Muhammad Sajid Faheem for "INTUMASCENT FLAME RETARDANT BILAYER COATINGS ON COTTON FABRIC OF CASEIN AND AMMOIUM POLYPHOSPHATE VIA BILAYER ASSEMBLY", TUL FTE's PhD student Jana Novotná and her paper "DIELECTRIC PROPERTIES OF EPOXY COMPOSITES FILLED WITH RECYCLED CARBON FIBERS" and PhD student Tao Yang for "EVALUATION ON THE ACOUSTIC PROPERTIES OF MULTI-COMPONENT POLYESTER NONWOVENS".

2.2.6 Supporting students' participation in competitions and exhibitions

Markéta Klíčová: Ranked in the Thesis TOP 10 of the Czech Republic in the Werner von Siemens Award competition (the thesis supervised by RNDr. Jana Horáková, Ph.D.; KNT). February 2019. - ERN (Euroregion Neisse-Nisa-Nysa) 2018 Award in the Young Scientist category. December 2018, Hrádek nad Nisou. - Young Innovator of The Year Audience Choice Award - an international award under the auspices of Falling Walls. November 2018, Berlin. - The Liberec Region Governor's Award for outstanding educational, scientific and research work, June 2018, Liberec. - Falling Walls Lab National Winner - a national award under the auspices of Falling Walls. May 2018, Brno.

Students of the BSP TFD course (Bachelor's Study Programme - Textile and Fashion Design) took part in two competitions and eights exhibitions, two of which were held abroad. BSP TFD students participated in the following **competitions**:

- Fabiánová Martina. Design.s 2018. The Award of the Dean of the Multimedia

Communications Faculty of Tomas Bata University in Zlin. Brno, 2018.
(a total of nine TDF students competed)

- Fabiánová Martina. Stanislav Libenský Award 2018, Praha, 2018.

BSP students took part in the following **exhibitions**:

- BAKALAUREÁTY 2018. An exhibition of students' final works. Displayed design. Galerie N, Jablonec n.N., 2018.
- ŠPERK a SKLO (JEWELRY AND GLASS). A joint exhibition of students' works. Displayed design. Galerie N, Jablonec nad Nisou, 2018.
- TEXTIL-ODĚV (TEXTILE AND FASHION) 2018. A joint exhibition of students' works. Displayed design. Galerie N, Jablonec nad Nisou, 2018.
- Chereshneva Olga, Zemanová Markéta. ŠPERKSTRET Bratislava 2018. Displayed design. Bratislava, 2018.
- Prague Design Week 2018. Displayed design. A presentation of the works of students of the KDE. Prague, 2018.
- Zemanová Marie. Design week Zlin 2018.
- Krotká Filoména. Celebration - 20th international mini textile exhibition Bratislava 2018.
- Horáčková Kristýna et al. ILUZE DESIGNU. Ústí nad Labem, 2018.

PhD students are supported to take part in conferences primarily through the SGC.

2.3 Links between education and internationalisation

The scope of TUL FTE's internationalisation and international excellence is described in detail in Chapter 5 Internationalisation. The main impact on educational activities is mentioned there.

2.3.1 Programmes of study in a foreign language

The Faculty of Textile Engineering has all of its courses (in Bachelor's, follow-up Master's and PhD programmes) accredited for instruction in English as well as in Czech. The PhD and follow-up Master's study programmes "Textile Engineering", the "Clothing and Textile Engineering" course, provide instruction in English, and the first student is enrolled in a Bachelor's study programme. Although there is an interest in studying in English, applicants face problems in terms of recognition of their prior education and in obtaining visas. In order to attract tuition-paying students for selected courses the Faculty works with the Rectorate's Foreign Relations Department, and managed to enrol a limited number of applicants to start courses.

2.3.2 Lecture stays of international experts

Seventeen stays of foreign experts from the RSA, Mauritius, Turkey, India, Estonia, Slovakia, Macedonia, Spain, Russia, Ireland and New Zealand took place, nine of which were one-week stays under Erasmus+ KA103, three stays under Erasmus+ KA107, two stays under the MF TUL, one stay as part of the Visegrad Funds implemented in 2017-2018 and two stays were funded by foreign experts themselves. An overview of stays:

1. Elena TOMOVSKÁ - Department of Textile Engineering, Faculty of Technology and Metallurgy, University St. Cyril and Methodius, Macedonia
2. Alexander G. BANNOV – Faculty of Mechanical Engineering and Technology, Department of Chemistry and Chemical Technologies, Novosibirsk State Technical University

3. Cormac FLYNN – Galway-Mayo Institute of Technology
4. Adine GERICKE - Programme in Textile and Polymer Science, Department of Chemistry & Polymer Science, University of Stellenbosch, RSA
5. Hemrajsingh Roshan UNMAR - Department of Applied Sustainability and Enterprise Development, Faculty of Engineering, University of Mauritius
6. Gürcan GÜLER - Süleyman Demirel University, Faculty of Forestry, Isparta, Turkey
7. Diana TUULIK - Tallinna Tehnikakõrgkool/TTK University of Applied Sciences, Institute of Clothing and Textile, Estonia
8. Engin AKÇAGÜN - Mimar Sinan Fine Arts University, Vocational School, Apparel Production Technology Program, Şişli İstanbul, Turkey
9. Osman Ozan AVINC - Pamukkale University Engineering Faculty Textile Engineering Department, Turkey
10. Jela LEGERSKÁ - Alexander Dubcek University in Trencin, Faculty of Industrial Technologies in Puchov, Slovakia
11. Vladimíra KRMELOVÁ - Alexander Dubcek University in Trencin, Faculty of Industrial Technologies in Puchov, Slovakia
12. Jan KRMELA - Alexander Dubcek University in Trencin Faculty of Industrial Technologies in Puchov, Slovakia
13. Francesca PIÑOL - Escola Massana, Spain
14. Santiago PLANELLA - Escola Massana, Spain
15. Dipayan DAS - Department of Textile Technology, Indian Institute of Technology Delhi, Hauz Khas, New Delhi, India
16. S. M. ISHTIAQUE - Department of Textile Technology, Indian Institute of Technology Delhi, Hauz Khas, New Delhi, India
17. Paul EWART - Centre for Engineering and Industrial Design Waikato Institute of Technology Rotokauri Campus, Hamilton, New Zealand

2.3.3 Students' participation in industry placement programmes, internships, conferences and summer schools abroad

This participation is funded through mobility programmes Erasmus+ KA103, Erasmus+ KA107, funds provided directly to students by the Department of Foreign Affairs, TUL's and FTE's Mobility Fund (MF) and from funds of individual Departments (for more details see Chapter 5.4 Mobility). In 2018 a total of twenty-nine foreign-country study and work stays took place during the summer academic semester: twenty-three students under Erasmus+ and six students through other scholarship activities for a total period of seventy-four months; another thirteen foreign-country work and study stays ran during the winter academic semester 2018-19: eight students under Erasmus+ and five students through other scholarship activities for a total period of thirty months. In 2018 a total of forty-two students travelled abroad for 104 man-months.

2.4 Links between education and the Faculty's third role

Collaboration between prospective employees and TUL FTE takes place through sustainability of OP VK (Operational Programme Education for Competitiveness) projects. The key mission of those activities is to increase the employment rates of TUL FTE graduates in their fields. The most significant target is to set interdisciplinary collaboration. Work to achieve this target is under way through the innovation of the subject curricula of accredited programmes taking into account the

needs of the application area, supporting students' mobility throughout their studies, the diversification of industry placements and students' soft skills, all this based on feedback from students, graduates and employers. Of great benefit to students is the opportunity of company tours, study and work stays and writing Bachelor's and Master's theses whose topics are derived directly from businesses. Each year TUL FTE provides an opportunity for representatives of textile industry companies to present career options at their enterprises, either through employment workshops held at their sites and accompanied by company tours or specialized seminars and job fairs. Vacancies are advertised outside of the Department of Studies and on the Faculty's website. A functional database is continuously available for students to get information about collaboration between businesses and TUL FTE.

2.4.1 Joint work on the design of programmes of study

TUL FTE strives, in collaboration with industrial associates, to involve professionals from the application area in students' education. Collaboration with companies associated under the Clutex o.p. cluster is long-term, while these businesses also appreciate the Faculty's more open approach, its offer to run joint R&D projects and the opportunity to comment on newly-created study programmes and courses so that graduates would be more suited to the demands of the labour market. This link is maintained through staffing - ing. Gabriela Krupincová, Ph.D., Vice-Dean for Science and Research at TUL FTE, is a member of the administrative board of Clutex, taking part in Clutex general and other meetings; Ing. Libuše Fouňová, a manager at Clutex, is a member of VR TUL FTE, a member and chairperson of state final exams that take place at TUL for Bachelor's and follow-up Master's courses and acts as a thesis opponent.
Other scholarly discussions are held at other forums called for this purpose by regional self-government bodies or initiated directly by companies and management of textile engineering high schools. The discussions take place in keeping with sector agreements already in effect or under preparation.

2.4.2 Professionals from the application area teaching in accredited programmes of study

In 2018 a number of professionals from the application area were involved in providing instruction in accredited study programmes by running and sponsoring selected subject focused on project education and transfer of knowledge and R&D results into practical use:

- doc. Ing. Václav Klička, CSc., Ph.D. – Project
- Ing. Petr Štoček - Strategies of textile goods sales, Innovative marketing and sales management
- prof. RNDr. Gejza Dohnal, CSc. – Industrial experiment planning
- Mgr. Oldřich Palata - History of arts and fashion culture, Current arts and design, Aesthetics
- Ing. Jiří Koucký, CSc. - Glass and costume jewellery commodity analysis
- Ing. Zdeněk Štěpán - Glass and costume jewellery commodity analysis
- Ing. Jitka Burešová, Ph.D. – Textile stylistics
- doc. Emilie Frydecká, ak. mal. – History of décor, Graphics for designers
- Zdeněk Kindl – Computer graphics 1,2
- PhDr. Kateřina Nora Nováková, Ph.D. - Making costume jewellery
- Mgr. Denisa Smetanová - Making interior design
- Mgr. Ivana Hubáčková - Principles of partnership collaboration
- doc. Ing. Josef Dvořák, CSc. – Theory of weaving

2.4.3 Consultation for and supervision of Bachelor's and Master's theses

Most of the collaboration is not formalised and consultants from businesses need to be added to thesis assignments at a later date. The current practice which works well is for theses worked on in association with a specific business to be supervised by an academic from TUL FTE and assisted by an industry specialist acting as a consultant.

2.4.4 Lectures and seminars for students

Experts and outstanding graduates from the application area and other research and scientific organisations in the Czech Republic and abroad (see Chapter 3.2.3) were involved in TUL FTE's educational activities through specialized seminars covering selected subjects in keeping with the key targets of TUL's LTP (Long Term Plan) and TUL FTE's LTP. These seminars were conducted as part of instruction for individual subjects and separately for various audiences across the courses.

- Ing. Karel Boněk (RIETER CZ) – Spinning on rotary spinning machines (a lecture given as part of Spinning)
- Bc. Jiří Jiroutek, a photographer (a motivation talk by an industry expert, subject Theory of Colours)
- Ing. Petr Tylínek, a fashion artist (a lecture, subject Textile Stylistics)
- KDE academics - a seminar for students from the University of Hradec Kralove - Patterning of Jacquard textiles
- (international experts are listed in Chapter 3.2.3)

2.4.5 Company tours

Company tours at the following businesses were conducted in 2018:

- Kordárna Plus a.s. (Velká nad Veličkou, Senica), Continental Barum s.r.o. (Otrokovice), Toray Textiles Central Europe, s.r.o. (Prostějov), Clasic Cotton – přádelna s.r.o. (Jaroměř), Schoeller, s.r.o. (Křešice)
- NANOVIA s.r.o. Litvínov, Večerník s.r.o, Liberec, Inotex, Dvůr Králové n.L., Nanovia s.r.o, Litvínov-Chudeřín, VÚTS Liberec, Elmarco Liberec, Polypan, Hangzhou, China
- Juta Dvůr Králové n.L., Fibertex Svitavy, Retex Moravský Krumlov, PFNonwovens (Pegas) Znojmo, Ecotextil Horňátky

2.4.6 Industry placements for students

PhD courses at TUL FTE include a mandatory 6-month industry placement. In 2018 this mandatory placement and the subsequent presentation was completed by six students. Other PhD students worked at institutions abroad as part of this mandatory placement in keeping with their individual plans of study, with the placements to be completed at a later date during their courses. The optional subject Industry Placement is also taken by a number of Bachelor's and follow-up Master's courses.

