TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

ANNUAL REPORT 2015

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CONTENTS

INTRODUCTION

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

1 INTRODUCTION

The year 2015 was the last year for the fulfilment of the long-term plan for the educational, scientific, research, development, artistic and other creative activities of the Faculty of Mechanical Engineering of the Technical University of Liberec between 2011 and 2015. At the same time, the Academic Senate of the Faculty of Mechanical Engineering, TUL was processing the long-term plan for the educational, scientific, research, development, artistic and other creative activities of the Faculty of Mechanical Engineering, TUL between 2016 and 2020.

This annual report on the activities of the Faculty of Mechanical Engineering, TUL for 2015 presents information about the faculty, teaching and educational activities, scientific research activities, international cooperation, partnerships, and internationalisation. The sustainability of the faculty and its development requires the cooperation of the academic community, adequate knowledge and competency of the faculty academic staff, personal and team development, adequate laboratory facilities and equipment, as well as quality support from the positions of the rector departments and TUL management.

In terms of the faculty structure, the Department of Manufacturing Systems and Automation, which had been created by a merger of the Department of Manufacturing Systems and the Department of Cybernetics, started operations in January 2015. Toward the end of the year, and taking effect in 2016, a new organisational structure of the Faculty of Mechanical Engineering, TUL Dean's Office was approved, which reflects the need for a more transparent configuration and distribution competences in the area of administrative activities (study department) and local governance activities (development and projects department). These departments are clear in terms of their competences in relation to the other departments and sections of TUL and in terms of the future development of the faculty, capacity options, and requirements, and so this new structure allows the establishment of appropriate sections within the department.

In the area of external assessment of the faculty in 2015, accreditation was awarded to the habilitation procedures and procedures for appointing professors in the following fields: technologies and materials, manufacturing systems and processes, machinery and equipment design.

In the area of research and development, the Faculty of Mechanical Engineering, TUL retained its position in terms of the number of points for results applied in the RIV database, increased the share of higher-quality publishing outputs, and successfully maintained its volume of contractual research, which is a strong positive aspect in 2015. Due to the completion of running projects and the solution of projects in other segments of TUL, the volume of targeted funding obtained under the umbrella of the faculty declined. In terms of the total volume of targeted funds acquired, the academic staff of the faculty are maintaining the trend from previous years.

In the area of teaching, discussions have been initiated regarding the modification of the fields of study in relation to their practical requirements and the maintenance of the university character of the faculty. The expected interest in the five-year master's study programme was not fulfilled to full capacity. Due to population decline, the number of students enrolled for their first years is generally dropping, and this trend is expected to continue in years to come. The faculty continued in the development of its existing international cooperation in the areas of education and internships. In 2015, the number of self-paying students substantially increased in follow-up master's and doctorate study programmes. In terms of lifelong education, the faculty is very successful.

At the beginning of 2015, the commissioning of all laboratory and teaching spaces in the Department of Glass Machinery and Robotics and the Department of Applied Mechanics in building G, where they were relocated in September 2014 from building P; the Dean's Office was also relocated from building A. In 2015, the laboratories of the Department of Engineering Technology were relocated from building E2 to the ground floor of building G.

In conclusion, I would like to thank all the members of the academic community and other faculty staff for their contribution to the development of the faculty and the university through their work, activities, and efforts in spite of all the existing difficulties. They deserve much gratitude and appreciation.

Prof. Dr. Ing. Petr Lenfeld
Dean
Faculty of Mechanical Engineering
Technical University of Liberec

FACULTY STRUCTURE

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

2 FACULTY STRUCTURE

2.1 Faculty bodies

	Representation
Dean	Prof. Dr. Ing. Petr Lenfeld
Secretary	Ing. Anna Benešová

Academic Senate of the Faculty of Mechanical Engineering, TUL

Chairman	doc. Ing. Lukáš Čapek, PhD
Deputy Chairperson for the Chamber of Academic Staff	Prof.Ing. Ladislav Ševčík, CSc.
Deputy Chairperson for the Chamber of Students	Ing. Ondřej Řídký
Secretary	Ing. Rudolf Martonka, PhD
Members of the Chamber of Academic Staff	Prof.Ing. Jaroslav Beran, CSc.
	Ing. Luboš Běhálek, PhD
	Ing. Jiří Blekta, PhD
	doc. Ing. Václav Dvořák, PhD
	Ing. Vlastimil Hotař, PhD
	Ing. Michaela Kolnerová, PhD
	doc. Ing. Lubomír Moc, CSc.
	Prof. Ing. Iva Nová, CSc.
	Ing. Robert Voženílek, PhD
Members of the Chamber of Students	Ing. Martin Borůvka
	Ing. Jan Hujer
	Ing. Lukáš Zuzánek
	Ing. Jiří Komárek
	Ing. Andrii Shynkarenko

Academic Senate of the Technical University of Liberec

Academic representatives for the Faculty of Mechanical Engineering, TUL	Prof. Ing. Jaroslav Beran, CSc.
	doc. Ing. Lubomír Moc, CSc.
Student representatives for the Faculty of Mechanical Engineering, TUL	Ing. Jan Vácha

Representative of the FME, TUL on the Universities Council

Ing. Michaela Kolnerová, PhD

Scientific Council of the FME, TUL

Chairperson	Prof. Dr. Ing. Petr Lenfeld
Members – TUL	doc. Ing. Martin Bílek, PhD
	Prof, Ing, Jaroslav Beran, CSc.
	doc. Ing, Karel Fraňa, PhD
	doc. Ing, Josef Janeček, CSc.
	Prof. RNDr. David Lukáš, CSc.
	Prof Ing Petr Louda, CSc
	doc. Ing. Miroslav Malý, CSc.
	Ing. Ivo Matoušek, PhD
	Prof..Ing. Iva Nová, CSc.
	Prof. Ing. Miroslav Olehla, CSc.
	Prof. Ing. Lubomír Pešík, CSc.
	doc. Ing. Iva Petríková, PhD
	doc. Ing Ludvík Prášil, CSc
	Prof. Ing. Jan Skalla, CSc.
Members – External	
University of Pardubice, Faculty of Transport Engineering	

	doc. Ing. Ivo Drahotský, PhD
Faculty of Nuclear Sciences and Physical Engineering, CTU in Prague	
	Prof. Ing. Nikolaj Ganev, CSc.
Faculty of Mechanical Engineering, CTU Prague	Prof. Ing. Stanislav Holý, CSc.
Faculty of Applied Sciences, University of West Bohemia in Plzeň	
	Prof. Ing. Vladislav Laš, CSc.
Faculty of Technology, Tomas Bata University in Zlín	
	doc. Ing. David Maňas, PhD
Institute of Thermomechanics, Czech Academy of Sciences Prague	
	Prof. Ing. František Maršík, DrSc
Magna Exteriors & Interiors (Bohemia), s.r.o., Liberec	
	Ing. Pavel Neumann
Faculty of Mechanical Engineering, Technical University of Ostrava	
	Prof. Ing. Petr Noskievič, CSc.
Faculty of Mechanical Engineering, Slovak University of Technology in Bratislava	
	doc. Ing. František Palčák, CSc.
Institute of Thermomechanics, Czech Academy of Sciences Prague	
	Prof. Ing. Jaromír Příhoda, CSc.
Professor Emeritus	Prof. Ing. Jaroslav Purmenský, DrSc
Professor Emeritus	Prof. RNDr. Miroslav Raab, CSc.
Faculty of Mechanical Engineering, Technical University in Brno	
	doc. Ing. Pavel Rumíšek, CSc.
Faculty of Mechanical Engineering, CTU in Prague	
	Prof. Ing. Milan Růžička, CSc.
Rieter CZ, s.r.o.	Ing. Jiří Sloupenský, CSc.
Faculty of Mechanical Engineering, CTU in P	Prof. RNDr .Petr Špatenka, CSc.
ČEZ, a.s., Temelín Nuclear Power Plant	Pavel Šimák
Benteler ČR s.r.o. Stráž nad Nisou	doc. Ing. Jiří Vejvoda, CSc.

Disciplinary Committee

Chairman	doc. Ing. Václav Dvořák, PhD
Members	doc. Ing. Martin Bílek, PhD
	Ing. Jan Hujer
	Ing. Petr Kulhavý

2.2 Faculty structure

The faculty is organisationally divided into the Dean's Office, the Study Department, and ten departments.

Organisational department	Representation
Dean's Office	
Dean	Prof. Dr. Ing Petr Lenfeld
Vice-Dean for Scientific and Research Activities and doctoral studies	doc. Ing. Martin Bílek, PhD
Vice-Dean for Education and Teaching activities	Ing. Ivo Matoušek, PhD
Vice-Dean for External and International Relations	doc. Ing. Karel Fraňa, PhD
Secretary	Ing. Anna Benešová
Dean's Secretariat	Pavla Kholová
Manager for Development and Projects	RNDr. Iveta Lukášová

Financial Manager	Ing. Tomáš Kysilka

Study Department

Head of the Study Department	Mgr. Radka Dvořáková
Officer	Ing. Mgr. Dana Semotjuková
Officer for International Relations	Ing. Marcela Válková

Departments

Department of Applied Mechanics	doc. Ing. Iva Petríková, PhD
Department of Engineering Technology	Ing. Jaromír Moravec, PhD
Department of Materials Science	Prof. Ing. Petr Louda, CSc.
Department of Power Engineering Equipment	doc. Ing. Václav Dvořák, PhD
Department of the Design of Machine Elements and Mechanisms	Prof. Ing. Ladislav Ševčík, CSc.
Department of Machining and Assembly	doc. Ing. Jan Jersák, CSc.
Department of Vehicles and Engines	Ing. Robert Voženílek, PhD
Department of Glass Machinery and Robotics	doc. Ing. František Novotný, CSc.
Department of Textile Machine Design	Prof. Ing. Jaroslav Beran, CSc.
Department of Manufacturing Systems and Automation	Ing. Petr Zelený, PhD

2.3 Faculty personnel structure

In 2015, the Faculty of Mechanical Engineering, TUL had a total of 151 employees (113.4 FTE), of whom 111 were academic staff (83.1 FTE). The total number of instructors dropped year-on-year by 3.5%.

Instruction in bachelor's, master's, and doctorate programmes was provided mainly by internal professors, who numbered 20, and associate professors, who numbered 27, as guarantors of study subjects, instructors, lecturers, and supervisors of students' final theses. Teaching tasks were handled by 52 assistant lecturers, 9 assistants, and 3 lecturers.

2.4 Professorship and habilitation proceedings

The proceedings for awarding the title of professor that started in 2013 were completed, and the title was awarded in 2015. Two proceedings for awarding the title of professor were initiated; one was completed in 2015. Two habilitation proceedings were initiated.

EDUCATIONAL ACTIVITIES

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

3 EDUCATIONAL ACTIVITIES

The faculty provides and guarantees expert-level offerings for all three types of study programmes – bachelor's programmes (BSP), master's study programmes (MSP), and doctoral study programmes (DSP).

3.1 Accredited study programmes and fields

The faculty guarantees the instruction of six study programmes. All the instruction is conducted in the Czech and English languages and in full-time and part-time arrangements. The overviews are shown in table annexe 3.1.

Instruction at detached workplaces
Instruction at detached workplaces was not conducted in 2015.

