TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

ANNUAL REPORT 2017

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INTRODUCTION

1 INTRODUCTION

The Faculty of Mechanical Engineering is the oldest faculty of the Liberec University, in 2018 it will celebrate the 65th anniversary of its foundation and throughout its existence it has always been striving to fulfil its goals, tasks, visions and mission not only for the development of the faculty but also the Technical University in Liberec. The Faculty of Mechanical Engineering has always claimed responsibility for the development of the University as a whole, although this has often led to a weakening of the Faculty in terms of individual activities and personnel.

The Annual Report on the activities of the Faculty of Mechanical Engineering TU Liberec for the year 2017 presents information about the faculty, pedagogical activities, scientific research activities, international cooperation, partnerships and internationalization, and presents information on the implementation of the Strategic Plan of educational, scientific, research, development, artistic and other creative activities of the Faculty of Mechanical Engineering of the Technical University of Liberec for the period 2016–2020 and its Implementation Plan for 2017.

For the development and sustainability of the Faculty, quality and responsible work of each employee of the Faculty is required, but cooperation of the academic community is also necessary, this must be based on sufficient knowledge and competence of Faculty's academic staff, on development of personalities and teams, on sufficient laboratory facilities and equipment and on quality support in terms of administrative activities not only at Faculty, but also from the position of the departments of the Rectorate and TUL management.

Therefore, at this point, I would like to thank all members of the academic community and other Faculty employees for the fact that by their work they not only contributed to the good results and position of the Faculty and the University on a national and international scale, but also to the development of the Faculty in all three areas of activity.

prof. Dr. Ing. Petr Lenfeld
Dean
Faculty of Mechanical Engineering TUL

FACULTY STRUCTURE

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

2 FACULTY STRUCTURE

2.1 Faculty Bodies

	Members
Dean	prof. Dr. Ing. Petr Lenfeld
Head of Deans Office	Ing. Anna Benešová
Academic Senate of the Faculty of Mechanical Engineering TU in Liberec	
	– from 30.6.2014 till 30.6.2017
Chair	Assoc. prof. Ing. Lukáš Čapek, Ph.D.
	– till February 2017
	prof. Ladislav Ševčík, CSc.
	– from February 2017
Vice-Chair for the Chamber of Academic staff	prof. Ing. Ladislav Ševčík, CSc.
	– till February 2017
Vice-Chair for the Chamber of Students	Ing. Ondřej Řídký
Secretary – member of the Academic Senate	Ing. Rudolf Martonka, Ph.D.
Members of the Chamber of Academic Staff	prof. Ing. Jaroslav Beran, CSc.
	Ing. Luboš Běhálek, Ph.D.
	Ing. Jiří Blekta, Ph.D. – till 7.2.2016
	Assoc. prof. Ing. Václav Dvořák, Ph.D.
	Ing. Vlastimil Hotař, Ph.D.
	Ing. Michaela Kolnerová, Ph.D.
	Assoc. prof. Ing. Lubomír Moc, CSc.
	Ing. Aleš Lufinka, Ph.D. – from 7.2.2016
	prof. Ing. Iva Nová, CSc.
	Ing. Robert Voženílek, Ph.D.
Members of the Chamber of Students	Ing. Martin Borůvka
	Ing. Jan Hujer
	Ing. Lukáš Zuzánek
	Ing. Jiří Komárek
	Ing. Andrii Shynkarenko
FS TUL representative of the Higher Education Council	
	Ing. Rudolf Martonka, Ph.D.
Academic Senate TU Liberec	**–** till 30. 6. 2017
Academic staff representatives for FS TUL	prof. Ing. Jaroslav Beran, CSc.
	Assoc. prof. Ing. Lubomír Moc, CSc.
Student representative for FS TUL	Ing. Jan Vácha
Academic Senate of the Faculty of Mechanical Engineering TU in Liberec	
	– from 30. 6. 2017
Chair	prof. Ing. Iva Nová, CSc.
Vice-Chair for the Chamber of Academic staff	Ing. Aleš Lufinka, Ph.D.
Vice-Chair for the Chamber of Students	Ing. Tomáš Kořínek
Secretary – member of the Academic Senate	Assoc. prof. Ing. Jiří Machuta, Ph.D.
Members of the Chamber of Academic Staff	prof. Ing. Jaroslav Beran, CSc.
	Ing. Luboš Běhálek, Ph.D.
	Ing. Martin Lachman, Ph.D.
	Ing. Rudolf Martonka, Ph.D.
	Assoc. prof. Ing. Lubomír Moc, CSc.
	Assoc. prof. Ing. Jaromír Moravec, Ph.D.
	Assoc. prof. Ing. Pavel Solfronk, Ph.D.
	prof. Ing. Ladislav Ševčík, CSc.
	Ing. Petr Zelený, Ph.D.
Members of the Chamber of Students	Jan Bayer
	Ing. Ondřej Baťka
	Ing. Martin Borůvka

	Ing. Petr Kulhavý
	Ing. Pavel Srb
Degate for AS FS TUL for participation in meetings of AS TUL	
	Assoc. prof. Ing. Lubomír Moc, CSc.

FS TUL representative of the Higher Education Council

	Ing. Rudolf Martonka, Ph.D.

Academic Senate TU Liberec	– from 30.6.2017
Academic staff representatives for FS TUL	prof. Ing. Jaroslav Beran, CSc.
	Ing. Vlastimil Hotař, Ph.D.
Student representative for FS TUL	Ing. Petr Kulhavý

Scientific Board of the Faculty of Mechanical Engineering TU in Liberec

	– from 9.4.2014 till 8.2.2018
Chair	prof. Dr. Ing. Petr Lenfeld
Members from TUL	Assoc. prof. Ing. Martin Bílek, Ph.D.
	prof. Ing. Jaroslav Beran, CSc.
	Assoc. prof. Ing. Karel Fraňa, Ph.D.
	Assoc. prof. Ing. Josef Janeček, CSc.
	prof. RNDr. David Lukáš, CSc.
	prof. Ing. Petr Louda, CSc.
	Assoc. prof. Ing. Miroslav Malý, CSc.
	Ing. Ivo Matoušek, Ph.D.
	prof. Ing. Iva Nová, CSc.
	prof. Ing. Miroslav Olehla, CSc.
	prof. Ing. Lubomír Pešík, CSc.
	Assoc. prof. Ing. Iva Petríková, Ph.D.
	Assoc. prof. Ing. Ludvík Prášil, CSc.
	prof. Ing. Jan Skalla, CSc.
External members	
UP DFJP Pardubice	Assoc. prof. Ing. Ivo Drahotský, Ph.D.
FJFI ČVUT Praha	prof. Ing. Nikolaj Ganev, CSc.
FS ČVUT Praha	prof. Ing. Stanislav Holý, CSc.
FAV ZČU v Plzni	prof. ing. Vladislav Laš, CSc.
FT UTB ve Zlíně	Assoc. prof. Ing. David Maňas, Ph.D.
ÚT AV ČR, v. v. i. Praha	prof. Ing. František Maršík, DrSc.
Magna Exteriors (Bohemia), s.r.o., Liberec	Ing. Pavel Neumann
FS VŠB-TU Ostrava	prof. Ing. Petr Noskievič, CSc.
SjF STU Bratislava	Assoc. prof. Ing. František Palčák, CSc.
ÚT AV ČR, v. v. i. Praha	prof. Ing. Jaromír Příhoda, CSc.
profesor emeritus	prof. Ing. Jaroslav Purmenský, DrSc.
profesor emeritus	prof. RNDr. Miroslav Raab, CSc.
FSI VUT v Brně	Assoc. prof. Ing. Pavel Rumíšek, CSc.
FS ČVUT v Praze	prof. Ing. Milan Růžička, CSc.
Rieter CZ, s.r.o.	Assoc. prof. Ing. Jiří Sloupenský, CSc.
FS ČVUT v Praze	prof. RNDr. Petr Špatenka, CSc.
ČEZ, a.s., Jaderná elektrárna Temelín	Ing. Pavel Šimák
Benteler ČR s.r.o. Stráž nad Nisou	Assoc. prof. Ing. Jiří Vejvoda, CSc.

Disciplinary Committee

	from 1.3.2016 till 28.2.2018
Chair	Assoc. prof. Ing. Václav Dvořák, Ph.D.
Members	Assoc. prof. Ing. Martin Bílek, Ph.D.
	Ing. Jan Hujer
	Ing. Petr Kulhavý

Committee for Economic Affairs

Chair	Ing. Anna Benešová, Head of Dean's Office
Members	Ing. Luboš Běhálek, Ph.D.
	Assoc. prof. Ing. Martin Bílek, Ph.D.
	Assoc. prof. Ing. Lubomír Moc, CSc.
	prof. Dr. Ing. Pavel Němeček
	Ing. Jitka Havlíková

Industrial Board – representatives of companies
AGC Automotive Czech a.s., Bílina, Chudeřice; Benteler ČR s.r.o., Chrastava; BOS Automotive, Products CZ s.r.o., Klášterec nad Ohří; Continental Automotive Czech Republic s.r.o., Jičín; EDAG Engineering CZ spol. s r.o., Mladá Boleslav; Faurecia Emissions Control Technologies, Mladá Boleslav, s.r.o., Mladá Boleslav; Foxconn CZ s.r.o., Pardubice; GDK, spol. s.r.o., Kolová; Grupo Antolin Turnov s.r.o., Turnov; Kamax, s.r.o., Turnov; KOH-I-NOOR PONAS s.r.o., Polička; KSM Castings a.s., Hrádek nad Nisou; Magna Exteriors & Interiors(Bohemia), s.r.o., Liberec; Preciosa a.s., Jablonec nad Nisou; Rieter CZ s.r.o.; Ústí nad Orlicí; Škoda Auto a.s.; Mladá Boleslav; TOS Varnsdorf a.s., Varnsdorf; TRW Automotive Czech, s.r.o., Jablonec nad Nisou.

Concept and quality of the Faculty of Mechanical Engineering TU in Liberec activities

Chair	prof. Dr. Ing. Petr Lenfeld
Members	Assoc. prof. Ing. Václav Dvořák, Ph.D.
	Assoc. prof. Ing. Štěpánka Dvořáčková, Ph.D.
	Ing. Vlastimil Hotař, Ph.D.
	Ing. Petr Lepšík, Ph.D.
	Assoc. prof. Ing. Jaromír Moravec, Ph.D.
	Ing. Petr Zelený, Ph.D.
	Assoc. prof. Ing. Pavel Solfronk, Ph.D.
	Ing. Adam Hotař, Ph.D.
	Ing. Jan Valtera, Ph.D.
	Mgr. Radka Dvořáková
	RNDr. Iveta Lukášová

2.2 Faculty Structure

The Faculty is organizationally divided into the Dean's Office, the Student Affairs office and ten departments.

Organizational unit	Members
Dean's office	
Dean	prof. Dr. Ing. Petr Lenfeld
Vice-Dean for Doctoral Studies and Development	Assoc. prof. Ing. Martin Bílek, Ph.D.
Vice-Dean for Education and Student's Affairs	Ing. Ivo Matoušek, Ph.D.
Vice-Dean for International and Public Relations	prof. Ing. Karel Fraňa, Ph.D.
Head of Dean's Office	Ing. Anna Benešová
Dean's Secretary	Pavla Kholová
Department of development and projects	
Development and projects manager	RNDr. Iveta Lukášová
Financial manager	Ing. Tomáš Kysilka
OP projects adminmistrator	Ing. Zuzana Horčičková
Student Affairs office	
Head of Student Affairs office	Mgr. Radka Dvořáková
Student Affairs office worker	Ing. Mgr. Dana Semotjuková
International relations	Ing. Marcela Válková
Departments	
Department of Applied Mechanics / DAM	Assoc. prof. Ing. Iva Petríková, Ph.D.
Department of Engineering Technology / DET	Assoc. prof. Ing. Jaromír Moravec, Ph.D.
Department of Material Science / DMS	prof. Ing. Petr Louda, CSc.
Department of Power Engineering Equipment / DPE	Assoc. prof. Ing. Václav Dvořák, Ph.D.
Department of the Design of Machine Elements and Mechanism / DMM	prof. Ing. Ladislav Ševčík, CSc.
Department of Machining and Assembly / DMA	Assoc. prof. Ing. Jan Jersák, CSc.
Department of Vehicles and Engines / DVE	Ing. Robert Voženílek, Ph.D.
Department of Glass Producing Machines / DGR	Assoc. prof. Ing. František Novotný, CSc.

and Robotics	
Department of Textile Machine Design / DTD	prof. Ing. Jaroslav Beran, CSc.
Department of Manufacturing Systems and Automation / DMA	Ing. Petr Zelený, Ph.D.

2.3 Personnel Structure of the Faculty

In 2017, a total of 144 employees (107.5 FTEs) were active at the FS TUL, of which 108 were academic staff (80.35 FTEs). The total number of teachers decreased year-on-year by 0,1 FTE.

Teaching in Bachelor's, Master's and doctoral degree programmes was provided mainly by 20 internal professors and 26 associate professors in the position of study subjects guarantors, trainers, lecturers and supervisors of students' final theses. Also 51 specialized assistants, 9 assistants and 2 lecturers participated in the fulfilment of pedagogical tasks.

See annexed tables 2.3.

2.4 Procedures to the Appointment of a Professor and Associate Professor

In 2017, one professor was appointed and one professor procedure was initiated. In 2017 five associate professor procedures were successfully completed, of which two were commenced in 2016 and three were commenced in 2017. One of the associate professor procedure initiated in 2016 was still ongoing.

See text appendix 2.4.

EDUCATIONAL ACTIVITIES

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

3 EDUCATIONAL ACTIVITIES

The Faculty carries out and guarantees the professional level of all three types of study programmes.

3.1 Accredited Degree Programmes and Branches

The Faculty guarantees teaching in 6 study programmes. All programmes are accredited in Czech and English, in full-time and part-time form of study. Overviews are given in table annex 1.3

3.2 Offer of Study in English

- In 2017, the Faculty of Mechanical Engineering offered study in English in the follow-up Master's degree programme in full-time form and in all doctoral degree programmes.
- Teaching in English also took place in the short-term programmes ERASMUS+, CEEPUS, IAESTE and IP TUL in all study programmes. See chapter 5.3 for details.

3.3 Interest in Studies and Admission Procedures

690 applicants showed their interest in studying at the Faculty of Mechanical Engineering of TUL (compared to 2016 it is 36 applicants less). Of the total number of applicants, 445 students enrolled, i.e. approximately 64% (68% in 2016). 857 students enrolled in all years of study in the academic year 2017/18 (i.e. 89 less than in 2016).

The structure of students does not change, the proportion of students in individual types of study remains approximately the same. From the total number of students enrolled, 63% of students is enrolled in Bachelor's programme, approximately 26% in Master's programmes and11% in doctoral programmes.

Approximately half of those interested applicants are from secondary technical schools, one fifth from grammar schools and about one third from other secondary schools.

BSP 523 applicants, 344 enrolled. Applicants for Bachelor study fields of BSP were mainly from secondary technical schools (approximately 50% of the total number of applicants), from grammar schools (17%) and other secondary schools (33%).

MSP 1 applicant, 0 enrolled.

FMSP 144 applicants, 85 enrolled. Of these, 61 were applicants of study programme in English and 9 students enrolled. Applicants for Master's programme in Czech were in most cases graduates of Bachelor studies at the TU Liberec and in individual cases from other faculties.

DSP 22 applicants, 16 enrolled. Six enrolled students for doctoral study programmes were graduates from the Faculty of Mechanical Engineering of TU Liberec, the other students completed their previous degree at another university.

3.4 Numbers of Students and Graduates

The number of unsuccessful students during the first year of study is still high, especially in the Bachelor's degree programme. Students are admitted according to the secondary school study results.

During the first year, 228 students in BSP and 7 students in FMSP failed their studies . The average duration of studies exceeds the standard length of study.

BSP In the academic year 2017/2018, 539 students were enrolled (of which 407 in full-time study and 132 in part-time study). In 2017, 62 students (42% of the total number of graduates) successfully completed their studies. The average length of study of BSP graduates in 2017 was 4.79 years

(F)MSP In the academic year 2017/2018, 224 students were enrolled (of which 149 in full-time study and 75 in part-time study). In 2017, 72 students successfully completed their studies (49% of the total number of graduates). The average length of study of FMSP graduates was 2.62 years.

DSP In the academic year 2017/2018, 90 students were enrolled (49 in full-time study and 41

in part-time study). In 2017, 13 students successfully completed their studies (9% of the total number of graduates). The average length of study for graduates was 8.38 years.

3.5 Credit System and Study Evaluation

For the evaluation of the course of studies in Bachelor's and follow-up Master's degree programmes, the credit system ECTS (European Credit Transfer System) is used.

Bilingual Diploma Supplement, supported by consistent usage of the credit system, has been automatically received by each TUL graduate since 2005 as a supplement to their diploma.

For successful completion of the study in 2017 was required to obtain:
- 180 credits in BSP,
- 120 credits in FMSP,
- 300 credits in MSP (five-year).

3.6 Scholarships

Scholarships paid in 2017 were awarded in accordance with the Scholarship Regulations of the Faculty of Mechanical Engineering TU Liberec and in accordance with the valid directives of the Dean of the Faculty of Mechanical Engineering.

- In total, scholarships were paid to 852 students.
- The total amount of scholarships paid was CZK 9.96 million.
- The amount of scholarships paid in 2017 decreased by CZK 90 000.

Preciosa Foundation Jablonec nad Nisou scholarship
A total of 10 students of the Faculty of Mechanical Engineering received scholarships amounting to CZK 25 000.

3.7 Creative Activity of Students

FOLLOW-UP DEGREE STUDY

Prize of the Governor of the Liberec Region
Ing. Martina Češková
Branch: Engineering Technology and Materials
Thesis topic: Injection Mould Design for a Promotional Item

TUL Rector's Award
Ing. Adam Luke
Branch: Machines and Equipment Design
Thesis topic: Mechanical Properties Verification of Optimized Part Produced by 3D Printing

Preciosa Foundation Award
Ing. Jan Seidl
Branch: Machines and Equipment Design
Thesis topic: Cavitation in Medical Application

FS TUL Dean's Award
Ing. Roman Rybáček
Branch: Machines and Equipment Design
Thesis topic: Design of Internal Combustion Engine for Hybrid Vehicle

Graduated with Honours – received red diploma
Ing. Petr Čečák
Ing. Martina Češková
Ing. David Klimenta
Ing. Roman Rybáček
Ing. Martin Ševic
Ing. Jan Vais

BACHELOR'S DEGREE STUDIES

Dean's Award
Bc. Jan Boubín – Evaluation of Bronze Crystallization in Different Conditions of Cast Solidification
Bc. Jiří Souček – Spinning Electrode for Production of Mixed Nanofiber Material

Graduated with Honours – received red diploma
Bc. Kristýna Kubíková

ARMEX Technologies Award – Thesis of the year 2017

The ARMEX Technologies team selected the three best student theses. More than 100 students entered the competition, students were mostly from CTU and UWB.

The winner was Jiří Souček from our Faculty of Mechanical Engineering TU Liberec.
In his work he focused on the construction of a new type of electrode for the production of mixed nanofibrous material. It is a construction of a world-unique electrode that enables spinning of two different materials without mixing them.

Student section of the ČEEP 2016 competition – Czech Energy and Ecological Project, Construction and Innovation – patronage of Rectors from five Universities.

Ing. Roman Rybáček – graduate of FMSP 2017
Thesis topic: Design of Internal Combustion Engine for Hybrid Vehicle
Award of the Rector of the Technical University of Liberec and reward CZK 20 000.

Student Grant Competition at the Faculty
Within the student grant competition, 21 projects amounting to the total of CZK 6.5 million were being solved. See table annex 4.5 for an overview.

Student Scientific and Professional Activities of SVOČ 2017
The ninth annual competition to encourage talented students in Bachelor's, Master's and PhD study branches was organized by the Faculty of Textile Engineering, Mechanical Engineering, Mechatronics, Informatics and Interdisciplinary Studies and the Faculty of Economics. The aim of the competition is to support creative types of students who have the prerequisites for scientific and development activities at technical faculties of TUL. 54 students participated in the competition, including 15 students from the Faculty of Mechanical Engineering. The event was supported by IP TUL 2017.

Mechanical Engineering Section – placing in the Bachelor's and follow-up Master's study programme section:
Roman Rybáček – Design of Internal Combustion Engine for Hybrid Vehicle
Jiří Čech – Innovation of Foam Seal Applicator Device
Jiří Souček – Spinning Electrode for Production of Mixed Nanofiber Material

Mechanical Engineering Section – placing in the PhD study programme section:
Ing. Petr Kulhavý – The use of hyperelastic element in the production of shaped templates of highly structured composite sheets
Ing. Ondřej Matúšek – A detection of distorted part of the float glass by means of the laser beam
Ing. Tomáš Kořínek – The CO_2 reduction in indoor rooms

FPV Racing Vrtule2017 Liberec
The second year of the Czech FPV Drone University Competition took place on June 17. The track complexity and a number of 26 racers makes it the biggest domestic drone competition. 26 competitors met on Saturday at the university football stadium in Harcov. They came from all corners of the Czech Republic, several pilots arrived from Slovakia and Poland and of course the pilots from our university also competed. The organizers were Andrii Shynkarenko and Iaroslav Kovalenko, PhD students of the Department of Manufacturing Systems and Processes, and Martin Bubla, a Bachelor's programme student.

CREO UNIVERSITY CHAMPION 2017
The fourth year of the competition for bachelor students has a winner. The fastest designer was Aleš Vodseďálek, second place Jan Bělík and third place Marek Lukášek. Winners received vouchers for the purchase of electronics and small gifts. The competition was organized on October 21 by the Department of Textile Machine Design of the Faculty of Mechanical Engineering.

Student Formula TUL
An international competition involving more than 500 university teams from around the world. The aim of the competition is to design and construct an innovative formula that will stand up against other teams in challenging races and disciplines testing the car's characteristics and the capabilities of the entire team. FS TUL team was established in 2016.

In June 2017, the formula was officially christened and subsequently took part in races Formula Student in Italy and Formula Student Czech Republic. The construction of the student formula is sponsored by companies and industrial partners. See text annex 6.6.

3.8 Educational Promotion Activities

Open door days for those interested in studies
- Open doors day at FS TUL – February 2017.
- Open doors day at FS TUL – December 2017.
- Open doors day TUL – November 2017.
- Visits of students at TUL – in February, we welcomed students from SPŠ Chrudim and SŠ Automobilní Ústí nad Orlicí at our Faculty.

Educational fairs
Study in study programmes and the possibilities for graduates were promoted at education fairs (active participation of FS):
- X. European Fair of Higher Education Gaudeamus – Prague, Letňany – January 2017 (TUL, FME).
- NAFSA 2017, USA – May 2017 (TUL, FME).
- EAIE 2017, Seville, Spain - September 2017 (TUL, FME).
- Educa 2017 Education Fair in Liberec – October 2017 (TUL).
- European Fair of Post-Secondary Education Gaudeamus in Brno – November 2017 (TUL, FME).
- Facon Education Fair, Kuala Lumpur – December 2017 (TUL, FME).

T–Fórum 2017
The 23rd annual event of the Job Fair T–Fórum for Students was attended by representatives of 62 industrial companies. The fair is traditionally organized by a branch of the IAESTE organization at the Technical University of Liberec in co-organization of the Department of Vehicles and Engines of FS TUL. The fair is one of the largest personnel events in the region. December 2017.

Study promotion
- Promotion through FB and Faculty website.
- FB campaigns for selected age groups of secondary school students – ODD, applications for study.
- During January, Vice-Dean for Education and Student's Affairs visited SPŠ Vlašim, SPŠ and JŠ Kolín, VOŠ, SPŠ and OA v Čáslavi, VOŠ and SPŠ Jičín.
- During February, Vice-Dean for Education and Student's Affairs Dr. Ivo Matoušek visited secondary schools: SPŠ Varnsdorf, Gymnázium Frýdlant v Čechách, SPŠ SOŠ and SOU Nové Město nad Metují, VOŠ and SPŠ Rychnov nad Kněžnou, SPŠ Hronov.
- Workshop for students of Gymnázium Česká Lípa
  On March 27, a 3-hour Workshop was held in the laboratory of the Department of Applied Mechanics with the participation of a group of 12 3rd-year students of the Gymnázium Česká Lípa and pedagogical accompaniment. During the workshop, students had the opportunity to see several practical demonstration: measuring the deflection of the beam using a strain gauge and parallel analytical calculation, experimental determination of the pneumatic spring characteristics, demonstration of gyroscopic effect and electronic cam. Students were able to

test some tasks themselves, such as measuring contact pressure on the vehicle seat or behaviour of shape memory materials.