2.5 Professionals from the application area teaching in accredited programmes of study

In February and November 2018 TUL FTE held Open Days for prospective students. The November Open Days are University-wide, with the Faculty having the opportunity to run its own

presentations and show its facilities such as laboratories and pilot plants to prospective students. Some high schools organise tours of laboratories and special pilot plants at TUL FTE also outside of Open Days. On 18th September 2018 it was already the fifth time that young fashion designers from the Czech Republic and Slovakia had met for the competition "Clothing and Textile, Liberec 2018, aka There would no clothing without textile". Students from primary and highs schools presented their fashion collections at the premises of the Technical University of Liberec under the auspices of the Faculty of Textile Engineering. The event was co-financed from the Fund for Education of the Statutory Town of Liberec and from the budget of the Liberec Regional Authority. Side events and textile workshops, prepared by students of the Secondary School of Textile Engineering, were held on the ground floor and in the lobby of the university building. Guests of honour from Poland, Spain and Portugal were invited through the EDTEX project. The Festival of Arts and Industry Schools of the Liberec Region, co-organised by the Museum of North Bohemia in Liberec, was held on the same day, and provided visitors with information, insights and personal stories about this branch of study. This live school presentation is intended primarily for prospective students and also fans of young student design and arts trades. As part of both of these events primary and high school students were taken on a tour of TUL FTE's departments.

Motivational events for prospective students

Search for and long-term work with talented individuals in primary and tertiary education, especially those who can be expected to become researchers in the fields of engineering and natural sciences that are developed at Technical University in Liberec, is an important activity. In 2018 the following activities were conducted with the aim to motivate high school students to further study in engineering branches:

- Open Days TUL, FTE
- Tours (high school) – SSTE Liberec – Technological laboratories at KTT
- Promotional presentations at primary schools - "How the Little Mole Got His Trousers" - presentation of textile techniques (Primary School 5. květen Liberec)
- Presentations given by PhD students: Jakub Erben: A presentation on tissue engineering and its applications at UTB, 19 November 2018, Tomáš Kalous: Presenting KNT at UTB in Zlin.

3. Academic staff, employees

In 2018 TUL FTE had 118 employees; of these 74 were academics. TUL FTE had nine professors, 14 docents, 31 assistant professors, 18 assistants and two lecturers. The overview of employee structure is shown in the following tables. In 2018 TUL FTE had nine academics - foreign nationals (numbers of individuals).

Table 10: Academics, researchers and other staff (full-time equivalents)

	Academic staff							Research staff				Other employees	Employees TOTAL
	Academics TOTAL	Professors	Docents	Assistant professors	Assistants	Lecturers	R&D staff involved in teaching	Postdoctoral researchers	Ph.D. students	Other R&D staff	Researchers not included in other		
Total	66.2	5.8	12.9	29.4	16.1	2.0	0.0	2.1	1.5	0.8	0.7	37.9	**109.1**
Out of that women	39.6	0.0	4.7	21.5	13.4	0.0	0.0	0.8	0.7	0.8	0.5	26.3	**68.6**

Table 11a: Age structure of academics

	Academic staff											
	Professor		Docents		Assistant professors		Assistants		Lecturers		R&D staff involved in teaching	
FTE	TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women
Up to 29							1					
30-39			1		11	6	3	3	2			
40-49	1		3	1	14	11	7	7				
50-59	1		7	4	2	2	6	5				
60-69	2				4	3						
Over 70	5		3				1					
TOTAL	**9**	**0**	**14**	**5**	**31**	**22**	**18**	**15**	**2**	**0**	**0**	**0**

Table 11b: Age structure of researchers

	Research staff								Other employees		TOTAL	Out of which women
	Postdoctoral researchers ("postdocs")		PhD students		Other science, research and development staff		Researchers not included in other categories					
FTE	TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women		
Up to 29 let			1	1					2	1	**4**	**2**
30-39	3	1	2	1			2	2	5	2	**29**	**15**
40-49									12	10	**37**	**29**
50-59									6	5	**22**	**16**
60-69					1	1	1		7	4	**15**	**8**
Over 70									2	1	**11**	**1**
CELKEM	**3**	**1**	**3**	**2**	**1**	**1**	**3**	**2**	**34**	**23**	**118**	**71**

Table 12: Numbers of academics by FTE and qualification

	Academic staff								Research staff		TOTAL	Out of which women
	Prof.		Doc.		DrSc., CSc., Dr., Ph.D., Th.D.		Other					
FTE	TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women		
Up to 0.3	2				1	1					**3**	**1**
0.31–0.5					1	1	2	2	3	3	**6**	**6**
0.51–0.7	2		1		2	1	2	1	1	1	**8**	**3**
0.71–1	5		13	5	26	18	15	12	6	2	**65**	**37**
More than 1					1	1	1				**2**	**1**
TOTAL	**9**	**0**	**14**	**5**	**31**	**22**	**20**	**15**	**10**	**6**	**84**	**48**

No habilitation or professorship proceedings were not completed at TUL FTE in 2018.
In the year 2018 employee selection was conducted for five academic and other vacancies at TUL FTE. On 9th March 2018 the selection committee recommended hiring two candidates for academic-rank associate professor positions at KMI (one vacancy), one candidate for an associate professor position at KTT (one vacancy), two candidates for a science and development staff position at KMI (one vacancy) and two candidates for a research staff position at KNT (one vacancy).
On 18th July 2018 the selection committee recommended hiring four candidates for a science and research staff position - Postdoc KMI 1 (one vacancy under the MOTUL project), two candidates for a science and research staff position - Postdoc KMI 2 (one vacancy under the MOTUL project), one candidate for a science and research staff position - Postdoc KTT (one vacancy under the MOTUL project), one candidate for a science and research staff position - Postdoc KOD (one vacancy under the MOTUL project) and one candidate for a science and research staff position - Senior KMI (one vacancy under the MOTUL project). The MOTUL project aims at improving the quality of research at TUL by enhancing the level of training of the University's researchers and expanding and improving the quality of international collaboration. Research is an important indicator of results of the University's work which are used in its assessment. Closer collaboration with international partners will provide an opportunity for the career growth of researchers and research teams and also significantly contribute to achieving highly regarded results which will be reflected in the assessment of the institution. The following selected candidates were hired and involved in the work of their departments:

- Postdoc KTT Danas Sutula joined on 10th September 2018. His job description is the modelling of thermal loads of tissues using the finite element method and validating calculation models through experiments. The postdoc is a member of the team of doc. Lukáš Čapek and will work under his supervision for 12 months.
- Senior KMI Leonard Mwaikambo joined on 11th October 2018. His area of expertise includes the development of composite systems reinforced by natural fibres with "green" (biopolymerous, biodegradable and biocompatible) matrixes as binding agents and an

understanding of their production and their use in industrial applications which he will be developing during his 6-month stay.

On 15th August 2018 the selection committee recommended hiring one candidate for an associate professor position at KDE - designer and jeweller (one position to fill in vacancy for a maternity leave period). On 26th September 2018 the selection committee recommended hiring three candidates for a science and research staff position - Postdoc KOD (one vacancy - 2nd round). On 29th November 2018 the selection committee recommended hiring one candidate for the Head of Department position at KNT (one vacancy).

Table 13: Recorded employee numbers as at 31st December 2018 – natural persons

Staff	Prof.	Doc.	AP	Assist.	Lect.	Academics TOTAL	Researchers	Academics and researchers TOTAL	OT	HSP	Trad.	TOTAL	Out of which women
KTT	3	1	5	4	1	15	1	16	2	1	0	17	9
KMI	2	4	6	4	0	17	2	19	3	1	1	23	20
KHT	1	3	6	1	0	11	2	13	0	1	0	12	7
KOD	1	1	6	2	0	10	1	11	3	1	1	16	10
KNT	2	2	6	0	0	11	4	15	2	1	0	14	6
KDE	0	3	1	9	1	14	0	14	5	0	0	18	9
DFT	0	0	1	0	0	1	0	1	1	5	0	7	6
SFT	0	0	0	0	0	0	0	0	0	4	0	4	4
FT	**9**	**14**	**31**	**20**	**2**	**76**	**10**	**86**	**16**	**14**	**2**	**118**	**71**

3.1 Education and training for employees

Education and training for employees took place at TUL FTE throughout the year.

- Training for purchased equipment such as a DSC, a laser analyser of part distribution, a Xenotest Alpha, a spectroradiometer, a transfer print press and a Shima Seiki hybrid knitting machine was conducted as part of OP RDE projects focusing on material and technical procurement.
- Technology scouts (Zdeněk Kůs, Jiří Havlíček, Pavla Těšinová, Gabriela Krupincová) took part in expert training under the university-wide OP RDE project *The efficient technology transfer at the Technical University of Liberec* covering topics such as contracts and contractual relationships in the context of technology transfer and legislative aspects of TT in health care, workshops with international experts focusing on TT issues and economic aspects of TT in the area of intrapreneurship.
- The university-wide OP RDE project *Development of human resources at TUL for increased education relevance, quality and accessibility under the conditions of Industry 4.0* aims primarily at developing key competencies of teaching and other staff of the university and implementing measures to enhance the relevance of graduates on the labour market under the conditions of Industry 4.0 and information society, improving the quality of assistance and counselling services and improving conditions for students with SP or coming from a disadvantaged background and implementing and strengthening the system of providing and internal evaluating of the quality and strategic management of the university in the context of legislative changes. .
- Training focused on improving teaching skills (an internal language school, a two-year university teaching course for engineering branches).

- Other specialist training and courses for academic staff and PhD students (a first aid course for KNT staff and PhD students; KTT – training for software for preparing patterns for weft knitting by SHIMA SEIKI CZ.

3.2 Motivational tools of employee remuneration

TUL FTE has no career scheme for its academic staff; however, it has drawn up Framework Criteria for habilitation and professorship proceedings. The criteria can be seen as general guidelines for framework requirements for habilitation and professorship candidates at TUL FTE. The key factor of those proceedings is primarily the stance of the habilitation and assessment committee.

Personal bonuses (based on performance and projects; monthly or half-yearly) are determined by Heads of Departments (or faculty sections) depending on the individual contribution of each employee. In 2018, based on the Dean's proposal the Senate paid out 3,337 thousand CZK from its financial result as a special annual bonus to employees. The amount of bonus for each employee was determined by the decision of Heads of Departments based on overall annual appraisal.

TUL FTE employees have an opportunity to take advantage of TUL's facilities such as its own nursery SKATULKA and TUL's children's playroom, accommodation at its residential facilities (halls of residence, hostels, start-up flats) and TUL's range of sports and physiotherapy options.

3.3 Aid to PhD students and junior academics

Aid is provided especially to junior researchers and PhD students, perceived as prospective colleagues. Aid is granted to the following activities:

- R&D activities from scholarship funds and specific research conducted through the Student Grant Competition (SGC);
- Workshops for PhD students from study programmes of the Textile Engineering Faculty and Mechanical Engineering Faculty of TUL;
- Participation in exhibitions and competitions;
- Participation in the students' Science and Scholarly Activity Competition (SSSC);
- Industry placements;
- Publication scholarships;
- International mobility (placements, internships, summers schools, conferences, study stays) is supported through the University's Erasmus+ mobility programme, faculty Erasmus+ KA107 projects for stays outside of the EU, CEEPUS and TUL's and FTE's Mobility Funds (MF).

Motivational tools for student remuneration

TUL FTE provides successful Bachelor's and follow-up Master's study programme students with merit scholarships. Of the total sum of scholarship paid in 2018 these scholarships amounted to 288 thousand CZK including scholarships paid out for graduating with honours.

PhD students receive scholarships from the FTE through funds provided from the MEYS, with these scholarships amounting to 4,433 thousand CZK in 2018.

In 2018 the Faculty paid out accommodation scholarships in the amount of 1,723 thousand CZK and social scholarships in the amount of 40 thousand CZK.

4. Science and research, development, innovation, artistic and other creative activities

TUL FTE conducts creative activities as defined by §1 of Act No. 111/1998 Coll., on Higher Education Institutions in the following areas:

- Fundamental research (funded from contributions and CSF funds)
- Applied research (funded from contributions, TACR funds, projects run by Czech ministries, joint research and commissioned research)
- Innovation activities (as part of supplementary activities in the form of commissioned jobs)
- Artistic creative work

TUL FTE's creative activities are based on its Strategic Plan. Aid is provided in particular for those research activities which are in keeping with the fast developing research trends. Scientific and research work is linked especially to those areas where the Faculty has traditionally had a high level of competence and quality staffing alongside with a high likelihood of receiving financial aid through various grant competitions. The science and research development of the FTE targets primarily the following areas:

1. **New materials**. Research and development of new materials in the field of clothing and technical textiles, development of composite structures containing inorganic fibres, nanoparticles and textile reinforcements and the design and evaluation of intelligent textiles.
2. **Metrology and new quality assessment methods.** Modelling the properties of fibre and textile formations using CAD, development of methods for evaluating the comfort of textiles, quality assessment, textile comfort and defects of textiles.
3. **Advanced textile technologies.** Modification and development of technologies for processing new materials, new sources of energy and new transport media in textiles, interdisciplinary use of textiles, use of optical fibres and shape memory materials for engineering products, development on the field of textile sensors and sensors suitable for use in textiles, Ecological aspects of new technologies.
4. **Use of nanotechnologies.** Research, development and use of nanotechnologies in textiles, production and use of nanofibres and nanofibre structures, application of nanoparticles for special effects.
5. **Application of results of creative work in product design and innovation.** Application of results of new material and technology research in product design and innovation. Development of new methods and forms of design work. Harmonizing the artistic and technological elements of design and maintaining artistic design concepts while applying scientific methods and procedures.