3.2 Programmes in the English language

- The Faculty of Mechanical Engineering, TUL offers instruction in the English language in all types of study programmes.
- In the summer semester of the 2014/15 academic year, the FME provided instructions in the English language to eight students. Five were enrolled as self-paying students and three as government scholars under the programme entitled 'Provision of study in the field of energetics conducted in the English language'. The Government of the Czech Republic provides this scholarship to students from developing countries through the Ministry of Education, Youth and Sports as part of its foreign development cooperation programme to support studies at public universities in the Czech Republic.
- In the winter semester of the 2015/16 academic year, 29 students enrolled in the FME for study in the English language. Of these, 23 were enrolled as self-payers and 6 as government scholars.
- Instruction in the English language was also conducted under the short-term ERASMUS+, CEEPUS, IAESTE, and IP TUL programmes. For details, see section 5.3.

3.3 Interest in studies and admission conditions

In 2015, 776 candidates expressed interest in studying at the Faculty of Mechanical Engineering, TUL (compared with the year 2014, this figure is lower by 21). Of the total number of applicants, 554 students were enrolled, approximately 71.4% (in 2014, this figure was 69%). In the 2015/16 academic year, 1,059 students were enrolled for study in all years (i.e. 95 fewer students than in the year 2014).

The student structure not changing: the ratio of students in the individual types of study remained roughly the same. Of the total number of enrolled students, 65% are enrolled in bachelor's programmes, about 21% in master's programmes, and 14% in doctoral programmes.

About half of the applicants for study come from secondary vocational schools, one-fifth from gymnasia, and about one-third from other secondary schools.

BSP 637 applicants, 449 enrolled Applications for study in BSP fields were filed mainly by applicants from secondary vocational schools (about 53% of the total number of applicants), while other students were drawn from gymnasia (20%) and other secondary schools (27%).

MSP 7 applicants, 2 enrolled

NMSP 104 applicants, 78 enrolled Of this number, 31 were applicants and 17 were enrolled in programmes taught in the English language.
The applicants for study in Czech master's programmes were, in most cases, graduates of a bachelor's study programme at TUL and, in some cases, from other faculties.

DSP 28 applicants, 25 enrolled The applicants for study in doctoral programmes were mainly graduates of master's study programmes at the Faculty of Mechanical Engineering, TUL; 8 applicants accomplished the preceding study level at a different university.

3.4 Numbers of students and graduates

The number of unsuccessful students in the first year of study is still high, particularly in bachelor's study programmes. The students are enrolled on merit from secondary schools.

During the first year of study, 183 students were unsuccessful in BSPs and two students in NMSPs. The average study completion time exceeds the standard period of study.

BSP In the 2015/2016 academic year, 690 students were enrolled (of whom 517 were full-time and 173 were part-time students). In 2015, 50 students (27% of the total number of graduates) successfully completed their studies. The average study period of the BSP graduates in 2015 was 4.68 years.

(N)MSP In the 2015/2016 academic year, 226 students were enrolled (of whom 139 were full-time and 87 were part-time students). In 2015, 129 students (69% of the total number of graduates) successfully completed their studies. The average study period of the NMSP graduates was 2.79 years.

DSP In the 2015/2016 academic year, 143 students were enrolled (of whom 78 were full-time and 65 were part-time students). In 2015, 8 students (4% of the total number of graduates) successfully completed their studies. The average study period of the graduates was 6.88 years.

3.5 Credit system and study assessment

The European Credit Transfer System (ECTS) is used for the assessment of study progress in bachelor's and follow-up master's programmes.

The bilingual Dodatek k diplomu / Diploma Supplement, supported by consistent application of the credit system, has been automatically awarded to every TUL graduate as a supplement to their diploma since 2005.

To successfully complete studies in 2015, the credit requirement were as follows:

- BSP 180 credits,
- NMSP 180 credits for the three-year programme and 120 credits for the two-year NMSP,
- MSP (five-year programme) 300 credits.

3.6 Scholarships

The scholarships paid in 2015 were awarded in compliance with the Scholarship Rules of the Faculty of Mechanical Engineering, TUL and according to the applicable decrees of the Dean of the Faculty of Mechanical Engineering.

- In all, scholarships were paid to 925 students.
- The total amount paid in scholarships was CZK 12.54 million.
- The amount paid in scholarships in 2015 was lower by CZK 3.5 million as compared with 2014.

Scholarship of the Preciosa Jablonec nad Nisou Foundation (Nadace Preciosa Jablonec n/N)
A total of 13 students of the Faculty of Mechanical Engineering, TUL were awarded this scholarship in amounts ranging from CZK 2,000 to CZK 5,000, resulting in a total amount of CZK 44,000.

3.7 Student creative activities

Award of the Governor of the Liberec Region
Ing Martin Horák
Field: Engineering technology
Thesis topic: Preparation and evaluation of high-temperature plasma-deposited layers for use in nuclear power

Award of the Rector of TUL
Ing Tomáš Kořínek
Field: Applied mechanics
Thesis topic: Study of the spread of pollution in a room

Award of the Dean of the Faculty of Mechanical Engineering, TUL
Ing Jan Král
Field: Engineering technology and materials
Thesis topic: The design of an injection mould for the processing of silicones

Ing Tomáš Marek
Field: Design of machines and equipment
Thesis topic: Proposal of measures for noise reduction on the fifth gear of the MQ100 gearbox

Ing David Svoboda
Field: Applied mechanics
Thesis topic: Analysis of rotor response to vibrations of the base

Ing Peter Kancian
Field: Production systems and processes
Thesis topic: Rationalisation of the manufacturing process of a selected product in the company DZ Dražice

Ing Michal Říčan
Field: Automated control systems in engineering
Thesis topic: Application for synchronisation of events between VersionOne and ALM

Bc Václav Jiřiček
Programme: B2301 Mechanical Engineering
Bachelor's thesis topic: Cavitation in water pumps

Passes with honours – Red Diploma
Ing Tomáš Blažek
Ing Petr Bali Šoltés
Ing Josef Egrt
Ing Martin Horák
Ing Peter Kancian
Ing Tomáš Marek
Ing Jaroslav Propš
Ing Michal Říčan
Ing Michal Strnad
Ing David Svoboda
Ing Tomáš Tisovský
Ing Mirko Šída

Student grant contest at the faculty
Within the framework of the students grant contest, seventeen projects were solved for a the total volume of CZK 6.4 million. For details, see section 4.5.

Student Scientific and Professional Activity (SSPA/SVOČ)
The seventh year of the contest in support of talented master's and doctoral study programme students was organised by the Faculty of Textile Engineering; the Faculty of Mechanical Engineering; the Faculty of Mechatronics, Informatics, and Interdisciplinary Studies; and the Faculty of Economics. The aim of the competition is to support creative students with expectations for scientific and development activity at the technical faculties of TUL. The contest welcomed the participation of 59 students, 12 of whom were from the Faculty of Mechanical Engineering. The project was supported by the IP TUL 2015.

The Engineering Section – Placement in the section of further master's and doctoral study programme:
Josef Břoušek – Electric vehicle gearbox
Martin Borůvka – Extraction of cellulose nanocrystals and their potential application in advanced composite systems

David Svoboda – Analysis of rotor response to vibrations of the base

Workshop for doctoral students of the Faculty of Mechanical Engineering, TUL and the Faculty of Textile Engineering, TUL
Between 22 and 25 September, the doctoral students had their already traditional annual meeting at the Mountain Chalet Světlanka in Rokytnice nad Jizerou. A total of 12 students of the Faculty of Mechanical Engineering, TUL and 28 students of the Faculty Textile Engineering presented their professional works. An integral part of the meeting was a debate with the rector, the deans, and the academic staff of both faculties. The programme also included professional lectures by invited speakers. The project was funded by the IP TUL 2015.

Student creative activities in the Department of Glass Machinery and Robotics
This activity traditionally takes place in cooperation with the Preciosa Foundation. Six master's and bachelor's students presented their work. The committee, which, in addition to the members of the department, also included Jiří Vavřena, Chief Researcher of Výzkumný a vývojový závod, a.s., and Ing Ivo Schötta, Director of the Preciosa Foundation, selected and endowed a monetary award upon the students for their work:

1st place: Maxim Yurin **–** Handling of large-format insulation panels
2nd place: Tomáš Mikan **–** Handling of glass blanks for cutting operations
3rd place; Marina Chichilimova – New embossing processes in the mechanical matting of flat glass
4th place: Jan Svoboda – Device for measuring the integrity of printed antennas on glass

Awards:
Zdeněk Vít – Design procedures for light structural frames of effectors and peripherals of robots
Petr Voleník **–** Camera systems in industrial robotics

CREO University Champion
The second annual competition for the fastest designer took place on 21 October, sponsored by the Department of Textile Machine Design. The winner of the second year of the contest, and hence the fastest designer, was Jakub Macháček, followed by Petr Jiránek in second place, and Jana Svobodová in third. In addition to cash prizes – CZK 2,000, CZK 1,000, and CZK 500 – all winners also received material prizes and trinkets.

Start Your Career
On 23 October, the Department of Manufacturing Systems and Automation organised the 'Start Your Career' design competition in cooperation with the company Machine building s.r.o. Students could choose from two assignments and had all day to create a technical solution, including design and automation. The assignment was based on projects that the company solved in the past. Two solutions were selected as the best. First place, which carried a cash prize of CZK 10,000 and the option of future cooperation with the company, was awarded to Lukáš Bárta; second place, with a cash prize of CZK 5,000 and the option of future cooperation, was awarded to Aleš Hloucal.

Brückenbauwettbewerb 2015
Our faculty's student teams were successful in this international bridge-building competition. The competition took place at the Brandenburgische Technische Universität Cottbus-Senftenberg between fifteen student teams from BTU Cottbus-Senftenberg, TU Wroclaw, TU Liberec, and the University of Zielona Góra. A simultaneous competition was held at Shanghai Second Polytechnic University in China, where an additional twenty-seven teams participated. Both events ran in parallel, such that the participants could monitor the work of colleagues in China and vice-versa via an online connection.

- **Team Liberec 1** represented by Tomáš Kořínek, Janka Styková, and Jan Pavlovec took third place among the European teams. The first three European teams were simultaneously assessed alongside the twenty-seven teams in China. Our team took fourth place!
- **Team Ronima** represented by Roman Rybáček, Nikola Stripačuková, and Martin Jirucha took fourth place among the European teams.
- **Team Tacoma** represented by Ondřej Baťka, Martin Dvořák, and Tomáš Tisovský took fifth place among the European teams.

Seminars and workshops organised in projects under the OP VK
More details can be found on the TUL website:
http://www.fs.tul.cz/cz/rozvoj-a-projekty/archiv-projektu/msmt---rozvojove-projekty-2010/

3.8 Educational promotion events

Open Days for prospective students

- Open Day at the Faculty of Mechanical Engineering, TUL – February 2015.
- Open Day at the Faculty of Mechanical Engineering, TUL – December 2015.
- Visit of students from VOŠ, SPŠ, and OA Čáslav to the Faculty of Mechanical Engineering, TUL – May 2015.
- Visit of students from the SPŠ in Trutnov and the SPŠ in Vlašim to the FME, TUL – December 2015.