- Grammar school students at the Faculty of Mechanical Engineering
  On April 3 we welcomed at the Faculty of Mechanical Engineering, students of grammar schools from Rumburk, Varnsdorf, Mnichovo Hradiště, Semily, Jablonec nad Nisou and F. X. Šaldy v Liberci. The program of the visit included excursions to the laboratories of the Department of Engineering Technology, the Department of Vehicles and Engines and the Department of Manufacturing Systems and Automation. The students also attended a lecture by Dr. Dana Drábová from the State Office for Nuclear Safety. The lecture morning was held on April 25 at our Faculty for students of SPŠSE and VOŠ Liberec.
- In April we welcomed students from SŠ Automobilní Ústí nad Orlicí.

Study promotion at FS TUL for foreigners

- Welcome Days at TUL, February 15–19
  On February 15, 2017, traditionally, before the start of the summer semester, Welcome Days were held for international students who came to the university under the Erasmus+ program. In the summer semester 2016/2017, we welcomed 34 new students from France, Spain, Portugal, Turkey, Poland, Germany and newly from Finland as part of the Erasmus+ program and 2 students from Taiwan as part of inter-university cooperation. Another 3 students from Turkey, 2 students from Portugal and 1 student from Lithuania extended their studies from the winter semester and continued their studies in the summer semester. At the same time, 13 foreign students took part in an Erasmus+ program internship at the Faculty of Mechanical Engineering in the summer semester.
- BSc WING / SWEEK–Liberec 2017
  In the period May 7–13, The so-called "study trip" of students from FHS St. St. Gallen who study a programme combining economic and technical disciplines took place. As part of their program, they also attended selected lectures at the Faculty, namely those of representatives of DET and DVE departments.
- Welcome Days at TUL, September 26–October 1
  On September 27, 2017, traditionally, before the start of the winter semester 2017/2018 Welcome Days were held for international Erasmus+ students from France, Poland, Portugal, Spain, Turkey, Greece, Lithuania, Slovakia and Hungary, who began to study at the FS TUL winter semester 2017/2018 in the total number of 42 students. As part of inter-university cooperation, 1 Taiwanese student also started one-semester study. At the same time, 2 foreign students commenced an internship at the Faculty of Mechanical Engineering within the Erasmus+ program during the winter semester.
- Orientation Week
  International Office of TUL in collaboration with ESN organized within the period of September 26 to October 1 an Orientation Week for governmental scholarship holder students and self-funding students from India, who began their studies in FMSP, DSP at the Faculty of Mechanical Engineering in WS 2017/2018. During the Orientation Week, students were introduced to the university. They were provided with practical information about studying at the Faculty. Students were enrolled into study and other administrative tasks related to the admission of students were carried out.
- International Day 2017
  On November 2, the international fair of opportunities to work and study abroad was held at the university under the auspices of the International Office of TUL. The aim of this event was to support outgoing student mobility In addition to lectures by students with experience from studying abroad and presentations of agencies enabling various types
  of stays abroad, the program also included a discussion of representatives of Czech and European regional administrations on migration. Part of the fair was also the opening of the exhibition My Erasmus+.
- In cooperation with The Institute for Language and Preparatory Studies, Charles University, 40 technically or economically oriented international students preparing for their studies in the Czech Republic visited the Faculty of Mechanical Engineering on December 12.
- FME TUL – seminar for students of the Faculty of Mechanical Engineering on the possibilities of study within the ERASMUS+ program, in December 2017.

Presentation of the departments of the Faculty of Mechanical Engineering to students of the second and third years of the Bachelor's study programme

- In March, a presentation of the activities of departments and laboratories was held with representatives of individual departments who introduced the activities of departments. The event was designed for undergraduate students who are in the stage of deciding and thinking about the final thesis or professional traineeship, and for them to decide at which department they will carry out these activities.
- The project also included a questionnaire survey of students on the quality of Bachelor's study.

Promotion of studies within the GreK project

Cooperation Program of the Czech Republic – Free State of Saxony 2014–2020. The events were organized by the Department of Engineering Technology.

- Scientific practice " Injection molding, blow molding and extrusion of thermoplastics". TUL – 24.11.2016, 15.11.2017.
- Scientific practice "Additive technologies and thermoplastic composites with textile reinforcement". HSZG, Fraunhofer Institut – 8.12.2016, 29.11.2017.
- Joint excursion of students to company Magna Exteriors (Bohemia) s.r.o. Liberec. 15.12.2016.
- Joint excursion of students to company Rail Components and Systems GmbH Königsbrück. 5.1.2017.
- Scientific practice "Injection molding process and control of injection machines in relation to final quality of injection parts". TUL – 2.5.2017.
- Scientific practice " Digital Microscopy ". Fraunhofer Institut – 9.5.2017.
- Joint excursion of students to company VYVAPLAST s.r.o. Turnov – 15.5.2017.
- Practical workshop: development process of small wind power station – 29.11 to 1.12.2017.
- Joint excursion of students to company Kautex Textron Bohemia s.r.o. Kněžmost – 4.12.2017.

3.9 Quality of Teaching

Teaching is organized in accordance with accredited study plans and is guaranteed by educators who prove their professional competence through professional and publishing activities.

Lecturers are mainly professors and associate professors of the Faculty of Mechanical Engineering and in selected cases other experts from the ranks of university academic staff. External workers from industry and the CAS are also involved in the teaching, see the table annex 6.4.3.

In the context of professionally focused seminars and lectures, other experts from the application and academic spheres have presented here, see chapter 6.5.

Activities to support the quality of teaching are specified in detail in the annual reports of each department. In summary:

- There was a significant investment development of classrooms and laboratories from the funds of FRIM, IP TUL and OP RDE projects in the amount of approximately CZK 5 million, see chapter 7.2.
- In support of teaching, 7 study materials were published, of which 3 in English (electronically in the first edition).
- 4 functional models, 1 didactic aid and virtual model for teaching were created. See table annex 3.9.1, documented in detail in the department's annual reports.

Quality Assessment of Teaching and Learning

Students have the opportunity to evaluate anonymously courses in the IS STAG system. The event is organized by the Student Chamber of TUL. In the winter semester 2016/17 – 180 students participated in the evaluation, in the summer semester 2016/17 a total of 99 students of the Faculty of Mechanical Engineering.

DPE and DMA departments carry out evaluation of teaching within the end of teaching for their own feedback.

3.10 Lifelong Learning

In the context of lifelong learning, i.e. non-accredited training courses, the Faculty of Mechanical Engineering conducts a wide range of professional seminars and trainings that are content-structured according to the requirements of industrial firms and companies.

Lifelong learning is an important item of cooperation with industry:

- A total of 44 professional seminars and courses were organized.
- The courses were attended by approximately 336 participants.
- The volume of funds received through this activity amounted to approximately CZK 2 million.

SCIENTIFIC RESEARCH ACTIVITIES

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Faculty of Mechanical Engineering

4 SCIENTIFIC-RESEARCH ACTIVITIES

4.1 Focus of Scientific and Research Activities

The scientific and research base are traditional fields that accentuate the needs of applied research and development in the Czech Republic.

Areas that are being developed:

- Competitive machines and equipment.
- Material engineering.
- Progressive technological and production processes.
- Energy storage and transfer.

It mainly reflects and accentuates the needs of applied research and development in the Czech Republic, with an emphasis on:

- Research and development of traditional and modern materials.
- Research, development and innovation of standard and progressive technologies.
- Reducing energy intensity.
- Weight reduction.
- Construction of special machines and equipment.
- Sustainable transport.

In 2017, scientific and research activity of the Faculty continued also within the research programs of the Centre for Nanomaterials, Advanced Technology and Innovation (hereinafter referred to as CNATI). In terms of project sustainability, the Faculty develops two research programs:

- Competitive engineering.
- Material research.

4.2 Institutional Support

In the year 2017, the Faculty obtained funds for institutional support in the amount of CZK 29,286 mil., which represents 48% of the R&D activities. This amount was allocated to the departments to support research and stabilize research teams

4.3 Competence Centre

In 2017 activity of Josef Božek – Competence Centre for Automotive Industry led by the Czech Technical University in Prague continued. The participant from the Faculty of Mechanical Engineering is the Department of Vehicles and Engines. See appendix 4.3

4.4 Scientific–research Projects

The scientific-research activities of the Faculty were mainly focused, as in previous years, on applied and experimental research and development. The Faculty was involved as co-beneficiary in TA CR, MIT CR, GA CR, H2020 projects and in the role of beneficiary in MoI CR and MEYS projects.

In 2017, in total 13 projects were solved at the Faculty. Of those 3 new projects were launched in 2017, and 3 projects were successfully completed at the end of the year. 2 international project, one H2020 and one R&D mobility project, were solved.

The volume of grant support obtained by the Faculty for the solution of science and research projects amounted to approx. CZK 25.25 million, which represents approx. 41.5% of the total volume of earmarked financial funds.

The share of FS TUL in projects of other parts of TUL, mainly CxI, was approx. 8 mil.
For overviews of projects and financial subsidies see table and text appendices 4.4.

Overview of scientific–research projects

- TA CR: TA04021338 – Development of a CFD code for the design of desulphurizing equipment
- TA CR: TH01010690 – Development of advanced technology of felt hats making
- TA CR: TH02020032 – Product development of AlSi5Mg alloy for the automotive industry

- MIT CR: TRIO: FV10709 – Numerical simulation of welding and life prediction of welded structures in the field of land transport, steel structures and power engineering
- MIT CR: TRIO: FV10510 – Low-temperature repairs of creep-resistant cast turbine component
- MIT CR: TRIO: FV10467 – Development of progressive fulling technology in hat production
- MIT CR: TRIO: FV10215 – Highly efficient jet loom for production of leno of fabrics
- MIT CR: TRIO: FV20241 – Modular range of tool magazine for machine tools
- MIT CR: TRIO: FV20547 – Special transformation mechanisms in drives with electronic cams
- MOI CR: VI20172020052 – Applied research in the field of the new generation of personal protective equipment
- GA CR: P108/12/1452 – Optimization of high-temperature mechanical properties of aluminides Fe3Al type iron with carbide elements
- H2020: A novel process for manufacturing complex shaped Fe-Al intermetallic parts resistant to extreme environments
- MOBILITY-7AMB: CZ/Poland – Research of processes in supersonic ejectors with isobutane

Projects submitted and solved by the academic staff of FME under CNATI

- TA CR: TE01020020 – Josef Božek – Competence Centre for Automotive Industry
- TA CR: TA04011009 – Research of utility properties and application possibilities of light polymer composites for body building
- TA CR: TH01031152 – Increasing the efficiency of machines and equipment by reducing friction losses of the machine and its components

Project of commercialization of R&D results submitted and solved under CNATI

- TA CR-GAMA: TG01010117 – PROSYKO – 3 sub-projects solved by the academic staff of FME

4.5 Student Grant Competition

Within the support of specific research carried out through the Student Grant Competition, 20 projects with a total volume of financial support CZK 6.5 million were solved, which represents 10.7% of the total volume of financial resources obtained by the Faculty for scientific-research activity. For an overview of projects, see table annex 4.5.

4.6 Contract Research and Development

Contractual research and development within supplementary activities form an important segment of the Faculty's activities. In 2017, the contractual research earnings of the Faculty of Mechanical Engineering amounted to approximately CZK 12.17 million.

Contractual research and development carried out by academic staff of the Faculty of Mechanical Engineering under CNATI amounted to approximately CZK 5.39 million. For an overview of revenues of each workplace, see table annex 4.6.1.

4.7 Supplementary Activity

The earnings of supplementary activities of the Faculty of Mechanical amounted to CZK 4.44 mill. Supplementary activities carried out by academic staff of the Faculty of Mechanical Engineering under CNATI amounted to CZK 6.13 mill.

The faculty of Mechanical Engineering provides expert activities in the field of engineering, mechanical engineering and technical fields (various). In 2017, no expert reviews were prepared.

The Faculty provides Authorized Measurements of Pollutant Emissions pursuant to Section 15 Paragraph 1 a) of the Air Protection Act. The volume of services from this activity is declining. In 2017, two contracts were executed.

For an overview of revenues by workplace, see table annex 4.6.1.

4.8 The Institute for Nanomaterials, Advanced Technology and Innovation

The Faculty of Mechanical Engineering develops laboratories for two research programs within the existing infrastructure.
Sustainability of the project terminates in 2018, see the text annex 4.7

4.9 Results of Research-development Activities

Within the five-year evaluation period it can be stated that the most numerous group of outputs at the Faculty is the category of articles published in the conference proceedings. The second most numerous category is articles in a professional periodical. The results of applied research follow. In this area the functional sample, utility model and patent are the most frequently represented among the output categories. It is possible to record the trend of decreasing absolute number of R&D outputs, see table annex 4.9.5

In 2017, the number of functional samples increased. On the contrary, the number of patents decreased. The Faculty of Mechanical Engineering no pilot plant and certified technology was reported at the Faculty of Mechanical Engineering.

The Faculty of Mechanical Engineering has registered the following selected results in the year 2016 (year of data collection 2017) in IS R&D, see table annex 4.9.6:

- 65 results – result type J (article in a periodical)
- 100 results – result type D (article in the proceedings)
- 16 results – result type P (patent)
- 7 results – result type F/U (utility model)
- 6 results – result type GB (functional sample)

For the year 2017 (year of data collection 2018) it is planned to insert the following number of outputs into the IS RVVI, see table annex 4.9.7:

- 60 results – result type J (article in a periodical)
- 81 results – result type D (article in the proceedings)
- 13 results – result type P (patent)
- 7 results – result type F/U (utility model)
- 16 results – result type GB (functional sample)

At the Faculty, the results for 2017 show a trend towards increasing the number of quality outputs. In 2017, a total of 51 journal entries were published at the Faculty that are part of the WoS or Scopus databases, and 73 articles in the conference proceedings, which are included in the listed databases. Of these, 16 articles in journals with IF. If we compare these data with the previous period, it can be stated that in 2016 a total of 56 outputs were published in journal, which are included in WoS or Scopus databases, and 82 articles in the conference proceedings that are included in the listed databases. Of these, 13 articles in journals with IF. In 2015, a total of 24 outputs were published in journals that are included WoS or Scopus databases, and 57 articles in conference proceedings that are included in these databases. Of these, 23 articles in journals with IF.

In 2017, significant R&D results were selected at the Faculty for evaluation within the Methodology 17+. A summary of these results is given in table annex 4.9.8.

Due to the change in the principles of evaluation of research organizations further parameters compared to the previous years are added/evaluated. It is a branch breakdown of outputs and the number of main results created with the support of specific research and institutional support .

From the performed analysis, it is evident that approximately 91 % of all outputs in 2017 were included in the field 2. Engineering and Technology according to the currently used classification of fields (Frascati manual). Another field in which the Faculty applies outputs is field 1. Natural Sciences (approx. 7 %), see table annexes 4.9.9 and 4.9.10.

In the field of 2. Engineering and Technology in 2017, the most numerous sub-sectors are 2.3 Mechanical Engineering (41%) and 2.5 Material Engineering (34%). Other sub-sectors are significantly less represented (2.7 Environmental engineering – 10%, 2.10 Nanotechnology – 7%) and others. Table annex 4.9.11 shows the breakdown of sub-sectors JA to JY in 2016. Table annex 4.9.12 shows the breakdown of sub-sectors 2.3 Mechanical Engineering in 2017 .

In the framework of specific research, 33 articles in professional periodicals and 67 articles in proceedings have been written recently. In the framework of this support 7 functional samples were also created. A total of 107 outputs generated with SGS support are reported in 2017. It can be stated that in 2017 the outputs highly increased compared to the previous year. Summary data for the period 2016–2017 are presented in the table annex 4.9.13.

With the support of institutional support (IP) funds, 14 articles in professional periodicals and 41 articles in proceedings were created in 2017. In the framework of this support, 6 patents were also created. A total of 62 outputs generated with IP support are reported in 2017. Summary data for the period 2016–2017 are presented in the table annex 4.9.14.

In 2017, the results for the latest period of validity of Methodology evaluation of the results of research organizations for the years 2013 to 2016 were published. In Pillar I by this Methodology Faculty of Mechanical Engineering gained in total 4 370 points, in Pillar III it received 701 points and a total of 5 251 points were taken from the last periods for results applied in previous periods. In the evaluated period, the Pillar II allocated 10 % less than in the previous year. At the TUL, inaccurately reported points and points by Faculty's academic staff realized at other parts of the university were settled. A total of 309.57 points were moved to the Faculty. The overviews of the results and the points are presented in the table annexes 4.9.15. The results show that the results of applied research and the volume of funds for R&D have been an important factor in the performance of the Faculty of Mechanical Engineering in recent years. Table 4.9.16 shows distribution of points among Faculty's workplaces according to the Methodology in 2013 – 2016. Table 4.9.17 shows the distribution of outcomes according to the methodology of calculating the performance of individual workplaces applied to the Faculty of Mechanical Engineering.

Due to the preparation for a new methodology for evaluating the performance of RO (Methodology 2017+), the faculty focuses on significant publication outputs. The aim is to increase the number of publications in impacted journals.

4.10 Commercialization of Results and Outputs of Scientific–Research Activity

Strategy of commercialization of research and development results at the Faculty of Mechanical Engineering is oriented in two main directions:

For the transfer of new technologies and machinery through contractual or collaborative research and for the sale of licenses, or the sale of patents and utility models.

- Project VG20122014078. Protective masks (half masks) with filters made of nanofiber material (PUV 2013-28991/Spacer for fixation of material storage spacing, PUV 2013-28691/Protective breathing mask with common inhalation and exhalation opening, PUV 2013-28708/Flat filter with shape unstable filter material containing nanofiber layer, PV 2013-1049/Fixing of filter or other material stores, PV 2013-826/Protective breathing mask with a common inhalation and exhalation opening, PV 2013-835 Flat filter with shape-unstable filter material containing nanofiber layer; industrial model of breathing mask Filter).
  Income from the initial license fee in 2017 was CZK 1 mill.
- Project TA01020313. The process of material selection and testing for enthalpy exchangers, the design of heat exchanger surface of the plate heat exchanger. The annual payment for 2017 was CZK 100 thousands.
- PV 2014–692 Universal positioning welding tool. One-time license fee CZK 90 thousands.
- PV 2012–548 Composite with thermoplastic polyolefin matrix and coconut fibers for extrusion processes and PUV 2012–26532 Composite with thermoplastic polyolefin matrix and coconut fibers for extrusion processes. License fee CZK 270 thousands.

For the implementation of "proof of concept" projects, see text annex 4.9.

- In 2017, three partial FS TUL projects were being solved within the TUL project PROSYKO. The project is supported by the TAČR/GAMA program, Sub-program 1 is aimed at supporting the verification of the practical applicability of R&D results that arise in research organizations and have a high potential for application in new or improved products. The volume of funds for FS TUL was CZK 1,261 thousand.
  The project is managed under CNATI.

INTERNATIONAL COOPERATION

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5 INTERNATIONAL COOPERATION

In the area of international co-operation, activities focused on student and academic staff mobility and preparing agreements for bilateral co-operation with other research institutions prevailed. International cooperation in all areas of the Faculty was based on 79 contractual relations.

5.1 Internationalization in Education

As part of the internationalization of the environment at FME in 2017, FMSP continued in English in the branch of Machine and Equipment Design, Engineering Technology and Materials for 14 students from India – self-funded students 2015/2016, of which 10 students successfully completed their studies in 2017.

At the same time, teaching of FMSP in English in the branch Machine and Equipment Engineering Technology and Materials Design and Production Systems and Processes for 13 students from India – self-funded students 2016/2017 - continued.

Newly, 9 students from India – self-funded students 2017/2018 – were admitted to studies of the FMSP in English in the branch of Machine and Equipment Design, Manufacturing Systems and Processes

In 2017, one government scholarship holder (Egypt) successfully completed their follow-up Master's study programme in English N2301 Mechanical Engineering, study branch Machine and Equipment Design, focusing on energy equipment.

Four government scholarship holders (2x Egypt, Ghana, Taiwan) continued the follow-up master program N2301 Mechanical Engineering, study branch Machine and Equipment Design, focusing on power engineering in English, and one government scholarship holder (Kosovo) of the DSP P2302 Machines and Equipment, study branch Machines and Equipment Design, specialization Equipment for Thermal Engineering.

Five new government scholarship holders (2x Philippines, Ghana, Myanmar, Syria) have been enrolled for the follow-up master program N2301 Mechanical Engineering, study branch Machine and Equipment Design, specialization Energy Engineering, and one government scholarship holder (Lebanon) of study program P2302 Machines and Equipment Design, study branch Design of Machines and Equipment, specialization of equipment for Thermal Technology

With the support of the Faculty scholarship, 2 students from Vietnam continued their studies in DSP.

In 2017, three new students – self-funded (Egypt, Uzbekistan, Poland) were admitted to DSP. At the same time, 6 foreign DSP students - self-funded (Germany, Poland, Thailand, India) continued their studies at the Faculty.

In 2017, 3 students – self-funded (Thailand, Poland, Uzbekistan) failed to completed their DSP studies.

In 2017 six foreign students – self-funded (Brazil, India, Poland) came to a short-term internship and successfully completed the internship in 2017.

5.2 International Cooperation in Education

In the area of international cooperation in education, efforts have been directed to establishing new international contacts and activities. Realization of initiated activities was continued.

Students' Educational Activities Carried out within the Framework of Projects

- Institutional development project IRP FME TUL – “TUL as an important partner within the international education area” – continuation and deepening of existing cooperation with partner with universities from Canada or the USA.
- As part of the IRP FME TUL 12338 project, one Czech student stayed at the Canadian partner university Conestoga College of Technology and Advance Learning in 2017.
- 1 long-term (min. 28 days) stay and 2 short stays of a PhD students were carried out for the purpose of professional growth and strengthening existing contacts with foreign partner institutions with financial support of the Institutional Development Plan TUL 2017 Mobility Fund.
- 2 short-term several-day stays of foreign DSP students from German partner university were carried out at FME with financial support of TUL 2017 Mobility Fund.

- In 2017, long-term stay in length of 2 months of doctoral study programme student was carried out at a foreign partner university with financial support from other sources (the Cooperation Program Czech Republic - Free State of Saxony, Project BauQu)
- In 2017, long-term stay of DSP student doing an internship in total length of 2 months was carried out outside of any program.
- In 2017, short-term several-day activities of students with financial support from other sources were carried out – one short-term trips of DSP student (the Cooperation Program Czech Republic – Free State of Saxony, Project BauQu), two short-term stays of DSP students (the Cooperation Program Czech Republic - Free State of Saxony, Project Progress.digital), three short-term trips of DSP students (SGS) and 46 short-term trips of students with financial support from the Cooperation Program Czech Republic - Free State Saxony, Project GreK).
- In 2017, short-term several-day stays of foreign students with financial support from other sources were carried out – 18 short-term incoming-student stays with financial support from the Cooperation Program Czech the Cooperation Program Czech Republic – Free State Saxony, Project GreK.
- In 2017, also long-term stays of foreign students with financial support from other sources were carried out - 5 incoming-student internships of students from Polish partner university at TUL in length of 3 months and end of 4 stays of foreign students from Polish partner university (min. 28 days in 2017, “Study and Practice!”).

Educational Activities of Academic Staff Carried out within the Framework of Mobility Programs

- Total of 9 short-term stays of Faculty’s academic staff including lectures at partner institutions within the framework of Erasmus+ program and CEEPUS were carried out.
- 1 short-term teaching stay at a partner institution within the framework of Erasmus+ KA107 – Credit Mobility was carried out.
- 16 foreign academic staff for short-term teaching stay within the framework of Erasmus+ and 3 foreign academic staff within the framework of CEEPUS were accepted, out of those 1 foreign worker for long-term stay (min. 28 days).

5.3 International Cooperation in the Field of Scientific-Research Mobilities

- 4 several-day foreign stays of academic staff, out of those two in length of at least 5 days were carried out for the purpose of professional growth and strengthening existing contacts with foreign partner institutions with financial support of the TUL 2017 Mobility Fund.
- 2 stays of academic staff were carried out for the purpose of professional growth and strengthening existing contacts with foreign partner institutions with financial support of the CRP TUL 2017.
- 3 short-term stays of foreign academic staff from partner universities in Germany and Azerbaijan and 1 long-term stay (min. 28 days) of foreign academic staff from partner university in Poland were carried out with the financial support of the TUL 2017 Mobility Fund.
- As part of the IRP FME TUL 12383 project, one stay of Faculty’s academic worker at partner university in USA and one stay of another type of worker at the Canadian partner university took place in 2017.
- 3 long-term stay of junior academic staff of FME were carried out at foreign partner institutions in Germany in length of 1 month with financial support from other sources (OP RDE 16005).
- One long-term stay of an academic staff of FME was carried out at a foreign partner institution in Germany in length of 1 month with financial support from other sources (Cooperation Program Czech Republic - Free State of Saxony, BauQu).
- 2 long-term stays of junior academic staff of FME were carried out at a foreign partner institution in Poland in length of 15 days/each with financial support from other sources (7AMB, Joint Czech-Polish Research Projects).
- 2 stays of foreign academic staff for at least 15 days and 2 short-term several-day stays of foreign academic staff were carried out at the Faculty within the framework of 7AMB, Joint Czech-Polish Research Projects.
- There were 10 short-term several-day stays in Germany with financial support from other sources (Cooperation Program Czech Republic – Free State of Saxony, BauQu Project), 2 short-term several-days stay of the academic staff of FS in Germany with financial support from other sources (OP EfC – within the framework of sustainability), 13 short-term several-days stays

of academic staff of FME in Germany with financial support from other sources (Cooperation Program Czech Republic – Free State of Saxony, Project GreK), 3 short-term several-days stays of academic staff at foreign partner institutions in Greece and Germany with financial support from other sources (HORIZONT 2020, EQUINOX project), 1 short-term several-day stays of foreign academic staff of FME with financial support from other sources of (7AMB, Joint Czech-Polish Research Projects), 6 short-term several-days stay of academic staff of FS in the USA, Izrael and Germany with financial support from other sources (OP RDE 16003), 6 short-term several-days stays of FS academic staff in Germany with financial support from other sources (Cooperation Program Czech Republic - Free State of Saxony, Project Progress.digital) were carried out.