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

- Projects
- Publication activities
- Exhibition activities

4.1 Projects

Science and research projects focused on fundamental and applied research including experimental development are an integral part of the Faculty's work. Project funding makes it possible to extensively develop R&D activities and forms a significant portion of the FTE's budget. Projects from the following provider were investigated in 2018: MIT (8), TACR (4), MH (1), MI (1), CSF (1), MEYS (1). The purpose-tied funds received in 2018 amounted to 32.78 million CZK (excluding the SGC).

4.1.1 Projects under EU Operational Programmes – Science and Research

Projects run under the OP RDI (pre-seed – Nanofibre materials for tissue engineering and Innovative products and environmental technologies) were completed in 2015 and now are in the period of sustainability (the updated Financing Gap and Sustainability Monitoring Report are submitted for each monitored period of the projects).

In 2018 the evaluation of project application for OP RDE Adtifex was completed; the project was accepted for funding but due to the financial allocation of this call it was included in the project pipeline.

The Faculty actively participates in the OP RDE project TUL education infrastructure for increased education relevance, quality and accessibility under the conditions of Industry 4.0, reg. No. CZ.02.2.67/0.0/0.0/16_016/0002553, through which a range of new equipment will be procured. The Faculty's activities run primarily under KA03 – Material and technical equipment.

In January 2018 a project called Hybrid materials for hierarchical structures, reg. No. CZ.02.1.01/0.0/0.0/16_019/000843, was started. The project is conducted in collaboration with the Faculty of Mechanical Engineering and the Institute for Nanomaterials, Advanced Technologies and Innovation. The aim of the project is interdisciplinary research to help achieve excellent results.

4.1.2 Ministry of Industry and Trade projects

TRIO programme

1. FV10098 - MediTex - Research and development of new types of advanced textile materials with high potential intended to be applied in special textiles for medical and convalescent care. Investigator: VÚB a.s., co-investigator: Faculty of Textile Engineering, doc. Ing. Antonín Havelka, CSc.
2. FV10111 - SeniorTex - Smart modular clothing and textile products with integrated electronic microsystems for improving the health care of the aging population and handicapped people. Investigator: VÚB a.s., co-investigator: Faculty of Textile Engineering, doc. Ing. Antonín Havelka, CSc.
3. FV10356 - Hybrid safety equipment. Investigator: Sintex a.s., co-investigator: Faculty of Textile Engineering, prof. Ing. Jiří Militký, CSc.
4. FV10416 - Nanofibrous wound dressings. Investigator: VÚOS a.s., co-investigator: Faculty of Textile Engineering Faculty, prof. RNDr. David Lukáš, CSc.
5. FV20287 – Texderm – Textiles and clothing showing increased comfort intended for specific needs of children suffering from dermatological troubles. Investigator: VÚB a.s., co-investigator: Faculty of Textile Engineering, doc. Ing. Antonín Havelka, CSc.
6. FV30147 – Firtex – Textile structure enabling the back emission of human body thermal radiation. Investigator: Nanovia s.r.o., co-investigator: Faculty of Textile Engineering, prof. Ing. Jiří Militký, CSc.

OP PIK, Application programme

1. CZ.01.1.02/0.0/0.0/15_019/0004528 SENIOR - Special clothing and textiles of high useful properties based on the new generation of smart materials for increasing the efficiency of health and social care for the elderly.
   Investigator: VÚB a.s., co-investigator: Faculty of Textile Engineering, doc. Ing. Antonín Havelka, CSc.
2. CZ.01.1.02/0.0/0.0/15_019/0004588 Sky Paragliders a.s. – Research and development of new technical fabrics for air rescue systems.
   Investigator: Sky Paragliders a.s., co-investigator: Faculty of Textile Engineering, prof. Ing. Jiří Militký, CSc.

OP PIK, Collaboration programme (under Clutex – Technical Textiles, o.s. cluster)

1. CZ.01.1.02/0.0/0.0/15_007/0002114 – Joint research – Clutex I. The Faculty of Textile Engineering provided consultation in investigating some of the sub-projects.
2. CZ.01.1.02/0.0/0.0/16_079/0008314 – Joint research – Clutex II. The Faculty of Textile Engineering provided consultation in investigating some of the sub-projects.
3. CZ.01.1.02/0.0/0.0/17_103/0011803 – Joint research – Clutex III. The Faculty of Textile Engineering provided consultation in investigating some of the sub-projects.
4. OPPI 5.1 spk 01/001 - Technical Textile Cluster - Stage 2 - TUL FTE provided consultation in investigating science and research projects.

4.1.3 TACR projects

1. TH01020139 - Heat exchangers with polymeric hollow fibres for energetic systems of buildings. Investigator: Brno University of Technology; other participants: Promens a.s., Heat Transfer Systems s.r.o., ENBRA, a.s., Technical University of Liberec / Faculty of Textile Engineering. Co-investigator: Ing. Brigita Kolčavová Sirková, Ph.D.
2. TH01021163 - Energy efficient line lighting systems. Investigators: SINTEX, a.s., other participants: APPLYCON s.r.o., Hospital na Pleši s.r.o., STAP a.s., Technical University of Liberec / Faculty of Textile Engineering. Co-investigator: doc. Dr. Ing. Dana Křemenáková.
3. TJ01000292 - Sophisticated hybrid tapes for fabrication of composites by precise winding. Investigator: Technical University of Liberec / Faculty of Textile Engineering - Mohanapryia Venkataraman, Ph.D.
4. TG01010117 - PROSYKO - Pro-Active System of Commercialization at TU Liberec
   a) Sub-project: Textile composite material containing conventional polymer fibres and nanofibres. Investigator: Technical University of Liberec, sub-project investigator: Ing. Jiří Chvojka, Ph.D.

   b) Sub-project: Absorbable replacements of lateral knee ligaments. Investigator: Technical University of Liberec, sub-project investigator: doc. Ing. Lukáš Čapek, Ph.D.

   c) Sub-project: Protective clothing against radiofrequency electromagnetic radiation with sufficient comfort and other added properties. Investigator: Technical University of Liberec, sub-project investigator: Ing. Veronika Tunáková, Ph.D. / Ing. Alžběta Samková.

4.1.4 Ministry of Health projects

NV15-29241A - Nanofibrous Biodegradable Small-Diameter Vascular Bypass Graft. Investigator: Technical University of Liberec / Faculty of Textile Engineering. Other participant: Ministry of Defence / Faculty of Military Health Sciences, University of Defence Hradec Králové and Palacky University in Olomouc / Faculty of Medicine. Co-investigator: prof. RNDr. David Lukáš, CSc.

4.1.5 Ministry of Interior – Security Research programme

VI20172020059 - Intelligent textiles against CBRN substances.
Investigator: National Institute for Nuclear, Chemical and Biological Protection, v.v.i. Other participants: TUL – Faculty of Textile Engineering - Ing. Petr Mikeš, Ph.D.

4.1.6 Projects of the Ministry of Education, Youth and Sport – Inter-Excellence programme

Inter-Eureka – 170921 – Wearable IoT Investigator: GiTy a.s. Other participants: Masaryk University, TUL – Faculty of Textile Engineering – doc. Ing. Antonín Havelka, CSc.

4.1.7 CSF projects

17-02448S - Improved growth of human skin cells on biomimetic nanofibrous matrices for active

wound healing.
Investigator: Institute of Physiology ASCR, v.v.i. Other participants: Charles University / 1st Faculty of Medicine, TUL – Faculty of Textile Engineering - prof. RNDr. David Lukáš, CSc.

4.2 Prepared and submitted project applications

Table 14: Project applications prepared in 2018

Provider	Applicant / applicants	Project application title	Investigator
CSF - Standard	TUL FTE	Effects of thermal conductivity of threads on sewing needle warming	Mazari
CSF - Standard	TUL FTE+ University of South Bohemia	Dynamic interactions of live cells with material surfaces	Lukáš
CSF - Standard	ČVUT + TUL FTE+ FM TUL	Analysis of hydrodynamic and diffusion phenomena in nanofibres	Mikeš
MŠMT - mobility CZ-Ukraine	TUL FTE	Research and development of textiles modified by nanofibres for protecting human health and electronic devices	Bajzík, Ocheretna
TACR - Epsilon 4	VUT + Hanon Systems + Promens + Zena + TUL FTE	Heat exchangers with hollow polymer fibres for the automotive industry	Kolčavová
TACR - Epsilon 4	CxI TUL + TUL FTE+ Aquatest	Complete removal of nitrogen and phosphorus from waste water using purpose-made textile carriers of biomass	Dvořák, Kolčavová
MŠMT - mobility CZ-China	TUL FTE	Design of multilayer micro and nanofibre structures intended primarily for air filtration	Militký
Ministry of Health	Thomayer Hospital + University of Defence + TUL FTE	Effects of polydioxanone stents on the structure and function of the tracheal wall	Čapek
Ministry of Health	Institute of Rock Structure and Mechanics AS CR + ČVUT + TUL FTE	Biomechanically defined absorbable materials for cardiovascular surgery	Horáková
TACR - Delta 6	Inotex + TUL FTE	SMARTTHERM - Intelligent thermal control fibres and functional coating on textiles based on thermally resistant encapsulated PCM	Militký
H2020 - Marie Curie IF	TUL FTE	Burns biomechanics: Heat transfer through a clothing system	Čapek
MPO TRIO 4	Rieter CZ + TUL FTE	Processing of waste and recycled textile fibres	Krupincová
MPO TRIO 4	VÚB + TUL FTE	VIDTEX - Smart textiles and clothing of highly useful properties for improving road safety, particularly visibility	Havelka
MPO TRIO 4	VÚOS + TUL FTE	Development of new nanofibrous materials for chronic wound dressing	Chvojka
H2020 - Marie Curie ITN	Technische Universitaet Chemnitz + Universidade de Aviero + Chalmers Tekniska Hoegskola AB + TUL FTE+ Universitat Linz + Labosport International + Leibniz Institut + Politechnika Wroclawska + Universita degli Studi di Padova	HYPROTECT	Čapek
MŠMT, InterAction	TUL FTE+ Inotex	Multifunctional nano-composite, environmentally friendly hybrid systems for non-flammable textile treatment	Křemenáková
2018 total			**16**

4.3 Publication activities – R&D outputs

The publication activities of the Faculty's staff members are of high significance for the science, research and innovation work of the Faculty and reflect its scientific and teaching potential. This work is an important criterion for evaluating the quality and efficiency of RDI work in general. The assessment of publication work is used as a criterion for allocating funds to the Faculty, the accreditation process and career growth of individual staff members etc. The publication work of staff members is recorded annually in the CEP (Central Register of Projects), database RIV (Register of Results).

Methodology 17+

In June 2018 the Office of the Government published on the website of the RDI information system all reports used as a basis for the evaluation of research organisations in the first year of implementation of Methodology 17+. In this first year of implementation of the new methodology the total evaluation of research organisation is conducted on the basis of results in **Modules 1** and **2**, and others if applicable. As stated on the Information system site, to a large extent this evaluation only **informative in nature** due to a relatively small amount of data, and besides obtaining the first results it was used to **verify the feasibility and appropriateness of the chosen procedures**.

The evaluation of selected results conducted by the R&D Council Department through Expert Panels using remote reviews is one of the foundations of evaluating research organisations according to Methodology M17+ under **Module 1**. The published reports summarising the conclusions of this evaluation process by area groups include detailed commentaries by chairpersons of Expert Panels and the list of results. The Faculty of Textile Engineering of TUL submitted a total of nine results (eight in the field of Engineering and Technology, one in Natural Sciences); two of the results were evaluated with Grade 2 (excellent), four results received Grade 4 (average), two results were Grade 5 (below average) and one results was not evaluated.

Bibliometric analysis carried out by the R&D Council Department in detail for each research organisation represents the main basis for their evaluation in accordance with Methodology M17+ under **Module 2**. They follow up on Field-specific bibliometric analysis with commentaries by Expert Panels published back on 3rd June 2018. Research organisations performed their field-specific bibliometric analysis based on data from the Web of Science. In total 136 results of TUL were analysed, out of which 48 results include at least one co-author from the Faculty of Textile Engineering. Six results for the Faculty are recorded in the first quartile according to the journal ranking determined by the Article Influence Score.

In November 2018 a table of indicative scaling of research organisations based on the above data was published, with the **Technical University of Liberec** receiving less-than-flattering **indicator B-** and placing **19th**.