Educational fairs

Study opportunities within the framework of the study programmes and possibilities for the practical engagement of graduates were promoted at the following educational fairs (with active participation of the Faculty of Mechanical Engineering):

- Gaudeamus, the European higher education and lifelong learning exhibition – January 2015 (TUL, Faculty of Mechanical Engineering).
- EAIE 2015 in Glasgow – September 2015 (TUL, Faculty of Mechanical Engineering).
- Educa 2015 in Liberec – October 2015 (TUL).
- Gaudeamus Nitra, a European higher education and lifelong learning exhibition – October 2015 (TUL).
- Gaudeamus Brno, a European higher education and lifelong learning exhibition – November 2015 (TUL, Faculty of Mechanical Engineering).
- European Higher Education Fairs – EHEF Kazakhstan – September 2015 (Faculty of Mechanical Engineering).
- EDUEXPO in Brazil – September 2015 (TUL, Faculty of Mechanical Engineering).
- NAFSA Boston, USA – May 2015 (Faculty of Mechanical Engineering).
- South-East Asia EXPO, Jakarta – November 2015 (TUL, Faculty of Mechanical Engineering).

T-Fórum 2015

The twenty-first year of the T-Fórum job fair for students was attended by representatives of about fifty industrial enterprises and companies. This annual fair is organised by the branch of IAESTE under TUL in cooperation with the Department of Vehicles and Engines of the Faculty of Mechanical Engineering, TUL. The fair ranks among the largest HR events in the region. December 2015.

Promotion of study

- Promotion on Facebook and the faculty website.
- Facebook campaign for selected secondary student age groups – DOD, applications for admission.
- Promotion of study by personal visits and presentations at selected secondary schools and gymnasia – gymnasium and secondary school in Rychnov nad Kněžnou, gymnasium in Dvůr Králové, gymnasium in Broumov; secondary schools in Nové město nad Metují; secondary schools in Jičín, Trutnov, Čáslav, Ústí nad Labem, and Děčín.

Promotion of study for foreigners at the Faculty of Mechanical Engineering, TUL

- Welcome Days at TUL
  On 19 February 2015, Welcome Days were organised prior to the beginning of the summer semester for foreign students who are visiting the university as part of the Erasmus+ programme. The Faculty of Mechanical Engineering, TUL welcomed twenty-three new students from France, Spain, Portugal, Turkey, Lithuania, Poland, Slovakia, Bulgaria, and Hungary. An additional four students from Turkey extended their studies from the winter semester and are continuing their studies in the summer semester.
- Welcome Days at TUL
  On 24 September 2015 the already traditional Welcome Days for foreign students taking part in the Erasmus+ programme were organised for students from France, Poland,

Portugal, Spain, Turkey, Greece, and Germany, who enrolled for study at the Faculty of Mechanical Engineering, TUL in the winter semester of 2015/2016.

- Orientation Day
  Organised by the International Department of TUL in cooperation with the Faculty of Mechanical Engineering on 13 November, an Orientation Day was held for self-paying students from India, who started their NMSP studies at the Faculty of Mechanical Engineering. Within the framework of Orientation Day, the students were familiarised with the university and Faculty of Mechanical Engineering, TUL and were provided with practical information about their studies at the faculty and the foreign study options under the Erasmus+ programme.
- Faculty of Mechanical Engineering, TUL – seminar for students of the Faculty of Mechanical Engineering about the possibilities of study within the ERASMUS+ Programme – December 2015.
- Within the framework of cooperation with the Institute for Language and Preparatory Studies, a group of 8 technically focused foreign students visited the faculty in preparation for their studies in the Czech Republic. The visit was held within the framework of Open Day – December 2015.

Presentation of the departments of the Faculty of Mechanical Engineering, TUL to second- and third-year students in Bc study programmes

- A presentation of the activities of the departments and laboratories was held, as is tradition, in March. The event was intended for bachelor's students who are thinking about and deciding on their final theses or professional practice, and are also making a decision on the department where they want to engage in their future activities.

Promotion of the Applied Mechanics study programme – Department of Applied Mechanics

- Workshops for secondary school students in the laboratory of the Department of Applied Mechanics – 12 March, 19 March, 21 October 2016
- Summer school in applied mechanics – 16–17 September organised jointly with the Department of Power Engineering Equipment

Manufacturing systems and automation

- A workshop for 40 students of the Secondary Vocational School from Ústí nad Labem was organised by the Department of Manufacturing Systems and Automation.

Promotion of studies as part of the educational projects under the OP VK

- The events were organised by the faculty and the university.

3.9 Quality of instruction

Teaching is organised in accordance with the accredited study programmes and is guaranteed by educators who certify their proficiency with specialised professional and publishing activities.

The lecturers are mainly professors and associate professors of the Faculty of Mechanical Engineering, TUL and, in select cases, experts drawn from other areas of the university. Teaching is also done by external staff from industry and other institutions (such as the Czech Academy of Sciences).

In 2015, a total of fifteen external instructors presented professional lectures in individual subjects within the accredited study programmes. Additional experts in the application and academic sector (see section 6.5) also gave addresses within the framework of professionally focused seminars and lectures.

Innovations in the content of the subjects is kept up to date on an ongoing basis by the individual workplaces of the faculty and are incorporated into the content of each professional subject and into broader innovations in teaching and instructional materials. This reflects the needs of industrial practice as well as the content of the faculty's scientific research activities.

Activities in support of the quality of teaching are described in detail in the annual reports of the individual departments. In summary, it is possible to state the following:

- Continuous innovation took place in the subjects funded by projects that are part of the Education for Competitiveness Operational Programme.

- The creation of presentations in electronic format is standard, and video recordings are offered via CD and other media for study purposes. It is further possible to say that the frequency and smoothness of each of these practices has increased. Special interactive web applications were developed to increase the effectiveness and attractiveness of classroom instruction and many teaching catalogues. More details are available in the annual reports of the individual departments.
- Standard technical building and investment development of instruction rooms and laboratories was carried out using FRIM funds.
- Twenty-seven textbooks were published to support instruction. Many new lecture presentations, didactic aids, teaching texts, and experimental teaching equipment were created.
- All the departments perform their own questionnaire assessment of the quality of the teaching subjects.
- The students have the opportunity to anonymously evaluate the subjects in the IS STAG system. The event is organised by the Students Chamber of TUL. In the winter semester of 2014/15, 131 students participated in the evaluation process, and in the summer semester of 20104/2015 a total of 54 students participated.

3.10 Lifelong education

Within the framework of the offer of lifelong education, the Faculty of Mechanical Engineering, TUL offers a broad range of professional seminars, the contents of which are structured to meet the requirements of the industrial companies and society at large.

Lifelong education is a significant item for cooperation with industrial practice:

- The overall framework of lifelong education comprised a total of 1,283 teaching hours in 47 courses.
- These courses were attended by about 504 participants.
- The volume of funds obtained from this activity amounted to approximately CZK 1.9 million.

SCIENTIFIC RESEARCH ACTIVITIES

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

4 SCIENTIFIC RESEARCH ACTIVITIES

4.1 Focus of scientific research activities

The basis of scientific research are the traditional fields, which accentuate the need for applied research and development in the Czech Republic.

Developed activities:

- Accumulation and transfer of energies.
- Competitive machines and equipment.
- Materials engineering.
- Progressive technological and manufacturing processes.

These research activities also reflect and particularly accentuate the need for applied research and development in the Czech Republic with emphasis on:

- Research and development of traditional and modern materials.
- Research, development, and innovation of standard and progressive technologies.
- Reduction of energy requirements.
- Reduction of weight.
- Design of special machines and equipment.
- Sustainable transportation.

In 2015, the scientific research activities of the faculty also continued under the research programmes of the 'Centre for Nanomaterials, Advanced Technologies, and Innovations (referred to hereinafter in the text as 'CNATI'). Within the sustainable framework of the project, the faculty is developing two research programmes:

- Competitive Engineering.
- Materials research.

4.2 Institutional support

In 2015, the faculty obtained institutional support funds in the amount of CZK 28.82 million, which is approximately 63.4% of the research and development funds. This amount was allocated to the various departments in support of research and the stabilisation of research teams.

4.3 Competence Centre

The year 2015 also saw the activities of Josef Božek in the form of the Competence Centre for Automotive Industry under CTU in Prague. As a co-solver, it is represented by a team from the Department of Vehicles and Engines. Its research activities are managed by the CNATI institute. See text annexe 4.3.

4.4 Scientific research projects

Just like in previous years, the scientific research activities of the faculty were focused mainly on applied and experimental research and development. The faculty was involved in the role of the recipients or co-beneficiaries in projects by the TA CR, MoE CR, GA CR.

Of its ten total research and development projects, the Faculty of Mechanical Engineering, TUL solved one project as a beneficiary and nine as a co-beneficiary. Of the total number of projects, the solution of one new project started in 2015 and four projects were successfully completed by the end of the year. The volume of targeted support for solution of scientific and research projects amounted to about CZK 10.23 million, of which CZK 950,000 was transferred to co-solvers. These funds make up about 22.6% of the total volume of funds for scientific and research activities.

The volume of targeted support received by the Faculty under the CNATI by the academic staff of the Faculty of Mechanical Engineering, TUL was CZK 7.96 million. Apart from this, the academic staff of the Faculty of Mechanical Engineering, TUL are carriers of the MEYS/OP R&D for Innovations pre-seed project and are the solvers of the activities under the TA CR/GAMA project. A significant share accrues to the research and development activities of the academic staff of the

Faculty of Mechanical Engineering, TUL on the CNATI sustainability project – Development of the Institute for Nanomaterials, Advanced Technologies, and Innovations (CNATI++).

For an overview of the projects and the financial grants, see table and text annexes 4.4.

Overview of scientific research projects

- TACR: TA04021338 – Development of CDF code for the design of desulphurisation equipment
- TACR: TA03010852 – Development of a progressive system for cooling glass-moulding machines
- TACR: TA03010492 – Applied multidisciplinary research and development of progressive methods of cooling in technological processes
- TACR: TA03030978 – Research and development of a delay-free shock-absorber
- TACR: TA02020716 – Research in ORC technology with a low-volume piston steam-propelled engine for small and waste heat sources
- TACR: TA01010879 – New systems of monitoring the length of end measures and evaluating their quality
- TACR: TH01010690 – Development of progressive technology for the production of felt hats
- Grant Agency of the CR: P108/12/1452 – Optimisation of the high-temperature mechanical properties of Fe3Al-type iron aluminides with carbide formers
- Grant Agency of the CR: GA14-08888S – Control of flow fields using liquid oscillations
- EU/Ministry of the Environment: LIFE+ – Demonstration of monitoring toxicity of the exhaust gases of diesel engines during real-time operation

Projects submitted under the CNATI – solved by the academic staff of the Faculty of Mechanical Engineering, TUL under CNATI

- TACR: TA04011009 – Research in the useful properties and application possibilities for light polymer composites for bodywork building
- TACR: TA02010992 – Development and verification of new numerical methods of welding and thermal processing, including simplified numerical prediction of the life of welded joints for progressive materials used in energy production, aircraft, and possibly the space industry
- TACR: TH01031152 – Improvements in the efficiency of machines and equipment by reducing friction losses of the machine and its components
- TACR: TH01021093 – New matting technology and prototype machine tools for processing glass surfaces
- TACR: TE01020020 – Josef Božek – Competence Centre for Automotive Industry

Projects for the commercialisation of research and development results under the CNATI – solved by the academic staff of the Faculty of Mechanical Engineering

- OP R&D for Innovations pre-seed: CZ.1.05./3.1.00/13.0291 – New technologies and special components of machines
- TACR-GAMA: TG01010117 **–** PROSYKO – two partial projects

4.5 Student grant contest

Within the framework of support for specific research realised via the Student Grant Competition, seventeen projects were solved with a total funding volume of CZK 6.4 million, which comprised about 14% of the total volume of funds used for scientific research activities. For an overview of projects, see table annexe 4.5.