- 17 short-term stays of foreign academic staff within the framework of EQUINOX project (H2020) and 16 short-term stays of foreign academic staff within the framework of the Cooperation Program Czech Republic – Free State Saxony, Project GreK were carried out at the Faculty.

5.4 International Mobility

The mobility of students, academic staff and other employees of FME was realized mainly within the programs of ERASMUS+, CEEPUS, Institutional Development Program. A significant share of mobility was also realized within other sources.

The mobility of international students and academic staff at FME TUL took place primarily within the programs of ERASMUS+ and CEEPUS. Foreign students also took advantage of the offer of stays within the IAESTE program. Mobility of foreign students and academic staff was also realized within other sources.

The Faculty motivates students of all study programmes to carry out a study stay abroad. The priority is given to increasing the number of doctoral students going on mobility. Since 2010, foreign study stays or internships have been included in the study plans of doctoral study programmes. In 2017, the total mobility of academic staff and other Faculty staff as well as mobility of foreign students and academic staff increased. The overall mobility of Faculty's students slightly decreased.

Foreign Students and Foreign Academic Staff Stays
In 2017, the total number of stays of foreign students and foreign academic staff in the framework of mobility programs and other sources at the Faculty slightly increased in comparison with 2016, while in the individual categories of mobility, the largest increase was recorded in the stays of foreign students coming primarily with financial support from Erasmus+ program and other financial sources. Numbers of foreign academic staff in the framework of Erasmus+ program in comparison with 2016 increased, while CEEPUS programs numbers slightly decreased. Numbers of foreign academic staff within the TUL Mobility Fund remained at the 2016 level. Numbers of foreign students and academic staff financed from other sources increased compared to 2016 as well. By contrast, other activities of foreign students in 2017 decreased.

Foreign Mobility of Academic staff and Other Faculty Staff
The overall foreign mobility of academic staff and other Faculty staff in 2017 in terms of programs and other resources increased compared to 2016, and in addition to outgoing mobility within the framework of programs Erasmus+, CEEPUS, TUL development projects and mainly other sources were also used. Foreign mobility of Faculty students within mobility programs and other sources overall increased in 2017. In individual categories of mobility, there was a decrease in student outgoing mobility numbers within the framework of programs Erasmus+, CEEPUS and IRP TUL. By contrast, foreign mobility of Faculty students with financial support from other sources increased. Total number of foreign mobility of Faculty staff within the Erasmus+ program and CEEPUS stayed at the level of 2016. Outgoing foreign mobility of Faculty staff within IRP TUL slightly decreased compared to 2016. By contrast outgoing mobilities of academic staff with financial support from other sources increased. Other foreign activities of academic staff slightly increased compared to 2016.

- There were 16 student study and work stays lasting one semester under the Erasmus+ program, with most of the stays being mobilities of students in the Bachelor's and Follow-up master study programmes.
- 9 Erasmus+ and CEEPUS outgoing mobilities of academic staff were realized, with 5-day short-term teaching stays prevailing.

- 1 mobility of academic staff within the Erasmus + KA107 program (Credit Mobility) of 8 days to was carried out.
- There were 133 stays of foreign students at the Faculty of Mechanical Engineering from the European area within the Erasmus+, CEEPUS and IAESTE programs, and in addition 1 from China, 1 from Brazil, 1 from India and 1 from Syria under IAESTE.
- A total of 19 teaching stays of foreign academic staff at the Faculty of Mechanical Engineering were carried out under the Erasmus+ and CEEPUS programs, 2 teaching stays under CEEPUS were lasting at least 15 days and short-term teaching stays prevailed in length of min. 5 days.
- 1 student stay of one month and 2 short student stays of 5 days within the Mobility Fund TUL 2017 were carried out.
- There were 4 outgoing mobility stays of academic staff within the TUL 2017 Mobility Fund, of which 1 shorter than 5 days.
- There were 2 outgoing mobilities of academic staff within CRP TUL 2017.
- 2 short stays of foreign students within the TUL Mobility Fund 2017 were carried out.
- 1 long-term stay of a foreign academic staff lasting one month and 3 short-term stays of foreign academic staff within the TUL Mobility Fund 2017 were carried out.
- 1 student stay abroad for the duration of one semester started within the IRP FME TUL – "TUL as an important partner within the international education area" – continuation and deepening of existing cooperation with partner universities in Canada or the USA.
- 1 academic staff stay at a partner institution within the IRP FME TUL 12338 "TUL as an important partner within the international education area – continuation and deepening of existing cooperation with partner universities in Canada or the USA." was carried out.
- 1 other staff stay at a partner institution within the IRP FME TUL 12338 "TUL as an important partner within the international education area – continuation and deepening of existing cooperation with partner universities in Canada or the USA." was carried out.
- One student of doctoral study program stay at a foreign partner institution in 2 months length with financial support from other sources (Cooperation Program Czech Republic – Free State of Saxony, BauQu) was carried out.
- 52 short-term several-day student outgoing stays with financial support from other sources were carried out (Cooperation programs Czech Republic – Free State of Saxony, GreK, BauQu, Progress.digital, SGC). Reciprocally, there were 18 short-term incoming stays of foreign students with financial support from other sources.
- 3 one-semester stays of students within the framework of inter-university cooperation were carried out, Taiwan.
- 4 long-term stay of an academic staff were carried out in length of 1 month with financial support from other sources (1x Cooperation Program Czech Republic – Free State of Saxony, BauQu, 3x OP RDE 16005) and 2 stays of academic staff were carried out in length of 15 days/each with financial support from other sources (7AMB, Joint Czech-Polish Research Projects).
- 44 short-term several-day outgoing stays of academic staff and 2 outgoing stays in the category of other staff with financial support from other sources (Cooperation Program Czech Republic – Free State of Saxony, 7AMB, HORIZONT 2020, OP VK, SGS, OP RDE, TAČR) were carried out. Reciprocally, there were 2 incoming stays of foreign academic staff in length of 16 days/each and 35 short-term incoming stays of foreign academic staff with financial support from other sources.
- One stay of DSP student doing an internship in total length of 2 months was carried out outside of any program.
- 9 internships stays of foreign students in length of 1 month and more at the Faculty outside of any program with financial support from other sources and 1 internships stay of foreign student in a category of freemover in length of 12 days were carried out.
- The Faculty of Mechanical Engineering provided teaching of selected courses for Erasmus+ students who came to FT.

Within the Framework of ERASMUS+ Program

- A total of 60 inter-institutional agreements with partner universities were valid, of which 6 were new inter-institutional agreements concluded in 2017.

New cooperation in Europe

- 1 new agreement has been concluded with National Research University „Moscow Power Engineering Institute“ (Russia).

New cooperation in Asia

- 1 new agreement has been concluded with Azerbaijan Technical University (Azerbaijan).

Negotiations on concluding new bilateral agreements in the area of mutual exchange of students, academic staff and in science and research with universities started

- Kielce University of Technology (PL) – Erasmus+.
- Karelia University of Applied Sciences (FI) – Erasmus+.

Within the Framework of CEEPUS Program

In 2017, the Faculty of Mechanical Engineering was an active participant in 3 CEEPUS III networks.

- CIII-RS-0304 Technical Characteristics Researching of Modern Products in Machine Industry (Machine Design, Fluid Technics and Calculations) with the Purpose of Improvement Their Market Characteristics and Better Placement on the Market.
- CIII-BG-0722 Computer Aided Design of Automated Systems for Assembling.
- CIII-RO-0013 Teaching and Research of Environment – Oriented Technologies in Manufacturing.

PARTNERSHIP AND COOPERATION

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

6 PARTNERSHIP AND COOPERATION

Partnership and cooperation with scientific-research institutions and industry partners is one of the pillars of the Faculty's stability

6.1 Membership in Czech and Foreign Associations and Organizations

FS TUL Membership in Institutions and Organizations of Educational and Professional Character

- Association of Deans of Technical Faculties
- Czech Society for Mechanics

Membership of Departments

- Automotive Industry Association
- Association of the Glass and Ceramics Industry
- Confederation of Industry and Transport
- Company for Machine Tools (at FS CTU in Prague)

Platforms and Clusters

- Czech Technology Platform of Engineering, o.s.
- Josef Božek National Competence Centre
- CENEN-net – a free academic community
- ININet platform
- NESEFF (Network for energy supply and energy efficiency)
- COST: Proposal Title: Solutions for Critical Raw Materials Under Extreme Conditions Proposal Acronym: CRM-EXTREME
- EIP: European Innovation Partnership (EIP) - Sustainable substitution in extreme conditions

6.2 Cooperation with Universities and Research Organizations

Forms of cooperation with universities and research organizations include a wide range of activities.

Meetings, Hosting, Mission

- **Dr. Moshe Tshuva visited the Faculty of Mechanical Engineering**
  Dr. Moshe Tshuva is a Head of AFEKA Mechanical Engineering College in Israel. On June 1 he visited TUL with the intention to arrange cooperation in the area of mechanical engineering.
- **Representatives of the Consulate General of the Czech Republic in Toronto at the Faculty of Mechanical Engineering**
  Mr. David Müller, Head of Economic and Trade Section, Consulate General of the Czech Republic in Toronto, visited the Faculty of Mechanical Engineering on June 21, together with Mr. Matyáš Pelant, Head of Unit of Americas, The European Union and Foreign Trade Section, and Ms. Eva Jungmannova, Head of Strategic Projects and New Technologies, CzechInvest. On behalf of the Faculty of Mechanical Engineering, prof. Dr. Ing. Petr Lenfeld and Ing. Marcela Válková were present.
- **International meeting of experts at FS TUL within the EQUINOX project**
  On Monday, July 24, participants of H2020 project visited FS TUL within the EQUINOX project "A novel process for manufacturing complex shaped Fe–Al intermetallic parts resistant to extreme environments". Professional guarantor for the Faculty of Mechanical Engineering TUL is Ing. Pavel Hanus from the Department of Material Science. A group of 20 participants from England, Norway, Belgium, the Federal Republic of Germany, Italy, Greece, Spain and Ukraine will meet for a regular meeting to discuss project-related topics at an oval table and to visit laboratories that are used for the solution of the project.
- **Representatives of Afeka Academic College of Engineering at the Faculty of Mechanical Engineering**
  During August 15 – 18, representatives of our faculty, Vice-Dean Karel Fraňa and Marcela Válková, visited Afeka Academic College of Engineering in Israel, where they met with the Dean of the Faculty of Mechanical Engineering of the Israeli partner school, prof. Moshe Tshuvou

and talked about concrete possibilities of future cooperation. The outcome of the meeting was three main areas of activity: submission of the Erasmus+ Credit Mobility project; collaborative research in the fields of vehicle propulsion, energetics, 3D printing and plastics; admission of Afeka College students into doctoral studies at the Faculty of Mechanical Engineering. During the visit, Afeka College research institutes and laboratories were also introduced to the representatives of the Faculty of Mechanical Engineering

- **Visit to Conestoga College and University of Waterloo**
  During September 4–11, Vice-Dean prof. Karel Fraňa and Ing. Marcela Válková visited partner universities in Canada, Conestoga College and University of Waterloo. The meeting included the coordination of activities within the running Erasmus+ Credit Mobility project, namely the organization of a study stay of Canadian students at the Faculty, and also the conclusion and details of a new bilateral agreement concerning cooperation between the Faculty and Conestoga College (current agreement expires in 2018). During the visit there was also a meeting with students where the Faculty was presented and information concerning the possible study stay at the Faculty of Mechanical Engineering TUL within the Erasmus+ Credit Mobility project was presented. The Waterloo Institute for Sustainable Energy was introduced to the representatives of the Faculty of Mechanical Engineering and a meeting was held at the University of Waterloo. A meeting was held with Mr. David Müller, Head of Economic and Trade Section, Consulate General of the Czech Republic in Toronto. The aim of the meeting was to revive and deepen the interconnection of Liberec – Canada cooperation, specifically the Kitchener / Waterloo region. The meeting followed the visit of Mr. David Müller, which took place in June at the Faculty of Mechanical Engineering.
- **European Association of International Education**
  During September 12 – 15, the conference of the European Association of International Education (EAIE) was held traditionally, this time in Seville, Spain. The conference serves mainly to meet with existing partner universities, to establish new contacts and to educate people who work in the field of foreign relations. The Faculty of Mechanical Engineering was represented by Ing. Marcela Válková.
- **Energy savings in construction**
  During September 25–27, the delegation of employees of the Moscow Power Engineering Institute and the Faculty of Mechanical Engineering of the Azerbaijan Technical University in Baku visited our Faculty. The aim of the visit was cooperation negotiations, a visit to laboratories and involvement in international projects.
- **The Faculty of Mechanical Engineering started cooperation with the Moscow Power Engineering Institute MPEI**
  On 20 November, cooperation agreement between the MPEI and the Faculty of Mechanical Engineering TU in Liberec was signed by the Vice-Rector of MPEI prof. Vladimir N. Zamolodchikov. The cooperation will include the development of new contacts and the exchange of students and academic staff in the framework of various exchange programs. Russian students have been interested in studying in the Czech Republic for a long time and thus the newly established cooperation will help to realize study stays of local students at workplace of our Faculty.
- **Dean of FME from Afeka Academic College of Engineering at our Faculty**
  On November 24, Professor Moshe Tshuva, Dean of the Faculty of Mechanical Engineering of the Israeli Afeka Academic College of Engineering, visited our Faculty with his colleagues. They presented their research interests to our engineers and discussed further cooperation

Informal Cooperation of Faculty Workplaces

The departments cooperate with related workplaces in the Czech Republic and Slovakia at both scientific research and pedagogical levels. Members of the departments regularly meet in committees for the associate professor procedure, defence of doctoral theses, publish joint publications etc.

Meeting of departments

- **Meeting of material departments**
  During May 23–24 the meeting of the Departments of Materials Engineering from the Czech and Slovak Republic took place at TUL. This year's meeting is organized by our Department of Material Science. In addition to expert questions, a new evaluation of R&D and a new accreditation system will be discussed. The meeting was attended by 37 representatives of various academic institutions, of which 14 representatives from Slovakia.

- **Meeting of department and institutes of production technology and robotics 2017**
  The meeting took place during September 18 -19. Representatives from 10 universities from the Czech and Slovak Republic attended the conference held in Bratislava. Our Faculty was represented by the Department of Glass Producing Machines and Robotics and the Department of Manufacturing Systems and Automation. Possibilities of future cooperation in the area of robot design, manipulators, peripherals and automation technology were discussed. There was an exchange of views and experiences in teaching activities and the future direction of robotics development was discussed.

Scientific–research Cooperation Supported by Projects and Grants
The Faculty participated together with universities and research organizations to address 2 projects of collaborative nature (TAČR, MIT, MOI), 1 scientific-research project (GAČR) national and 2 project of international R&D cooperation (H2020, 7AMB).

Cooperation supported by the OP Enterprise and Innovation for Competitiveness
The Faculty participated in the solution of OP EIC projects in role of co-solver and also in form of Innovative vouchers. See text annex 7.4.2.

Cooperation supported by the OP Cross-Border Cooperation
Together with the German universities, the Faculty participates in the solution of 3 projects OP Cooperation Program Czech Republic – Free State of Saxony 2014–2020.

Accredited Cooperation in Education
Accreditation granted to the Faculty of Mechanical Engineering TU in Liberec for the implementation of doctoral study programme in cooperation with other institutions:

- Together with the Institute of Thermomechanics of the Academy of Sciences of the Czech Republic for doctoral study programme Mechanical Engineering, study branch Applied Mechanics. Full-time and part-time form, standard length of studies 4 years, studies both in Czech and English.
- Together with the Institute of Macromolecular Chemistry of the Academy of Sciences of the Czech Republic for doctoral study programme Mechanical Engineering, study branch Materials Engineering. Full-time and part-time form, standard length of studies 4 years, studies both in Czech and English.

6.3 Conferences, Symposia, Fairs

Project Meeting EQINOX, Grant Agreement no.689510
During July 24–25 Department of Material Science organized meeting within the Horizon 18M project. The meeting took place in Prague, one day in Liberec.
Number of participants: 24, of which 18 from partner entities abroad.

SESIA 2017
September 12–14 meeting of the deans of the Czech and Slovak faculties of mechanical engineering took place in Žilina. This time under the auspices of FS VŠB - TU Ostrava. Discussions dealt with the issue of R&D evaluation, the issue of accreditation and the use of EU financial sources.

XLVIII. International Scientific Conference KOKA 2017
During September 11–12 Department of Vehicles and Engines organized conference in Hradiště nad Jizerou. Traditional meeting conference of Czech and Slovak universities and institutions dealing with research of motor vehicles and internal combustion engines. The conference was focused on research and development of internal combustion engines and motor vehicles and current development trends. The content of the conference was pedagogical activity in the area of education of young research and development workers.
Number of participants: 52 from the Czech Republic and Slovakia

NESEFF
On October 12, a meeting was held within the Network for Energy Supply and Energy Efficiency focused on saving energy and alternative energy sources. NESEFF (Network for Energy Supply and Energy Efficiency) is an international organization dedicated to energy saving and alternative energy sources. Representatives of the National Research University in Moscow, known as the Moscow Energy Institute, Azerbaijani Technical University based in Baku, the Brandenburgische

Technische Universität in Cottbus – Senftenberg (BTU), the Berlin Bundesanstalt für Materialforschung und - prüfung (BAM) and representatives of the Technische Universität Dresden (TUD) presented their contributions on energy savings topic.

XII. Experimental Fluid mechanics 2017
During November 21–24 Department of Power Engineering Equipment organized conference.
The 12th annual conference was focused on experimental research in the field of fluid mechanics, and thermodynamics.
Number of participants: 168, of which 95 from abroad.

The 10th International Scientific Conference Manufacturing Systems Today and Tomorrow
During November 9–10. Department of Manufacturing Systems and Automation organized conference at TUL.
Number of participants: 40 participants from the Czech Republic.

MSV in Brno
October 9–13 the results of cooperation with the Faculty of Textile Engioneering and CNATI were presented there by our Faculty. For more see chapter 6.6 below.
On the occasion of the MSV in Brno, the conference Future of Mechanical Engineering in the Czech Republic was held. Its topic was: The Future of Mechanical Engineering in the Czech Republic – graduates and research capacities, Potential of graduates of mechanical engineering in practice.

6.4 Cooperation with Industry

Forms of cooperation with industry include scientific-research and pedagogical activities.

Industrial Board of the Faculty of Mechanical Engineering TU in Liberec
The Industrial Board is an advisory working group established by the Dean of the Faculty of Mechanical Engineering TU in Liberec. It includes 17 representatives of industrial companies and enterprises. In 2017, two meetings took place.

Scientific-Research Collaborative Cooperation with the Application Sphere
The Faculty together with industrial partners, participated in a role of co-solver in the implementation of 3 projects supported by TA ČR and 6 projects supported by the Ministry of Industry and Trade of the Czech Republic. As a researcher, it implemented 1 projects supported by the MOI CZ.

Scientific-Research Contractual and Complementary Activities
Scientific and research complementary activities represent an important segment of the Faculty's activities. See chapter 4.6 for details.

Expert Activity
The Faculty holds an expert certificate for the fields of Mechanical Engineering, Technical fields (various), Energetics, Glass. In 2017, no reviews were prepared.
The Faculty holds an Authorization for Measurement of Pollutant Emissions pursuant to Section 15 Paragraph 1 a) of the Air Protection Act. In 2017, two authorized measurements were carried out. See table annex 6.4.2.

Education of Industrial Workers
Education of workers from the industrial sphere is an important segment of the Faculty of Mechanical Engineering's activity. A total of 44 professional seminars and courses were organized. The courses were attended by 336 participants. The volume of funds obtained through this activity amounted to approximately CZK 2 million.

Cooperation in Education Supported by OP Cross-border Cooperation Projects
Within the GreK project, which aims to build and strengthen cross-border cooperative teaching of modern plastics processing methods between the Zittau / Görlitz University and the Technical University of Liberec, regional plastics companies and research institutions are involved.

Professional Work Experience of Students in Companies
All students of Bachelor and Master's, or follow-up Master's study programmes of the Faculty have completed the compulsory subject Professional Work Experience in Companies in the length of 2–6 weeks according to their study branches (Bachelor studies – compulsory elective course Professional Practice, Master studies – compulsory course Professional Practice in Companies in the length of 2–4 weeks according to the study branches).

Bachelor and Master theses
Assignment of Bachelor's and Master's theses in cooperation with experts from industrial companies is a standard activity of all departments of the Faculty of Mechanical Engineering. See table annex 6.4.3.

Involvement of Experts from Companies and Institutions in Teaching
Standard forms of cooperation are lectures by experts, supervision of theses and experts participating in the students' work experience. See table annex 6.4.3.
In the context of professionally focused seminars and lectures, other experts from the application sphere and academic sphere presented, see chapter 6.5 below Special events and lectures.

Students Excursion to Industrial Companies and Institutes
In 2017 and one and several-day excursions of students to industrial companies and firms were realized by individual departments:
VYVAPLAST s.r.o.; Turnov, EXPLAT s.r.o.; Hradec Králové, Siemens, s.r.o., odštěpný závod Elektromotory Mohelnice; ALUCAST s.r.o., Tupesy; INVOS s.r.o., Svárov; PROMENS a.s.; Zlín, FATRA a.s., Napajedla; Lucid spol. s r.o. Jablonec nad Nisou; Škoda Auto a.s. Mladá Boleslav – nástrojárna, lisovna, vývoj převodovek; Modelárna Liaz spol. s r.o. Liberec; Magna Bohemia s.r.o. Liberec; Komerční slévárna šedé a tvárné litiny Turnov a.s.; Matador Automotive ČR s.r.o. Liberec; KSM Castings CZ a.s. Hrádek nad Nisou; Benteler ČR s.r.o. Chrastava; Preciosa Ornela a.s. v Desné a v Zásadě; Misan s.r.o., Lysa nad Labem; VANAD 2000, Golčův Jeníkov; Ortopedická klinika FN Motol; Argo Hytos a.s. Vrchlabí; VÚTS a.s.; Tonak a.s., Nový Jičín; Tonak a.s., Strakonice; Denso Manufacturing Czech s.r.o.; Uhelná elektrárna Mělník; ZVVZ Milevsko; malé vodní elektrárny Vydra a Čeňkova Pila včetně expozice "Šumavská energie"; Aerodynamická laboratoř v Novém Kníně (pracoviště Ústavu termomechaniky AV ČR); Městská elektrárna Písek; vodní dílo Štěchovice (přehradní a přečerpávací vodní elektrárna); Jadernou elektrárnu Temelín; Teplárny Liberec, a.s.; Home Credit Arena Liberec; Atrea s.r.o. – pasivní domy v obci Koberovy; Vodní nádrže Josefův Důl; Větrné elektrárny v Jindřichovicích pod Smrkem; fy Skácel solar v Liberci; Bioplynová stanice Křížany; FÚ AV ČR.

Excursion of Academic Staff to Industrial Companies and Institutes
During the year, academic staff excursions to industrial companies took place and professional seminars were attended in the following companies: Misan s.r.o. (Lysá nad Labem); AV ČR – Bioreaktor; SVOTT, s.r.o. (Mladá Boleslav); JE Temelín; SolidVision, Boskovice; VANAD 2000 a.s. (Golčův Jeníkov); Johnson controls a.s.; Rieter a.s.; SAV Košice; Večerník s.r.o.; VUTS a.s.

6.5 Professional Events and Lectures

- **Problems of optical measurements and image correlation**
  On January 10, organized by the Department of Applied Mechanics. Company SOBRIETY gave a theoretical introduction to optical measurement and image correlation and practical demonstrations
- **Lecture of prof. Alexandera Lion from University of the Bundeswehr Mnichov**
  On January 24 and 26, organized by the Department of Applied Mechanics. The professor's visit also included discussions on cooperation in the exchange of students, the possibility of involvement in international scientific projects and tours of TUL laboratories. Professor Lion also accepted an invitation to an afternoon discussion at the Dean's Office of the Faculty of Mechanical Engineering, where he met the Vice-Dean Assoc. prof. Karel Fraňa. The subject of the discussion was the mutual exchange of experience in the field of support of scientific projects in the Czech Republic and the Federal Republic of Germany.