The more detailed analysis by InCites shows that in 2016 the Technical University of Liberec (not broken down into faculties) had a total of 92 publications in all sub-branches (D-FORD) of branch 2.5 Materials engineering (FORD). It is apparent that TUL is active in sub-branch Materials Science – Textiles (42 publications by authors / co-authors from TUL FTE) and 80% publications are in Q1+Q2 (Web of Science filters quartiles according to JIF, methodology 2017+ according to AIS).

Sub-branch Materials Science – Textiles indexes 24 journals. According to Methodology 17+, which evaluates the entire Materials Engineering branch, the quality of journals of the Materials Science – Textiles sub-branch are of "low quality" (only **one** journal is in Q1, two journals in Q2, ten in Q3 and 11 in Q4).

The evaluation of quality of universities according to Methodology 17+ shows that the Faculty of Textile Engineering of TUL contributes to lower-quality journals in the Materials Engineering branch, while in the field of Materials Science – Textiles our level is high (80% of publications in Q1+Q2). Therefore it would be worth considering performing more thorough evaluation at level D-FORD as agreed on also by chairpersons of the expert panels of bibliometric reports at the Conference of Implementation of METHODOLOGY 2017+ on June 27 2018 in Prague.

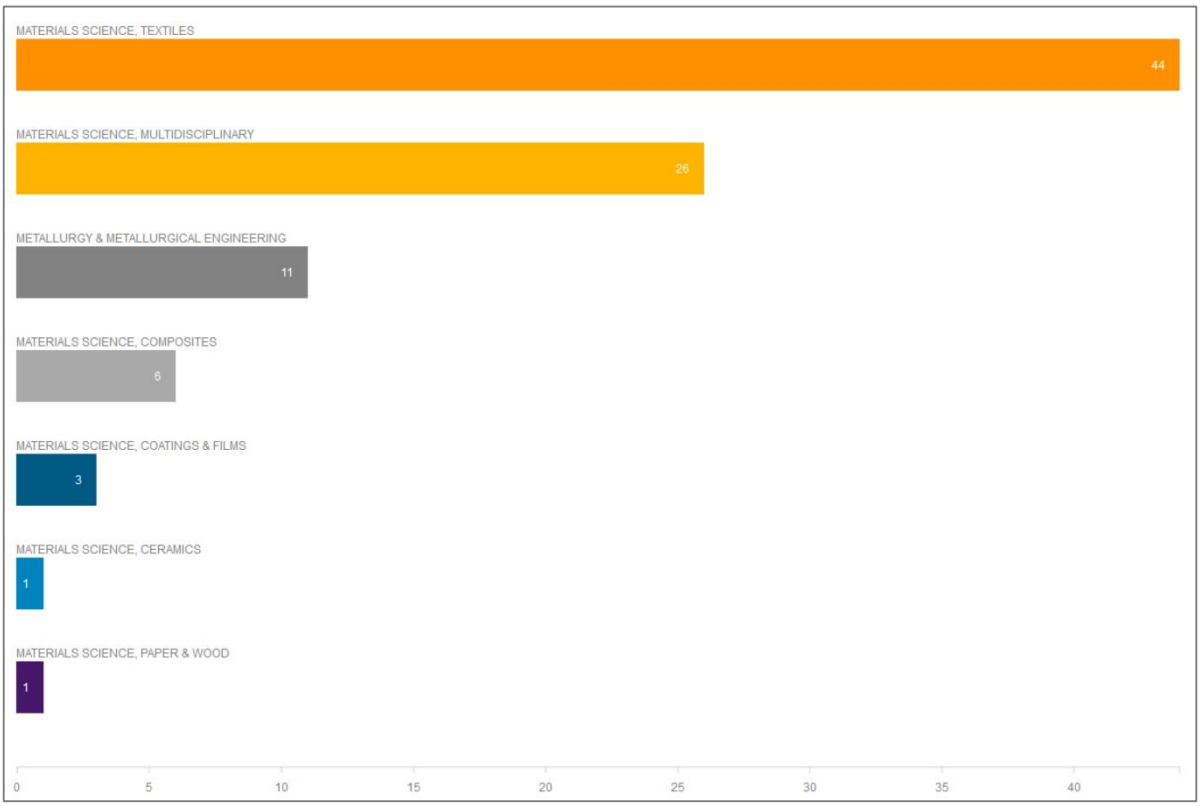


Fig. 2: Web of Science documents of TUL in 2016 2.5 Materials Engineering branch (FORD)

Publication activities in 2018

The Faculty of Textile Engineering joined the scheme of detailed result evaluation in international rankings. Analytical tool InCites by Thomson Reuters (http://incites.isiknowledge.com/) uses citations of publications indexed on the Web of Science (WoS) to perform advanced analysis of publication activities and the impact of research work on the level of individuals, teams, departments, institutions and branches.

Materials Science - Textiles is one of the research branches on the WoS where the Faculty of Textile Engineering of the Technical University of Liberec is active. InCites makes it possible to compare research outputs of the Faculty of Textile Engineering of the Technical University of Liberec in this research sub-branch with organisations from around the world and Europe as well as the Czech Republic. In 2018 TUL records in this sub-branch 39 documents (38 of which are

authored or co-authored at TUL FTE), which puts TUL FTE on 10th place compared with the other approximately 1429 organisations in the world in terms of the number of documents.

The total number of documents in the Materials Science - Textiles branch produced by the Technical University of Liberec between 1980-2018 is 470, which places the University 23rd out of a total of 3458 organisations (out of which 28.5% of documents are in Q1 and 29.7% in Q2). (the above data were taken on 8th March 2019).

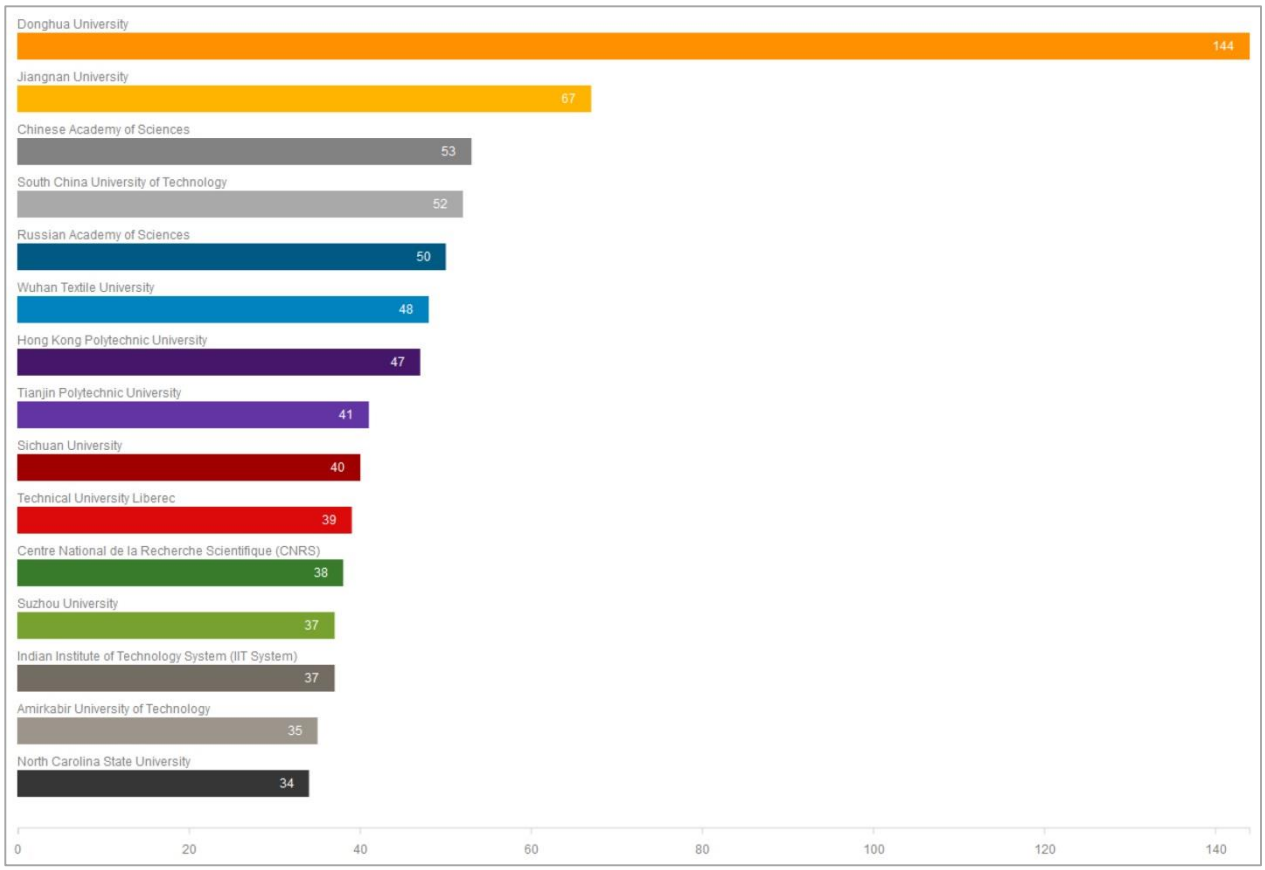


Fig. 3: Number of documents per organisation (15 most significant) globally in the Materials Science – Textiles branch in 2018

4.4 Exhibitions - artistic output

The Working Commission of the Council of Higher Education Institutions for arts schools and faculties initiated in association with the Ministry of Education, Youth and Sport of the Czech Republic the creation of a register of creative artistic work results (RUV - Artistic Outputs Results) and methodology for evaluating those outputs. Based on this methodology the works produced by teachers and possibly students of such schools are supposed to be put into categories and combinations of categories with various scoring. There are several reasons for this: an effort to map out creative activities within the field of arts in relation to universities, the need to formulate trends and lines of development, determining the performance of universities with accredited artistic study programmes, interdisciplinary comparison in the field of artistic outputs and comparison with research as such.

Obtaining a status of a joining faculty with an option to report results of creative artistic work in the RUV is a success of TUL FTE and the staff of the Department of Design. In 2018 TUL FTE

submitted for certification 35 artistic outputs in two segments: Design – 23 outputs (sub-segments: Fashion, textile, jewellery and Glass, porcelain and pottery) and Fine arts – 12 outputs (sub-segment: Fine arts). Twenty-four of the total number of outputs were produced by academic staff and 11 by students, with some of the joint student works sponsored by a member of academic staff. Information about results produced by individual institutions participating in this project is available on www.iruv.cz.

As part of its artistic work TUL FTE sponsors the operation of the University's Galerie N (Gallery N) in Jablonec nad Nisou where it holds exhibition of its own works produced by members of staff of the Department of Design, works of students from the FTE and other universities and works of a range of guests from the artistic world. Members of staff of the Department of Design also take part in other exhibitions. The programme of the Galerie N includes various artistic directions (design, painting, graphic arts, jewellery etc.), Czech and international work and presentations of beginning as well as renowned artists.

In 2018 the Department of Design of TUL FTE held ten exhibitions through the programme of the Galerie N in the following areas: design, applied art, artistic trade and fine arts. Galerie N's 2018 programme:

- January - Exhibition TEXTIL a ODĚV (Textile and Clothing), semester works of BSTON students. A vernissage with fashion show.
- March – Exhibition NUSLE, HZA Bažant. Seriography.
- April – Exhibition DVĚ GENERACE, Vladimír Škoda et al. Paintings.
- May – Exhibition BAKALAUREÁTY 2018. An exhibition of final works of BSTON students.
- June – Exhibition 100 LET-100 NÁZORŮ. An exhibition of semester glass / jewellery works of BSTON students.
- August – Exhibition SETKÁNÍ V KRAJINĚ. An exhibition of FP TUL's teachers.
- August – VARIACE. Emilie Frydecká. Lace.
- October – Exhibition - 120 years of Moravian tapestry manufacturing.
- November – RELATIVNÍ HRANICE/SPIRIT, I. Kolorenčová, L. Semecká, M. Váradiová. Glass.
- December – Exhibition LP 2018, Lhotský/Plíva. Glass and paintings.