4.6 Contractual research and development

Contractual research and development within the framework of the supplementary activities comprise a significant segment of the faculty's activities. Revenue from the contract research of the Faculty of Mechanical Engineering, TUL in 2015 was about CZK 9.6 million, of which CZK 8.4 million was related to the results entered in the RIV database.

The contractual research and development engaged in by the academic staff of the Faculty of Mechanical Engineering, TUL under CNATI amounted to about CZK 3.6 million, and their results were entered into the RIV database.

For an overview revenues by individual workplace, see table annexe 4.6.

4.7 Supplementary activities

Revenue from the supplementary activity of the Faculty of Mechanical Engineering, TUL was CZK 1.7 million. Apart from this, the Faculty of Mechanical Engineering, TUL provides expertise in the field of engineering, mechanical engineering, and technical fields (miscellaneous). In 2015, the service revenue from this activity amounted to CZK 259,980.

4.8 Centre for Nanomaterials, Advanced Technologies, and Innovations

The Faculty of Mechanical Engineering, TUL is developing laboratories for two research programmes within the framework of the CNATI infrastructure under construction.

Competitive Engineering	**Professional guarantor**
Laboratory for the Innovation of Textile Machinery	Prof. Ing. Jaroslav Beran, CSc.
Laboratory for Progressive Engineering Technologies	Ing. Jiří Bobek, PhD
Hydrodynamics Laboratory	Prof. Ing. Ladislav Ševčík, CSc
Drive Units Laboratory	Ing. Robert Voženílek, PhD
Robotic Systems Laboratory	doc. Ing. František Novotný, CSc
Laboratory for Chip Technologies	doc. Ing. Jan Jersák, CSc.
Laboratory for Prototype Technologies and Processes	Ing. Petr Zelený, PhD
Materials research	
Laboratory for Testing Nanolayers	Prof. Ing. Petr Louda, CSc.

4.9 Results of scientific research and development activities

During the five-year period of 2009 through 2013, the number of points for results applied in the RIV database has increased again. In 2015, the results for the second period were published according to the new methodology for the validation of research results of organisations for the period 2013 to 2015 (hereinafter referred to as Methodology 2013). According to Pillar I of Methodology 2013, the Faculty of Mechanical Engineering, TUL received a total of 4,393 points; in Pillar III it received 1,263 points. Most recently it received a total of 6,400 points for the applied results implemented between 2008 and 2011. In the period of 2009 through 2013, 10% fewer points were allocated in Pillar II as in the preceding period. An overview of the results and points evaluation are given in table annexe 4.8. It is clear from the results that the applied research results were an important element of the performance of the Faculty of Mechanical Engineering, TUL in the most recent period. An evaluation of 2014 (data collected in 2015) was not available by the closing date of this report.

The Faculty of Mechanical Engineering, TUL has the following selected results on record in the ISVAV applied in 2014 (data collected in 2015):

- 61 results – result type J (article in the periodical)
- 166 results – result type D (article in the collection)
- 5 results – result type P (patent)
- 17 results – result type F/U (utility design)

For 2015 (data collected in 2016), the following outputs are expected to be entered in the ISVAV:

- 73 results – result type J (article in the periodical),
- 155 results – result type D (article in the collection)
- 15 results – result type P (patent)
- 19 results – result type F/U (utility design)

It is clear from the stated outputs that the total number of outputs is increasing overall. The number of entered outputs is expected to increase from 350 in 2014 (data collected in 2015) to an estimated 378 in 2015 (data collected in 2016). There is a visible rising trend in the number of quality outputs in the Faculty of Mechanical Engineering, TUL for 2015. In 2015, the Faculty of Mechanical Engineering, TUL created a total of 39 outputs in periodicals with an impact factor and 55 outputs in periodicals classified in the WoS or Scopus databases.

4.10 Commercialisation of the results and outputs of scientific research activities

The strategy for commercialisation of the research and development results of the Faculty of Mechanical Engineering, TUL is focused in two main directions:

First on the transfer of new technologies and mechanical equipment through contractual and eventually collaborative research, and second on sale of licences, patents, and utility models.

- Project VG20122014078. Protective masks (half-masks) with filters made of nanofibre material (PUV 2013-28991/Means for fixing the spacing of material folds, PUV 2013-28691/Gas mask with common inhalation and exhalation opening, PUV 2013-28708 / Planar filter with dimensionally unstable filter material with a layer of nanofibres, PV 2013-1049/ Fixation of the folds of filter or other material, PV 2013-826/Gas mask with common inhalation and exhalation opening, PV 2013-835/Planar filter with dimensionally unstable filter material with a layer of nanofibres; industrial pattern – Gas mask filter).
  The revenue from the entry licence fee in 2015 was CZK 1 million.
  Subsequent years also saw the collection of fees for the utilisation of licences.
- Project TA01020313. Procedure for the selection and testing of materials for enthalpy exchangers, procedure for design of the heat-exchange surface of plate exchanger. Yearly payment CZK 100,000 for 2015. Annual payment up to 2019.
  For implementation of a 'proof of concept' and 'pre-seed' type of project.
  See text annexe 4.9
- In 2015, the solution of the project on the commercialisation of the results of research organisations and protection of their intellectual property continued. Within the project, the staff of the Faculty of Mechanical Engineering, TUL are solving a total of four activities that are targeted at the commercialisation of the R&D results obtained mainly under the MSM467488501 Research Project. The project is under the CNATI.
- In 2015, two partial PROSYKO projects were solved. The project is supported under the TACR/GAMA, Sub-Programme 1, which is focused on supporting the validation of the practical usage of R&D results created in the research organisations and with a high potential for application in new or improved products, manufacturing procedures, or services with high added value and a high probability of strengthening of competitiveness. The project is under the CNATI. See text annexe 4.9.

INTERNATIONAL COOPERATION

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

5 INTERNATIONAL COOPERATION

The area of international cooperation was dominated by activities focused on the mobility of students and academic staff and preparation of contracts for bilateral cooperation with other scientific research institutions. International cooperation in all areas of the faculty's operations were underpinned by sixty-five contractual relationships.

5.1 Internationalisation of instruction

In the area of internationalisation of the Faculty of Mechanical Engineering, the teaching of NMSP in the English language was successfully initiated in 2015 for the Design of Machines and Equipment and Engineering Technologies and Materials programmes for fifteen self-paying students from India.

One newly enrolled student was awarded a Czech Government Scholarship to study in the follow-up N2301 Mechanical Engineering master's programme in the field of Design of Machines and Equipment with focus on power engineering equipment.

At the same time, the instruction of three government scholars continued in the follow-up N2301 Mechanical Engineering master's programme in the field of Design of Machines and Equipment with focus on power engineering equipment. One female foreign student was enrolled for a three-month attachment under a government scholarship from her dispatching country.

Within the framework of the faculty scholarship, two students from Vietnam were enrolled for DSP studies.

In 2015 additional self-paying foreign students continued their studies at the faculty: two in NMSPs and four in DSPs.

Three self-paying foreign students came to the Czech Republic for short attachments in 2015.

5.2 International cooperation in education

In the area of international cooperation in education, there was an effort focused on the establishment of additional international contacts and activities and the execution of already planned activities.

Student educational activities realised under the projects

- The institutional development project IRP Faculty of Mechanical Engineering, TUL – TUL was a significant partner in the international educational area: it strengthened existing cooperation agreements with Canadian and American partner universities.
- Within the framework of the project, two Czech students commenced study residencies in 2015 at the Canadian partner Conestoga Polytechnic University.
- Doctoral students engaged in four long-term (stays of at least twenty-eight days) and two short-term residencies for the purpose of professional growth and strengthening existing contacts with foreign partner institutions with the financial support of the Institutional Development Plan of the TUL Mobility Fund 2015.
- One doctoral student engaged in a long-term residency at the Faculty of Mechanical Engineering, TUL under the Institutional Development Plan of the TUL Mobility Fund 2015.
- In 2015, doctoral students engaged in two long-term residencies under the Institutional Development Plan of the TUL Mobility Fund 2014.
- Students of the Faculty of Mechanical Engineering, TUL engaged in two short-term study residencies at the partner university Østfold College University in Norway under the Norwegian Funds programme. Norwegian students engaged in three reciprocal short-term stays at the Faculty of Engineering.
- In 2015, a doctoral student completed their six-week residency a foreign partner institution that was funded from other sources (OP EfC), doctoral students took part in two short-term residencies with financial support from other sources (Mobility), and still other doctoral students took part in three short-term residencies with financial support from other sources (Medetox Project).

Educational activities of the academic staff realised within the framework of mobility

- A total of twelve short-term residencies of the faculty's academic staff associated with lectures at partner institutions were accomplished under the Erasmus+ and CEEPUS programme.
- A total of nineteen foreign academic staff members were received for short-term teaching residencies under the Erasmus+ and CEEPUS programme.

5.3 International cooperation in the area of scientific research

- One long-term scientific residency of young academic staff was accomplished under the FTE project – support for the creation of excellent research and development teams at TUL:
- Ing Petra Dančová, PhD was a resident for one month at Technische Universiteit Eindhoven in the Netherlands.
- One scientific residency of a young foreign academic staff member was completed under the FTE project – Support for the creation of excellent research and development teams at TUL.
- Six long-term residencies of young academic staff were realised for the purpose of professional growth and strengthening existing contacts with foreign partner institutions with the financial support of the TUL Mobility Fund 2015.
- Eight short-term (shorter than five days) residencies of young academic staff were realised for the purpose of professional growth and strengthening existing contacts with foreign partner institutions with the financial support of the TUL Mobility Fund 2015.
- One residency of an academic staff member was realised for the purpose of professional growth under the CRP TUL 2015.
- Four short-term residencies of foreign academic staff from partner universities in Germany, France, and Thailand were realised at the Faculty of Mechanical Engineering, TUL under the TUL Mobility Fund 2015.
- Three short-term residencies of the academic staff of the Faculty of Mechanical Engineering, TUL were realised at the partner university Østfold College University in Norway under the Norwegian Funds programme. Two reciprocal short-term residencies of Norwegian academic staff were realised at the Faculty of Engineering TUL.
- Four short-term residencies of young academic staff of the Faculty of Mechanical Engineering, TUL and two short-term residencies of doctoral students were accomplished at the partner Graz University of Technology under the AKTION Czech Republic–Austria project.
- Two long-term residencies (minimum duration of three weeks) of a young academic staff member of the Faculty of Mechanical Engineering, TUL were accomplished at a partner institution in Germany and two short-term (several days) residencies in Poland were funded from other sources (OP VK); two short-term (several days) stays of an academic staff member of the Faculty of Mechanical Engineering, TUL in Italy with financial support from other sources (Medetox Project); and two short-term (several days) stays of an academic staff member of the Faculty of Mechanical Engineering, TUL took place in Slovakia with financial support from other sources (7AMB).