- **Presentation of MetaCentrum national grid infrastructure services**
  On January 31, a practically oriented seminar was held for PhD students and academic staff. The seminar also included practical involvement of the participants in the discussed topics.
- **Linear motors LinMot**
  On February 27, a seminar was held at the Department of Textile Machine Design. LinMot linear motors are brushless synchronous motors with integrated position encoder and electronics. The resulting linear movement is the result of direct transmission of electromagnetic force without mechanical gears or other helping ones
- **Seminar by Helago**
  On 30 March, organized by the Department of Manufacturing Systems and Automation.
- **Professors from Germany gave lectures at FME TUL**
  On March 22, foreign professors presented at our Faculty as a part of regular teaching of the course Elasticity and Strength II and Plasticity. Professor Ziegenhorn of the Brandenburg University of Technology informed the students of the FS about the current trends in the field of construction design with regard to new materials and also together with his colleagues Ing. Oswald, Ing. Schobem, Ing. Grzelak a Dr. Sparr they presented research on composite materials. In the second part of lectures representatives of the Federal Institute for Materials Research and Testing (BAM – Bundesanstalt für Material und Prüfung) presented, Professor Otremba and Dr. Werner. Their lecture focused on testing the mechanical properties of new materials used in the aerial and aerospace industry. A set of lectures for our students was also organized with the help of cross-border cooperation between the Czech and German sides within the BauQ project. The Faculty of Mechanical Engineering has been cooperating with the Brandenburg University of Technology for a long time, which with help of Professor Simon, has enabled this set of lectures for our students.
- **Automotive gearboxes**
  On April 4, a lecture organized under patronage of the Department of Vehicles and Engines given by dr. Martin Hrdlička, Head of chassis and aggregate development at the Škoda Auto Engine Centre.
- **Inside into Building Physics. Thermal bridges**
  On April 24, Dr.-Ing. Peggy Freudenberg, the Dresden University of Technology presented.
  Dr.-Ing. Peggy Freudenberg, senior researcher at the Department of Indoor Climate. The topic of the lecture was “Inside into Building Physics. Thermal bridges”.
- **Heat transfer theory in plate heat exchangers**
  On May 16, company Alfa Laval and the Department of Power Engineering Equipment organized the event. The lecture was focused on the theory of heat transfer in plate exchangers, their construction and the main differences between tube and plate exchangers.
- **Return of cannabis to the domestic textile industry**
  On May 15, the Department of Textile Machine Design organized seminar. The program of the seminar was a lecture by Ing. Tomáš Rohal, who produces various products from this widely applicable plant. The “Slow fashion” concept was introduced, one of the fashion trends that covers a return to quality, ecology and sustainable values. Ing. Tomáš Rohal, the owner of company Bohempia, is a graduate of the Department. During the seminar he introduced his company, which he founded with the idea of using unconventional hemp material for the production of clothing.
- **Public Workshop Progress.digital**
  Took place on June 27 organized by the Department of Manufacturing Systems and Automation within project OP Cross-border Cooperation CR – Saxony.
- **Presentation of PhD students from RWTH Aachen University**
  On September 4, the Department of Textile Machine Design organized the event. Students were guests of Dr. Jan Valtera, who has completed an internship at the prestigious world-renowned RWTH University in Aachen, Germany, as part of the preparation of new doctoral study programmes at FME TUL
- **Seminar by STRUTERS**
  On 15 August, organized by the Department of Material Science.

- **Seminar by PRAGOLAB and QNESS**
  On 22 August, organized by the Department of Material Science.
- **Seminar by OLYMPUS**
  On 12 October, organized by the Department of Material Science.
- **Seminar Energy savings in buildings**
  During October 24–25 the Department of Power Engineering Equipment organized the seminar. The seminar was focused on the interconnection of industrial enterprises with the academic sphere. At the seminar, industrial enterprises gained an overview of the possibilities of cooperation with technical universities and conversely students and academic staff gained knowledge of practical applications. It was financially supported by the IP TUL project.
  Number of participants: 42, number of lectures 19.
- **Seminar by Dormer&Pramet**
  On 9 November, organized by the Department of Manufacturing Systems and Automation, 50 participants.
- **Lecture by Hennlich s.r.o.**
  On November 13, the Department of Textile Machine Design organized the event. The program of the seminar was a demonstration of the assortment and novelties offered by the company, presentation of design tips and tricks using sliding bushes made of highly abrasion resistant triboplastics made by company IGUS and also introducing other possibilities of using parts in the design of single-purpose machines.
- **CroBoPlast**
  On December 6, the first meeting of the academic, research and industrial sphere of the Oberlausitz region – the Liberec region and its surroundings was held, dealing with technologies of plastics and composites processing. Organized by the Faculty of Mechanical Engineering TU in Liberec with support from the European Regional Development Fund. The meeting was attended by more than 100 students of TUL and HS Zittau/Görlitz and 70 representatives of the industrial and research spheres of the Czech Republic and the Free State of Saxony.
- **Lecture by Westsächsische Hochschule Zwickau University**
  On December 11, a lecture of an associated university at our Faculty took place.
- **Kooperation zwischen Universitä**
  On December 12, prof. Sylvio Simon (BTU Germany) gave a lecture.

6.6 Awards

Gold Medal awarded for the Yarn Production Machine with Nanofibers

The award from The International Engineering Fair in Brno was brought by the inter-faculty development team of the Faculty of Textile Engineering TUL, led by prof. David Lukáš, and the Faculty of Mechanical Engineering TUL, led by prof. Jaroslav Beran, for the line for the production of linear composite material containing nanofibers. The unique device was also part of the exposition of our faculty at the Brno Exhibition Center throughout the last week.

The new device won the Gold Medal in the category of Innovative Processing Technology. It is an award with tradition of more than 50 years. The device of the Technical University of Liberec was appreciated by 15-member expert committee for the high innovation order, the high degree of invention and novelty, as well as the numerous functional differences from the prior state of technics.

"This device from the Technical University of Liberec was awarded with Gold medal because it received absolutely the most points in all evaluated criteria. Such exceptionally innovative exhibit has so far not been evaluated by evaluation committee for awarding Gold medals," said the Secretary of the evaluation committee Bohuslav Bušov about line for the production of yarn nanofibers from TUL.

Linear composite material containing nanofibers was developed together by scientists from the Faculty of Mechanical Engineering, the Faculty of Textile Engineering and the Institute for Nanomaterials, Advanced Technologies and Innovations (CNATI). The basic research carried out at the university became the basis for the construction of testing facilities and test of nanofiber composite yarn

processing supported by projects of the NANOPROGRESS cluster. Company Sintex, which is a member of a cluster is already engaged in the possible applications of composite yarn with nanofibers.

6.7 Our Sponsors

Support from company ČEZ a.s. – CZK 200 thousand
Annual financial support and offer of other professional events, i.e. summer schools for students, excursions of employees and students to nuclear power plants, organization of professional lectures at TUL.

StudentFormula support TUL 2016-2017 – CZK 1 412 thousand
AGC Automotive Czech; AUFEER DESIGN, s.r.o.; AurelCZ – Zkušebna Chrastava; Benteler ČR s.r.o.; Clean - air s.r.o.; CNC obrábění Liberec s.r.o; ČEZ a.s.; Démos trade, a.s.; DENSO MANUFACTURING CZECH s.r.o.; Entry Engineering s.r.o.; Firma Jiří Bělík; GRM Systems; GRUPO ANTOLIN Turnov s.r.o.; Henniges Automotive; KAMAX s.r.o.; Knorr-Bremse ČR; KOBIT, spol. s r.o.; M JINDRA s.r.o.; Magna Exteriors (Bohemia) s.r.o.; Modelárna Liaz spol. s r.o.; Rieter CZ s.r.o.; RP Technology s.r.o.; ŠKODA AUTO a.s.; VYVA PLAST, s.r.o.; WÜRTH, spol. s r.o.

FACULTY DEVELOPMENT

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

7 FACULTY DEVELOPMENT

The Faculty's own development took place in all areas of its activities with the financial support of grants and projects.

7.1 Quality and Culture of Academic Life

Internal impulses for Faculty development

- Individual Language courses organized by CDV TUL and individual language courses.
- Education of academic staff in so-called academic skills and competences.
- Training of academic staff in professional courses within the TUL of OP RDE.
- Completion of courses in higher education pedagogy.
- See table and text appendices 7.1.

Quality assurance of activities

- There was a regular monthly Dean Board, represented by Vice-Deans, Heads of Departments, Head of Dean's Office and representatives of the Student Affairs Office and Department of Development and Projects.
- There were 5 meetings of the Scientific Board of the Faculty of Mechanical Engineering TUL. There were 9 meetings of the Academic Senate of the Faculty of Mechanical Engineering TUL. The meeting of the Academic Community with the Dean of the Faculty of Mechanical Engineering TUL took place in February.

Meeting of Alumni

In 2017, meetings of alumni classes of 1962, 1963, 1966, 1987 took place.

7.2 Infrastructure

In 2017, the reconstruction of building C continued. Department of Power Engineering Equipment resides in the temporary premises in building F during the reconstruction. Completion of the reconstruction is expected in spring 2018.

The investment development of the laboratories and classrooms of the Faculty of Mechanical Engineering came from the following resources:

- FRIM – departments about CZK 3 mil. (DMS, DET, DGR, DTD, DMA).
- IRP TUL – DMA upgrade of the computer lab 12 work stations with equipment; DGR CZK 200 thousand UV camera for industrial and medical applications.
- OP RDE – within the Faculty project ViFS TUL upgrading laboratories in the amount of CZK 4.24 mil.
- R&D project MoI VI20172020052 – purchase of a 3D printer for CZK 7.1 million (to CNATI laboratories).

7.3 Development Projects

TUL Institutional Development Plan for 2017

Within the framework of IP TUL, the Faculty was the researcher of 8 partial projects, see the table annex 7.3.

- Promotion and presentation of FME TUL.
- Innovation of the computer lab of DMA.
- Creation of study texts (in digital form) in English for international students.
- TUL as an important partner in the international learning space – strengthening existing cooperation with partner universities from Canada and the USA.
- Innovation of study branch Manufacturing Systems and Processes by implementation of Industry 4.0 principles.
- Realization and verification of DPKV by means of controlled propulsion, its parameters, application of the model in education and offer of results to industry in the Czech Republic and abroad.
- Use of UV camera for industrial and medical applications.

- Energy savings in buildings in practice 2nd year of the three-year cycle.

7.4 Projects Funded by the EU Structural Funds in 2014–2020

In 2017, solving of two projects funded by the EU Structural Funds under the Research, Development, Education Program were commenced. See text and table annex 7.4.

In 2017, another project financed from EU Structural Funds under the Cross-border Cooperation Program Czech Republic – Free State of Saxony was commenced. A total of three projects were being solved. See text and table annex 7.4.

EXTERNAL AND INTERNAL EVALUATION OF THE FACULTY

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

8 EXTERNAL AND INTERNAL EVALUATION OF THE FACULTY

8.1 External Evaluation of the Faculty

Accreditation procedure

- In the course of 2017 files of new doctoral study programmes have been prepared and in December submitted for consideration and approval by the National Accreditation Bureau Accreditation: DSP Applied Mechanics, DSP Machines and Equipment design, DSP Technologies and Materials. Accreditation files were filed in Czech and English versions, i.e. a total of 6 accreditation files.

Quality Standards of Activities of the Faculty of Mechanical Engineering TU in Liberec

- In parallel with the preparation of accreditation files, the quality standards of activities of the Faculty of Mechanical Engineering were elaborated. Among other things, this report outlined some shortcomings, particularly of an administrative-executive nature, which the Faculty is gradually eliminating. It also raised some more conceptual issues, such as the involvement of students and academic staff in the evaluation of studies, etc. The Dean of the Faculty appointed the Advisory Working Group of Quality and Concept of FME TUL Activities and appointed its members, which will deal with these matters.

FEANI

- FME TUL is accredited by FEANI and is registered in the “FEANI Index”.

Interest in Graduates and Quality of Graduates

- The demand for graduates of the Faculty of Mechanical Engineering is high and the demand for graduates exceeds the supply. The Faculty monitors the number of graduates in the Labour Office CZ records of Regional Office in Liberec, which monitors the number of graduates as of April 30 and September 30 of the relevant year.

Comparative evaluation of universities and faculties

- The Centre for Educational Policy of the Pedagogical faculty of Charles University elaborated profiles of 20 Czech public universities by faculties. FS TUL was part of the evaluation.

Meeting of Deans of Mechanical Engineering Faculties of Czech and Slovak Universities – SESIA 2018

- During September 12 – 14, the traditional meeting of Deans of the Czech and Slovak Faculties of Mechanical Engineering took place in Žilina. The individual faculties presented their activities. Discussions were devoted to the issue of evaluation of R&D, the issue of accreditation and the drawing of funds from the EU.

8.2 Internal Evaluation of the Faculty

- A regular annual evaluation of the results of activities of individual departments took place.
- Annual reports on the activities of departments are stored in the electronic archive of FME TUL.
- Regular monthly Dean Boards, represented by Vice-Deans, Heads of Departments, Head of Dean’s Office and representatives of the Student Affairs Office and Department of Development and Projects took place.
- There were 5 meetings of the Scientific Board of the FME TUL.
  There were 9 meetings of the Academic Senate of the FME TUL.
- The meeting of the Academic Community with the Dean of the Faculty of Mechanical Engineering TU in Liberec took place in February 2017.
- The Faculty regulations were checked and updated in connection with amendments to the internal regulations of TUL. The regulations were translated into English and were published in the public part of the English version of the website.

8.3 Management of the Faculty and Control Activities

- In accordance with Act No. 320/2001 Coll., Act on Financial Control, Implementing Decree No. 416/2004 Coll. and the Rector's directive on the internal control system, all types of control control were carried out at the Faculty, i.e. preliminary, continuous and subsequent.
- The evidence of those are the minutes of meetings of the Faculty management and leaders, minutes of individual inspections and Reports of the Department's Audit Activities for 2017.
- The Head of the Dean's Office of the Faculty trained departmental budget administrators.
- Continuous and follow-up inspections of selected projects, student grant competition projects were carried out at the departments, and processes were checked, i.e. the budget of FME TUL and the inventory of property were checked.

Academic Staff Awards
In December, the academic staff of our Faculty who contributed to the development of the Technical University of Liberec were awarded. Bronze medal from the Rector of the Technical University of Liberec was received by: prof. Ing. Stanislav Beroun, CSc., Assoc. prof. Ing. Lubomír Moc, CSc., Assoc. prof. Ing. Heinz Neumann, CSc., prof. Ing. Přemysl Pokorný, CSc.

Sad announcements
In September František Manlig, a member of the Department of Manufacturing Systems and Automation, died at the age of 53. Assoc. prof. Dr. Ing František Manlig joined his working and professional career with the Faculty of Mechanical Engineering of the Technical University of Liberec, where he worked at the Department of Manufacturing Systems, later the Department of Manufacturing Systems and Automation, for more than 28 years. His professional area was production logistics and simulation of production systems. He promoted project-oriented teaching at the university. He was the guarantor of the study branch Manufacturing Systems and Processes, member of Councils for doctoral programmes at TUL and the Faculty of Mechanical Engineering at UWB in Pilsen, Examination Board member, a member of the Czech Society for Operations Research and a member of numerous program and scientific committees of conferences. Above all, he was a friendly colleague and a good person that cannot be forgotten.

In September, our colleague Ing. Jan Frinta, almost 74 years of age, member of the Department of of Machining and Assembly. He has been actively involved in the teaching of subjects within the Bachelor's and follow-up master's program, and for many years also ensured cooperation between manufacturing companies and our university.

Honour their memory!

CONCLUSION

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

9 CONCLUSION

The Annual Report on the Activities of the Faculty of Mechanical Engineering TU in Liberec for 2017 provides information on the Faculty, its pedagogical and educational activities, scientific-research and creative activities, national and international cooperation, partnership and internationalization, and the third role.

In 2017,The Faculty of Mechanical Engineering has aimed at development not only in pedagogical activity, scientific, research, development and innovation activities, but also in the area of third role. The annual report shows that the Faculty's activities in 2017 were very thorough and extensive, and covered a wide range of activities that are mentioned in the previous chapters and in the following annexes to the annual report. University faculties must provide these activities inherently. From the Annual Report it is evident that the Faculty has succeeded in meeting the goals with the support and activities of all members of the academic community and other workers in 2017 as well.

In some areas and activities, the Faculty has achieved high quality and very good results, e.g. in the area of academic staff qualifications, age structure, science and research, projects, publications, legislation and process settings within the faculty, interest and number of applicants in a foreign language, in the area of student involvement in internal processes. On the other hand, there is still a lack of interest of the young generation in the study of technical fields, and despite the Faculty's maximum efforts towards secondary schools, this trend has not been changed. A major persistent problem of public universities is the funding of educational activities by the state, which would ensure both decent education and the valuation of academic staff. This handicap then very often leads either to the departure of young academic staff to industry or research centres, or to the orientation of some workers only towards projects at the expense of their activities and skills growth. The internal problem is a high overhead burden of educational activities of TUL. The last, but not unimportant, problem of today is the administrative burden and the overwhelming administration of the Faculty workplaces and academic staff.

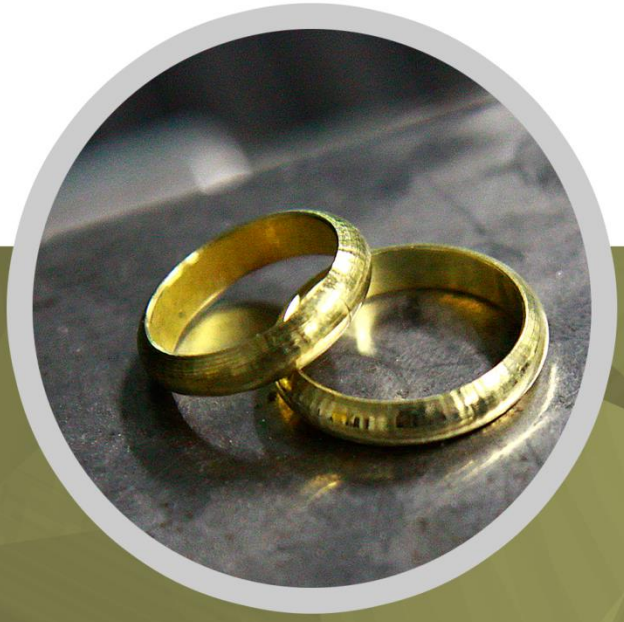
Nowadays, there are a lot of changes and new things at the state level that do not always have to benefit the development of universities. That's why I want to give my very sincere thanks once again to all members of the academic community who through their work, their activities and their efforts take care of the development of the Faculty and the university, for which they deserve great appreciation.

In Liberec, May 22, 2018

prof. Dr. Ing. Petr Lenfeld
Dean
Faculty of Mechanical Engineering TU Liberec

The Annual Report was approved by the Academic Senate
of the Faculty of Mechanical Engineering TU in Liberec on June 6, 2018.

TABLE ANNEXES



TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

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2.3 Personnel Structure of the Faculty

Tab. 2.3.1 Average recalculated numbers and qualification structure of employees as of December 31

Year	Academic Staff					Scientific workers	Other staff	Total
	Professors	Associate Professors	Senior Lecturers	Lecturers	Tutors			
2000	8,6	29,7	47,4			–	39,6	125,4
2001	8,7	33,7	47,3			6,6	37,7	134,0
2002	8,5	34,4	50,9			5,4	31,4	130,6
2003	10,1	31,4	52,0			7,7	26,3	127,5
2004	11,6	29,2	22,5	31,1		3,1	26,2	123,7
2005	12,1	28,4	31,3	17,4		13,2	29	131,4
2006	11,7	28,0	34,3	19,6		5,8	25,5	124,9
2007	10,1	27,5	48,9	5,3		1,1	29,7	122,5
2008	9,7	26,7	51,5	6,9		1,6	32,4	128,8
2009	12,6	24,9	50,3	7,7		5	34,6	135,1
2010	14,9	28,4	46,7	7,7	9,9	3	41,0	151,6
2011	16,5	26,4	51,7	6,2	8,8	0	34,2	143,8
2012	14,6	21,94	47,0	6,5	7,9	0	34,8	132,7
2013	13,5	23,5	43,3	6,8	6,5	0	44,2	136,8
2014	12,65	22,35	43,15	5,1	2,75	2,5	37,3	125,8
2015	11,45	21,3	41,05	6,3	3	0,7	29,6	113,4
2016	12,65	20,3	39,2	4,7	3,6	1,5	25,7	107,65
2017	12,9	21,4	38,05	6,8	1,2	1,6	25,25	107,05

Tab. 2.3.2 Number of staff (physical) and qualification structure of faculty staff

Year	Academic Staff					Scientific workers	Other staff	Total
	Professors	Associate Professors	Senior Lecturers	Lecturers	Tutors			
2008	19	33	65	12	0	9	46	184
2009	24	32	60	10	0	10	52	188
2010	24	33	60	13	0	5	54	189
2011	23	31	55	10	14	0	47	180
2012	22	27	54	8	11	0	43	165
2013	22	27	50	8	8	0	54	169
2014	21	28	52	7	4	3	50	165
2015	20	27	52	9	3	1	39	151
2016	20	26	50	7	4	2	34	143
2017	20	26	51	9	2	2	33	144

Tab. 2.3.3 Age Structure of Faculty Academic Staff as of 31 December 2017

Age	Academic Staff										Scientific workers	
	Professors		Associate Professors		Senior Lecturers		Lecturers		Tutors			
	total	women	total	women	total	women	total	women	total	women	total	women
under 29	0	0	0	0	0	0	1	0	1	0	1	0
30-39	0	0	3	1	21	3	5	1	1	0	1	0
40-49	1	0	7	0	24	4	1	0	0	0	0	0
50-59	5	0	5	2	3	1	0	0	0	0	0	0
60-69	6	1	5	0	2	0	2	1	0	0	0	0
over 70	8	1	6	0	1	0	0	0	0	0	0	0
Total	20	2	26	3	51	8	9	2	2	0	2	0

Tab. 2.3.4 Structure of Academic Staff (employment agreements) of the Faculty according to the Extent of Workload as of 31 December 2017

Workload extent in %	Total	Professors	Associate Professors	CSc., Dr., Ph.D.	Other
under 0,3	20	6	1	10	3
under 0,5	4	1	2	1	0
under 0,7	15	2	6	6	1
over 0,7	69	11	17	34	7
Total	108	20	26	51	11

3.1 Accredited Study Programmes and Branches

Pursuant to Article II of Act No. 137/2016 Coll., the accredited study programmes which are carried out by higher education institutions under the existing legal regulations on the last day before the date of entry into force of this Act, become degree programmes accredited under the Act No. 111/1998 Coll. as amended as of the effective date of this Act and are accredited for a specified period, but for at least 3 years from the effective date of this Act; for this period, the current division of these study programmes into branches of study remains unchanged. **

Tab. 3.1.1 Overview of Accredited Study Programmes and Branches Guaranteed by the FME

STUD PROG	Study programme	KKOV	Study branch	Accreditation till	Standard length of studies Study form			
					B	M,N	P	F, A
B 2301	Mechanical Engineering			1.3.2019	3			P, K, A
N 2301	Mechanical Engineering	3909T010	Innovation Engineering	1.11.2020		2		P, K, A
		2302T002	Machines and Equipment Design	31.7.2020		2		P, K, A
		2301T048	Engineering Technology and Materials	31.7.2020		2		P, K, A
		2301T049	Manufacturing Systems and Processes	31.8.2024		2		P, K, A
M 2301	Mechanical Engineering	3901T003	Applied Mechanics	31.3.2020		5		P, K, A

P 2301	Mechanical Engineering	3901V003	Applied Mechanics	1.3.2018			4	P, K, A
		2301V031	Manufacturing Systems and Processes	10.2.2018			4	P, K, A
		3911V011	Material Engineering	10.2.2018			4	P, K, A
P2302	Machines and Equipment	2302V010	Machines and Equipment Design	31.12.2017			4	P, K, A
P2303	Engineering Technology	2303V002	Engineering Technology	10.2.2018			4	P, K, A

STUDPROG – study programmes codes
KKOV – study branch code
B – Bachelor's study programme
N – Master's study programme following up a Bachelor's study programme
M – Master's study programme
P – PhD. Study programme
F – form of study: P – full-time, K – part-time (combined) form of studies
A – Study programmes (study branches) carried out in English

3.2 Studies Offered in English

Pursuant to Article II of Act No. 137/2016 Coll., the accredited study programmes which are carried out by higher education institutions under the existing legal regulations on the last day before the date of entry into force of this Act, become degree programmes accredited under the Act No. 111/1998 Coll. as amended as of the effective date of this Act and are accredited for a specified period, but for at least 3 years from the effective date of this Act; for this period, the current division of these study programmes into branches of study remains unchanged.