Members of KDE's academic staff participated in 24 exhibitions (two solo exhibitions, 22 joint exhibitions, out of which 13 were international):

- Krotký, Svatoslav. POCTA SUKNU. A textile production exhibition. Humpolec, 2018.
- Šikolová, Ludmila. Give me your hand. A jewellery exhibition. Munich, Germany, 2018.
- Šikolová, Ludmila. ZÓNA BEZ HRANIC. A jewellery exhibition. Bratislava, 2018.
- Šikolová, Ludmila. ZÓNA BEZ HRANIC. A jewellery exhibition. Prague, 2018.
- Šikolová, Ludmila. ZÓNA BEZ HRANIC. A jewellery exhibition. Legnica, Poland, 2018.
- Šikolová, Ludmila. 10 SEM cor-ten – An international symposium. Current jewellery. Bratislava, 2018.
- Plíva, Oldřich. E-GLASS. A glass designers' exhibition. Lwow, Poland, 2018.
- Plíva, Oldřich. DECHEM-TAHEM-TVAREM-ŽÁREM. A glass designers' exhibition. Olomouc, 2018.
- Plíva, Oldřich. Z Jizerských hor do Českého ráje (From the Jizera Mountains to Bohemian Paradise). A glass designers' exhibition. Jab.n.N., 2018.
- Plíva, Oldřich**.** LP 2018 - Lhotský/Plíva. A glass exhibition. Jablonec n.N., 2018.
- Kadlecová, Zuzana. Exhibition of paintings. Loebau, Germany, 2018.

- Kadlecová, Zuzana. Painters of the Pojizeří 2018. An exhibition of paintings. Semily, 2018.
- Kadlecová, Zuzana. ILUSTRACE. Illustration of the book Roots of Women's Spirituality. Liberec, 2018.
- Kadlecová, Zuzana. An exhibition of paintings. Book launch - Roots of Women's Spirituality. Liberec, 2018.
- Střílková Válková, Jana. Give me your hand. A jewellery exhibition. Munich, Germany, 2018.
- Střílková Válková, Jana. NOVÁ GENERACE. A jewellery exhibition. Semily, 2018.
- Střílková Válková, Jana. ZÓNA BEZ HRANIC. A jewellery exhibition. Bratislava, 2018.
- Střílková Válková, Jana. ZÓNA BEZ HRANIC. A jewellery exhibition. Prague, 2018.
- Střílková Válková, Jana. ZÓNA BEZ HRANIC. A jewellery exhibition. Legnica, Poland, 2018.
- Steffanová Kindl, Marcela. ZÓNA BEZ HRANIC. A jewellery exhibition. Bratislava, 2018.
- Steffanová Kindl, Marcela. ZÓNA BEZ HRANIC. A jewellery exhibition. Prague, 2018.
- Steffanová Kindl, Marcela. ZÓNA BEZ HRANIC. A jewellery exhibition. Legnica, Poland, 2018.
- Veselá, Zuzana. Designer's Open. A fashion collection exhibition. Leipzig, Germany, 2018.
- Veselá, Zuzana. MODEZONE. A fashion collection exhibition. Linz, Austria, 2018.

5. Internationalisation

In the year 2018 TUL FTE continued its internationalisation efforts stemming from activities that receive long-term support and are stipulated in its Long-Term Plan. The Faculty develops long-term collaboration with most of the international universities involved in the field of textile from all around the world. International relations are enhanced by working on joint projects, preparing and organising joint meetings, seminars and conferences, preparing joint publications and student and teacher exchanges. Long-term collaboration with nearly all significant international textile-field higher education institutions is in place.
The following are the key performance indicators of creative activities being monitored:

- International excellence
- Collaboration agreements (MoU - Memorandums of Understanding)
- Organisation of international seminars and conferences
- Mobility – international stays, incoming international stays (depending on funding – Erasmus+ KA103, Erasmus+ KA107, TUL Mobility Fund, FTE Mobility Fund, CEEPUS, Visegrad Funds, bilateral agreements between universities and agreements between countries)
- Joint R&D projects

5.1 International excellence of TUL FTE

The Faculty of Textile Engineering is a regular member of AUTEX - the Association of Universities for Textiles. A representative from the FTE is a member of the Review Committee for Accreditation of the AUTEX Joint Study Programme - E-Team NMSP "Textile Engineering" accredited in Gent, Belgium.
As a member of ATOK - the Association of Textile-Clothing–Leather Industry - it takes part in EURATEX (European Apparel and Textile Confederation) meetings. TUL FTE is involved in activities related to international collaboration with the EU within the "European Technology Platform - Fibers Textiles Clothing" in eight topic groups:

1. Circular economy – Innovative textile material approaches focussing on sustainability
2. Resource efficiency – Advanced textile surface processing technologies

3. Textile Industry 4.0 – Advanced manufacturing technologies for fibres-based materials
4. Innovative textile and composite solutions for construction and sustainable infrastructure
5. Smart textile solutions for functional clothing, wearables and innovative medical technology
6. Digital fashion

Members of the Faculty's staff are **members of a number of scientific committees of various journals and conferences, trade organisations and boards of administration**:

prof. Ing. Jiří Militký, CSc.

- A member of Ukrainian Engineering Academy Kiev, Russia
- President of Czech Monitoring Committee of FEANI Brussels, Belgium
- A member of Honorary Lifetime Contribution Award (TBIS)
- Vice-President of Textile Bioengineering and Informatics Society
- A member of editing councils of the following journals: Composites B (USA), Journal of the Textile Institute (England), Research Journal of Textiles and Clothing (Hong Kong), Fibers and Textiles (Slovakia), Fibers and Textiles in Eastern Europe (Poland), Przeglad Wlokieniczny (Poland), Journal of Fiber Bioengineering & Informatics (Hong Kong), Journal of Textile Engineering (Hindawi).

doc. Ing. Michal Vik, Ph.D.

- CIE Commission Internatinale de L'éclairage
- OSA (Optical Society of America)
- ICCTM (International Committee on Cotton Testing Methods)
- ČNK CIE (Czech National Committee of the CIE)
- A member of the board of editors of "Svetlo" (Light) journal
- ČSO (Czech Lighting Society)
- ČIA (Czech Accreditation Institute) – expert
- BSI (British Standardisation Institute) – expert
- A representative of the Czech Republic with the 1 CIE division
- A member of TC 1-95 CIE

doc. Ing. Martina Viková, Ph.D.

- ICCTM (International Committee on Cotton Testing Methods)
- AIC (International Colour Association)
- ČSO (Czech Lighting Society)
- Membership in Technical Committees CIE: TC1-95, TC 1-97

doc. Rajesh Mishra, Ph.D., B. Tech.

- A member of Scientific Committee for Textile Bioengineering and Informatics Symposium, Manchester
- A member of Institute of Engineers (India)
- A member of Indian Society of Technical Education
- A member of Textile Association, India

Ing. Vijaykumar Narayandas Baheti, Ph.D.

- Member of Textile Association of India
- Member of Institution of Engineers India

prof. RNDr. David Lukáš, CSc.

- A member of the Union of Czech Mathematicians and Physicists
- A member of the Czech Society for Mechanics and chairman of the Expert Group for the Mechanics of Nanomaterials

Ing. Jiří Havlíček, CSc.

- A member of the administration board of ATOK - Association of Textile-Clothing–Leather Industry
- A court-appointed expert in the fields of Textiles and Economics

RNDr. Jana Horáková

- A member of the European Society for Biomaterials
- A member of the Czech Bioimplantology Association ČLS JEP

doc. Ing. Lukáš Čapek, Ph.D.

- A member of Société français de biomécanique

Ing. Jana Ornstová

- President of the national Czech section of the International Federation of Knitting Technologists

prof. Ing. Luboš Hes, DrSc., Dr.h.c.

- A member of the European Committee for Standardisation CEN/TC 248, ISO /TC 38 (WG 17)
- A member of Fiber Society, Princeton, USA
- A member of Textile Institute Manchester
- IMEKO (International Measurement Confederation), Prague, CR, a representative of the Czech Republic with TC 12 (temperature measurement)
- A member of editorial boards of TRJ, JIT, FTEE, JNF, Tekstile ve Konfeksyion, JTEFT, Textilna Industria

Ing. Gabriela Krupincová, Ph.D.

- A member of the board of administration of CLUTEX - Technical Textile Cluster, o.s.

Ing. Pavla Těšinová, Ph.D.

- A representative of the FTE for dealing with AUTEX - the Association of Universities for Textiles
- A member of the Review Committee for Accreditation of the AUTEX Joint Study Programme - E-Team NMSP "Textile Engineering"
- A member of the Editorial Advisory Board of the Textile & Leather Review journal
- A member of the Expert Committee for Organising the Autex 2018 conference
- A member of the working group Business and Innovation, Research and Development for preparing the Liberec Region Development Strategy 2021+

Members of the editorial board of the Fibers and Textiles journal (Slovakia) - prof. Ing. Jiří Militký, CSc., doc. Ing. Maroš Tunák, Ph.D., Ing. Veronika Tunáková, Ph.D., Ing. Jana Drašarová, Ph.D.
Members of the editorial board of Tekstilec (Slovenia) – prof. Dr. Ing. Zdeněk Kůs, Ing. Petra Komárková, Ph.D.

National and international awards
Oldřich Jirsák: Medal of the Town of Liberec for exceptional merit in the field of nanotechnologies
Jakub Erben: **1st Prize of The International Théophile Legrand Textile Innovation Award** - Fibrous three dimensional scaffolds for preparation of thymus organoid – T cells immunotherapy

International evaluation of the University or its parts including international accreditations.
All study programmes at TUL FTE are accredited by FEANI - the European Federation of National Engineering Associations (provided they meet the required conditions (an industry placement)

graduates may be awarded the EURING degree). The trade organisation “The Textile Institute Manchester“ provides accreditation for Bachelor’s study programmes "Textile", follow-up Master’s study programme "Textile Engineering" and PhD study programme "Textile Engineering" until 2021.

5.2 Collaboration agreements

Long-term collaboration with virtually all important textile universities in Europe is in place, with collaboration being developed with renowned universities from around the world. The following table shows collaboration agreements made solely with the FTE.

Table 16: International collaboration agreements in effect

Continent	America	Europe	Asia	Africa	Australia and Oceania
2018					
Collaboration agreements signed at FTE (MoU)	2	6	16	4	-
Inter-institutional agreements for Erasmus+ and related activities for FTE signed at TUL	1	60	5	1	1
Collaboration agreements solely for FTE signed at TUL level (MoU)	2	-	3	1	-

New collaboration agreements (MOU or Inter-institutional agreements) were signed between the FTE and the following institutions:

- Galway-Mayo Institute of Technology, Ireland
- KU Leuven, Belgium
- Faculty of Natural Sciences and Engineering, University of Ljubljana, Slovenia
- University of Monastir, Tunisia
- TTK University of Applied Sciences, Tallinn, Estonia
- Akademia Sztuk Pieknych w Warszawie, Poland
- University of Bergen, Norway
- Aurel Vlaicu University of Arad, Romania
- ShinShu, Japan
- Kyoto Institute of Technology, Japan
- Vitebsk State Technological University, Belarus
- University of Mauritius, Mauritius
- Waikato Institute of Technology, New Zealand
- National Engineering School of Monastir, Tunisia

Letters of Intent were obtained with two universities in Japan - Kyoto Institute of Technology and Shinshu University, Ueda - for the purpose of the Erasmus+ KA107 application. Existing collaboration with these universities will be strengthened.