5.4 International mobility

The mobility of the students as well as academic and other staff of the Faculty of Mechanical Engineering, TUL was enabled largely under the ERASMUS+, CEEPUS, and Institutional Development programmes. The mobility of foreign students and academic staff at the Faculty of Mechanical Engineering, TUL was accomplished mainly under the ERASMUS+ programme. Foreign students also utilised residency offers under the IAESTE programme and CEEPUS.

The faculty motivates students in all study programmes to participate in study residencies abroad. Priority interest is placed on increasing the mobility of doctoral students. From 2010, doctoral study programmes include foreign study stays or internships.

In 2015, the overall mobility of the faculty's students as well as academic and other staff has increased, as has the mobility of foreign students and academic staff.

Residency of foreign students and academic staff

In 2015 the total number of foreign students and academic staff residencies, including other staff positions, under the mobility programmes at the faculty increased as compared with 2014, and individual mobility categories showed an increase in the number of foreign student residencies under the Erasmus+ and CEEPUS programmes. The number of incoming students under the

IAESTE programme has dropped slightly. The arrivals of foreign academic staff under the Erasmus+ and CEEPUS programme remained at 2014 levels. There is an increase in the numbers of incoming students and academic staff under the Norwegian Funds and the TUL Mobility Fund projects. Other activities of foreign students and academic staff have slightly increased as compared with 2014.

Foreign mobility of the faculty's academic and other staff

The foreign mobility of the faculty's academic and other staff under various programmes increased in 2015 as compared with 2014 and, apart from excursions under the Erasmus, CEEPUS, AKTION, and Norwegian Funds programmes, other sources of funding were also utilised, namely the TUL Mobility Fund. The foreign mobility of the faculty's students under various programmes increased in 2015, and increases in individual mobility categories were mainly due to the excursions of students under the Erasmus+, CEEPUS, Norwegian Funds, and AKTION programmes. The excursions of students under the IRP TUL were at the level of 2014. The foreign mobility of the faculty's staff increased under the CEEPUS, AKTION, Norwegian Funds, and TUL Mobility Fund programmes. Other foreign activities of students have declined as compared with 2014. Other foreign activities of academic staff have slightly increased as compared with 2014.

Thirty-four student study and attachment residencies with a duration of one semester were accomplished under the Erasmus+ programme, whereas most of the excursions fell under the mobility of bachelor students and follow-up study programmes.

- Two student residencies with a minimum duration one month were accomplished under the CEEPUS programme.
- Twelve excursions by academic staff were accomplished under the Erasmus+ and CEEPUS programmes; half were short-term instruction residencies with a duration of five days.
- Eighty-three residencies by foreign student from the European area were accomplished at the Faculty of Mechanical Engineering, TUL under the Erasmus+, CEEPUS, and IAESTE programmes, as were two residencies from Jordan and one from Japan under the IAESTE.
- Nineteen short-term instruction residencies of foreign academic staff were accomplished at the Faculty of Mechanical Engineering, TUL under the Erasmus+ and CEEPUS programmes; residencies with a duration of five days and less were dominant.
- Two short-term student trips were realised under the AKTION project.
- Four short-term academic staff trips were realised under the AKTION Programme.
- Two short-term student trips were realised under the Norwegian Funds project. Three reciprocal short-term stays of Norwegian students were realised at the Faculty of Engineering.
- Three short-term academic staff trips were realised under the Norway Funds project. Two reciprocal short-term residencies of Norwegian academic staff were realised at the Faculty of Engineering.
- Four student stays with a duration of one month or more were accomplished, as were two two-day student stays under the under the TUL Mobility Fund 2015.
- Two long-term stays of students under the TUL Mobility Fund 2014 were terminated.
- One two-month foreign student residency was accomplished at the Faculty of Mechanical Engineering, TUL under the TUL Mobility Fund 2015.
- Fourteen excursions by the academic staff were accomplished under the TUL Mobility Fund 2015.
- One short-term academic staff trip was realised under the CPR TUL 2015.
- Four short-term international academic staff stays were realised under the TUL Mobility Fund 2015.
- Two student foreign stays with a duration of one semester were initiated under the IRP Faculty of Mechanical Engineering, TUL 12208 in furtherance of 'TUL, as a significant partner in the international educational area, strengthen[ing] existing cooperation agreements with Canadian and American partner universities.'
- One six-week doctoral residency was accomplished at a foreign partner institution and was funded from other sources.
- Two scientific residencies of an academic staff member were accomplished with financial support from other sources (OP EC).
- The Faculty of Mechanical Engineering, TUL provided the instruction in select subjects for students who visited the FTE under the Erasmus+ programme.

Under the ERASMUS+ programme

- A total of forty-seven interinstitutional agreements with partner universities were in force, three of which were new agreements concluded in 2015.

Within the framework of cooperation in the European space

- A new contract was concluded with Østfold University College in Norway for the purpose of continuing cooperation in 2015.

Within the framework of cooperation in the Asian space

- A new contract was concluded with the Kazakh-British Technical University in Kazakhstan in 2015.
- A new contract was concluded in 2015 with King Mongkuts's University of Technology North Bangkok in Thailand.

The negotiation of additional bilateral agreements in the area of mutual exchanges of students, academic staff, and science and research commenced with the following university

- Apollo Engineering College in India.

Under the CEEPUS Programme

In 2015, the Faculty of Mechanical Engineering, TUL actively participated in three networks of the CEEPUS III programme.

- CIII-RS-0304 Technical Characteristics Researching of Modern Products in the Machine Industry (Machine Design, Fluid Technics, and Calculations) with the Purpose of Improving Their Market Characteristics and Placement on the Market.
- CIII-BG-0722 Computer Aided Design of Automated Systems for Assembling.
- CIII-RO-0013-10-1415 Teaching and Research of Environment-Oriented Technologies in Manufacturing.

PARTNERSHIPS AND COOPERATION

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

6 PARTNERSHIPS AND COOPERATION

Partnership and cooperation with scientific research institutions and partners from the industrial sector is one of the pillars of the faculty's stability.

6.1 Membership in Czech and international associations and organisations

Membership in institutions and organisations of an educational or professional character

- Association of the Deans of Technical Faculties
- Czech Society for Mechanics
- Automotive Industry Association
- Czech Society for Engineering Mechanics
- Association of the Glass and Ceramics Industry
- Confederation of Industry

Platforms and clusters

- Czech Hydrogen Technology Platform
- Automotive Industry Association
- Czech Technological Platform for Mechanical Engineering
- Josef Božek – Competence Centre for Automotive Industry
- CENEN
- 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 the universities and research organisations

Cooperation with universities and scientific research organisations covers a broad range of activities.

Queensland University of Technology Brisbane
Potential cooperation and exchange of students with QUT Brisbane in Australia was discussed in late February and early March led by doc. Karel Fraňa, Vice-Dean for External (international) Relations at the Faculty of Mechanical Engineering, TUL.

Education collaboration in mechanical engineering
As part of ongoing cooperation with Østfold University College in Norway, a two-day joint workshop was organised on 24 and 25 March at the Faculty of Mechanical Engineering, TUL. Liberec was visited by a delegation comprising the vice-dean of the Norwegian university, Prof Hong Wu; Mr Rino Nilsen; and three students. Prof Wu delivered several lectures during the workshop in which he gradually introduced Norway, Østfold University College, and that institution's mode of instruction. In the afternoon programme, students of both the partner university and the Faculty of Mechanical Engineering, TUL presented their scientific activities. As part of the workshop, tours were given of various laboratories of the Faculty of Mechanical Engineering, including those of the Department of Vehicles and Engines, the Department of Engineering Technology, the Department of Materials Science, the Department of Power Engineering Equipment, and the Department of Manufacturing Systems and Automation.
In April 2015, TUL students were guests of Østfold University College, where they presented their scientific activities and met and engaged in discussions with the Norwegian students. The aim of both institutions is to create conditions in both institutions that encourage a continuation of cooperatively exchanging students and academic staff even after completion of this initial project. Future agreements and mode of cooperation will be specified within the scope of a partnership and cooperation agreement.

Working visit to Østfold University College
Our academic staff and students participated in a second joint workshop, this time organised on the premises of Østfold University College from 20 to 23 April. The Vice-Dean of the Faculty

of Mechanical Engineering, Doc Karel Fraňa, presented our faculty to the academics and students of the Norwegian university. Ing Martin Borůvka, a doctoral student, acquainted the attendees with the issue of 'Green composite materials based on nanocellulose'. Two other students, David Svoboda and Tomáš Kořínek, presented their diploma thesis topics through posters, which are located in Østfold University College's Faculty of Mechanical Engineering. This workshop built on the first successful visit by the Norwegian partners to our faculty.

As part of the visit, a meeting was also held with the Dean of the Faculty of Mechanical Engineering, TUL of Østfold University College, Dr Kamil Dursun, and Vice-Dean Prof Hong Wu. One of the issues that was discussed in the workshop was the search for opportunities in the area of continuing cooperation, such as under the Erasmus+ programme.

Visit to TU Sofia
Between 23 and 26 May, representatives of the Faculty of Mechanical Engineering, TUL visited TU Sofia. Within the scope of the visit, a meeting was held with the Dean of TU Sofia's Faculty of Mechanical Engineering, Prof Dr Eng Lubomir Dimitrov, to discuss the issue of cooperation in the area of student and teacher exchanges under various mobility programmes. The opportunity for two PhD students from TU Sofia to study at the Faculty of Mechanical Engineering, TUL beginning in the 2015/2016 academic year was also discussed.

Within the framework of this visit, meetings also took place with the head of the international department, Dimitrinka Marguenova, MScEcon, on the matter of concluding a new interinstitutional contract under the Erasmus+ Programme and with the coordinator of the CEEPUS Programme at the TU of Sofia, PhD Eng Georgi Dinevem, on the topic of fulfilling quotas for the following academic year. The Faculty of Mechanical Engineering, TUL was represented at these meetings by Prof Petr Louda and Ing Marcela Válková.

Faculty mission to the Norwegian partner university
The student faculty missions undertaken at Høgskolen and Østfold University College in support of international faculty cooperation under the Norwegian Funds and EEA Fund (NF-CZ07-ICP-1-030-2014) programmes were successful.

Delegation from a Finnish Faculty of Mechanical Engineering
Between 2 and 5 June 2015, our faculty had the opportunity to welcome a three-member delegation from the Helsinki Metropolia University of Applied Sciences in Finland, an institution that the Department of Vehicles and Engines has been cooperating with for several years already. In the past, several month-long residencies by students of the Department of Vehicles and Engines have been accomplished at this partner university.

As part of the Finnish delegation's visit, presentations on the major areas of education, science, research, and foreign cooperation activities were given by both guest and host. An excursion was also organised to various laboratories of the Faculty of Mechanical Engineering, including those of the Department of Materials Science, Department of Manufacturing Systems and Automation, Department of Textile Machine Design, Department of Machine Elements and Mechanisms, Department of Engineering Technology, and the Department of Vehicles and Engines.