Tab. 3.2.1 Overview of Accredited Study Programmes and Branches in English

STUD PROG	Study programme	KKOV	Study branch	Accreditation till	Standard length of studies Study form			
					B	M,N	P	F, A
B2301	Mechanical Engineering			1.03.2019	3			P, K, A
N2301	Mechanical Engineering	3909T010	Innovation Engineering	1.11.2020		2		P, K, A
		2301T048	Engineering Technology and Materials	31.7.2020		2		P, K, A
		2302T010	Machines and Equipment Design	31.7.2020		2		P, K, A
		2301T049	Manufacturing Systems and Processes	31.8.2024		2		P, K, A
M2301	Mechanical Engineering	3901T003	Applied Mechanics	31.3.2020		5		P, K, A
P2301	Mechanical Engineering	3901V003	Applied Mechanics	1.3.2018			4	P, K, A
		2301V031	Manufacturing Systems and Processes	10.2.2018			4	P, K, A
		3911V011	Material Engineering	10.02.2018			4	P, K, A
P2302	Machines and Equipment	2302V010	Machines and Equipment Design	31.12.2017			4	P, K, A
P2303	Engineering Technology	2303V002	Engineering Technology	10.02.2018			4	P, K, A

STUDPROG – study programmes codes
KKOV – study branch code
B – Bachelor's study programme
N – Master's study programme following up a Bachelor's study programme
M – Master's study programme
P – PhD. Study programme
F – form of study: P – full-time, K – part-time (combined) form of studies
A – Study programmes (study branches) carried out in English

3.3 Interest in Studies and Requirements for the Admission Procedure

Tab. 3.3.1 Applicants for studies in Bachelor's and Master's programmes for the academic year 2017/2018

Code	Study programme	Number of Applicants				
		Applied to studies	Accepted to Studies	Accepted after PŘ	Accepted in total	Enrolled
B2301	Mechanical Engineering (K)	135	132	0	132	114
B2301	Mechanical Engineering (P)	388	309	0	309	230
N2301	Mechanical Engineering (K)	50	46	0	46	45
N2301	Mechanical Engineering (P)	94	40	2	42	40
M2301	Mechanical Engineering (P)	1	0	0	0	0
P2301	Mechanical Engineering (K)	5	5	0	5	5
	Mechanical Engineering (P)	6	5	1	6	3
P2302	Machines and Equipment (K)	4	4	0	4	4
	Machines and Equipment (P)	3	3	0	3	2
P2303	Engineering Technology (K)	3	2	0	2	1
	Engineering Technology (P)	1	1	0	1	1
Faculty in total		**690**	**547**	**3**	**550**	**445**

Note.: P – full-time form of studies, K – part-time/combined form of studies, PŘ – review of the decision.

3.4 Number of Students and Alumni

Tab. 3.4.1 Number of Students Enrolled to studies as of 31 October 2017

KKOV	Study programme	Czech Republic			Foreigners			Total		
		P	K	Total	P	K	Total	P	K	Total
B2301	Mechanical Engineering	340	126	466	67	6	73	407	132	539
M2301	Mechanical Engineering	7	0	7	0	0	0	7	0	7
N2301	Mechanical Engineering	85	69	154	57	6	63	142	75	217
P2301	Mechanical Engineering	14	10	24	5	6	11	19	16	35
P2302	Machines and Equipment	14	15	29	6	3	9	20	18	38
P2303	Engineering Technology	7	7	14	3	0	3	10	7	17
Faculty in total		**467**	**227**	**694**	**138**	**21**	**159**	**605**	**248**	**853**

Tab. 3.4.2 Number of International Students Enrolled as of 31 October 2017

Type	Form	Studies in Czech		Studies in English			Total
		Government scholarship holders	Others	Government scholarship holders	Self-funding students	Short-term	
Bachelor's	K	0	6	0	0	0	**6**
	P	3	40	0	0	24	**67**
Follow-up	K	0	6	0	0	0	**6**
	P	0	1	9	26	21	**57**
Master's	K	0	0	0	0	0	**0**
	P	0	0	0	0	0	**0**
PhD	K	0	4	0	5	0	**9**
	P	0	8	2	4	0	**14**
Total		**3**	**65**	**11**	**35**	**45**	**159**

Tab. 3.4.3 Number of students as of 31 October 2017 Number of Alumni in 2017 (from 1.1.2017 to 31.12.2017)

Study programme	Number of students		Number of Alumni	
	Full-time	Part-time	Full-time	Part-time
Bachelor's programme	407	132	45	17
NMSP (MSP) – Studies in Czech	93	69	35	26
NMSP (MSP) – Studies in English	56	0	11	0
PhD programme	49	41	4	9
Total	**605**	**248**	**95**	**52**

Tab. 3.4.4 Overview of Alumni and their Length of Studies

Study programme	Form	Date of graduation	Number of Alumni	Average length of studies
MSP	P	February 2017	0	–
	P	June 2017	1	3,00
	K	February 2017	0	–
	K	June 2017	0	–
Total MSP		February + June	**1**	**3,00**
NMSP	P	February 2017	3	3,00
	P	June 2017	42	2,31
	K	February 2017	1	3,00
	K	June 2017	25	3,08
Total NMSP		February + June	**71**	**2,62**
Total MSP + NMSP		February + June	**72**	–
BSP	P	February 2017	7	4,86

	P	August 2017	38	3,97
	K	February 2017	7	7,86
	K	August 2017	10	5,7
Total BSP		February + August	**62**	**4,79**
DSP	P		4	6,25
	K		9	9,33
Total DSP			**13**	**8,38**
Total alumni (BSP, MSP, NMSP, DSP)			**147**	**3,99**

Tab. 3.4.5 Number of Alumni in Study Programmes and Specializations between 20087–2017

Programme Branch Specialization	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
B2341 Engineering	**54**	**38**	**53**	**103**	**114**	**129**	**130**	**77**	–	–	–
Branch Materials and Technology	**37**	**18**	**20**	**40**	**41**	**53**	**60**	**30**	–	–	–
Specialization Material Engineering	13	4	6	16	16	13	12	4	–	–	–
Specialization Machining and assembly	–	2	–	7	4	20	14	7	–	–	–
Specialization Engineering metallurgy	2	3	4	5	12	5	11	5	–	–	–
Focus Forming of metals and plastics	22	9	10	12	9	15	23	14	–	–	–
Branch Machines and Equipment	**10**	**13**	**15**	**27**	**28**	**51**	**47**	**18**	–	–	–
Specialization Transport machinery and equipment	5	7	11	11	21	22	28	9	–	–	–
Specialization Power machines and equipment	2	–	2	8	6	9	5	1	–	–	–
Specialization Glass machines	–	2	1	2	1	5	2	6	–	–	–
Specialization Construction of machines	3	4	1	6	10	15	12	2	–	–	–
Branch Production Systems	**7**	**7**	**18**	**36**	**35**	**25**	**23**	**29**	–	–	–
Specialization Engineering Informatics	1	–	–	2	1	3	2	1	–	–	–
Specialization Production management	6	5	15	16	14	17	12	14	–	–	–
Specialization Production systems	–	2	3	18	20	5	9	14	–	–	–
B2301 Mechanical Engineering							**6**	**30**	**50**	**87**	**62**
M2301 a N2301 Mechanical	**112**	**110**	**103**	**96**	**68**	**64**	**65**	**72**	**129**	**82**	**72**

Engeeniring											
Branch Applied Mechanics	**5**	**3**	**4**	**6**	**4**	**1**	**6**	**9**	**3**	**1**	**1**
Specialization Engineering Mechanics	4	1	4	6	2	–	4	8	2	1	–
Specialization Mechanics of Fluids and Thermodynamics	1	2	–	–	2	1	2	1	1	–	1
Branch Automated control systems in Engineering	**2**	**7**	**4**	**4**	**3**	**4**	**3**	**1**	**2**	–	–
Specialization Engineering Automation	2	7	4	4	3	4	1	–	2	–	–
Specialization Automatic Control of Technical Processes	–	–	–	–	–	–	2	1	–	–	–
Branch Machines and Equipment Design	**46**	**33**	**22**	**34**	**18**	**15**	**19**	**19**	**23**	**4**	–
Specialization Wheeled and transport handling machines	18	12	10	14	6	5	7	4	5	2	–
Specialization Machine Tools and Assembly Machines	3	2	2	1	3	2	1	1	2	–	–
Specialization Reciprocating Internal Combustion Engines	7	3	5	6	3	4	3	5	8	1	–
Specialization Glassmaking and Ceramic Machines	7	–	4	6	3	1	1	–	2	–	–
Specialization Thermal technology	10	10	–	3	2	3	3	4	5	1	–
Specialization Textile machines	1	6	1	4	1	–	4	5	1	–	–
Branch Engineering Technology	**56**	**55**	**50**	**32**	**24**	**23**	**17**	**20**	**20**	**2**	–
Specialization Material Engineering	8	13	8	15	8	4	2	5	4	2	–
Specialization Machining and assembly	11	9	13	8	6	2	9	5	4	–	–
Specialization Engineering metallurgy	10	16	9	7	6	3	2	3	3	–	–
Specialization Metals and Plastics Forming	22	22	13	9	9	14	4	7	9	–	–
Branch Flexible Production Systems for Engineering Production	**3**	**8**	**10**	**11**	**9**	**11**	**7**	**10**	**6**	–	–
Branch Innovation Engineering	**–**	**4**	**13**	**9**	**10**	**10**	**13**	**13**	**6**	**7**	**5**
Specialization	–	4	13	9	10	10	13	13	6	7	5

Product Innovation											
Specialization Process Innovation	–	–	–	–	–	–	–	–	–	–	–
Branch Machines and Equipment Design									**25**	**26**	**31**
Specialization Textile and Single-purpose Machines									5	2	1
Specialization Glass Machines and Robotics									3	1	1
Specialization Machnes Production									3	4	11
Specialization Motor Vehicles									12	13	11
Specialization Energy facilities									2	6	7
Specialization Instrumentation									0	–	–
Branch Engineering technology and materials									**36**	**29**	**22**
Specialization Plastics processing									10	10	9
Specialization Foundry, Welding and Metal Forming									11	13	6
Specialization Material Engineering									6	4	4
Specialization Machining and Assembly									9	2	3
Branch Production Systems and Processes									**8**	**13**	**13**
Specialization Production Systems									6	13	13
Specialization Automated control systems									2	–	–
TOTAL P2301+P2302+P2303	**9**	**16**	**9**	**17**	**12**	**14**	**5**	**23**	**8**	**15**	**13**
P2301 Mechanical Engineering	**5**	**6**	**3**	**8**	**9**	**5**	**1**	**10**	**4**	**6**	**3**
Branch Applied Machanics	**3**	**1**	**–**	**5**	**4**	**2**	**–**	**3**	**2**	**3**	**1**
Specialization Engineering Mechanics	3	–	–	5	3	1	–	2	–	3	–
Specialization Mechanics of Fluids and Thermodynamics	–	1	–	–	1	1	–	1	2	–	1
Branch Material Engineering	**1**	**3**	**2**	**2**	**4**	**3**	**–**	**5**	**1**	**3**	**1**

Branch Production Systems and Processes	**1**	**2**	**1**	**1**	**1**	**0**	**1**	**2**	**1**	**–**	**1**
Specialization Applied Cybernetics	2	–	–	1	–	–	1	1	1	–	–
Specialization Automation of technical preparation of production	–	–	–	–	–	–	–	1	–	–	1
Specialization Automation of machines and production processes	–	–	–	–	–	–	–	–	–	–	–
Specialization Manufacturing systems with industrial robots	–	–	1	1	–	–	–	–	–	–	–
P2302 Machines and Equipment	**2**	**5**	**2**	**3**	**1**	**3**	**3**	**10**	**1**	**4**	**4**
Branch Machines and Equipment Design	**2**	**5**	**2**	**3**	**1**	**3**	**3**	**10**	**1**	**4**	**4**
Specialization Machine parts and mechanisms	2	1	–	1	–	2	1	1	–	1	1
Specialization Wheeled transport and Handling machines	–	–	1	1	1	–	1	4	–	1	–
Specialization Machine Tools and Assembly Machines	–	–	–	–	–	–	–	1	–	–	–
Specialization Reciprocating internal combustion engines	–	2	1	1	–	1	–	1	–	–	3
Specialization Glassmaking and Ceramic Machines	–	2	–	–	–	–	–	–	–	–	–
Specialization Technical machine diagnostics	–	–	–	–	–	–	–	–	–	–	–
Specialization Textile and clothing machines	–	–	–	–	–	–	–	3	–	1	–
Specialization Equipment for thermal engineering	–	–	–	–	–	–	1	–	1	1	–
P2303 Strojírenská technologie	**2**	**5**	**4**	**6**	**2**	**6**	**1**	**3**	**3**	**5**	**6**
Branch Engineering Technology	**2**	**5**	**4**	**6**	**2**	**6**	**1**	**3**	**3**	**5**	**6**
Specialization Material Engineering	1	–	–	–	–	–	–	–	–	–	–
Specialization Machining and	–	–	1	1	–	–	–	1	1	–	2

assembly											
Specialization Foundry	1	2	1	1	2	3	–	1	–	–	1
Specialization Welding	–	1	–	2	–	–	–	–	–	–	1
Specialization Metal forming	–	1	2	2	–	3	–	–	–	–	2
Specialization Polymer manufacturing	–	1	–	–	–	–	1	1	2	5	–
Total for each year	**175**	**164**	**165**	**216**	**194**	**207**	**206**	**202**	**187**	**184**	**147**

Tab. 3.4.6 Number of Students of PhD study programmes in 2017 (as of 31 October 2017)

Department	Full-time	Part-time	Total	Defended 2017
DAM	1	1	2	0
DET	8	4	12	4
DMS	6	4	10	1
DPE	12	5	17	1
DMM	4	9	13	1
DMA	2	3	5	2
DVE	7	4	11	3
DGR	2	1	3	0
DTD	4	1	5	0
DMA	3	9	12	1
Total	**49**	**41**	**90**	**13**

3.6 Scholarships

Tab. 3.6.1 Scholarships Paid to Students in 2017

Scholarship type	Number of Students
Merit based	114
For outstanding research, development or other creative results contributing to deepen knowledge	213
In a difficult social situation	5
Accommodation scholarship	421
To support studies abroad	18
To support studies in the Czech Republic	45
For PhD students (DSP)	36
Total	**852**

Tab. 3.6.2 Amount of Scholarships Paid in 2017

Financial source of scholarships	Scholarship Type	Amount (in ths. CZK)
State budget	To DSP students	2 455

State budget – government scholarships	To international students	1 519
Scholarship fund of FME TUL		3 703
	Of which:	
	Merit-based scholarships	1 962
	extraordinary scholarships	1 069
	To support studies abroad	540
	To support studies in the CR	132
Other (SGS, IP, grants, donations)		2 279
Total		**9 956**

3.9 Quality of Teaching

Tab. 3.9.1 Publication Activity of FS TUL in 2017

Year	Number of published titles								
2015	Book in Czech	Book in English	Study material	Web application	Study material in CZ	Study material in EN	Teaching aid	Virtual models	Functional model/Exp. equipment
Total	–	–	4	1	4	3	1	1	4

Documented in detail in the annual reports of the departments.

3.10 Lifelong Learning

Tab. 3.10.1 Lifelong Learning Courses in 2017 – Education for Business

Technical Sciences		
Course length	Number of courses	Number of attendants
to 15 hours	18	113
16–100 hours	26	223
101 and more hours	–	–

4.1 Scientific-Research Activity

Tab. 4.1.1 Subsidies to FS TUL for scientific–research activity in 2017

Source	Share (%)	Subsidy (in ths. CZK)		
		NIV	INV	Total
Institutional Support	47,9	29 286	0	29 286
Grant support	41,4	18 154	7 100	25 254
Specific research support (SGC)	10,7	6 531	0	6 531
Total		53 971	7 100	61 071

Tab. 4.1.2 Development of subsidies for scientific and research activities

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
FME	79,1	76,2	64,9	73,7	57,1	59,7	63,5	44,5	47,2	61,1

Of which INV		4,9	3,9	5,8	2,9	4,7	2,8	0	0	7,1
Of which non-public		2	1,8	2,1	0,9		0,5	0,6	0,5	
FME*									8,5	8

* FS under other components.

4.1.3 Grant support to FS TUL for S&R in 2017

Provider	Program	Subsidy (in ths. CZK)		
		NIV	INV	Total
GA CR	GA-Standard projects	951	0	951
TA CR	ALFA (2011-2016)	1 285	0	1 285
TA CR	EPSILON (2015-2025)	2 770	0	2 770
MIT CR	TRIO	5 443	0	5 443
MoI CR	Program BV	4 819	7 100	11 919
H2020	H2020-SC-2015-one-stage	2 822	0	2 822
MEYS CR	7AMB / Shared Czech-Polish SP	64	0	64
Total		18 154	7 100	25 254
Non-public sources				0

4.1.4 Targeted support for scientific research projects in 2017 – FME TUL share on solving projects under other TUL components

Provider	**Program**	**Component**
TA CR	Competence Centres (2012–2019)	CNATI
TA CR	ALFA (2011–2016)	CNATI
TA CR	EPSILON (2015–2025)	CNATI
TA CR	GAMA (2014–2019)	CNATI
MoI ČR	Security research (2015–2020)	CNATI
MIT CR/EU	OP PIK	CNATI
MEYS CR	NPU	CNATI
Total share of FS approx. * Participation in the NPI project (CxI) is not included.		8 mil CZK

Tab. 4.1.5 Targeted support for scientific and research projects of FME TU (grants and special–purpose)

Source (in ths. CZK)	**Year**								
	2009	2010	2011	2012	2013	2014	2015	2016	2017
Targeted support FME	76 186	63 783	49 431	39 349	35 884	34 590	15 700	17 933	31 781
Of which non-public sources	2 000	900	749	900	*	499	615	494	
Of which investment	4 975	286	2 116	2 962	4 664	2 760	0	0	7 100

* In previous years, a contract research project of the KSR, VZ and the Centre was solved and counted.

4.4 Scientific–Research Projects

Tab. 4.4.1 Scientific and research projects solved in 2017

Provider	Program	FS TUL as		Of which in 2017	
		Beneficiary	Co-beneficiary	End of solution	Start of solution
GA CR	GA-Standard projects	0	1	0	0
TA CR	ALFA (2011-2016)	0	1	1	0
TA CR	EPSILON (2015-2025)	0	2	1	0
MIT CR	TRIO	0	6	0	2
MoI CR	Program BV	1	0	0	1
H2020	H2020-SC-2015-one-stage	0	1	0	0
MEYS	7AMB Czech-Polish SP	1	0	1	0
Total		**2**	**11**	**3**	**3**

4.5 Student Grant Competition

Tab. 4.5.1 List of student grant competition projects in 2017

Int. č.	Name of Projects Researcher	Solution period	Subsidy (in ths. CZK)
21071	Development and prototype production of compact DLP 3D printer Ing. Iaroslav Kovalenko	2015–2017	290
21120	Research on advanced composites materials, polymeric materials, development and simulation of mechanical and mechatronic systems Ing. David Cirkl, Ph.D.	2016–2018	309
21121	Advanced Analysis Utilization the for the Research of the Special Material Types Application Possibilities in the Industrial Production Ing. Ondřej Řídký	2016–2018	225
21122	Research of physical, thermal and technological parameters for the application of production technologies Ing. Jiří Sobotka, Ph.D.	2016–2018	408
21123	Study and evaluation of the material's structure and properties Ing. Adam Hotař, Ph.D.	2016–2018	395
21124	Experimental and numerical investigation in applied fluid mechanics and energy devices Ing. Jan Kracík	2016–2018	392
21125	Innovation of products and equipment i engineering practice Ing. Rudolf Martonka, Ph.D.	2016–2018	354
21126	Improving the quality of machining and assembly processes Ing. Miloslav Ledvina	2016–2018	199
21127	Modern methods of development and testing of vehicles and their parts Ing. Pavel Brabec, Ph.D.	2016–2018	430

21128	Research and development in the field of glass-producing machines, industrial and service robotics Ing. Vlastimil Hotař, Ph.D.	2016–2018	196
21129	Research of the structures and the procesess of textile and single-purpose machines Ing. Michal Strnad	2016–2018	274
21130	Research and development in the field of 3D technology, manufacturing systems and automation Ing. Radomír Mendřický, Ph.D.	2016–2018	453
21131	Research and development of devices for production of nanofibrous materials using AC-elektrospinning process Ing. Ondřej Baťka	2016–2018	350
21132	Innovation of technical systems structures with the use of composite materials Ing. Petr Lepšík, Ph.D.	2016–2018	285
21135	Experimental and numerical research of real fluid Ing. Jan Novosád	2016–2018	270
21179	Prediction of Springback of Drawn Stampings by using the Advanced FEM Computational Models Ing. David Koreček	2017	287
21180	Research of renewable and biodegradable "green" composites based on cellulose nanocrystals Ing. Martin Borůvka	2017–2018	227
21181	Capturing shaped objects from transparent materials using reflected laser projection Ing. Ondřej Matúšek	2017	214
21182	The cavitation phenomenon and its erosion potential Ing. Jan Hujer	2017	180
21183	Development of the device for polymer solution dosing for nanofiber yarn production Andrii Shynkarenko	2017	250
21184	Construction and development of a device for dynamic cell cultivation – Bioreactor Ing. Michal Moučka, Ph.D.	2017	350
21016	Management SGC – DFME	2017	153
FS total			**6 491**

4.6 Scientific-research Contractual and Complementary Activity

Tab. 4.6.1 Overview of Revenue of Contractual and Complementary Activity in 2017

Department	Contractual Research under FME (ths. CZK)	Complementary Activity under FME (ths. CZK)	Contractual Research under CNATI (ths. CZK)	Complementary Activity under CNATI (ths. CZK)
DAM	32	931	31,5	–
DET	2 394	968	121	–

DMS	1 298	634	–	–
DPE	744	190	–	–
DMM	3 387	222	808	226
DMA	0	66	–	–
KVE	3 784	660	–	5 797
KGR	66	–	1 109	111
DTD	105	–	3 319,5	–
KMA	362	115	–	–
Total	12 171	3 786	5 389	6 134
DFME		654		

Tab. 4.6.2 Development of the Volume of Funds from Contract Research and Complementary Activities

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Revenue (ths. CZK)	11 597	9 499	9 600	8 171	8 131	9 373	12 115	11 692	13 351	16 759
Profit ratio in revenues (%)	17,7	16,5	22,2	22,1	22	29	21,5	20,2	21,8	22,6

4.9 Results of Scientific Research and Development Activities of FME TUL

Tab. 4.9.5 Number of Faculty Outputs in 2013–2017

Type of output	Number of outputs in					Total
	2013	2014	2015	2016	2017	
J – Article in a professional periodical	65	58	68	65	60	319
D – Article in proceedings	149	170	127	100	81	627
FP – industrial pattern	3	2	0	0	0	5
FU – utility model	18	17	19	7	7	68
GA – prototype	4	7	0	4	1	16
GB – Functional sample	13	16	9	6	16	60
B – professional book	1	2	6	2	0	11
P – patent	9	5	14	16	13	57
S – software	3	3	3	1	0	10
ZA – pilot plant	0	1	1	0	0	2
ZB – Proven technology	2	5	4	0	1	12
M – organizing a conference	4	0	4	2	3	13
W – organizing of workshop	11	6	8	1	0	26
Total	282	292	263	204	184	

Note.: Dates from 2013–2016 taken from www.rvvi.cz, dates for 2017 taken from publikace.tul.cz (data in the databases as of 14 April 2018).

Tab. 4.9.6 Number of Selected Outputs by Departments in 2016 and 2017 (number of results)

Workplace	Year 2016 / Year 2017													Total	
	B	BN	C	D	DN	FU	GA	GB	J	JI	JN	JR	P	Number	Share (%)
DAM				9	2					3	1		1	16	6,2
		1	2	3	3					3	3			15	6,4
DET		2		17		5			1	2	30		2	59	22,9
		1		9		1			1	2	17	1	7	39	16,5
DMS		1							2	5	4	4	2	18	7,0
				9	9					2	2	1	1	24	10,2
DPE	1	2		25	6		1		2				1	38	14,7
		3		14	7					1	1	1		27	11,4
DMA		2		15	4			2			3			26	10,1
		1		6	11			5			3			26	11,0
DMM		1		20	2		3	1	2		4		2	35	13,6
			1	19	2	4	1	2			5			34	14,4
DMA				4					4		3			11	4,3
										2	5			7	3,0
DVE		1	1	8	10				1	2		1	3	27	10,5
				14	7			2	2	1		1		27	11,4
DGR				2	5							2		9	3,5
		1	1	1	1	1		2		1		5		13	5,5
DTD				5		2		3		1			8	19	7,4
				8	1	1		5		4			5	24	10,2
Total	1	9	1	105	29	7	4	6	12	13	45	7	19	258	
	0	7	4	83	41	7	1	16	3	16	36	9	13	236	

Note.: Data taken from publikace.tul.cz (data in the database as of 14 April 2018).