Fig. 4: Collaboration agreements in Europe

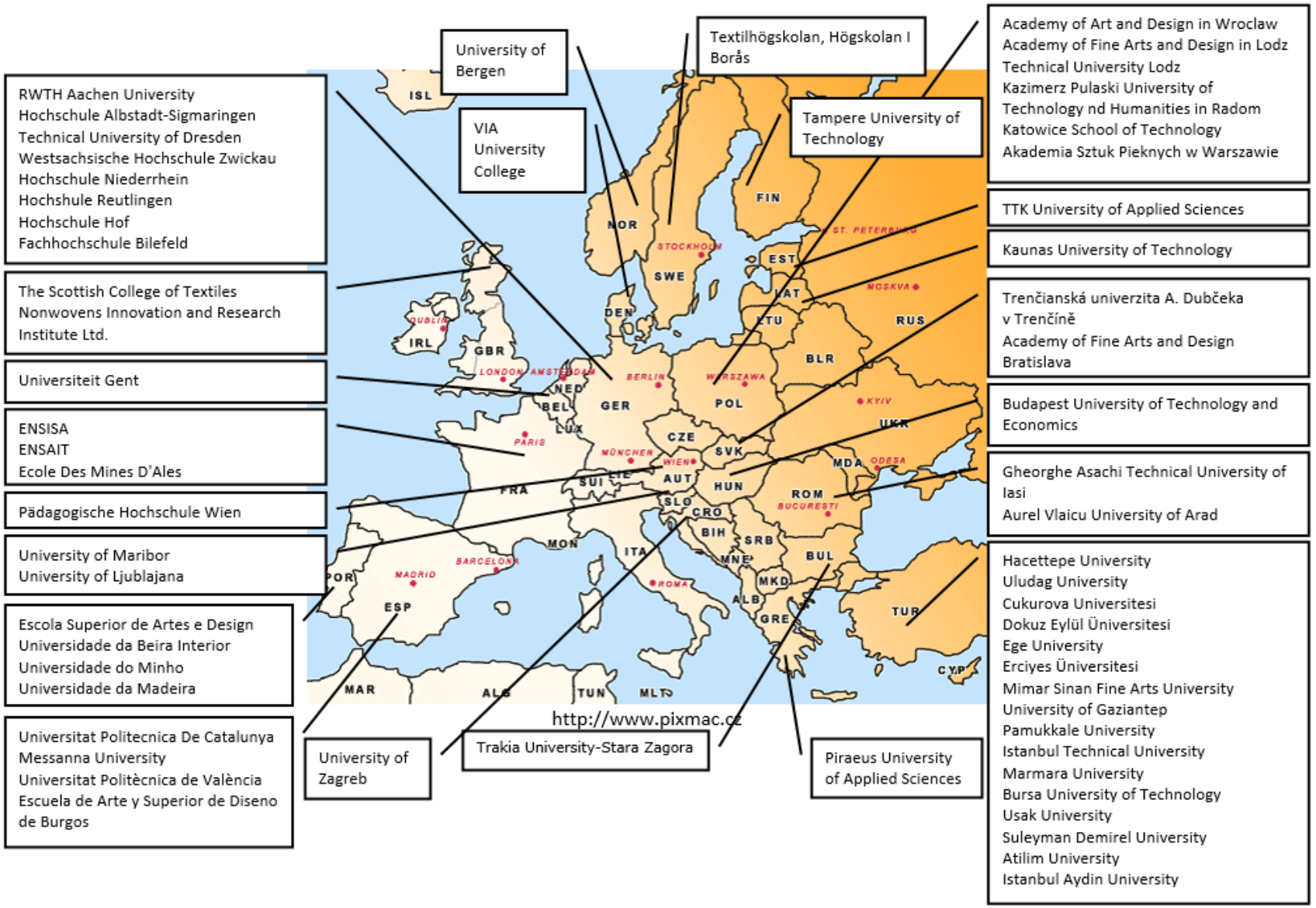
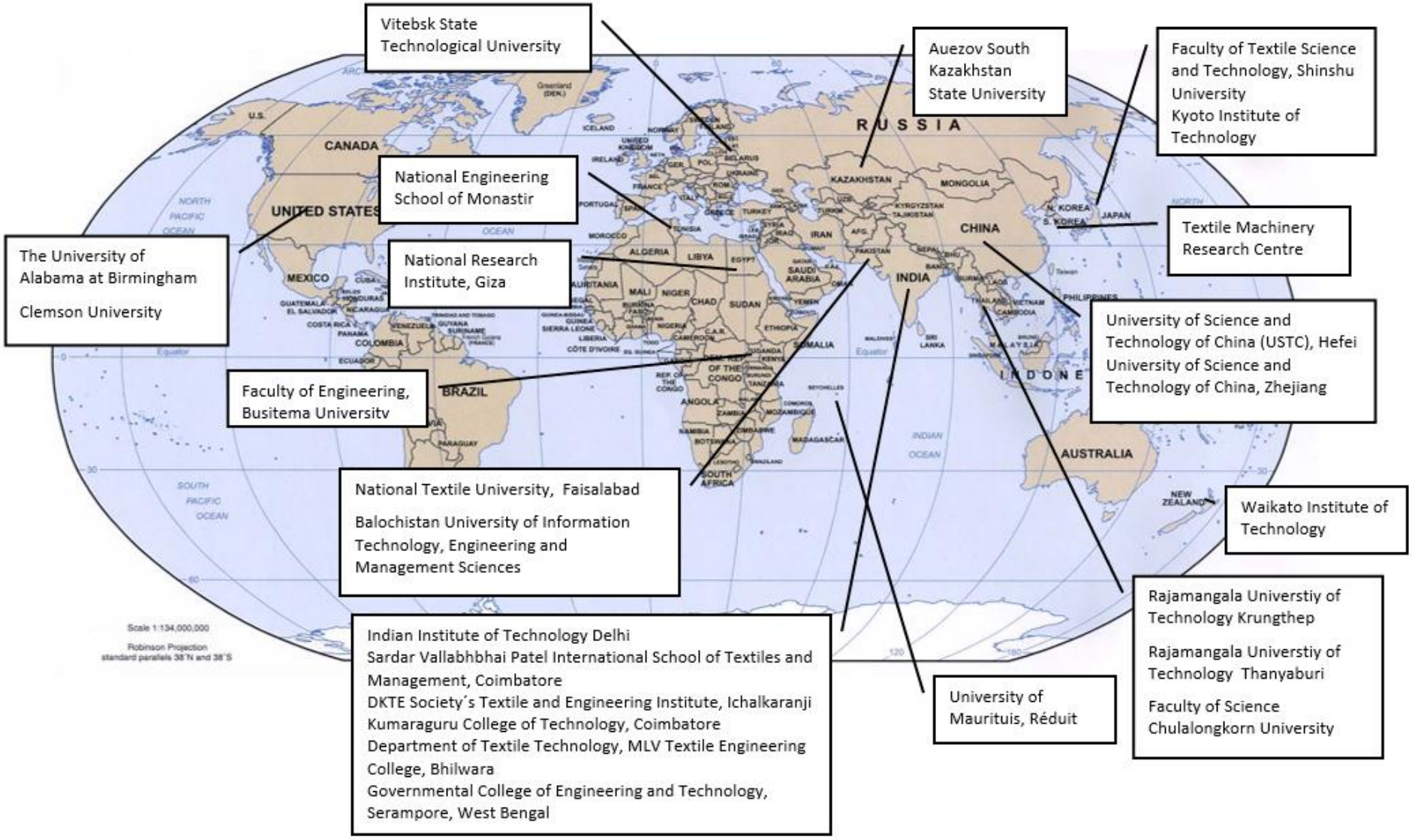


Fig. 5: Collaboration agreements



5.3 Scientific conferences and seminars

Organisation of conferences

22nd International Conference STRUTEX

Between 5-7 December 2018 TUL FTE held an international conference at its premises. This conference takes place once every two years under the auspices of the Department of Technologies and Structures and is attended by textile specialists from all around the world. Selected conference papers are published in the trade journal *Vlákna a textil* (Fibres and Textile - Scopus).

Conference organisation participation

- prof. Ing. Jiří Militký, CSc., a member of the Autex 2018 Conference International Scientific Committee
- Ing. Pavla Těšinová, Ph.D., a member of the Autex 2018 Conference International Scientific Committee
- doc. Ing. Michal Vik, Ph.D. a member of the Autex 2018 Conference International Scientific Committee
- Mohanapriya Venkataraman, Ph.D.: Keynote Lectures:
  IUMRS ICA 2018, International Union of Materials Research Society – International Conference in Asia, October 31 – November 2, 2018, Bali, Indonesia.
  5th International Symposium on Advanced Textile Science and Technology (ISATST 2018) at Zhejiang Sci-Tech University, Hangzhou, China held on 24th to 26th October 2018.
- prof. Ing. Jiří Militký, CSc. and doc. Rajesh Mishra, Ph.D., B. Tech., members of the TBIS 2018 Conference International Scientific Committee

Summer school

International Summer School of Patterning 2018 – between 13-24 August 2018 the Department of Textile Technologies of the Faculty of Textile Engineering of the Technical University of Liberec held the second edition of the International Summer School of Patterning. The fundamental mission and goal of the summer school of patterning is to clarify the process of manufacturing of fabrics - woven and knitted textiles - from the first idea related to its application to its final production using two main textile technologies - weaving and knitting. The second edition was attended by eight participants from around the world: Canada, Peru, Spain, Ethiopia, France, the Czech Republic and Brazil.

5.4 Mobility

International mobility (industry placements, internships, summer schools, conferences) is supported through the university-wide Erasmus+ KA103 and the Faculty's Erasmus+ KA107 mobility programmes, CEEPUS and TUL's and FTE's Mobility Funds (hereinafter referred to as the MF). In addition, mobility is accepted as part of inter-institutional and international agreements and, in some cases, funded through scholarships provided by the sending state or receiving university abroad. There were 17 stays of international experts from the RSA, Mauritius, Turkey, India, Estonia, Slovakia, Macedonia, Spain, Russia, Ireland and New Zealand - nine one-week stays under Erasmus+ KA103, three stays under Erasmus+ KA107, two through TUL's MF, one stay under Visegrad Funds completed in the years 2017-2018 and two stays covered by the own funds of the international experts (see Chapters 2.4.2 and 2.4.4).

Erasmus+ KA103 / Erasmus+ KA107 programme

Erasmus+ KA 103 projects focus on individual mobility based on agreements between institutions. Work and study stays are available for students in the countries participating in the Programme (28 EU member states, EEA countries - Iceland, Lichtenstein and Norway, and Turkey and the former Yugoslav Republic of Macedonia). Academics have an option of teaching stays and can also receive aid to take part in training events alongside with researchers. The Erasmus+ KA107 project organizes teaching and study stays and training for students and staff. A condition for all study stays is that credits are recognized after returning to the home university as part of collaboration with partner countries (countries other than those that participate in the Programme).

A total of 27 subjects with instruction in English were opened for international students, primarily those coming through Erasmus+.

The 2016 Erasmus+ KA107 project application for a two-year period was approved - 30 months for incoming students from the USA, China and Thailand; 12 months for student stays in the USA; 80 days for incoming teachers from Thailand and Egypt; 60 days for teachers stays in Thailand and China; of these stays with Thailand, the USA and China were completed in 2017.

The 2017 Erasmus+ KA107 project application for a two-year period was approved - 18 months for incoming students from Japan and India; nine months for student stays in the same countries; 14 days for incoming teachers from and teacher stays in India.

The 2018 Erasmus+ KA107 project application for a two-year period was approved - eight months for incoming students from Tunisia; 40 days' teacher mobility with Tunisia. A mobility application with Israel was also approved; however, this mobility will not be fulfilled and was transferred to the Faculty of Mechanical Engineering due to the rejection of collaboration following a change in the foreign policy of the Israeli university in question. Further funds were approved to support international mobility not authorised under the KA107 application with the following states: Japan, Mauritius, New Zealand, Taiwan, Ukraine, the USA, Kazakhstan and Belarus. These funds will be provided under the same conditions as KA107.

In the year 2018 the FTE's students and members of staff travelled under the Erasmus+ programme to the USA, Japan, Tunisia, Poland, Turkey, France, the UK, Romania, Thailand, Luxembourg, Germany, Slovenia, Slovakia, China, Croatia, Belgium, Sweden, Portugal and Denmark. The FTE received incoming students and staff members from Turkey, Romania, France, Germany, Poland, Finland, Slovenia, Lithuania, the USA, India, Serbia, Slovakia, Spain and New Zealand.

All credits completed by outgoing students at a hosting institution abroad are fully recognized. Already before arrival students receive a proposal for future recognition under the university process which runs in the IS STAG through the documents "Learning Agreement of Study" and "Learning Agreement of Traineeship". it is the FTE's common practice to consult recognition with the guarantors of courses and subjects and relevant vice-deans. Recognition is provided primarily for compulsory subjects and compulsory-elective subjects, with special subjects which are not compatible being recognized under their original designation as optional. The document used to evidence recognition in the IS STAG is called "The sending institution´s transcript of records ("doklad o uznání" in Czech)", and it is handed over to the student alongside with the record of completing an international stay in the IS STAG.

All international students coming to study regularly in Czech are smoothly incorporated in study groups alongside Czech students. Short-term international students receiving instruction or training in English are engaged primarily with existing project working groups at the Departments and are also included in subjects such as "Textile Engineering" and "Fundaments of Clothing Comfort" taught in English to Czech students. The Faculty as well as the University provide administrative services for the duration of study while the ESN Students' Club helps with arranging leisure activities outside class.

TUL and FTE Mobility Funds (MF)

In addition, students and members of staff were sent abroad to Japan, Australia, China Croatia and the USA through the TUL and FTE Mobility Funds (MF), and two incoming stays of academics took place at the KNT and KTT from Russia and Ireland respectively.
The TUL MF is part of support for Development Institutional Projects and its budget is approved by TUL's Senate. Each faculty can submit applications at its own discretion. The selection of candidates is up to the Rector of TUL, with the MF Council, which includes representatives from all parts of the University, having an advisory vote. The TUL MF has international internships for PhD students and junior researchers as its priority; however, aid can also be provided for excellent science conferences and summers schools. Due to the extensive interest in the TUL MF in 2018 it was necessary to support some of the mobility initiatives through the funds of the Departments and the Faculty of Textile Engineering.

Internships of incoming international students
Talks between the FTE and international organisations led to the Faculty opening its laboratories to their students for joint research projects run through summer internships and individual placements. A total of 17 summer internship topics were announced and subsequently taken up by students, and other topics were announced based on collaboration between individual departments. Thirty-six stays of international students from India, Sweden, Spain, Thailand, France, China, Kazakhstan, Ethiopia and Romania amounting to 67 student-months in total took place.
Not only there were international specialists involved in teaching thorough specialised seminars, but active international collaboration in investigating R&D projects was under way. International students participated in industry placements not only through the Erasmus Programme, but also under bilateral agreements and through the TUL Mobility Fund.