Visit from BTU Brandenburg University of Technology
Between 6 and 7 October 2015, we welcomed to our faculty a group of four students and three academics from the Brandenburg University of Technology (BTU) in Germany. The representatives of BTU were acquainted with various faculty laboratories, participated in professional lectures, and were led on an excursion to Magna.

Informal cooperation of the faculty's departments
The faculty's departments are cooperating with related workplaces in the Czech Republic and Slovakia at the scientific research and teaching levels. Members of the department meet regularly in committees for habilitation proceedings, doctoral dissertation defences, joint publications, and many other purposes.

Meeting of manufacturing machine departments and institutes
Between 3 and 4 September 2015, a gathering was held in Železná Ruda in Šumava which saw the participation of representatives of the Department of Glass Machinery and Robotics. The possibilities of potential future cooperation in the field of the design of robotics, manipulators,

peripheries, and automated equipment were discussed. The attendees exchanged opinions and experiences in teaching activities and discussed trends in the future of robotics.

Scientific research cooperation under projects and grants
The faculty participated, alongside other universities and various research organisations, in the solution of four scientific research projects.

Development cooperation under projects and grants
The faculty jointly participated with other universities in the solution of projects under the Education for Competitiveness Operational Programme.

Accredited cooperation in education
Accreditations awarded to the Faculty of Mechanical Engineering, TUL for the realisation of study programmes in cooperation with other institutions:

- The Institute of Thermomechanics of the Czech Academy of Sciences (IMC) awarded accreditation for a Mechanical Engineering doctoral study programme in the field of Materials Engineering. The programme features full-time and part-time study with a duration of four years with instruction in both Czech and English.
- The Institute of Macromolecular Chemistry of the Czech Academy of Sciences (IMC) awarded accreditation for a Mechanical Engineering doctoral study programme in the field of Materials Engineering. The programme features full-time and part-time study with a duration of four years with instruction in both Czech and English.

6.3 Conferences, symposia, and trade fairs

SESIA 2015
Between 9 and 11 September, the academic functionaries and secretaries of various mechanical engineering faculties in the Czech Republic and Slovakia met at Smolenice. The organiser of this year's event was the Faculty of Materials Science and Technology in Trnava, part of the Slovak University of Technology in Bratislava. The deans of the individual faculties assessed the condition of the faculty and the coming year's outlook. This was followed by a discussion primarily of demographic considerations, student numbers, and study successes. Other discussion topics included accreditation processes and other differences between the Czech Republic and Slovakia.

Meeting of secondary school headmasters with the management of the Faculty of Mechanical Engineering
On 16 September, the representatives of various secondary schools met the management of the Faculty of Mechanical Engineering, TUL at the Technical University of Liberec, which hoped to start a tradition of regular round table meetings to discuss selected topics on education, preparation of students for studying at universities, options for improving the quality of student instruction, and deepened cooperation between secondary schools and the faculty. The participants in the meeting declared their readiness to cooperate in the promotion of technical fields, sharing of information, mutual promotion, and professional preparation of students and staff.

Meeting of industrial enterprise representatives with the management of the Faculty of Mechanical Engineering, TUL
On 23 October, a meeting between the representatives of industrial enterprises and the leadership of the Faculty of Mechanical Engineering, TUL was held. This began the tradition of regular round-table meetings to discuss selected topics related to the education and training of students and improvements in the level of their professional preparation in compliance with the requirements of practice and future employers. The major topic of this year's meeting was the issue of cooperative education and the possibility of implementing longer-term apprenticeships of our students in industrial practice.

Final conference of the industry year campaign
This event was scheduled for 3 December in the Congress Centre Prague with the participation of government ministers, industry personalities, academic staff, and participants from other sectors. The Faculty of Mechanical Engineering, TUL was represented by the dean and vice-deans. The organisers requested that the Dean of the Faculty of Mechanical Engineering, TUL make a brief address.

21st Congress of the European Society of Biomechanics
A meeting of the world's leading biomechanics took place from 5 to 8 July in Prague and was attended by our academic staff. The Congress was organised under the patronage of the Czech Society of Biomechanics. The event was also co-organised by a team under doc. Lukáš Čapek of the Department of Applied Mechanics of the Faculty of Mechanical Engineering.
Participants included 600 individuals from forty-eight countries worldwide.

57th International Engineering Trade Fair
In Brno between 14 and 18 September, the Faculty of Mechanical Engineering represented TUL in conjunction with TU Brno and CTU Prague. Engineers were attracted by the prototype for manufacturing nanofibres by drawing using equipment that creates individual micro- and nanofibres by drawing from polymer drops with defined properties. Other interesting exhibits included an electric vehicle – an improved version with a new power train and design – as well as the special glasses through which we invited visitors 'into' the 3D laboratory of the Faculty of Mechanical Engineering, TUL via a smartphone application. We also offered demonstrations of successful applications such as a blow moulding machine and an apparatus for determining the limit states of sheet deformation.

12th Local Mechanical Properties
This event was organised between 4 and 6 November by the Department of Materials Engineering in cooperation with the TU in Košice and the University of West Bohemia in Plzeň.
Participants numbered 79, of whom 22 were foreign.

10th Experimental Fluid Mechanics 2015
The jubilee tenth year of the conference was organised by the Department of Power Engineering Equipment from 17 to 20 November in Kajserštejnský Palace in Prague. The conference was focused on research in the field of fluid mechanics, thermodynamics, environmental biomechanics, and techniques and ranks among the most prestigious events in the field of fluid mechanics in the Czech Republic and the EU as a whole. Participants were mostly scientific researchers from colleges, universities, academies of science, and research centres. The primary organiser is the Department of Power Engineering Equipment of the Faculty of Mechanical Engineering. This year, collaborating partners included the companies Cryptomania, TSI, LaVision, MIT, Mecas Esi, Dantec, and Lenam.
Participants numbered 250, including 180 foreign participants from twenty-five countries.

9th Manufacturing Systems Today and Tomorrow
The Department of Manufacturing Systems organised a conference at TUL between 26 and 27 November. This year's event was focused on manufacturing management.
Participants numbered 83, of whom 10 were foreign.

9th European Conference on Constitutive Models for Rubber (ECCMR) 2015
Scientists from Europe, the United States, Canada, and Japan gave lectures from 1 to 4 September at this conference focused on constitutive modelling of rubber, which was organised by our Department of Applied Mechanics. The conference is organised once every two years, and the Czech Republic was on the list of organisers for the first time. The Faculty of Mechanical Engineering, TUL chose the Hotel Diplomat in Prague as the venue of the meeting, which included nearly 150 female and male scientists from twenty-three countries.
Participants numbered 143, of whom 135 were foreign.

14th Conference on Glass Producing Machines
Organised every three years by the Department of Glass Machinery and Robotics on 17 September at TUL under the patronage of the Czech Glass Society. This year, a seminar entitled 'Metals in Glass Technologies' was organised alongside the conference. The participants this year included the representatives of the German company iProTec, the Slovak company RONA, and the Czech companies Kavalier Glass, Electroheat, and Nicolet, among others.
Participants numbered 66, of whom 6 were foreign.

41st International Conference of Departments of Transportation, Handling, Building Construction, and Agricultural Machines

This event was organised by the Department of Vehicles and Engines from 27 to 28 April. The conference was attended by representatives of Czech and Slovak universities and more than forty participants made presentations. The facilities for the conference were provided by SkiCentrum Harrachov. Lively discussions were held on relevant topics and an excursion to the local glassworks was also organised as part of the event's entertainment. Next year's conference will be organised by the TU Bratislava.
Participants numbered 46, of whom 15 were from Slovakia.

Conference on Laboratory Methods
The Department of Power Engineering Equipment organised this conference within the framework of the OP EfC project from 29 to 30 at Ještěd. The conference was focused on laboratory measurement, technical diagnostics of machines, and the collection and processing of data. The conference was organised for TUL staff and students under the TK MOST project. Participants numbered 56, and twenty-four articles were presented.

6.4 Cooperation with industrial practice

Forms of cooperation with industrial practice include scientific research and teaching activities.

Scientific research cooperation with the application sector under projects and grants
The faculty participated as a co-solver or main solver in the implementation of seven projects and, under the CNATI, participated in the implementation of four projects with industrial partners supported by the TA CR.

OP Enterprise and Innovation projects
The faculty participated in the solution of partial tasks within the scope of one project solved by an industrial subject as well as tasks within the Nanoprogress project/cluster (under CNATI/FTE).

Cooperation in project supported education
The faculty cooperated with industrial partners in the solution of projects under OP Education for Competitiveness.

Contractual scientific research activities
Supplementary scientific research activities are a significant segment of the faculty's activities. For details, see section 4.6.

Education of staff from industrial practice
The education of staff in the industrial sector is a significant segment of the activities of the Faculty of Mechanical Engineering. The overall framework of the lifelong education programme made up a total of 1,283 teaching hours in forty-seven courses attended by a total of 504 participants. The volume of funds obtained from this activity amounted approximately CZK 1.9 million.

Apprenticeship of students in enterprises
All the students in the faculty's bachelor's, master's, and, eventually, follow-up master's study programmes accomplished obligatory apprenticeships in various enterprises ranging from two to six weeks and applicable to their fields of study.

Bachelor's and master's theses
The assignment of bachelor's and diploma theses in cooperation with professionals from industrial enterprises is a standard activity of all departments of the Faculty of Mechanical Engineering.

Student excursions to industrial enterprises and institutes
In 2015, individual departments organised student excursions to the following industrial enterprises: Preciosa Ornela a.s. in Desná and Zásada; Tonak a.s.; Deprag CZ; ŠKODA AUTO a.s.; SKLOPAN LIBEREC a.s.; Modelárna Liaz spol. s r.o.; Denso Manufacturing Czech s.r.o.; Misan s.r.o.; Lucid spol. s r.o. in Jablonec nad Nisou; KSM Castings CZ a.s. in Hrádek nad Nisou; Komerční slévárna šedé a tvárné litiny Turnov a.s.; Matador Automotive ČR s.r.o. in Liberec; Magna Bohemia s.r.o. in Liberec; Ronal ČR s.r.o. in Jičín; Seco group a.s. in Jičín; Aerodynamics laboratory in Nový Knín (a branch of the Institute of Thermomechanics of the Czech Academy of Sciences); the Nuclear

Research Institute in Řež u Prahy; ZVVZ Milevsko (a supplier of ecological equipment); the Písek City Power Plant; the Lipno Hydropower Plant; the Temelín Nuclear Power Plant; and Mondi Štětí (paperworks).

Academic staff excursions
During the year, the academic staff participated in excursions to the following industrial companies: Tonak a.s.; Deprag CZ; Rieter CZ, s.r.o.; Inteva CZ, Trima; and Johnson Controls.

Expert guests from enterprises and institutions
A standard form of cooperation is lectures presented by experts in practice. In 2015, a total of fifteen external lecturers gave presentations on their individual subjects of expertise as part of the accredited study programmes. Other experts from the applied and academic sectors also gave addresses as part of various professionally focused seminars and lectures; see section 6.5 below.