Tab. 4.9.7 Number of Selected Outputs of Faculty Departments in 2016 and 2017 (share of results)

Workplace	Year 2016 / Year 2017													Total	
														Number	Share (%)
DAM				9,25	1,5					2	0,5		0,66	13,9	5,8
		0,12	0,3	2,2	3					1,8	2			9,4	5,3
DET				18,5		5,6			1	0,31	26,8		2	56,2	23,5
		0,33		8,67		0,75			1	1,25	14,2	1	5,83	33,0	18,7

DMS		1		3,13	4,1				2	2,6	1,6	2,4	1,6	18,4	7,7
				4,18	7					0,8	0,3	0,25	0,5	13,0	7,4
DPE	0,5	2		25,5	5,7		1		1,5				0,5	36,7	15,3
		3		12,1	5,59					0,25	1	1		23,0	13,0
DMA		2		13,93	4			2			4,67			26,6	11,1
		0,75		4,05	9,1			5			2,8			21,7	12,3
DMM		1		17,7	2		1,84	0,67	1,95		3,5		1,35	30,0	12,5
			0,5	16	0,66	0,87	0,25	0,34			4,25			22,9	13,0
DMA				2,25					0,74		3			6,0	2,5
										1,08	4,5			5,6	3,2
DVE		1	0,4	5,62	10				1	0,43		1,33	2,8	22,6	9,4
				12,5	7			0,9	1,2	0,29		1		22,9	13,0
DGR				1,67	5							2		8,7	3,6
		1	1	0,5	1	0,33		0,53		1		4,5		9,9	5,6
DTD				5,31		1,75		4,7		1			7,64	20,4	8,5
				7,46	0,28	1		3,36		0,56			2,55	15,2	8,6
Total	0,5	9	0,4	103	32,3	7,35	2,84	7,37	8,19	6,33	40,1	5,73	16,5	239,6	
	0	5,2	1,8	67,7	33,6	2,9	0,25	10,1	2,2	7,02	29,1	7,7	8,9	176,6	

Note.: Data taken from publikace.tul.cz (data in the database as of 14 April 2018).

Tab. 4.9.8 Results included in the Faculty Round of Selection of Significant Results according to Methodology 17+ in 2017

Name of Result	Author	Result type	Branch	Co-authorship
Cladded thread-cutting tools of high-speed cutting steel, especially screw-cutting taps	Petr Louda [KMT] Zbigniew Rozek [KMT] Mateusz Fijalkowski [LMM]	P	2.3	FME/CNATI
Guide pulleys of hardened steel for wire drawing	Petr Louda [KMT] Zbigniew Rozek [KMT] Mateusz Fijalkowski [LMM]	P	2.3	FME/CNATI
Design modification of the cores and elements forming and surrounding the shape cavity of productional tools that enables their cooling by liquefied technical gases	Pavel Brdlík [KSP] Martin Seidl [KSP] Iva Nováková [KSP] Jiří Šafka [LPT]	FU	2.3	FME/CNATI
Tempering unit with controlling equipment	Pavel Brdlík [KSP]	FU	2.3	FME
Devices for measuring the size of the gas layer between the casting and foundry mould	Jiří Machuta [KSP] Iva Nová [KSP]	P	2.3	FME
Moulding material mixture for making moulds and cores	Iva Nová [KSP] Jiří Machuta [KSP] Iva Nováková [KSP]	P	2.3	FME

Compact DLP 3D Printer	Iaroslav Kovalenko [KSA]	GB	6.5	FME
Prototype of new flanges for mounting the roller laminator	Tomáš Martinec [OFM] Michal Petrů [LHD] Ladislav Ševčík [KST]	GA	2.3	FME/CNATI
Travelling vehicle wheel	Václav Záda [MTI] Pavel Brabec [KVM] Robert Voženílek [KVM]	P	2.3	FMII/FME
Hybrid polymeric composite with nature fibers and hollow glass microspheres	Jiří Habr [KSP] Petr Lenfeld [KSP] Luboš Běhálek [KSP] Martin Seidl [KSP] Jiří Bobek [LPT]	FU	2.3	FME/CNATI
Polymeric composite with nature fibres and lightweight matrix	Jiří Habr [KSP] Petr Lenfeld [KSP] Luboš Běhálek [KSP] Jiří Bobek [LPT] Martin Seidl [KSP]	FU	2.3	FME/CNATI
Method of winding self-supporting bobbin and self-supporting bobbin with cheese package of lower thread for sewing machines	Jaroslav Beran [KTS] Jozef Kaniok [KTS] Vratislav Procházka [KTS] Michal Kašpárek [KTS]	P	2.3	FME
A linear fibre formation with a case of polymeric nanofibres enveloping the supporting linear formation constituting the core, the method and equipment for its production	Martin Bílek [KTS], Ondřej Baťka [LHD], Josef Skřivánek [KTS], Petr Žabka [KTS], Jiří Komárek [KTS], David Lukáš [KNT], Pavel Pokorný [KNT], Jaroslav Beran [KTS], Jan Valtera [KTS], Eva Košťáková [KNT], Petr Mikeš [KNT], Jiří Chvojka [KNT], Tomáš Kalous [KNT], Filip Sanetrník [KNT]	P	2.10	FTE/FME/CNATI
Pin mounting of rotary component, such as a bearing of prestressed belt conveyor idle pulley of textile machine	Martin Diblík [MTI] Ladislav Ševčík [KST] Pavel Rydlo [MTI] Jaroslav Hanuš [KTM] Martin Konečný [KTS]	P	2.3	FTE/FME/FMII
Device for making fabric of defined thickness	Jaroslav Hanuš [KTM] Ladislav Ševčík [KST] Martin Konečný [KTS] Pavel Rydlo [MTI]	P	2.3	FTE/FME/FMII
Functional prototype of mobile flood board	Michal Petrů [LHD] Ladislav Ševčík [KST] Tomáš Martinec [OFM] Ivan Mašín [KST]	GA	2.3	FME/CNATI
Disc for combing out pile on the surface of felt semi-finished products and equipment for combing out pile on the surface	Jaroslav Beran [KTS] Jaroslav Kopal [KTS] František Kazda [KTS]	P	2.3	FME

of felt semi-finished products fitted with this disc				
Apparatus for producing nanofibers and/or microfibers by polymer solution or melt centrifugal spinning	Pavel Pokorný [KNT] Lenka Blažková [KNT] Josef Skřivánek [KTS] Tomáš Kalous [KNT] Eva Košťáková [KNT] Jaroslav Beran [KTS] Martin Diblík [MTI] David Lukáš [KNT]	FU	2.10	FTE/FME/FMII
Enthalpic heat-exchange apparatus	Václav Dvořák [KEZ] Tomáš Vít [KEZ]	P	2.3	FME
Coaxial electrode for AC spinning of polymer solutions	Josef Skřivánek [KTS] Jan Valtera [KTS] Jaroslav Beran [KTS] Martin Bílek [KTS] Lucie Vysloužilová [KNT]	GB	2.10	FME/FTE
Model of the fireproof rolling gate	Michal Petrů [LHD] Ladislav Ševčík [KST] Tomáš Martinec [OFM] Ivan Mašín [KST]	GB	2.5	FME/CNATI
Innovative fire closure - fireproof rolling gates	Michal Petrů [LHD] Ladislav Ševčík [KST] Tomáš Martinec [OFM] Ivan Mašín [KST]	GA	2.5	FME/CNATI
Device for the collection and twisting fibers	Andrii Shynkarenko [KSA] Anton Krotov [KSA] Michal Moučka [KSA]	GB	2.10	FME

Tab. 4.9.9 Results produced by FS in 2016 in A-K Branches (according to Classification of CEP & CEZ & RIV Branches)

Branch Classification	Number of outputs	Recalculated shares (%)
A Social Sciences	1	0,2
B Physics and mathematics	24	5,3
D Earth sciences	1	0,2
E Biosciences	1	0,2
J Industry	423	94,0
Total	450	100,0

Note.: Data taken from publikace.tul.cz (data in the database as of 15 February 2017)

Tab. 4.9.10 Frequency of Results produced by FS in 2017 in Branches according to Methodology 17+ (according to the Branch Classification in Frascati manual)

Branch Classification	Number of outputs	Recalculated shares (%)
1 Natural Sciences	19	6,7
2 Engineering and Technology	259	90,9
3 Medical and health sciences	4	1,4
5 Social Sciences	3	1,1

Total	285	100,0

Note: Data taken from the database publikace.tul.cz as of 14 April 2018.

Tab. 4.9.11 Results produced by FS in 2016 in JA-JY Branches (according to Classification of CEP & CEZ & RIV Branches)

Branch Classification	Number of outputs	Recalculated shares (%)
JA Electronics and optoelectronics, electrical engineering	6	1,4
JB Sensors, measuring and regulation	2	0,5
JD Use of computers, robotics and its applications	1	0,2
JE Non-nuclear energy, energy consumption and use	55	13,0
JG Metallurgy, metal materials	23	5,4
JH Ceramics, refractory materials and glass	5	1,2
JI Composite materials	35	8,3
JJ Other materials	35	8,3
JK Corrosion and surface treatment of material	16	3,8
JL Material fatigue and fracture mechanics	1	0,2
JO Ground transport systems and equipment	1	0,2
JP Industrial processes and processing	57	13,5
JQ Machinery and tools	87	20,6
JR Other mechanical engineering	71	16,8
JS Reliability and quality management, testing	9	2,1
JT Propulsion, engines and fuels	19	4,5
Total	**423**	100,0

Note.: Data taken from the database publikace.tul.cz as of 15 February 2017.

Tab. 4.9.12 Results produced by FS in 2017 in Engineering and Technology Branch (according to the Branch Classification in Frascati manual)

Branch Classification	Number of outputs	Recalculated shares
2.2 Electrical Engineering, Electronic Engineering, Information Engineering	12	4,6
2.3 Mechanical Engineering	105	40,5
2.5 Material Engineering	89	34,4
2.6 Medical Engineering	1	0,4
2.7 Environmental Engineering	27	10,4
2.9 Industrial Biotechnology	4	1,5
2.10 Nano-technology	18	6,9
2.11 Other Engineering and technologies	3	1,2
Total	259	100,0

Note: Data taken from the database publikace.tul.cz as of 14 April 2018.

Tab. 4.9.13 Number of Outputs of the SGC projects between 2016 and 2017

Type of output	Number of outputs		Recalculated share of FME outputs	
	2016	2017	2016	2017
J – Article in a professional periodical	18	33	17,8	28,7
D – Article in proceedings	68	67	63,35	57
FP – industrial pattern	0	0	0	0
FU – utility model	0	0	0	0
GA – prototype	0	0	0	0
GB – functional sample	2	7	2	6,06
B – professional book	0	0	0	0
P – patent	0	0	0	0
S – software	0	0	0	0
ZA – pilot plant	0	0	0	0
ZB – Proven technology	0	0	0	0
C – Chapter in a monograph	0	0	0	0
O – other outputs	0	0	0	0
Total	88	107	83,15	91,76

Note: Data taken from the database publikace.tul.cz as of 14 April 2018.

Tab. 4.9.14 Number of Outputs financed from Institutional Support between 2016 and 2017

Type of output	Number of outputs		Recalculated share of FME outputs	
	2016	2017	2016	2017
J – Article in a professional periodical	23	14	14,39	8,7
D – Article in proceedings	32	41	27,64	35
FP – industrial pattern	0	0	0	0
FU – utility model	0	0	0	0
GA – prototype	0	0	0	0
GB – functional sample	0	0	0	0
B – professional book	1	0	0,5	0
P – patent	9	6	6,37	4,25
S – software	0	0	0	0
ZA – pilot plant	0	0	0	0
ZB – Proven technology	0	0	0	0
C – Chapter in a monograph	0	0	0	0
O – other outputs	1	1	1	0,6
Total	66	62	49,9	48,55

Note: Data taken from the database publikace.tul.cz as of 14 April 2018.

Tab. 4.9.15 Evaluation of FME TUL Results according to Valid Methodology in 2017 (evaluation period 2011–2015)

Evaluation of results of research organizations in 2017			
Data export for organization: Technical University of Liberec / Faculty of Mechanical Engineering			
	Number of results	Score points	Points modified according to Annex 8 of the Methodology
Pillar I	479	5843,42	4 369,945
Pillar II *			948,564
Pillar III			700,743
Results of Applied Research 2011, Pillar III 2012-2013			5 251,37
Overall rating			11 270,623
***** In 2013, Pillar II was initiated by a 1/9 allotment of the sum of Pillar I, Pillar III points and applied research results from past evaluations. In each subsequent period, this score decreased by 10%.			

Note.: Total points transferred from other TUL components: 309,57

Tab. 4.9.16 Allocation of Points among Faculty Workplaces according to Methodology 2013–2016 (evaluation period 2015)

Department	Year 2011 to 2015						
	2011	2012	2013	2014	2015	Total	Share (%)
DAM	197,93	273,92	142,56	183,75	327,01	1 125,18	10,95
DET	738,39	236,08	365,06	477,14	509,77	2 326,45	22,64
DMS	302,24	410,52	101,32	352,68	124,07	1 290,82	12,56
DPE	390,60	112,90	183,57	177,04	317,38	1 181,50	11,50
DMM	279,74	50,26	61,53	96,19	144,25	631,96	6,15
DMA	75,89	55,82	229,89	104,12	34,06	499,77	4,86
DVE	574,69	148,62	135,88	107,54	193,85	1 160,58	11,30
DGR	125,29	24,51	54,43	77,37	75,90	357,50	3,48
DTD	205,93	79,00	168,22	266,90	271,42	991,46	9,65
DMA	341,52	6,21	88,33	181,73	90,91	708,70	6,90
Total	3 232,22	1 397,84	1 530,80	2024,46	2 088,62	10 273,93	100,00

Tab. 4.9.17 Allocation of Points among Faculty Workplaces according to FME TUL Methodology (evaluation period 2015)

Publication results according to FS methodology for 2015											
Type of result	B	C	D			J					Total
Depart.			D	Neuv	Total	Jimp	Jsc	Jrec	Neuv	Total	
DPE	51,90		70,71	1	71,71	46,13	60,45		0,5	107,08	230,72
DAM			26,70		26,70	160,55	9,645		1	171,20	197,89
DMS			20,78	6,5	27,28	84,69	54,63	3	2	144,32	171,60

DMA			0,47	1,5	1,97		40,3			40,3	42,27
DMA	33,87		9,70	5	14,70		25,79	1		26,79	75,36
DET			49,75	8	57,75	2,28	86,62	2		90,90	148,65
DGR							14,209	2		16,21	16,21
DMM	31,29		38,37	3	41,37		20,15			20,15	92,81
DTD			3,22	2	5,22	20,03	13,36			33,40	38,62
DVE		0,566	18,99	7	25,99	47,45	11,65	1	1	61,10	87,66
Total	117,09	0,566	238,68	34	272,68	361,13	336,81	9	4,5	711,44	1 101,79

5.2 International Cooperation in Education

Tab. 5.2.1 Overview of cooperation based on inter–university agreements 2017

Type of Agreement / Country	**Partner institution**
Inter–university cooperation	
Azerbaijan	Azerbaijan Technical University
Brazil	Pontifícia Universidade Católica do Rio de Janeiro
Bulgaria	Technical University of Sofia
France	Université de Franche-Comté, ISIFC
India	Apollo Engineering College
Indonesia	Diponegoro University
Canada	Conestoga College Institute of Technology and Advance Learning, Ontario
Canada	University of Waterloo, Ontario
Kazakhstan	Kazakh – British Technical University
Norway	Ostfold University College
Russia	National Research University „Moscow Power Engineering Ins.“
Slovakia	Trenčianska univerzita Alexandra Dubčeka
Germany	Hof University of Applied Sciences
Germany	BTU Cottbus – Senftenberg
Thailand	King Mongkuts´s University of Technology North Bangkok
Vietnam	Nha Trang University, Faculty of Mechanical Engineering
Agreements with institutes/institutions	
PL	Institute for Engineering of Polymer Materials and Dyes, Torun
USA	ATCC – Material Transfer Agreement
India	Europe Study Centre
Erasmus – inter-institutional agreements	
See chapter 5.4	60 institutions
Total	**79**

5.3 International S&R mobility and development projects

Tab. 5.3.1. CEEPUS – mobility funds – incoming academic staff and students

Year	2013	2014	2015	2016	2017
Contribution/CZK	207 000	127 576	213 764	100 600	71 100

Tab. 5.3.2 International Projects

Provider	Program	Solution period	Foreign Partner	Type of collaboration
MEYS	AMB	2016–2017	Politechnika Bialostocka, Poland	Mobility S&R
EU	H2020	2016–2018	National Technical University of Athens	S&R
EU	OP	2015–2019	Hochschule Zittau/Görlitz Technische Universität Dresden	Development
EU	OP	2016–2019	Technische Universität Dresden	Development
EU	OP	2017–2019	Technische Universität Dresden	Development

See Annex 5.3 for details.

5.4 International Mobility

Tab. 5.4.1 International mobility under programs in 2017

Program	ERASMUS			CEEPUS	IAESTE	AKTION
	C	U	Z			
Number of outgoing students	16*	13	3	0	0	0
Number of incoming students	128**	84	44	3***	7****	0
Number of outgoing academic/other staff	7*****	7	0	2	0	1
Number of incoming academic/other staff	16******	16	0	3*******	0	0
Total	**167**	**120**	**47**	**8**	**7**	**1**

C – total, U – completed, Z – started.
* of which 4 Ph.D., all mobilities in the length of at least 28 days in 2017.
** all incoming stays in the length of at least 14 days in 2017.
*** NMSP students, all mobilities in the length of at least 28 days in 2017
**** all incoming stays in the length of at least 28 days in 2017.
***** of which 1 mobility shorter than 5 days.
****** of which 7 incoming stays in the length of less than 5 days.
******* Incoming stays in the length of at least 5 days.

Note.: Student stays started in the previous year and stays shorter than 4 weeks (28 days) and stays of academic staff / other staff of less than 5 days are also included.

Tab. 5.4.2 Other International Activities outside Programs in 2017

Activity	Conference Active participation	Conference Passive participation	Negotiation on cooperation	Other
Outgoing students	4	0	4	17*
Incoming students	2	0	0	1**
Outgoing academic/other staff	14	4***	27****	22*****
Incoming academic/other staff	31	18	3	27******

Total	**51**	**22**	**34**	**67**

* Of which 1 internship in the length of at least 28 days (outside programs), professional training course.
** Internship in the length of 12 days.
*** Of which 1 outgoing other staff member – EAIE conference.
**** Of which 1 other staff member
***** Fair, training, seminar, presentation, excursion, meeting of departments, various.
****** Lectures, presentations, meetings of departments.
Note.: Conference participation does not include 95 participants of Experimental Fluid Mechanics 2017 conference due to no distinction between student and academic status, of which 70 active participation.

Tab. 5.4.3 Mobility in the framework of government scholarships, development projects, other sources in 2017

Program	Government scholarships	Development projects	Other sources	Self-funding students
Number of outgoing students	0	4*	53**	0
Number of incoming students	12***	2****	30*****	53******
Number of outgoing academic/other staff	0	8*******	52********	0
Number of incoming academic/other staff	0	4*********	37**********	0
Total	**12**	**18**	**172**	**53**

***** 3 students supported from IRP TUL Mobility Fund 2017 – of which 2 mobilities shorter than 15 days, 1 student supported from IRP FS 12338.
** 1 internship in the length of at least 28 days and 1 short-term mobility within the project Czech Republic - Free State of Saxony (BauQu), 46 short-term mobilities under the project Czech Republic - Free State of Saxony (GreK), 2 short-term mobilities within the project Cooperation program Czech Republic - Free State of Saxony (Pokrok.digital), 3 short-term mobilities within SGS.
*** Studying in English: Attia, Habashy, Salem, Aidoo, Tsao, Ajami, Duran, Linn, Moro, Salonga – NMSP studies, Cubreli, Kouta – DSP studies.
**** Arrivals within IRP Mobility Fund 2017, of which 1 arrival shorter than 5 days.
***** 3 one-semester arrival of students (study, inter-university cooperation Taiwan), 18x short-term Arrival within the Cooperation Program Czech Republic - Free State of Saxony (GreK), 9 internship of min. 28 days in the PL project „Study and practice!“
****** Of which 47 students – NMSP and Ph.D. studies (including students graduating in 2017), 6 students – internship in the length of at least 28 days.
******* 4x TUL Mobility Fund 2017 (2 short-term mobilities shorter than 5 days), 2 CRP, 1 mobility within IRP FS 12338 (partially covered), 1 other staff member mobility within IRP FS 12338.
******** 1 stay/traineeship in the length of at least 28 days (Czech-Saxony, BauQu), 3 min. 28 days (OP VVV 16005), 2 stays in the length of at least 15 days (7AMB, Joint Czech-Polish Research Projects), 10 credit mobility (BauQu), 2 cr. mobilities within the OP VK (sustainability), 1 cr. mobility (7AMP, Poland), 3 cr. mobilities (EQUINOX), 13 cr. mobilities (GreK), 6 cr. mobilities (Czech-Saxony, Pokrok.digital), 6 cr. mobilities (OP RDE 16003), 3 cr. mobilities (TAČR Delta), 2 other staff member cr. mobilities (Czech-Saxony, BauQu).
********* Arrivals within IRP Fond mobilit 2017, of which 1 stay in the length of at least 28 days, 2 arrivals shorter than 5 days.
********** 2 stay in the length of at least 15 days (7AMB, Polsko), 2 cr. Mobilities (7AMB, Polsko), 17 cr. Mobilities (H2020 EQUINOX), 16 cr. mobilities (GreK).

Tab. 5.4.4 Mobility under Programs, IRP, government scholarships, self–funding students, other sources according to countries in 2017

Country	Number of outgoing students	Number of incoming students	Number of outgoing staff	Number of incoming staff

Republic of Azerbaijan				2 (FOM, shorter than 5 days)
Brazil		2 (IAESTE) + 3 (self-funding, traineeship)		
Bulgaria				1 (Erasmus, in the length=5 days)
China		1 (IAESTE)	3 (other sources)	
Egypt		3 (government scholarship) + 1 (self-funding)		
Philippines		2 (government scholarship)		
Finland	1 (Erasmus)	1 (Erasmus)		
France	2 (Erasmus)	30 (Erasmus)	1 (Erasmus, in the length=5 days) + 1 (other source, cr. mobility)	
Ghana		2 (government scholarship)		
India		1 (IAESTE) + 39 (self-funding, of which 2 traineeship)		
Italy	2 (FOM, shorter than 28 days)		1 (FOM)	
Israel			1 (other source, cr. mobility)	
Japan				
Canada	1 (IRP 12338)		1 (Erasmus KA107, stay longer than 5 days) + 1 (IRP 12338, other staff member)	
Kosovo		1 (government scholarship)		
Lebanon		1 government scholarship		
Lithuania	1 (Erasmus)	7 (Erasmus)		
Hungary		1 (Erasmus)		
Malaysia			1 (CRP)	
Malta			1 (FOM, in the length=5 days)	
Myanmar		1 (government scholarship)		
Germany	4 (Erasmus) + 1 (other sources, long-term mobility) + 49 (other sources, cr. mobilities)	1 (Erasmus) + 2 (FOM, shorter than 28 days) + 2 (self-funding) + 18 (other sources, cr. mobilities)	2 (Erasmus, in the length=5 days) + 1 (FOM, in the length=5 days) + 3 (other sources, long-term stay) + 39 (other sources, cr. mobilities, of which 2 other staff member)	1 (FOM, in the length = 5 days) + 2 (Erasmus, shorter than 5 days) + 33 (other sources, cr. mobilities)

Poland	4 (Erasmus)	9 (Erasmus) + 3 (CEEPUS) + 1 (IAESTE) + 4 (self-funding, of which 1 traineeship) + 9 (other sources, long-term traineeship)	2 (Erasmus, in the length=5 days) + 1 (FOM, shorter than 5 days) + 3 (other sources, long-term stay) + 1 (other sources, cr. mobility)	5 (Erasmus, in the length of 5 and more days) + 2 (CEEPUS) + 1 (FOM) + 2 (other sources, in the length of 15 days) + 2 (other sources, cr. arrival)
Portugal	1 (Erasmus)	23 (Erasmus)	1 (Erasmus, in the length=5 days)	
Romania		1 (Erasmus)		
Greece		2 (Erasmus)		
Slovakia	2 (Erasmus) + 2 (other sources, cr. mobilities)	1 (Erasmus)		5 (Erasmus, 4 arrivals shorter than 5 days)
Slovenia				1 (CEEPUS, in the length=5 days)
United Arab Emirates		1 (IAESTE)		
Syria		1 (government scholarship)		
Spain	1 (Erasmus)	13(Erasmus)		
Switzerland	1 (other sources, cr. mobility)			
Taiwan		1 (government scholarship) + 3 (other sources, semester studies)		
Thailand	1 (FOM)	1 (self-funding)		
Turkey		39 (Erasmus) + 1 (IAESTE)	1 (Erasmus, shorter than 5 days)	3 (Erasmus, of which 1 stay shorter than 5 days)
USA			1 (IRP 12338 partially covered) + 1 (other sources)	
Uzbekistan		1 (self-funding)		
Great Britain			1 (CRP)	
Vietnam		2 (self-funding)		

Note.: Including Student mobilities started in previous year and stays shorter than 4 weeks (28 days) as well as mobilities of academic/other staff shorter than 5 days.