CEEPUS
Another mobility programme in place in 2018 was CEEPUS - a Central European university exchange programme focused on regional collaboration through the network of universities. TUL FTE is a member of the "Ars-Techne: Design and Development of Multifunctional Products" CIII-SI-0217-00-1617 and 1718 network, which has the University of Maribor as its guarantor. The other participating countries are Slovakia, Austria, Serbia, Croatia and Poland, with a total number of 13 universities. One incoming international student stay took place.

Teaching students on the E-Team Programme
The FTE is involved in regular teaching in the Master's programme Textile Engineering run at the Ghent University, Belgium, as part of activities of Autex. In 2018 two teachers went for a one-week education stay funded through Erasmus+ to 'Gheorghe Asachi' Technical University of Iasi, Romania:

- Prof. Jakub Wiener – "Dyeing of textiles, printing, textile chemistry, finishing of textiles"
- Doc. Rajesh Mishra – "Introduction to Nanotechnology, Nanoscale Phenomena, Mechanical Properties in Nanoscale Materials, Carbon Based Nanomaterials, Nanofibers, Nano Particles, Nanocellulose, Nanocomposites, Exercises".

Table 17a: ***Outgoing students***

Financial aid provider	*Number of months – aid application*	*Number of international stays*	*Number of months completed*

Erasmus+ KA103 No.2018-1-CZ01-KA103-022920	105	32	86
Erasmus+ KA107 No.2016-1-CZ01-KA107-023074	12 completed by 2017	-	-
Erasmus+ KA107 No.2017-1-CZ01-KA107 2017-1-CZ01-KA107-034883.	9	-	-
Erasmus+ KA107 No. 2018-1-CZ01-KA107-047257	-	-	-
Aid promised by IRO TUL for KA107 2018	27	1	3
CEEPUS CIII-SI-0217-00-1718	13	-	-
MF TUL and MF FTE including summer schools	42 (approx. 1,894 thou. CZK)	9	15 (approx. 700 thou. CZK)
Total	-	42	104

Table 17b: ***Incoming international students***

Financial aid provider	*Number of months – aid application*	*Number of incoming international students*	*Number of months completed*
Erasmus+ KA103 No.2018-1-CZ01-KA103-022920	-	51	143
Erasmus+ KA107 No.2016-1-CZ01-KA107-023074	30 completed by 2017	-	-
Erasmus+ KA107 No.2017-1-CZ01-KA107 2017-1-CZ01-KA107-034883.	18	2	6
Erasmus+ KA107 No. 2018-1-CZ01-KA107-047257	12	-	-
CEEPUS CIII-SI-0217-00-1718	13	1	3
Freemover mobility (without scholarship aid)	-	36	67
Total	-	90	219

Table 17c: ***Outgoing staff***

Financial aid provider	*Number of months – aid application*	*Number of staff international stays*	*Number of months completed*
Erasmus+ KA103 No.2018-1-CZ01-KA103-022920	186	38	170
Erasmus+ KA107 No.2016-1-CZ01-KA107-023074	80	4	20
Erasmus+ KA107 No.2017-1-CZ01-KA107 2017-1-CZ01-KA107-034883.	14	-	-
Erasmus+ KA107 No. 2018-1-CZ01-KA107-047257	26	1	7
Aid promised by IRO TUL for KA107 2018	106	4	46
CEEPUS CIII-SI-0217-00-1617	20	-	-
MF TUL	62 (approx. 338 thou. CZK)	3	23 (approx. 128 thou. CZK)
Total	-	50	266

Table 17d: ***Incoming international staff***

Financial aid provider	*Number of months – aid application*	*Number of incoming international staff*	*Number of months completed*
Erasmus+ KA103 No.2018-1-CZ01-KA103-022920	-	9	45
Erasmus+ KA107 No.2016-1-CZ01-KA107-023074	80 completed by 2017	-	-
Erasmus+ KA107 No.2017-1-CZ01-KA107 2017-1-CZ01-KA107-034883	28	2	10

Erasmus+ KA107 No. 2018-1-CZ01-KA107-047257	73	-	-
Aid promised by IRO TUL for KA107 2018	140	1	14
CEEPUS CIII-SI-0217-00-1617	20	-	-
MF TUL	26 (approx. 62 thou. CZK)	2	26 (approx. 62 thou. CZK)
Visegrad Funds	-	1	15
Others, own	-	2	25
Total	-	17	135

6. Third role of the University / External collaboration processes

The third role of the University is understood to be an intersection of the university and outside world. The significance of this third role consists in the inseparability of science and education from the third role.

The following is monitored:

- Multiregional and national nature of collaboration
- Collaboration with regional self-government bodies
- Collaboration in R&D
- Collaboration in education
- Transfer of knowledge to the application area
    - Agreements, collaboration under way
    - Specialized training for companies
    - Promotional and information events

6.1 Multiregional and nationwide nature of collaboration

The Faculty of Textile Engineering of the Technical University of Liberec is the only one in the Czech Republic to provide education across the entire field of textiles. The Faculty works extensively with businesses and investigates a wide range of projects funded through various grants. For a long time it has been creating conditions for successful collaboration with many universities and institutions from the field of textile and material engineering.

The Faculty of Textile Engineering is a member of ATOK (Association of Textile-Clothing–Leather Industry), ČTPT z.s. (Czech Technology Platform for Textile) and Clutex o.s. (Cluster of Technical Textiles) and is engaged in long-term collaboration with the other members of these associations.

6.2 Collaboration with regional self-government bodies

The TUL FTE and Clutex o.s. have been involved in updating the data for Regional Strategy RIS 3 in the Liberec Region, Region of Hradec Kralove and Pardubice Region. The TUL FTE also participates in the implementation of the Sector Agreement for the Textile, Clothing, Leather and Shoemaking Industry in the Regions of Liberec and Hradec Kralove and Moravian-Silesian Region, striving alongside with the other stakeholders to expand these activities to other regions.

In association with Clutex, o.s. the TUL FTE aims to support and develop collaboration in the field of textile education on the level of high and vocational schools through its active participation in talks with work and education regional committees and in meetings with the management of textile- and clothing-field high and vocational schools. Under the auspices of the TUL FTE, Clutex o.s. and the

Liberec Clothing and Textile Competition Organisation Association there have already been three annual editions of a competition for young talented designers in several categories. A panel of experts consisting of renowned professionals, designers and municipality and industry representatives selects theme designs and collections prepared by students of primary and high schools.

6.3 Collaboration in R&D

The strengthening of relationships between the Faculty of Textile Engineering and the application area (textile and clothing industry businesses and their customers) is systematised through OP VK (Operational Programme Education for Competitiveness) projects. Communication and collaboration between the TUL FTE and textile and clothing businesses and their customers have been enhanced and improved, resulting in a better perception of the Faculty by the application industry, an increased number of science and research projects and improved application of R&D results in the field. The information and consultancy services it provides focuses on proactively meeting prospective collaboration partners from the application area, discussing possible subjects of collaboration such as joint projects, shared research and development capabilities, consultation, jointly designed topics of Bachelor's and Master's theses and options of student internships and industry placements (see 4.1 Projects)

Although collaboration with enterprises associated under Clutex is long-term, also these businesses appreciated the more open attitude of the Faculty and the offer of joint R&D projects. A Contact Point was created with the main aim to provide information about the TUL FTE and the Faculty's R&D activities to interested parties from among businesses, TUL's staff and students and others. Its creation and staff training resulted in improved and intensified communication and collaboration between the TUL FTE and textile and clothing businesses and their customers, resulting in a better perception of the Faculty by the application industry, an increased number of science and research projects and improved application of R&D results in the field. The information and consultancy services it provides focuses on proactively meeting prospective collaboration partners from the application area.

Collaboration talks with international institutions

29th January – 2nd February 2018 – Jela Legerská, Alexander Dubcek University in Trencin, Slovakia, talks about collaboration in the field of thermally insulating materials.
16th April – 27th April 2018 – Adine Gercke, research coordinator at University of Stellenbosh (RSA), talks about collaboration in the field of thermally insulating woollen materials.
23th June – 30th June 2018 – prof. Bijoya Kumar Behera, IIT Delhi, India
28th July – 2nd August 2018 - Juming Yao, Dr. Guocheng Zhu, Yurong Cai, Zhejiang Sci-Tech University, China
23rd September – 29th September 2018 - Dr. Hafsa Jamshaid, National Textile University, Faisalabad, Pakistan
6th December – 7th December 2018 - prof. Viatcheslav FREGER, Wolfson Department of Chemical Engineering, Technion – Israel Institute of Technology, Israel
2nd October – 16th October - dr. Paul Evart, Centre for Engineering and Industrial Design, Waikato Institute of Technology Rotokauri Campus, Hamilton 3200, NEW ZEALAND
6th December – 7th December 2018 - Kathleen Denis, KU Leuven, Belgium
30th May – 7th June 2018 - Cormac Flynn, Galway Mayo Institute of Technology, Dublin, Ireland
6th March 2018 – Prof. Ichiro Katayama, KINDAI University Osaka, Japan

7th March – 9th March 2018 – Prof. Tetsuya Sato, Prof. Hidekazu Yasunaga, KIT Kyoto, Japan

The other collaboration initiatives include contact with Areka Filtrasyon Teknolojileri Ltd., Istanbul, Turkey, a part of Istanbul Teknik Üniversitesi (ITÜ) and produces centrifugal and electrostatic spinning machines, and R&D collaboration talks with NC State University, USA, and Georgia Tech, USA.

6.4 Collaboration in education

The preparation and direction of the existing courses and programmes of study running as part of Bachelor's, Master's and PhD courses at the TUL FTE is regularly discussed with members of not only Clutex, but also ATOK and ČTPT.

The TUL FTE in association with industry partners strives to get industry experts involved in education of students. A great benefit for students is the opportunity to go on company tours, study internships and industry placements, and to investigate topics of Bachelor's and Master's theses which come directly from textile businesses. Collaboration with Clutex companies also offers the chance for these businesses to comment on newly created study programmes and courses in order for graduates to be better poised to meet the demands of the labour market. Other companies as well as Clutex members take part in trade meetings organized by the TUL FTE including the annual job fair T-Forum held under the auspices of IAESTE. The web interface where a choice of internships, industry placements and vacancies is advertised is continuously updated (see Chapter 5.2 Links between education and the Faculty's third role).

6.5 Knowledge transfer to the application area

A major result is a shift in thinking of the Faculty's academic staff as they have realized it is necessary to collaborate with the industry and adhere to implemented standards, particularly with respect to intellectual property and its commercialisation. Support to academic staff is provided through the newly created Centre of Technology Transfer Support which besides consulting offers legal services and interpretation of internal standards governing this area. At the same time projects such as TACR Gama are investigated with the aim to develop this field and proactively implement commercialization processes into daily work.

Scholarly lectures for businesses

As part of its educational activities the TUL FTE offers businesses bespoke industry training seminars. Their objective is to refresh or complement industry-related terminology, present news from the industry and opportunities for collaboration and receive feedback on the TUL FTE's selected activities. Included in this initiative were also seminars aiming to education R&D staff from the application area.

In 2018 two industry training seminars tailor-made to clients' requirements and specifications took place:

- Textile fibres and twisting - Vamafil, spol. s r. o.
- Clothes cut design – Adler Czech, a. s.

The lectures, held at the TUL FTE's laboratories, were complete with practical exercises, workshops and expert consultations.

Transfer of technology and know-how

Contractual collaboration with industrial partners and RDI institutions from abroad as well as the Czech Republic is under way, dealing with commissioned research meeting partners' specifications, consultancy and advisory services as required by partners and efforts to transfer knowledge and experience into the application area, transfer of know-how and intellectual property as required by partners and performing specific tasks related to expert examinations and laboratory analysis as needed by partners at any given time. Commissioned research is mostly financed by clients themselves, with only limited use of subsidy tools such as innovation vouchers.

The TUL FTE prefers entering into framework collaboration agreements which can act as general umbrella agreements for all kinds of collaboration and subsequent agreements made to fit the specific form of work (works contracts, service agreements, commissioned research agreements, joint intellectual property ownership agreements, licensing agreements, rental agreements, joint project agreements and joint promotion and advertising agreements).

There are currently 49 framework collaboration agreements in effect between the TUL FTE and its partners, while there are subsequent agreements dealing with specific tasks and requirements of both parties and agreements related to regular operation. In 2018 two new framework collaboration agreements were signed. In addition, concluded were six agreements for specialist services and consultancy, two collaboration agreements, two works contracts, one confidentiality agreement, one joint research agreement and several operational agreements.

Another indicator of successful collaboration with the application area is the income from supplementary activities (specialist consultancy, laboratory tests and their evaluation, specialist market research and research into the state-of-the-art of selected areas) in the total amount of success 1,431 thou. CZK.