6.5 Professional events and lectures

- **Seminars and workshops within the sustainability of the CREATex project**
  Ing Petr Lepšík, PhD: Invention principles – 16 February
  Ing Petr Lepšík, PhD: Trends in the evolution of technical systems – 17 February
- **Trends in metallic 3D print**
  The seminar took place on 23 April in the large auditorium of building G and presented the research activities of the Laboratory of Prototype Processes and Technologies. It was organised under the patronage of the Department of Manufacturing Systems and Automation. Attendees numbered 100.
- **Mechanics of deformable bodies, the finite elements method, and Matlab**
  For DSP students. Prof Okrouhlík of the Institute of Thermodynamics of the Czech Academy of Sciences delivered lectures to the DSP students – a cycle of eight three-hour lectures from April to June.
- **Problem of cavitation in power engineering**
  Prof Jean-Pierre Franc lectured at the Faculty of Mechanical Engineering, TUL on 27 April.
- **Utilisation of wastes in power engineering**
  Prof Jaroslav Hyžík delivered a lecture as part of the regular TST-P lectures on 21 April.
- **Gear measurement at ŠKODA AUTO a.s.**
  Ing Miroslav Hejcman of ŠKODA AUTO a.s. delivered a lecture at the Faculty of Mechanical Engineering, TUL on 28 April.
- **Cavitation and its application in technical practice**
  Ing Miloš Müller, PhD delivered a lecture as part of the regular TST-P lectures on 30 April.
- **Catastrophic blackout scenario**
  Ing Petr Novotný, CSc delivered a lecture as part of the regular TST-P lectures on 28 May.
- **TM and MT – tomography measuring methods, possibility for use in experimental turbosets**
  Professor Wang of the University of Leeds lectured at the Faculty of Mechanical Engineering, TUL on 5 May.
- **Measuring methods – impedance tomography**
  Dr David Krčmařík delivered a lecture at the Faculty of Mechanical Engineering, TUL on 11 May.
- **Power generation in Germany and the role of brown coal in the Lausitz Region**
  Prof Simon delivered a lecture at the Faculty of Mechanical Engineering, TUL on 7 October.
- **Non-destructive assessment of bone mechanical properties: from elasticity to damage**
  Prof David Mitton delivered a lecture at the Faculty of Mechanical Engineering, TUL on 10 November.

- **Machine Vision**
  Prof Remigius Labudzki delivered a lecture at the Faculty of Mechanical Engineering, TUL on 14 November.
- **Seminars and workshops within the sustainability of the INInet project**
  Doc Ivan Mašín, Ing Petr Lepšík, PhD, Ing Jan Pwetřík, PhD: Augmented Reality, 15 September
  Ing Petr Lepšík, PhD: Planning and management of joint projects – 7 December
  Ing Petr Lepšík, PhD: Search for innovation opportunities – 8 December
- **NOVELTIES 2015**
  The Department of Manufacturing Systems and Automation organised a seminar in cooperation with the company Dormer Pramet on 10 November on the novelties of 2015 in corrosion-resistant and difficult-to-machine materials. In addition to lectures on the tools used by this company and presentations by the department, a machining demonstration was performed on the Mazak Integrex 100-IV five-axis lathing-milling centre in the department's laboratory in building L.
- **New trends in simulation software**
  On 11 November, Pavel Hurník of MSC Software delivered a lecture on the possibilities of simulations and their application at the faculty.
- **ContiAcademy**
  Lectures and demonstrations of 3D printing and 3D scanning laboratories for the employees of Continental Automotive Czech Republic s.r.o. Trutnov were given on 24 November by the Department of Manufacturing Systems and Automation. Twenty-four participants were in attendance.

FACULTY DEVELOPMENT

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

7 FACULTY DEVELOPMENT

The faculty is developing in all areas of its operations with financial support from grants and projects.

7.1 Academic life, quality, and culture

Internal faculty development impulses

- Individual language courses and courses organised by the CDV TUL.
- Education of academic staff in academic skills and competences.
- Education of academic staff in professional courses.
- Higher education teachers.
- See table and text annexes 7.1.

QA of the activities

- The dean's regular monthly panel meetings represented by the vice-deans and the heads of the various department.
- The third meeting of the Scientific Council of the Faculty of Mechanical Engineering, TUL was organised.
- Four meetings of the Academic Senate of the Faculty of Mechanical Engineering, TUL were organised.
- One meeting of the academic community with the Dean of the Faculty of Mechanical Engineering, TUL was organised.

Graduate meetings

In 2015, graduates of the first graduating year and fourth graduating year met.

7.2 Infrastructure

At the beginning of 2015, all laboratory and teaching spaces of the Department of Glass Machinery and Robotics and the Department of Applied Mechanics were commissioned in building G, where they were relocated in September 2014 from building P; the Dean's Office was also relocated from building A.

Between January and August 2015, the laboratories of the Department of Engineering Technology were relocated from building E2 to the ground floor of building G.

In 2015, initial steps were taken for the reconstruction of building C. The Department of Power Engineering Equipment was relocated to temporary premises in building F.

The development of the laboratories and instruction rooms of the Faculty of Mechanical Engineering, TUL was funded as follows:

- FRIM – total for the departments CZK 1.77 million (DET, DPE, DVE, DTD)
- IRP TUL – CZK 250,000
- Gift from ŠKODA AUTO a.s. for development of the POWERTRAIN testing facility and Technical Diagnostics Lab – CZK 200,000
- OP EfC – in kind: equipment for instruction rooms with didactic aids, etc.

7.3 Development projects

Institutional Development Plan of TUL for 2015

Within the scope of IP TUL, the faculty solved four partial projects:

- Promotions and presentations of the Faculty of Mechanical Engineering, TUL
- TUL, as a significant partner in the international educational area, aims to strengthen existing cooperation agreements with Canadian and American partner universities
- Cooperative education at TUL
- Introduction of new subjects in the Biomedicine Engineering programme

7.4 Projects co-financed by EU structural funds

In 2015, involvement in projects funded under structural funds from the European Union continued, and all the projects so funded were successfully completed in this year.

OP Education for Competitiveness
In 2015, the Faculty of Mechanical Engineering, TUL continued solving five projects under the OP EfC, of which TUL saw four projects as a beneficiary and one project as a co-beneficiary, with a total grant volume of approximately CZK 10.26 million; see text annexe 7.4.

OP Research and Development for Innovations
In 2015, the solution of the project for Development of the Institute for Nanomaterials, Advanced Technologies, and Innovations (CNATI++) for the development of the built infrastructure continued, and the Faculty of Mechanical Engineering, TUL participated in its solution; see text annexe 4.7.

In 2015, the solution of the New Technologies and Special Machine Components project continued; see text annexe 4.9.

OP Enterprise and Innovation
The faculty continued solving two projects under the OP EI Innovations Programme for the protection of industrial rights, which were successfully completed in 2015; see text annexe 7.4.

The Faculty is a party to the solution of a scientific research project within the Nanoprogress cluster funded by the OP EI that is on record under CNATI/FTE.

EXTERNAL AND INTERNAL ASSESSMENT OF THE FACULTY

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

8 EXTERNAL AND INTERNAL ASSESSMENT OF THE FACULTY

External assessment of the faculty

- The external assessment of the quality of education can mainly be based on the accreditation procedure, the interest shown by graduates of the Faculty of Mechanical Engineering, and their engagement.
- In 2015, accreditation was awarded to the habilitation procedure and the procedure for the appointment of professors proceeded in the following fields: Technologies and Materials, Manufacturing Systems and Processes, Machinery and Equipment Design.
- Interest shown by the graduates of the Faculty of Mechanical Engineering, TUL is high and exceeds demand.
- These matters were discussed at the meeting of the Deans SESIA 2015.
- An annual assessment of the technical faculties of TUL was carried out by the editorial board of Hospodářské noviny.

Internal assessment of the faculty

- Regular annual assessment of the results of the operations of individual faculty workplaces was carried out, culminating in the presentation of the annual report on the operations of the departments.
- Effective 1 January 2015, the Department of Manufacturing Systems and Automation began operations. It was created by a merger of the Department of Manufacturing Systems and the Department of Cybernetics at the end of 2014.

Faculty management and control activities

- In compliance with Act No. 320/2001 Coll. (the Financial Control Act) and Implementing Decree No. 416/2004 Coll. (Rector's Guidelines on the Internal Control System), all types of management inspections were conducted in the Faculty of Mechanical Engineering, that is, preliminary, continuous, and post-inspections.
- This fact is documented by the minutes of the meetings of the faculty and the department heads, minutes from the individual control sessions, and reports on the control activities of the individual departments in 2015.
  The secretary of the faculty conducted regular training for the faculty budget managers.
- Continuous and follow-up checks of selected projects were conducted in the departments and control processes were carried out, such as the inventory of assets.
- The Annual Report of the faculty and its operations in 2014 was approved by the Academic Senate of the Faculty of Mechanical Engineering, TUL on 15 April 2015.

Important awards

The late professor Zdeněk Kovář was honoured by an award of honorary citizenship in memoriam by the Statutory City of Liberec in December. He passed away in 2014 at the age of 84. The award was presented to his wife Anastázia Kovářová by Mayor Tibor Batthyány at the ceremonial meeting of the representative council in the ceremonial hall of the City Hall.

Professor Kovář merged a significant part of his rich creative life with our Faculty of Mechanical Engineering. He was present at the beginning of university education in Liberec. He started teaching at the Technical University in 1953 as a fresh graduate of the CTU Faculty of Mechanical Engineering. He worked as Head of the Department for Piston-Driven Machines and founded the combustion engines laboratory. In the period after 1968, he was prohibited from working at universities. In 1970, he was stripped of his job and did not return to academia until 1990. He was first elected to the office of Dean of the Faculty of Mechanical Engineering, TUL and in autumn of 1990 to the office of Rector. He oversaw the beginning of the transformation of the College of Mechanical Engineering and Textiles into a university. It is mainly thanks to him that the first four faculties were successfully established and a university with a broader spectrum of scientific activities was created, offering technical education supplemented with humanities fields while retaining the character of a technical school.

Colleagues and friends from the home department, currently the Department of Vehicles and Engines, issued a memorial publication on the history of the department. This publication is currently also a memento of the personality of Professor Kovář and a commemoration of his importance to that department, the Faculty of Mechanical Engineering, and the university.

CONCLUSION

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

9 CONCLUSION

The faculty's activities in three major areas – education, scientific research, and creative activities – were varied in 2015 and covered a broad field. This is exactly what a university faculty must do and also what it must secure. The faculty was more successful in some activities and areas than in others, but it always made an effort to fulfil the tasks and objectives that will contribute to the future development of the faculty. The faculty also succeeded in spite of the fact that the legislation in force – namely the lack of a guided programme for the higher education system and bloated administration – are relatively significant obstacles to the development of the faculty and the performance of its activities.

It is for this reason that I once more would like to extend my thanks to all who put forth the effort to do their work well and to develop the faculty in spite of these problems.

Liberec, 30 March 2016

Prof. Dr. Ing. Petr Lenfeld
Dean
Faculty of Mechanical Engineering,
Technical University of Liberec

This annual report was approved by the Academic Senate of the Faculty of Mechanical Engineering, TUL on 15 April 2016.