Tab. 5.4.5 Development of international mobility and other activities

Activity	Number of outgoing and incoming mobilities								
	2011	2012	2013	2014	2015	2016	2017		
	Total	Total	Total	Total	Total	Total	P	OA	C
Outgoing students	91	56	68	111	94	106	73*	25	98
Incoming students	54	52	78	98	134	204	235**	3	238

Outgoing academic/other staff	95	108	137	117	135	107	70***	67	137
Incoming academic/other staff	229	31	50	51	52	58	60****	79	139
Total	**469**	**247**	**333**	**377**	**415**	**475**	**438**	**174**	**612**

C – Total; OA – other activities (Tab. 5.4.2).

P – within programs: (Tab.5.4.1., 5.4.3)
* of which 4 outgoing – IRP and 53 outgoing – other sources,
** of which 12 government scholarships, 2 IRP, 53 incoming – self-funding and 30 incoming – other sources,
*** of which 6 IRP, 2 CRP, 524 other sources,
**** of which 4 IRP, 37 other sources.

6.4 Expert Activity

Tab. 6.4.1 Expert Activity

Year	Number of reviews	Service (ths. CZK)
2012	0	0
2013	2	undifferentiated
2014	4	26,40
2015	3	259,98
2016	4	42,68
2017	0	0

Tab. 6.4.2 Authorized emission measurement

Year	2012	2013	2014	2015	2016	2017
Service (ths. CZK)	112,33	110,00	64,41	23,00	16,00	24,00

Tab. 6.4.3 Experts from the application sphere involved in teaching and practice in accredited study programmes of FS TUL in 2017

Department	Persons in labour-law relationship with the university or its unit			Persons without labour-law relationship with the university or its unit		
	Participating in instruction	Supervision of final thesis	Involved in practice	Participating in instruction	Supervision of final thesis	Involved in practice
DAM	4	0	0	1	1	0
DET	1	1	0	0	0	0
DMS	0	0	0	0	0	0
DPE	1	0	0	1	0	0
DMM	0	0	0	0	0	0
DMA	0	0	0	0	0	0
DVE	1	1	1	4	5	1
DGR	1	0	0	0	0	0
DTD	0	0	0	0	0	0
DMA	1	0	0	2	0	0
Total	9	2	1	8	6	1

7.1 Quality and culture of academic

Tab. 7.1.1 Overview of Courses of further education of FME employees in 2018 *

Course characteristics	Number of courses	Number of participants
Oriented towards pedagogical skills	2	13Z + 4S
Courses oriented towards general skills	*	17Z + 13S
Courses oriented to languages **	*	26Z + 6S
Professional courses	*	28Z + 6S

** Courses organized by CDV TUL, language schools, courses organized by departments.
* See the text appendix 7.1 for specifications

7.3 Development and Investment Projects financed by MEYS

Tab. 7.3.1 Institutional Development Plan for 2017 – partial projects run by FS TUL

Int. No.	Project title FS TUL Researcher / Workplace	Allocated funds (ths. CZK)		
		NIV	INV	Total
12318	Promotion and presentation of FS TUL RNDr. Iveta Lukášová / DFME	100	0	100
12319	Innovation of the computer lab Ing. Petr Keller, Ph.D. / DMA	5	380	385
12336	Creation of study texts (in digital form) in English for international students Ing. Ivo Matoušek, Ph.D.	100	0	100
12338	TUL as an important partner in the international learning space – strengthening existing cooperation with partner universities from Canada and the USA Ing. Marcela Válková / DFME	100	0	100
12343	Innovation of study branch Manufacturing Systems and Processes by implementation of Industry 4.0 principles Assoc. prof. Dr. Ing. František Manlig / DMA	80	0	80
12377	Realization and verification of DPKV by means of controlled propulsion, its parameters, application of the model in education and offer of results to industry in the Czech Republic and abroad Ing. Josef Kaniok, Ph.D. / DTD	50	50	100
12378	Use of UV camera for industrial and medical applications Ing. Vlastimil Hotař / DGR	200	0	200
12379	Energy savings in buildings in practice 2nd year of the three-year cycle / Ing. Petra Dančová, Ph.D. / DPE	100	0	100
Total FS TUL		735	430	1 165

7.4 Projects financed from EU Structural Funds 2014–2020

7.4.1 OP Research, Development and Education

Tab. 7.4.1.1 Involvement in OP RDE projects – FME TUL Beneficiary

Project title Registration number	Subsidy 2017 (in ths. CZK)	Implementation
Development of PhD study programmes of FME TUL CZ.02.2.69/0.0/0.0/16_018/0002718	1 376	2017–2022
Development of Research Infrastructure for PhD Study Programmes at FME TUL CZ.02.1.01/0.0/0.0/16_017/0002650	4 650	2017–2022

Tab. 7.4.1.2 Involvement of FS TUL in university OP RDE projects – TUL Beneficiary

Project title Registration number	Subsidy 2017 (in ths. CZK)	Implementation
Development of TUL human resources for increasing the relevance, quality and access to education in the conditions of Industry 4.0 CZ.02.2.69/0.0/0.0/16_015/0002329		2017–2022

7.4.2 OP Enterprise and Innovation

Project title Registration number	Implementation
Design of methodology for surface integrity evaluation of modified bases Cz.01.1.02/0.0/0.0/16045/0010270	2017
Changing surface properties – reducing the permeability of the protective film with fuel tanks by modifying the surface CZ.01.102/0.0/0.0/16045/00096410	2017
Surface modification of basalt microfibers Cz.01.1.02/0.0/0.0/17_115/0011169	2017–2018

7.4.3 OP Cross-Border Cooperation

Tab. 7.4.3.1 Involvement in Cooperation Program Czech Republic – Free State of Saxony projects

Project title Registration number	Subsidy 2017 (in ths. CZK)	Implementation
Cross-border cooperative teaching of plastics processing technologies Zittau-Liberec 100252772	874	2015–2019
Building partnerships in building technology research to educate scientific followers in the border region – BauQu 100252950	1 126	2016–2019
Practically oriented development of competencies in production technology in regions through cooperation.digital 100281976	1 440	2017–2019

TEXT
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TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

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7.4.3 Projects OP Crossborder Cooperation

2.4 Appointing procedures of Associate Professors and Professors

Professor procedures

Name and surname:	**Assoc. prof. Ing. Karel Fraňa, Ph.D.**
Workplace:	Faculty of Mechanical Engineering TU Liberec, Department of Power Engineering Equipment
Branch:	Machines and Equipment Design
Topic of professor lecture:	Energy saving and energy intensity reduction
Date of initiation of the procedure:	February 19, 2016
Defended in front of SB FS TUL:	October 21, 2016
Defended in front of SB TUL:	November 28, 2016
Appointment day:	June 19, 2017

Name and surname:	**Assoc. prof. Ing. Tomáš Vít, Ph.D.**
Workplace:	Faculty of Mechanical Engineering TU Liberec, Department of Power Engineering Equipment
Branch:	Machines and Equipment Design
Date of initiation of the procedure:	September 20, 2017
Status:	in progress

Associate Professors (Habilition) procedures

Name and surname:	**Ing. Jiří Machuta, Ph.D.**
Workplace:	Faculty of Mechanical Engineering TU Liberec, Department of Engineering Technology
Branch:	Technologies and Materials
Title of habilitation thesis:	Contribution to knowledge about quality of selected foundry mold materials and influence of their parameters on casting quality
Topic of habilitation lecture:	Simulation programs designed for solidification and cooling of castings
Date of initiation of the procedure:	March 21, 2016
Defended in front of SB TUL:	November 30, 2016
Appointment day:	February 1, 2017

Name and surname:	**Ing. Páv, Ph.D.**
Workplace:	ŠKODA AUTO a.s. Mladá Boleslav, Faculty of Mechanical Engineering TU Liberec, Department of Vehicles and Engines
Branch:	Machines and Equipment Design
Title of habilitation thesis:	Adaptive model of combustion of a homogeneous mixture in a cylinder of a spark-ignition internal combustion engine
Topic of habilitation lecture:	High pressure indication of a piston internal combustion engine
Date of initiation of the procedure:	February 9, 2016
Defended in front of SB TUL:	November 30, 2016
Appointment day:	February 1, 2017

Name and surname:	**Ing. Štěpánka Dvořáčková, Ph.D.**
Workplace:	Faculty of Mechanical Engineering TU Liberec, Department of Machining and Assembly
Branch:	Technologies and Materials
Title of habilitation thesis:	Contactless system for measuring the length of gauge blocks
Topic of habilitation lecture:	Verification of working gauges in practice
Date of initiation of the procedure:	May 20, 2016
Defended in front of SB TUL:	April 26, 2017
Appointment day:	June 1, 2017

Name and surname:	**RNDr. Věra Vodičková, Ph.D.**
Workplace:	Faculty of Mechanical Engineering TU Liberec, Department of Material Science

Branch:	Technologies and Materials
Title of habilitation thesis:	The problems of the high temperature phase structure and mechanical properties of aluminide-based Fe3Al FeAl and in the presence of additives
Topic of habilitation lecture:	Structural analysis of metallic materials, current methods and possibilities
Date of initiation of the procedure:	October 5, 2016
Defended in front of SB TUL:	April 26, 2017
Appointment day:	June 1, 2017

Name and surname:	**Ing. Petr Jirásko, Ph.D.**
Workplace:	VÚTS, a.s.
Branch:	Applied Mechanics
Title of habilitation thesis:	Mechatronics of drives of working members of mechanisms (monograph)
Topic of habilitation lecture:	Methodology of application of mechatronic systems in drives of working members of production machine mechanisms
Date of initiation of the procedure:	November 25, 2016
Defended in front of SB TUL:	November 15, 2017
Appointment day:	December 1, 2017

Name and surname:	**Ing. Petr Lepšík, Ph.D.**
Workplace:	Faculty of Mechanical Engineering TU Liberec, Department of the Design of Machine Elements and Mechanism
Branch:	Machines and Equipment Design
Title of habilitation thesis:	Tools of systematic creativity to increase efficiency of machines and equipment
Topic of habilitation lecture:	Innovation of technical systems by means of functional analysis
Date of initiation of the procedure:	November 25, 2016
Status:	in progress

3.4 List of Doctoral Graduates in 2017

Name and surname:	**Ing. Josef Horáček**
Study Branch:	2303V002 Engineering Technology
Specialization:	Foundry works
Supervising Workplace:	Department of Engineering Technology
Supervisor:	prof. Ing. Iva Nová, CSc.
Dissertation topic:	Numerical Simulation Calculations in Foundry Process and Materials
Date of defense:	February 22, 2017

Name and surname:	**Ing. Radek Holubec**
Studijní Branch:	2302V010 Machines and Equipment
Specialization:	Reciprocating internal combustion engines
Supervising Workplace:	Department of Vehicles and Engines
Supervisor:	Assoc. prof. Ing. Josef Laurin, CSc.
Dissertation topic:	Development of Apparatus for Determination of Derived Cetane Number of Fuels
Date of defense:	March 1, 2017

Name and surname:	**Ing. Peter Burik**
Study branch:	3911V011 Materials Engineering
Supervising Workplace:	Department of Material Science
Supervisor:	prof. Ing. Ladislav Pešek, CSc
Dissertation topic:	Modeling of global mechanical properties based on the experimental determination of local mechanical properties
Date of defense:	March 14, 2017

Name and surname:	**Ing. Jan Vavruška**
Study branch:	2301V031 Manufacturing Systems and Processes

Specialization :	Automatizace technické přípravy strojírenské výroby
Supervising Workplace:	Department of Manufacturing Systems and Automation
Supervisor:	Assoc. prof. Dr. Ing. František Manlig
Dissertation topic:	Strategies of Assigning Workers on Production Lines
Date of defense:	March 23, 2017

Name and surname:	**Ing. Petr Švarc**
Study branch:	3901V003 Applied Mechanics
Specialization :	Mechanika tekutin a termodynamika
Supervising Workplace:	Department of Power Engineering Equipment
Supervisor:	Assoc. prof. Ing. Václav Dvořák, Ph.D.
Dissertation topic:	Thermodynamic Processes in Water Thermal Energy Storages
Date of defense:	April 21, 2017

Name and surname:	**Ing. Monika Bělková**
Study branch:	2303V002 Engineering Technology
Specialization :	Metal forming
Supervising Workplace:	Department of Engineering Technology
Supervisor:	Assoc. prof. Ing. Pavel Solfronk, Ph.D.
Dissertation topic:	Magnesium Sheets Characteristics and Deformation Development in the Limit States Zone
Date of defense:	April 27, 2017

Name and surname:	**Ing. Tomáš Jíra**
Study branch:	2303V002 Engineering Technology
Specialization :	Metal forming
Supervising Workplace:	Department of Engineering Technology
Supervisor:	Assoc. prof. Ing. Pavel Solfronk, Ph.D.
Dissertation topic:	The Influence of Materials for the Size of Critical Deformations
Date of defense:	April 27, 2017

Name and surname:	**Ing. Martin Pechout**
Study branch:	2302V010 Machines and Equipment
Specialization:	Reciprocating internal combustion engines
Supervising Workplace:	Department of Vehicles and Engines
Supervisor:	Assoc. prof. Ing. Josef Laurin, CSc.
Dissertation topic:	Spark ignition engines in case of biobutanol fuels operation
Date of defense:	April 27, 2017

Name and surname:	**Ing. Vít Poucha**
Study branch:	2302V010 Machines and Equipment
Specialization:	Reciprocating internal combustion engines
Supervising Workplace:	Department of Vehicles and Engines
Supervisor:	Assoc. prof. Ing. Lubomír Moc, CSc.
Dissertation topic:	Flow analysis of two-stroke combustion engines
Date of defense:	May 25, 2017

Name and surname:	**Ing. Jiří Pacák**
Study branch:	2303V002 Engineering Technology
Specialization :	Welding
Supervising Workplace:	Department of Engineering Technology
Supervisor:	Assoc. prof. Ing. Heinz Neumann, CSc.
Dissertation topic:	Ensuring the quality of resistance point welds based on the analysis of selected quantities of a welding process and their variation in time
Date of defense:	May 25, 2017

Name and surname:	**Ing. Ondřej Kohl**
Study branch:	2302V010 Machines and Equipment
Specialization :	Machine Elements and Mechanisms
Supervising Workplace:	Department of the Design of Machine Elements and Mechanism

Supervisor:	prof. Ing. Lubomír Pešík, CSc.
Dissertation topic:	Air Damping of Driver's Seat
Date of defense:	June 29, 2017

Name and surname:	**Ing. Roman Licek**
Study branch:	2303V002 Engineering Technology
Specialization :	Machining and assembly
Supervising Workplace:	Department of Machining and Assembly
Supervisor:	prof. Ing. Alexey Popov, DrSc.
Dissertation topic:	Determination of principles of optimum process fluids application for machining
Date of defense:	November 30, 2017

Name and surname:	**Ing. Miloslav Ledvina**
Study branch:	2303V002 Engineering Technology
Specialization :	Machining and assembly
Supervising Workplace:	Department of Machining and Assembly
Supervisor:	prof. Ing. Nikolaj Ganev, CSc.
Dissertation topic:	Research of the progressive cooling methods influence at chosen machining technologies
Date of defense:	November 30, 2017

4.3 Competence Centre

Josef Božek Automotive Industry Competence Centre
Innovations in the design of vehicles and powertrains with internal combustion engines and electric motors to reduce fossil fuel consumption and emissions, maximize safety, comfort and driving pleasure, align with regulatory requirements and interact with infrastructure and other vehicles, and compete in emerging markets. Dual order of innovations being developed for immediately applicable output or basis for subsequent development. Use of knowledge database as an integrating element of complex topic and wide team.

Provider:	TA CR
Program:	TE Centres of Competence (2012–2019)
Project identification code:	TE01020020
Beneficiary:	CTU Prague
Other project participants:	Technical University of Liberec, CxI VSB-TU Ostrava Brno University of Technology
Companies:	Škoda Auto a.s.; Honeywell, spol. s r.o.; ČZ a.s.; Ricardo Prague s.r.o.; AICTA Design Work, s.r.o.; MOTORPAL, a.s.; BRANO a.s.; TATRA, a.s.; TÜV SÜD Czech s.r.o.
Solution period:	2012–2017
Guarantor for TUL:	prof. Ing. Celestýn Scholz, Ph.D., Department of Vehicles and Engines
Internal number TUL:	17880
Subsidy CNATI 2017:	total / INV /NIV – 1 374 000 / 0 / 1 374 000 CZK

4.4 Science–Research Projects

TA CR – ALFA

Development of a CFD code for the design of desulphurizing equipment

Provider:	TA CR
Program:	ALFA (2011–2016)
Project identification code:	TA04021338
Beneficiary:	DIZ Bohemia s.r.o.
Co-beneficiary:	TUL, Faculty of Mechanical Engineering
Researcher co-beneficiary:	Assoc. prof. Ing. Tomáš Vít, Ph.D., Department of Power Engineering Equipment

Internal number TUL: 17855
Solution period: 2014–2017
Subsidy FME 2017: total / INV / NIV – 1 285 000 / 0 / 1 285 000 CZK

TA CR – EPSILON

Development of advanced technology of felt hats making

Provider: TA CR
Program: EPSILON
Project identification code: TH 01010690
Beneficiary: Tonak, a.s.
Co-beneficiary: TUL, Faculty of Mechanical Engineering
Researcher co-beneficiary: prof. Ing. Jaroslav Beran, CSc., Department of Textile Machine Design
Solution period: 2015–2017
Internal number TUL: 17009
Subsidy FME 2017: total / INV / NIV – 1 604 802 / 0 / 1 604 802 CZK

Product development of AlSi5Mg alloy for the automnotive industry

Provider: TA CR
Program: EPSILON
Project identification code: TH02020799
Beneficiary: TOP ALULIT s.r.o.
Co-beneficiary: TUL, Faculty of Mechanical Engineering
Researcher co-beneficiary: Assoc. prof. Ing. Jiří Machuta, Ph.D., Department of Engineering Technology
Solution period: 2016–2019
Internal number TUL: 17025
Subsidy in 2017 total: total / INV / NIV – 2 843 943 / 0 / 2 843 943 CZK
Of which FME: total / INV / NIV – 1 165 156 / 0 / 1 165 156 CZK
ET: total / INV / NIV – 1 062 980 / 0 / 1 062 980 CZK
CNATI: total / INV / NIV – 102 176 / 0 / 102 176 CZK
Of which other co-beneficiaries: total / INV / NIV – 1 678 787 / 0 / 1 678 787 CZK

MIT CR – TRIO

Welding numerical simulation including fatigue prediction of welded construction in ground transportation, steel constructions and energy industrial section – high and low fatigue, thermal fatigue and hot tearing

Provider: MIT CR
Program: TRIO – 1st Call
Project identification code: FV10709
Beneficiary: MECAS ESI s.r.o.
Co-beneficiary: TUL, Faculty of Mechanical Engineering
Researcher beneficiary: Assoc. prof. Ing. Jaromír Moravec, Department of Engineering Technology
Internal number TUL: 17772
Solution period: 2016–2018
Subsidy in 2017 total: total / INV / NIV – 2 644 000 / 0 / 2 644 000 CZK
Of which FME/DET: total / INV / NIV – 1 240 000 / 0 / 1 240 000 CZK
Of which other co-beneficiaries: total / INV / NIV – 1 404 000 / 0 / 1 404 000 CZK

Low-temperature reparations of the turbines creep resistance casted components

Provider: MIT CR
Program: TRIO – 1st Call
Project identification code: FV10510
Beneficiary: Siemens s.r.o.
Co-beneficiary: TUL, Faculty of Mechanical Engineering
Researcher beneficiary: Assoc. prof. Ing. Jaromír Moravec, Ph.D., Department of Engineering Technology

Internal number TUL: 17773
Solution period: 2016–2017
Subsidy in 2017 total: total / INV / NIV – 2 592 800 / 0 / 2 592 800 CZK
Of which FME/DET: total / INV / NIV – 1 070 000 / 0 / 1 070 000 CZK
Of which other co-beneficiaries: total / INV / NIV – 1 522 800 / 0 / 1 522 800 CZK

Highly efficient air-jet weaving machine for production of leno fabrics
Provider: MIT CR
Program: TRIO – 1st Call
Project identification code: FV10215
Beneficiary: VÚTS a.s.
Co-beneficiary: TUL, Faculty of Mechanical Engineering
Researcher beneficiary: Assoc. prof. Ing. Iva Petríková, Ph.D., Department of Applied Mechanics
Internal number TUL: 17762
Solution period: 2016–2019
Subsidy FME 2017: total / INV / NIV – 1 000 000 / 0 / 1 000 000 CZK

Development of effective fulling technology in the hat production
Provider: MIT CR
Program: TRIO – 1st Call
Project identification code: FV10467
Beneficiary: TONAK a.s.
Co-beneficiary: TUL, Faculty of Mechanical Engineering
Researcher beneficiary: prof. Ing. Jaroslav Beran, CSc., Department of Textile Machine Design
Internal number TUL: 17776
Solution period: 2016–2019
Subsidy FME 2017: total / INV / NIV – 1 433 000 / 0 / 1 433 000 CZK

Modular range of machine tool holders
Provider: MIT CR
Program: TRIO – 2nd Call
Project identification code: FV20241
Beneficiary: VÚTS a.s.
Co-beneficiary: TUL, Faculty of Mechanical Engineering
Researcher beneficiary: Assoc. prof. Ing. David Cirkl, Ph.D. Department of Applied Mechanics
Internal number TUL: 17782
Solution period: 2017–2019
Subsidy FME 2017: total / INV / NIV – 700 000 / 0 / 700 000 CZK

Special transformation mechanisms in drives with electronic cams
Provider: MIT CR
Program: TRIO – 2nd Call
Project identification code: FV20547
Beneficiary: VÚTS a.s.
Co-beneficiary: TUL, Faculty of Mechanical Engineering
Researcher beneficiary: prof. Ing. Petr Louda, CSc., Department of Material Science
Internal number TUL: 17778
Solution period: 2017–2020
Subsidy FME 2017: total / INV / NIV – 815 000 / 0 / 815 000 CZK

MoI CR

Applied research in the field of next generation personal protective equipment For IRS needs
Provider: MoI CR
Program: Security Research Program
Project identification code: VI20172020052

Beneficiary:	TUL, Faculty of Mechanical Engineering
Co-beneficiary:	Clean air s.r.o.
Researcher beneficiary:	Ing. Martin Seidl, Ph.D., Department of Engineering Technology
Internal number TUL:	16298
Solution period:	2017–2020
Subsidy total in 2017:	total / INV / NIV – 12 660 000 / 7 100 000 / 5 560 000 CZK
Of which:	
Subsidy co-researchers:	total / INV / NIV – 741 000 / 0 / 741 000 CZK
Subsidy total in 2017:	total / INV / NIV – 11 919 000 / 7 100 000 / 4 819 000 CZK
Of which:	
Subsidy DET 2017:	total / INV / NIV – 2 738 467 / 0 / 2 738 467 CZK
Subsidy DMA 2017:	total / INV / NIV – 641 849 / 0 / 641 849 CZK
Subsidy DPE 2017:	total / INV / NIV – 375 587 / 0 / 375 587 CZK
Subsidy FMII 2017:	total / INV / NIV – 233 440 / 0 / 233 440 CZK
Subsidy CNATI 2017:	total / INV / NIV – 7 929 657 / 7 100 000 / 829 657 CZK

GA CR – GA

Optimization of pulsatile jet actuation in fluid mechanics

Provider:	GA CR
Project:	GA – standard projects
Project identification code:	GA16-16596S
Beneficiary:	Institute of Thermomechanics of the CAS, v. v. i.
Other participant:	Technical University of Liberec
Researcher for TUL:	Assoc. prof. Ing. Tomáš Vít, Ph.D., Department of Power Engineering Equipment
Internal number TUL:	17277
Solution period:	2016–2018
Subsidy FME 2017:	total / INV / NIV – 951 000 / 0 / 951 000 CZK

R&D projects solved under CNATI and other TUL units

Academic staff of Faculty of Mechanical Engineering are researchers, co-researchers or participate in project research.