Promotional and information events

Besides organising and co-organising trade conferences, seminars and workshops the TUL FTE takes part in selected promotional events:

- XXII. T-FORUM 2018 – 6 December – Liberec, CZ - A job fair for students and other candidates from the ranks of academic staff, it aims at starting new or give concrete form to existing collaboration initiatives with the presenting companies. Organised by IAESTE, the event was attended by 62 companies and included lectures given by selected participants and a round table discussion with HR managers.
- Prague Design Week 2018. Displayed design. A presentation of KDE's students' works. Prague, 2018.
- Programmes of the University's Galerie N, Jablonec n.N.
- The launch of the Faculty's "minigallery" G3P ("Galerie Třetí Patro" - Third Floor Gallery) in Building. An exhibition project of the Department of Design, the programme of the G3P has an objective to introduce works authored by students and graduates of the TON course, aiming to provide students of arts courses with the valuable experience of organising their own exhibitions. Another goal of the gallery is to bring the work of the young generation closer to the public and the staff of FTE and TUL. The Third Floor Gallery has potential to deepen the dialog among students of various fields within the Department of Design and initiate contact with the world outside of university campus as well as the environment of the Faculty of Textile Engineering. Three exhibitions have been held since October 2018.

Experts gave lectures and presentations at the following events:

- doc. Ludmila Šikolová, Festival Silver 2018, Legnica (a presentation entitled "Illusion")

- Heimtextil 2018, Frankfurt, Germany (a presentation of KDE's students' works)
- doc. Svatoslav Krotký and Oldřich Plíva, academic sculptor, VŠVU Bratislava (presentations covering the "Concept of teaching studio work at KDE TUL FTE")
- Radek Jirkovec: Composite scaffold for bone tissue engineering; World Congress on Medical Physics & Biomedical Engineering
- Markéta Klíčová: An invitation lecture for Lifelong Learning University Zittau/Goerlitz courses. April 2019. An invitation lecture for the Israeli ambassador. April 2019. A speech at the annual conference of the Regional Innovation Strategy of the Liberec Region (RIS3). October 2018. An interview for the Czech Radio, a live spot on ČT 24 (Studio 24) channel, a report from the KNT facilities on TV Nova, interviews in newspapers and Internet magazines (MF Dnes, Právo, Sciencemag, CEITEC magazine, …)
- Jakub Erben: A presentation about tissue engineering and its applications at UTB, 19 November, 2018
- Tomáš Kalous: Presenting KNT at UTB in Zlin.
- Ondřej Novák: An invitation lecture at Rynovice Prison, an interview for the CR Sever radio station.
- Jana Hlavatá: Participation in trade fair NanoTech 2018, 14 – 16 February, 2018, Tokyo, Japan. Searching for new application areas and potential collaboration. Participation in the IUPESM 2018 conference, 3-8 June, 2018, Prague. Presenting the results of production of porous fibres using electrospinning including biological testing. Participation in the Mechanics of Nanomaterials workshop, 14-15 June, 2018, Kryštofovo Údolí. Presenting the results of production of lignin fibres using centrifugal spinning.

7. Quality assurance and evaluation of activities

The Faculty strives to have all its activities evaluated. To this end it uses standardized processes and methodology partially implemented into TUL's internal regulations. The feedback is assessed at all management levels. To assure the quality of the Faculty's work internal auditing was used to some extent (specific research, financial management). Issues related to drawing funds, adhering to financial management rules and associated problems are discussed at meetings of management, departmental representatives and the Faculty Council. The Faculty Senate was proactively involved in activities related to evaluating relations between parts of the Faculty, website quality control and maintenance of collegial relationships among teachers and students. The process of quality assessment of activities was strengthened in 2018 by the involvement of members of management of the TUL FTE in expert groups under the university-wide **centralized development project** (MEYS Centralised Project C13+) *Strategic collaboration of universities in quality management of engineering education as needed by society and the knowledge-based economy* (principal investigator at TUL: prof. Dr. Ing. Pavel Němeček).

7.1 Management and Faculty Council meetings

The top management of the TUL FTE (Dean, Vice-Deans, Head of Dean's Office) would generally convene once a week (or more often when needed). The Faculty Council would generally meet once every two weeks (or more often when needed). Provably fundamental legal standards of TUL were presented at the meetings. Minutes of all Faculty Council meetings were taken. When necessary and to deal with urgent tasks the Dean called ad-hoc meetings with the parties involved.

7.2 Meetings of the Faculty Research Council

The 11th TUL FTE Research Council meeting was held on 23rd April, 2018.
Meeting agenda:

- Discussing study programme guarantors
- Submitting material for study programme accreditation - Bachelor's, follow-up Master's, PhD
- Commencing professorship proceedings
- Miscellaneous

The 12th TUL FTE Research Council meeting was held on 5th November, 2018
Meeting agenda:

- Professorship proceedings - doc. Ing. Michal Vik. Ph.D.
- Commencing habilitation proceedings - Ing. Adnan Ahmed Mazari, Ph.D.
- Experts authorised to act as examiners
- Miscellaneous

The items on the agenda including resolutions are published on the TUL FTE website.

7.3 Academic Senate meetings

In 2018, six meetings of the AS TUL FTE and four electronic ballots were held. The items on the agenda and resolutions dealt with by the Senate followed from the Faculty's activities. The AS TUL FTE approved the Annual Financial and Activity Report of the FTE for 2017 and allocation of the Faculty's funds for 2018 submitted by the Dean, including amendments 1 and 2. It also approved the conditions of TUL FTE entrance examinations for the academic year 2019/2020.

The AS TUL FTE repeatedly discussed at its meetings documents under preparation for the new accreditation of Bachelor's, follow-up Master's and PhD study programmes. The meetings of the AS TUL FTE also gave floor to members of the academic community to voice their opinions. Following discussion, the AS TUL FTE approved the study programme accreditation documentation presented by the Dean and the submission of the accreditations.

The Senate meetings discussed and debated requests from the FTE's Departments regarding procurement of new equipment and the Departments' technical matters. In October 2018 the AS TUL FTE approved Ing. Jindra Porkertova as a new member of TUL's Ethical Committee. The Senate composition changed in 2018, namely in the Students' Chamber. A vacancy created by termination of membership was filled by another candidate in keeping with the election placings.

7.4 Branch Council

The Branch Council of the PhD study programme Textile Engineering conducted fundamental concept, controlling and evaluation work for the PhD programme, most frequently using the "per rollam" voting process. The Branch Council convened on 9th April 2018 to discuss the state of the PhD programme, an overview of instructors and experts authorised to act as examiners at state doctoral examinations, the conditions and organisation of PhD courses, entrance examinations, newly proposed instructors and consultants and the overall concept of PhD programme accreditations prepared for submission.

8. Conclusion

Based on the above information the TUL FTE can be said to have worked in 2018 in keeping with the Long-Term Plan for Scientific, Research, Development, Innovation and Other Creative Work of the TUL FTE for the years 2016-2020 and its updates.

Education

As at 31st December 2018 there were 765 students studying at the TUL FTE (526 in Bachelor's, 239 in follow-up Master's and 67 in PhD courses). Three-hundred-and-fifty students started their first year. In 2018 (between January 1 and December 31 2018) a total of 136 students graduated from accredited study programmes, and 13 final state doctoral exams, with 11 students passing. In the same year, four students successfully defended their dissertation and were awarded a PhD degree. In 2018 education activities received aid from other sources through 12 development projects under the MYES institutional support initiative. The FTE participated in the university-wide Op RDI Roliz 4.0 project Development of human resources at TUL for increased education relevance, quality and accessibility under the conditions of Industry 4.0. In 2018 **the PhD study programme Industrial Engineering received accreditation for 10 years** and in June of the same year accreditation applications for all the remaining programmes of study were submitted for approval to the National Accreditation Bureau (NAB).

In 2018 TUL FTE conducted *a range of educational activities besides its accredited study programmes*. They included In particular lectures for TUL FTE students provided in association with businesses and TUL graduates, company tours and lecture internships of experts from Czech universities as well as from abroad. In 2017 a total of 53 students entered the SSSC in the Textile, Mechanical Engineering, Mechatronics and Economics categories. Seventeen projects were investigated at the TUL FTE as part of the Students' Grant Competition. Students and graduates from the Department of Design of TUL FTE successfully present themselves at *national and international exhibitions*. Students from Bachelor's courses participated in eight exhibition.

There were 17 stays of international experts from the RSA, Mauritius, Turkey, India, Estonia, Slovakia, Macedonia, Spain, Russia, Ireland and New Zealand, nine of which were one-week stays under Erasmus+ KA103, three stays under Erasmus+ KA107, two stays under MF TUL, one stay as part of the Visegrad Funds implemented in 2017-2018 and two stays were funded by foreign experts themselves. In 2018 a total of 42 students travelled abroad for 104 man-months.

Creative activities

Scientific and research work covers primarily the areas in which the Faculty has traditionally had a high level of competence and high-quality staff.

In 2018 projects from the following providers were conducted: MIT (8), TACR (4), MH (1), MI (1), CSF (1) and MEYS (1). Purpose-tied funding received in 2018 amounted to 32.78 mil. CZK (excluding SGS), and 16 project applications were prepared. The FTE joined the scheme of detailed result evaluation in international rankings. Materials Science - Textiles is one of the research branches on the WoS where the Faculty of Textile Engineering of the Technical University of Liberec is actively involved. InCites makes it possible to compare research outputs of the Faculty of Textile Engineering of the Technical University of Liberec in this research sub-branch with organisations from around the world and Europe as well as the Czech Republic. For 2018 TUL records in this sub-branch 39 documents (38 of which are authored or co-authored at TUL FTE), which puts TUL FTE on 10th place compared with the other approximately 1429 organisations in the world in terms of the number of documents.

As for creative artistic work, in 2018 TUL FTE submitted for certification 35 artistic outputs. The Department of Design of TUL FTE held ten exhibitions at the Galerie N, covering the fields of design, applied art, painting, photography and graphic art. Members of staff of the KDE participated in 24 exhibitions (two solo exhibitions and 22 joint exhibitions, of which 13 took place abroad).

Academic staff, employees

In 2018 TUL FTE had 118 employees; of these 74 were academics. TUL FTE had nine professors, 14 docents, 31 assistant professors, 18 assistants and two lecturers. The overview of employee structure is shown in the following tables. In 2018 TUL FTE had nine academics - foreign nationals (numbers of natural persons).

In the year 2018 an employee selection process was conducted for five academic and other vacancies at TUL FTE. Staff development support is directed towards publication work and mobility.

Internationalisation

The Faculty of Textile Engineering is a regular member of AUTEX - the Association of Universities for Textiles. A representative from the FTE is a member of the Review Committee for Accreditation of the AUTEX Joint Study Programme - E-Team NMSP "Textile Engineering" accredited in Gent, Belgium. The Faculty develops long-term collaboration with most of the international universities involved in the field of textile from all around the world. International relations are enhanced by working on joint projects, preparing and organising joint meetings and seminars, preparing joint publications and student and teacher exchanges. Long-term collaboration with nearly all significant international textile-field higher education institutions is in place.

All study programmes at TUL FTE are accredited by FEANI - the European Federation of National Engineering Associations (provided they meet the required conditions (an industry placement) graduates may be awarded the EURING degree). The trade organisation “The Textile Institute Manchester“ provides accreditation for Bachelor’s study programmes "Textile", follow-up Master’s study programme "Textile Engineering" and PhD study programme "Textile Engineering" until 2021.

New collaboration agreements (MOU and Inter-institutional Agreements Erasmus+) were signed between the FTE and 14 institutions. In 2018 the TUL FTE hosted an international conference and co-organised others. As part of the student mobility initiative there were 42 outgoing stays for 104 man-months and 90 incoming stays for 219 man-months. Members of academic and R&D staff completed 50 outgoing stays for 266 man-days and 17 incoming stays for 135 man-days supported from the Faculty’s and University’s mobility projects.

Third role of the University

The Faculty of Textile Engineering of the Technical University of Liberec is the only one in the Czech Republic to provide education across the entire field of textiles. The Faculty of Textile Engineering is a member of ATOK (Association of Textile-Clothing–Leather Industry), ČTPT z.s. (Czech Technology Platform for Textile) and Clutex o.s. (Cluster of Technical Textiles) and is engaged in long-term collaboration with the other members of these associations.

There are currently 49 framework collaboration agreements in effect between the TUL FTE and its partners, while there are subsequent agreements dealing with specific tasks and requirements of both parties and agreements related to regular operation. In 2018 two new framework collaboration agreements were signed. In addition, concluded were six agreements for specialist services and consultancy, two collaboration agreements, two works contracts, one confidentiality agreement, one joint research agreement and several operational agreements. In the same year two custom-made lectures for businesses and a number of promotional and information events

took place.

Liberec, 19th May 2018 Ing. Jana Drašarová, Ph.D., Dean