NP – MEYS CR see 4.7

OP RDI – Commercialization of results see 7.4.3

TA CR – Centres of competence see 4.3

TA CR – ALFA

Research of utility properties and application possibilities of lightweight polymer composites for body building

Provider:	TA CR
Program:	ALFA (2011-2016)
Project identification code:	TA04011009
Beneficiary:	TUL, CxI
Co-beneficiary:	Magna Exteriors s.r.o.
Researcher beneficiary:	prof. Dr. Ing. Petr Lenfeld, Department of Engineering Technology
Internal number TUL:	14141
Solution period:	2014–2017
Subsidy total 2017:	total / INV / NIV – 3 178 998 / 0 / 3 178 998 CZK
Of which CNATI:	total / INV / NIV – 538 800 / 0 / 538 800 CZK
FME/DET:	total / INV / NIV – 2 155 198 / 0 / 2 155 198 CZK
Co-researchers:	total / INV / NIV – 485 000 / 0 / 485 000 CZK

TA CR – EPSILON

Increasing the efficiency of machines and equipment by reducing friction losses of the machine and its components

Provider:	TA CR
Program:	TE Epsilon – 1st public tender
Project identification code:	TH01021093
Beneficiary:	VÚHŽ a.s., Dobrá
Other project participants:	TUL, CxI
Solution period:	2015–2017
Guarantor for TUL:	Ing. Robert Voženílek, Ph.D.
Internal number TUL:	17007
Subsidy CNATI 2017:	total / INV /NIV – 1 385 000 / 0 / 1 385 000 CZK

New technology of matting and prototype of machinery for glass surface treatment

Provider:	TAČR
Program:	EPSILON
Project identification code:	TH01031152
Beneficiary:	Sklopan Liberec
Co-beneficiary:	TUL, CxI
Researcher co-beneficiary:	Assoc. prof. Ing. František Novotný, CSc.
Solution period:	2015–2017
Internal number TUL:	17008
Subsidy CxI 2017:	total / INV / NIV – 4 001 758 / 0 / 4 001 758 CZK
Of which KSR 15 %:	total / INV / NIV – 600 000 / 0 / 600 000 CZK

TA CR – DELTA

Technology development and production of one-piece GFRP blades for wind power plants

Provider:	TA ČR
Program:	DELTA (2015-2025)
Project identification code:	TH01020796
Beneficiary:	LENAM, s r. o.
Co-beneficiary:	TUL, CxI
Researcher co-beneficiary:	Assoc. prof. Ing. Michal Petrů, Ph.D.
Solution period of project:	2014–2019
Internal number TUL:	17013
Subsidy CNATI 2017:	1 514 000 CZK
Of which DMM 20 %:	total / INV / NIV – 302 800 / 0 / 302 800 CZK

Development of technical means for rapid assortment change on the machine for preparation of production of industrial sorting screens

Provider:	TA CR
Program:	EPSILON
Project identification code:	TH02010964
Beneficiary:	TUL, CNATI
Researcher responsible:	Assoc. prof. Dr. Ing. Ivan Mašín a Assoc. prof. Ing. Michal Petrů, Ph.D.
Solution period of project:	2017–2019
Internal number TUL:	11018
Subsidy CNATI 2017:	884 400 CZK
Non-public sources 2017:	100 000 CZK
Of which DMM 20 %:	176 880 CZK

Functional development of bi-system liquid filter for process water recycling using modern modelling methods

Provider:	TA CR
Program:	EPSILON
Project identification code:	TH02020949
Beneficiary:	TUL, CxI

Researcher responsible: Assoc. prof. Ing. Michal Petrů, Ph.D.
Solution period of project: 2017–2019
Internal number TUL: 117019
Subsidy CNATI 2017: 1 368 224 CZK
Non-public sources 2017: 100 000 CZK
Of which DMM 15 %: 205 233 CZK

MoI CR – Security research program CR

Application of geopolymer composites as a fire barrier (AGK)
Provider: MoI CR
Program: Security research program CR 2015-2020 (BV III/1-VS)
Project identification code: VI 20172019055
Beneficiary: TUL, CNATI
Researcher beneficiary: prof. Ing. Petr Louda, CSc.
Solution period of project: 2017–2020
Internal number TUL: 16299
Subsidy CNATI 2017: total / INV / NIV – 3 267 000 / 0 / 3 267 000
Of which DMS 40 %: total / INV / NIV – 1 252 308 / 0 / 1 252 308

Development of flood protection systems to increase population and infrastructure protection
Provider: MoI CR
Program: Security research program CR 2015-2020 (BV III/1-VS)
Project identification code: VI20152018046
Beneficiary: JaP – Jacina, s.r.o.
Co-beneficiary: TUL, CNATI
Researcher co-beneficiary: Ing. Michal Petrů, Ph.D.
Solution period of project: 2015–2018
Internal number TUL: 17302
Subsidy CNATI 2017: 3 399 000 CZK

Use of modern modeling methods in the development and testing of fire closures
Provider: MoI CR
Program: Security research program CR 2015-2020 (BV III/1-VS)
Project identification code: VI20152018046
Beneficiary: JaP – Jacina, s.r.o.
Co-beneficiary: TUL, CNATI
Researcher co-beneficiary: Ing. Tomáš Martinec, Ph.D.
Solution period of project: 2015–2018
Internal number TUL: 17301
Subsidy CxI 2017: 1 962 000 CZK
Of which KST 20 %: total / INV / NIV – 392 400 / 0 / 392 400 CZK

4.7 Institute for Nanomaterials, Advanced Technologies and Innovation

Development of the Institute for Nanomaterials, Advanced Technologies and Innovation (CxI++)
The main objective of the project is to support the use of the newly built research infrastructure (see above) of the university workplace CNATI, a new building, acquired high-end instruments and equipment and research teams. The implementation of the submitted CxI++ project will significantly contribute to the efficiency of utilization of this infrastructure, its stability, long-term sustainability and its further systematically managed development while maintaining the set structure of the professional profile of the university workplace. The project deals with seven research topics, which are solved by academic staff of the Faculty of Mechanical Engineering.
Provider of subsidy: MEYS
Program of support: NPU
Beneficiary: Technical University of Liberec, CxI
Registration Number**:** LO1201
Subsidy total for project: 175 711 ths. CZK
Implementation period: 2014–2018
Internal number TUL: 16001

4.9 Commercialization of R&D Results and Outputs

PROSYKO – Proactive system of commercialization at TU in Liberec

Provider:	TA ČR
Program:	GAMA, Sub-program 1
Project type:	„Proof of concept stage“
Project identification code:	TG01010117
Beneficiary:	TUL, CxI
Researcher responsible:	Ing. Stanislav Petrík, Ph.D.
Solution period of project:	2014–2018
Internal number TUL:	17862
Partial project solved by FME:	**High-speed yarn winding system for spinning machines**
Int. of partial project:	14157
Solution period::	2015–2017
Subsidy FME 2017:	360 960 CZK
Researcher:	Ing. Jan Valtera, Ph.D., Department of Textile Machine Design
Partial project solved by FME:	**Ecological technology of combing for surface treatment of felt structures**
Int. number of partial project:	14163
Solution period:	2017–2019
Subsidy FME 2017:	609 203 CZK
Researcher:	Ing. Šimon Kovář, Ph.D., Department of Textile Machine Design
Partial project solved by FME:	**Orthopedic mattress with variable stiffness**
Int. number of partial project:	14162
Solution period:	2017–2018
Subsidy FME 2017:	316 134 CZK
Researcher:	Ing. Radek Votrubec, Ph.D., Department of Manufacturing Systems and Automation

5.2 International Cooperation in Education

TUL as an important partner in the international educational space – continuation and deepening of existing cooperation with partner universities from Canada or the USA

Provider:	MEYS
Program:	Institutional Development Plan TUL (IP TUL)
Researcher:	TUL, Faculty of Mechanical Engineering
Internal number TUL:	123388
Subsidy FS 2017:	100 000 CZK

Project Objective:
The objective of the project was to carry out motivational study stays of selected students of FME at partner from Canada or the USA. The long-term goal is to maintain and further develop contacts and activities with these universities.

5.3 International Projects

EQUINOX – A novel process for manufacturing complex shaped Fe-Al intermetallic parts resistant to extreme environments

Provider:	EU – European Regional Development Fund
Program:	H2020 – H2020-SC-2015-one-stage
Project identification code:	689 510
Lead partner:	National Technical University of Athens, School of Chemical Engineering
Participant:	TUL, Faculty of Mechanical Engineering
Researcher:	Ing. Pavel Hanus, Ph.D., Department of Material Science
Internal number TUL:	DZG93/2210
Period:	2016–2019

Total subsidy:	total / INV / NIV – 4 061 810 / 0 / 4 061 810 CZK (advance payment for 18 months of solution period)
Subsidy in 2017:	total / INV / NIV – 0 / 0 / 0 CZK (project financed from subsidy provided in 2016 for 18 months of project solution)
Subsidy 2017/FS:	total / INV / NIV – 2 821 908 / 0 / 2 821 908 CZK
Subsidy 2017/KSP:	total / INV / NIV – 1 020 251 / 0 / 1 020 251 CZK
Subsidy 2017/KMT:	total / INV / NIV – 1 801 657 / 0 / 1 801 657 CZK
Subsidy of other co-beneficiary:	total / INV / NIV – xxx / 0 / xxx CZK (unknown information)

Joint research of supersonic ejectors

Provider:	MEYS
Program:	7AMB, Joint Czech-Polish Research Projects
Project identification code:	7AMB16PL011
Partner organization:	Politechnika Bialostocka, Polsko,
Beneficiary:	TUL, Faculty of Mechanical Engineering
Researcher:	Assoc. prof. Ing. Václav Dvořák, Ph.D., Department of Power Engineering Equipment
Internal number TUL:	18001
Period:	2016–2017
Subsidy 2017 FS:	64 000 CZK

Development projects – see below 7.4.4 OP Cross-border cooperation

5.4 International mobility

The new European Union Education Program 2014–2020 Erasmus+ promotes cooperation and mobility in all fields of education, training and sport and youth.

Inter-institutional agreements valid in 2017 under ERASMUS+:

- Universiteit Gent (Belgie)
- Technical University of Sofia (BG)
- Technical University of Sofia – Plovdiv (BG)
- Technical University of Gabrovo (BG)
- Aalto University of Technology TKK (FI)
- Université de Bourgogne – Dijon(FR)
- University of Angers (FR)
- INSA Rennes (FR)
- Université de Franche-Comté Besançon (FR)
- Université de Technologie de Belfort-Montbéliard (FR)
- Ecole Nationale Mines d´Ales (FR)
- Universite de Savoie (FR)
- Groupe ESAIP (FR)
- Université de Haute Alsace (FR)
- BTU Cottbus-Senftenberg (DE)
- Technische Universität Dresden (DE)
- The University of Applied Sciences Emden/Leer (DE)
- Hochschule Hof (DE)
- WestsächsischeHochschule Zwickau (DE)
- Technische Universität Darmstadt (DE)
- Chemnitz University of Technology (DE)
- RWTH Aachen University (DE)
- Hochschule Zittau/Görlitz (DE)
- Hochschule Albstadt-Sigmaringen (DE)
- Budapest University of Technology and Economics (HU)
- Aleksandre Stulginskis University (LT)
- Vilnius College of Technologies and Design (LT)
- Koszalin University of Technology (PL)
- Technical University of Lodz (PL)

- Wroclaw University of Technology (PL)
- Universidade de Coimbra (PT)
- Universidade do Porto (PT)
- Universidade do Minho (PT)
- Universidade da Beira Interior (PT)
- University POLiTECHNICA of Bucharest (RO)
- University of Zilina (SK)
- Technical University of Košice (SK)
- Universita Alexandra Dubčeka Trenčín (SK)
- Universidad Politécnica de Valencia (ES)
- Universidade de Oviedo Gijón (ES)
- Universidad del Pais Vasco, Bilbao (ES)
- Erciyes University (TR)
- Osmaniye Korkut Ata University (TR)
- Karadeniz Technical University (TR)
- Cukurova Universitesi (TR)
- Trakia University – Stara Zagora (BG)
- Trakya Universitesi (TR)
- Istanbul University (TR)
- USAK University (TR)
- Dogus University (TR)
- Bursa Teknik Üniversitesi (TR)
- Hacettepe University (TR)
- Karabuk University (TR)
- Cumhuriyet University (TR)

New inter-institutional agreements concluded in 2017 for cooperation in the area of exchanges of students, academic staff and in the field of science and research:

- University of Bielsko-Biala (PL) – Erasmus+
- TU Zvolen (SK) – Erasmus+
- UTP University of Science and Technology in Bydgoszcz (PL) – Erasmus+
- Universite de Valenciennes et du Hainaut-Cambresis (FR) – Erasmus+
- Poznan University of Technolgy (PL) – Erasmus+
- Firat University (TR) – Erasmus+
- National Research University „Moscow Power Engineering Institute“ – Russia

Valid for bilateral agreements cooperation in areas of mutual exchanges of students, academic staff and research and development in 2017 as part of transatlantic cooperation:

- University of Waterloo (CAN)
- Conestoga College Institute of Technology and Advance Learning, Ontario (CAN)
- Nha Trang University (Vietnam)
- Diponegoro University (Indonesia)
- PUC do Rio de Janeiro (Brazil)
- Kazakh – British Technical University (Kazakhstan)
- King Mongkuts´s University of Technology North Bangkok (Thailand)
- Apollo Engineering College (India)
- Azerbaijan Technical University (Azerbaijan)

Other valid inter-institutional agreements Faculty of Mechanical Engineering are listed in Tab. 5.4.2.

Negotiations started on concluding further bilateral agreements in the area of mutual exchange of students, academic staff and science and research with universities:

- Kielce University of Technology – Erasmus+
- Karelia University of Applied Sciences (FI) – Erasmus+

7.1 Quality and Culture of Academic Life

- **Two-year university education courses, completed with the ING-PAED IGIP degrees and an international certificate of completion of the Branchy technical education course.**
  The Centre of Continuing Education of TUL organizes and offers as standard. In 2017, the following academic staff of FS TUL completed the second year (examinations in January 2018):
  Ing. Šimon Kovář, Ph.D.
  Ing. Rudolf Martonka, Ph.D.
  Ing. Ladislav Perk
  Ing. Marie Stará, Ph.D.
  Ing. Miroslav Vavroušek
  Ing. Radek Votrubec, Ph.D.
  Ing. Petr Žabka, Ph.D.

- **Academic writing in English**
  The British Council's English language specialists led a 2-day course at TUL. On behalf of the Faculty of Mechanical Engineering, academic staff and PhD students participated: Ing. Petr Žabka, Ph.D. Jan Valtera, Ph.D. Aleš Dittrich, Ing. Jan Kracik, Ing. Jan Novosad, Ing. Nguyen Van Vu.

- **Classroom communication/Presentations**
  The British Council's English language specialists led a 2-day course at TUL. On behalf of the Faculty of Mechanical Engineering, PhD students participated: Ing. Jan Kracík, Ing. Jan Novosad, Ing. Tomáš Kořínek, Ing. Tomáš Tisovský, Ing. Nguyen Van Vu.

- Language courses – English prevails.
- Webinar – Industry 4.0; Crisis communication; How to write and manage a project; OSH training PO
- First aid course.
- Professional training courses – Basic work with Ardulin; Seminar Metacentrum; Control Techniques training; Ansys; Summer School of Composite Materials in Jince; Comsol Multiphysics; MAR 101-Basic Nonlinear MSC.SW; SW Geomagic Design X; Probabilistic Graphical Models; Matlab; Lab View Training seminary; Hands-on-seminar Meta Centra; SW Magma 5; MAGMA Core + Mould.

Courses organized within the framework of the university project OP RDE – RoLiZ
Course title / lecturer: FME TUL participants

- Speech Technique / MgA. Zuzana Bubeníčková: Horčičková Z., Kovář Š., Lenfeld P., Stará M., Vavroušek M., Votrubec R., Žabka P.
- Rhetoric / MgA. Zuzana Bubenickova: Horcickova Z., Smith Black, Machuta J., Stara M., Vavrousek M., Votrubec R., Zabka P., Martonka R.
- Introduction to Adult Education / RNDr. Helena Zlámalová, CSc .: Horčičková Z., Kovář Š., Lenfeld P., Stará M., Vavroušek M., Votrubec R., Žabka P.
- Aspects of Intercultural Competences A / PhDr. Jana Jetmarová, Ph.D .: Blacksmith Š., Stará M., Vavroušek M., Votrubec R., Žabka P.
- Aspects of Intercultural Competences B / PhDr. Jana Jetmarová, Ph.D .: Blacksmith Š., Stará M., Vavroušek M., Votrubec R., Žabka P.
- Principles of Social Psychology in Practice / Mgr. Jiří Motl, Ph.D .: Blacksmith Š., Stará M., Vavroušek M., Votrubec R., Žabka P.
- Communication, assertiveness, self-reflection / Mgr. Jiří Motl, Ph.D .: Blacksmith Š., Stará M., Vavroušek M., Votrubec R., Žabka P.
- Introduction to Theory of Education / Assoc. prof. Dr. PaedDr. Petr Urbanek: Martonka R.,
- Working with students' cultural diversity / Mgr. Lucie Hubertova, Ph.D .: Valkova M.
- Didactics / PeadDr. Jitka Jursova, Ph.D .: Vavroušek M.

7.4 Projects financed from EU Structural Funds

7.4.1 OP Research, Development and Education

DspFMETUL – Development of research–oriented study programmes (Call PO2_02_16_018)
The project deals with the development of new doctoral study programmes of FS TUL which meet the requirements for doctoral study of technical direction in accordance with the requirements of the knowledge economy and in accordance with international standards. The study programmes cover the scientific and research areas of machine design and construction, production technology of processes and materials and mechanics.

Beneficiary:	Technical University of Liberec, Faculty of Mechanical Engineering
Provider:	MEYS – EU
Program:	OP RDE
Priority axis:	PO1 – Strengthening capacities for quality research
Investment priority:	1 – Improving the quality and efficiency and access to tertiary and even education, especially for disadvantaged groups, in order to increase participation and level of achieved education
Registration Number:	CZ.02.2.69/0.0/0.0/16_018/0002718
Researcher responsible:	Assoc. prof. Ing. Martin Bílek, Ph.D., DFME
Solution period:	2017–2022
Internal number TUL:	16005
Solution period:	2017–2022
Subsidy total:	3 064 815 CZK
Subsidy FME 2017:	total / INV / NIV – 1 375 908 / 0 / 3 064 815 CZK

ViFME TUL – Research infrastructures for educational purposes – building or upgrading (Call PO2_02_16_017)
The project deals with the development of instrumentation and laboratory equipment for the implementation of three new doctoral study programmes of FS TUL.

Beneficiary:	Technical University of Liberec, Faculty of Mechanical Engineering
Provider:	MEYS– EU
Program:	OP RDE
Priority axis:	PO1 – Strengthening capacities for quality research
Investment axis:	1 – Strengthening research and innovation infrastructure and capacities to develop excellence in research and innovation and support centres of excellence, particularly those of European interest
Registration Number:	CZ.02.1.01/0.0/0.0/16_017/0002650
Researcher responsible:	Assoc. prof. Ing. Martin Bílek, Ph.D., DFME
Solution period:	2017–2022
Internal number TUL:	16006
Subsidy total:	51 966 649 CZK
Subsidy FME 2017:	total / INV / NIV – 4 649 919 / 4 280 234 / 369 685 CZK

7.4.2 OP Entrepreneurship and innovation for competitiveness

Development of systems for bonding various substrates for progressive joining of body module components

Project:	CZ.01.1.2.0.15_019.01263
Program:	OP Entrepreneurship and innovation for competitiveness
Priority axis:	01.1 Development of research and development for innovation
Name of priority axis:	01.1.02 Promoting business investment in research and innovation and creating links and synergies between enterprises, R&D centres and the higher education sector, in particular by promoting investment in product and service development, technology transfer
Main applicant/Beneficiary:	Magna Exteriors (Bohemia) s.r.o.
Contracting partner:	TUL, Faculty of Mechanical Engineering, Department of Engineering Technology
Researchers responsible:	Assoc. prof. Ing. Pavel Solfronk, Ph.D., Ing. Pavel Doubek, Ph.D.
Project start:	November 2016

Status of project 2017: the project has been completed, not being solved

Innovative vouchers of the Liberec Region
2.2 Regional Innovation Program – Innovation Vouchers
Main applicant/Beneficiary: SILROC CZ, a.s.
Contracting partner: TUL, Faculty of Mechanical Engineering, departments DET, DAM
Researchers responsible: Ing. Pavel Brdlík, Ph.D., Assoc. prof. Ing. David Cirkl, Ph.D.
Solution period: 2017-2018
Contract research 2017: not in progress

Proposal of methodology of surface integrity evaluation of modified bases and evaluation of their properties
Project: CZ.01.1.02/0.0/0.0/16_045/0010270
Program: OP Entrepreneurship and innovation for competitiveness
Priority axis: Innovation Vouchers – Call I.
Beneficiary: PARDAM s.r.o.
Contracting partner: TUL, Faculty of Mechanical Engineering, Department of Material Science
Researcher responsible: prof. Ing. Petr Louda, CSc.
Solution period: 2017

Changing the surface properties - reducing the permeability of the fuel tank protective film by modifying the surface
Project: CZ.01.1.02/0.0/0.0/16_045/0009641
Program: OP Entrepreneurship and innovation for competitiveness
Priority axis: Innovation Vouchers – Call I.
Beneficiary: ETK s.r.o.
Contracting partner: TUL, Faculty of Mechanical Engineering, Department of Material Science
Researcher responsible: prof. Ing. Petr Louda, CSc.
Solution period: 2017

Changing the surface properties – reducing the permeability of the fuel tank protective film by modifying the surface
Project:
Program: OP Entrepreneurship and innovation for competitiveness
Priority axis: Innovation Vouchers – Call I.
Beneficiary: ETK s.r.o.
Contracting partner: TUL, Faculty of Mechanical Engineering, Department of Material Science
Researcher responsible: prof. Ing. Petr Louda, CSc.
Solution period: 2017

Projects submitted and solved by the academic staff of FME under CNATI

Test stand for pre-certification tests of internal combustion engines
Project: CZ.01.1.02/0.0/0.0/15_019/0004815
Program: OP PIK Aplikace
Main applicant/Beneficiary: TES Vsetín s.r.o.
Co-beneficiary: TUL, Faculty of Mechanical Engineering
Co-researcher co-beneficiary: TUL, CxI
Researcher: Ing. Pavel Brabec, Ph.D., Department of Vehicles and Engines
Internal number: 17059 FS, 17058 CNATI
Subsidy FME 2017: total / INV / NIV – 462 254 / 0 / 462 254 CZK
Donation – Beneficiary: 353 440 CZK (accounted in 2018)

Dynamic multi-axis electrohydraulic heat recovery units
Project: CZ.01.1.02/0.0/0.0/15_019/0004853
Program: OP Entrepreneurship and innovation for competitiveness
Main applicant/Beneficiary: OCHI inženýring, s. r.o.
Co-beneficiary: Technical University of Liberec, CNATI

Researcher:	prof. Ing. Petr Louda, CSc.
Internal number TUL:	17053/176
Solution period of project:	2016–2018
Subsidy CNATI:	total / INV / NIV – 1 284 000 / 0 / 1 284 000 CZK
Of which DMS 50 %:	642 000 CZK

7.4.3 OP Crossborder Cooperation

GreK
Cross-border cooperative teaching of plastics processing technology Zittau-Liberec

Program:	Cooperation program Czech Republic – Free State of Saxony 2014–2020
Priority axis:	3 – Investments in education, training and vocational training
Specific objective:	3.2 Improving youth employment
Registration number of project:	100252772
Provider of subsidy:	EU – European Regional Development Fund
Lead partner:	Hochschule Zittau/Görlitz (HSZG)
Project partner:	Technische Universität Dresden (TUD)
Project partner:	TUL, Faculty of Mechanical Engineering
Researcher responsible at TUL:	Ing. Luboš Běhálek, Ph.D., Department of Engineering Technology
Solution period:	2015–2019
Internal number TUL:	15401
Subsidy total:	272 727,40 €
Subsidy FME 2017:	874 077 CZK
Of which DET 2017:	874 077 CZK

BauQu
Building partnerships in the field of building technology research to educate scientific followers in the border region

Program:	Cooperation program Czech Republic – Free State of Saxony 2014–2020
Provider of subsidy:	EU – European Regional Development Fund
Lead partner:	Technische Universität Dresden (TUD)
Project partner:	TUL, Faculty of Mechanical Engineering
Researcher responsible at TUL:	Assoc. prof. Ing. Karel Fraňa, Ph.D., Department of Power Engineering Equipment
Solution period:	2016-2019
Internal number TUL:	15402
Subsidy FME 2017:	1 125 459 CZK

PROGRESS.digital
Practically oriented development of competencies in production technology in regions through cooperation.digital

Program:	Cooperation program Czech Republic - Free State of Saxony 2014–2020
Provider of subsidy:	EU – European Regional Development Fund
Lead partner:	Technische Universität Dresden (TUD)
Project partner:	TUL, Faculty of Mechanical Engineering
Researcher responsible for TUL:	Assoc. prof. Dr. Ing. František Manlig, Ph.D., Ing. František Koblasa, Ph.D. Department of Manufacturing Systems and Automation
Registration Number:	100281976
Solution period:	2017-2019
Internal number TUL:	15402
Subsidy total:	256085,90 EUR
Subsidy FME 2017:	1 440 134 CZK

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