TABLE ANNEXES

TECHNICAL UNIVERSITY OF LIBEREC
Faculty of Mechanical Engineering

TABLE ANNEXES

2.3 Faculty personnel structure

Table 2.3.1 Average adjusted numbers and qualification structure of employees as at 31/12/2015

Year	Academic Staff					Scientific staff	Other staff	Total
	Professors	Associate professors	Fellows	Assistants	Lecturers			
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

Table 2.3.2 (Physical) number and qualification structure of faculty staff

Year	Academic Staff					Scientific staff	Other employees	Total
	Professors	Associate professors	Fellows	Assistants	Lecturers			
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

Table 2.3.3 Age structure of the faculty's academic staff as at 31/12/2015

Age	Academic Staff										Scientific staff	
	Professors		Associate professors		Fellows		Assistants		Lecturers			
	Total	Wom	Total	Women	Total	Wom	Total	Wom	Total	Wom	Total	Wom.
Under 29	0	0	0	0	0	0	1	0	0	0	0	0
30–39	0	0	2	0	25	5	4	0	3	0	1	0
40–49	1	0	7	1	21	4	0	0	0	0	0	0
50–59	4	0	6	1	3	1	1	1	0	0	0	0
60–69	8	2	8	0	2	0	2	1	0	0	0	0
Over 70	7	0	4	0	1	0	1	0	0	0	0	0
Total	20	2	27	2	52	10	9	2	3	0	1	0

Table 2.3.4 Structure of the faculty's academic staff (employment agreements) by workload as at 31/12/2015

Scope workload in %	Total	Professors	Associate professors	CSc, Dr, PhD	Other
Under 0.3	17	8	1	7	1
Up to 0.5	9	2	3	2	2
Under 0.7	11	1	5	5	0
Over 0.7	74	9	18	36	11
Total	111	20	27	50	14

3.1 Accredited study programmes and fields

Table 3.1.1 Overview of accredited programmes and fields guaranteed by the FME

STUD PROG	Study programme	KKOV	Field of study	Accreditations to	Standard duration of study Form of study			
					B	M, N	P	F, A
B 2301	Mechanical Engineering			01/03/2019	3			P, K A
N 2301 (three-year)	Mechanical Engineering	2303T002	Engineering Technology *	31/10/2016		3		P, K A
		2302T002	Design of Machines and Equipment *	31/10/2016		3		P, K A
		2301T030	Manufacturing Systems *	31/10/2016		3		P, K A
		3902T021	Automated Control Cystems in Engineering *	31/10/2016		3		P, K A
		3901T003	Applied Mechanics *	31/10/2016		3		P, K, A
N 2301	Mechanical Engineering	3909T010	Innovative Engineering	01/11/2020		2		P, K A

(two-year)		2302T002	Design of Machines and Equipment	31/07/2020		2		P, K A
		2301T048	Engineering Technology and Materials	31/07/2020		2		P, K, A
		2301T049	Production Systems and Processes	31/07/2016		2		P, K, A
M 2301	Mechanical Engineering	3901T003	Applied Mechanics	31/03/2020		5		P, K, A
P 2301	Mechanical Engineering	3901V003	Applied Mechanics	01/03/2018			4	P, K A
		2301V031	Production Systems and Processes	10/02/2018			4	P, K A
		3911V011	Materials Engineering	10/02/2018			4	P, K A
P2302	Machinery and Equipment	2302V010	Design of Machines and Equipment	31/12/2017			4	P, K A
P2303	Engineering technology	2303V002	Engineering Technology	10/02/2018			4	P, K A

STUDPROG – study programme code
KKOV – study field code
B – bachelor's study programme
N – master's study programme building on the bachelor's study programme
M – master's study programme
P – doctoral study programme
* – only for completion
F – form of study: P – full-time study, K – part-time study
A – study programmes (fields of study) offered in the English language

3.2 Programmes in the English language

Table 3.2.1 Overview of accredited programmes and fields offered in the English language

STUD PROG	Study programme	KKOV	Field of study	Accreditations to	Standard duration of study Form of study			
					B	N	P	F, A
B2301	Mechanical Engineering			01/03/2019	3			P, K A
N2301 (3 years)	Mechanical Engineering	2303T002	Engineering Technology *	31/10/2016		3		P, K A
		3901T003	Applied Mechanics *	31/10/2016		3		P, K A
		3902T021	Automated Control Systems in Mechanical Engineering *	31/10/2016		3		P, K A
		2301T030	Manufacturing Systems *	31/10/2016		3		P, K A
		2302T010	Machines and Equipment Design *	31/10/2016		3		P, K A
N2301 (2 years)	Mechanical Engineering	3909T010	Innovation Engineering	01/11/2020		2		P, K A
		2301T048	Engineering Technology and Materials	31/07/2020		2		P, K A
		2302T010	Machines and Equipment Design	31/07/2020		2		P, K A
		2301T049	Manufacturing Systems and Processes	31/07/2016		2		P, K A

M2301	Mechanical Engineering	3901T003	Applied Mechanics	31/03/2020		5		P, K A
P2301	Mechanical Engineering	3901V003	Applied Mechanics	01/03/2018			4	P, K A
		2301V031	Manufacturing Systems and Processes	10/02/2018			4	P, K A
		3911V011	Materials Engineering	10/02/2018			4	P, K A
P2302	Machines and Equipment	2302V010	Design of Machines and Equipment	31/12/2017			4	P, K A
P2303	Engineering Technology	2303V002	Engineering Technology	10/02/2018			4	P, K A

STUDPROG – study programme code
KKOV – study field code
B – bachelor's study programme
N – master's study programme building on the bachelor's study programme
M – master's study programme
P – doctoral study programme
* – only for completion
F – form of study: P – full-time study, K – part-time study
A – study programmes (fields of study) accomplished in the English language

3.3 Interest in studies and admission conditions

Table 3.3.1 Applicants for study in bachelor's and master's study programmes in the academic year 2015/16

Code	Study programme	Number of candidates				
		Who have applied for registration	Enrolled for study	Enrolled after entrance examinations	Total enrolled	Enrolled
B2301	Mechanical Engineering (K)	160	152	0	152	137
B2301	Mechanical Engineering (P)	477	402	0	402	312
N2301	Mechanical Engineering (K)	36	27	2	29	29
N2301	Mechanical Engineering (P)	68	52	0	52	49
M2301	Mechanical Engineering (P)	7	4	0	4	2
P2301	Mechanical Engineering (K)	3	3	0	3	3
	Mechanical Engineering (P)	10	8	0	8	8
P2302	Machinery and Equipment (K)	4	4	0	4	4
	Machinery and Equipment (P)	7	7	0	7	7
P2303	Engineering Technology (K)	2	1	0	2	2
	Engineering Technology (P)	2	1	0	1	1
Faculty of Mechanical Engineering, TUL – Total		**776**	**662**	**2**	**664**	**554**

Note: P – full-time study, K – part-time study, PŘ- review of a decision

3.4 Numbers of students and graduates

Table 3.4.1 Number of foreign students enrolled as at 31/10/2015

KKOV	Study programme	Czech Republic			Foreign nationals			Total		
		P	K	Total	P	K	Total	P	K	Total
B2301	Mechanical Engineering	449	160	609	68	13	81	517	173	690
M2301	Mechanical Engineering	6	0	6	0	0	0	6	0	6
N2301	Mechanical Engineering	92	85	177	41	2	43	133	87	220
P2301	Mechanical Engineering	29	21	50	12	4	16	41	25	66
P2302	Machinery and Equipment	24	17	41	3	2	5	27	19	46
P2303	Engineering Technology	8	21	29	2	0	2	10	21	31
Faculty of Mechanical Engineering, TUL – Total		**608**	**304**	**912**	**126**	**21**	**147**	**734**	**325**	**1,059**

Table 3.4.2 Numbers of foreign students enrolled as at 31/10/2015

Type	Form	Year							Total
		1.	2.	3.	4.	5.	6.	7.	
Bachelor's	K	5	3	5					13
	P	45	11	12					68
Follow-up	K	1	1	0					2
	P	28	12	1					41
Master's	K	0	0	0	0	0			0
	P	0	0	0	0	0			0
Doctoral	K	0	3	2	0	1			6
	P	7	1	4	2	1	1	1	17
Total	**P + K**	**86**	**31**	**24**	**2**	**2**	**1**	**1**	**147**

Table 3.4.3 Numbers of students as at 31/10/2015 and numbers of graduates in 2015 (1 Jan 2015 to 31 Dec 2015)

Study programme	Number of students		Number of graduates	
	Full-time	Part-time	Full-time	Part-time
Bachelor's study programme	517	173	40	10
Master's study programme + NMP	139	87	101	28
Doctoral study programme	78	65	4	4
Total	**734**	**325**	**145**	**42**

Table 3.4.4 Overview of graduates according to study duration

Study programme	Form	Completion deadline	Number of graduates	Average duration of study
SME	P			
	P			
	K			
	K			
MSP total		0	**0**	**0**
NMSP	P	February 2015	6	3.67
	P	June 2015	96	2.69
	K	February 2015	1	4.00
	K	June 2015	26	2.92
NMSP total		February + June	**129**	**2.79**
Total MSP + NMSP		February + June	**129**	**2.79**
BSP	P	February 2015	3	4.33
	P	August 2015	37	4.24
	K	February 2015	3	7.67
	K	August 2015	7	5.86
BSP total		February + August	**50**	**4.68**
DSP	P		5	5.6
	K		3	9.00
DSP total			**8**	**6.88**
Total number of graduates (BSP, MSP, NMSP, DSP)			**187**	**3.43**

Table 3.4.5 Numbers of graduates by study programme and field 2005–2015

Programme Field Focus	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
B2341 Mechanical Engineering	**36**	**40**	**54**	**38**	**53**	**103**	**114**	**129**	**130**	**77**	–
Field Materials and Technologies	**15**	**27**	**37**	**18**	**20**	**40**	**41**	**53**	**60**	**30**	–
Focus Materials Engineering	6	12	13	4	6	16	16	13	12	4	–
Focus Machining and Assembly	1	2	–	2	–	7	4	20	14	7	–
Focus Engineering Metallurgy	2	2	2	3	4	5	12	5	11	5	–
Focus Metal and Plastic Moulding	6	11	22	9	10	12	9	15	23	14	–
Field Machinery and Equipment	**15**	**8**	**10**	**13**	**15**	**27**	**28**	**51**	**47**	**18**	–
Focus Transport Machinery and Equipment	8	5	5	7	11	11	21	22	28	9	–

Focus Energy Machinery and Equipment	2	2	2	–	2	8	6	9	5	1	–
Focus Glass Machinery	–	–	–	2	1	2	1	5	2	6	–
Focus Machine Building	5	1	3	4	1	6	10	15	12	2	–
Field Manufacturing Systems	**6**	**5**	**7**	**7**	**18**	**36**	**35**	**25**	**23**	**29**	–
Focus Engineering Informatics	–	1	1	–	–	2	1	3	2	1	–
Focus Production Management	5	4	6	5	15	16	14	17	12	14	–
Focus Manufacturing Systems	1	–	–	2	3	18	20	5	9	14	–
B2301 Mechanical Engineering									**6**	**30**	**50**
M2301 and N2301 Mechanical Engineering	**133**	**87**	**112**	**110**	**103**	**96**	**68**	**64**	**65**	**72**	**129**
Field Applied Mechanics	**5**	**6**	**5**	**3**	**4**	**6**	**4**	**1**	**6**	**9**	**3**
Focus Engineering Mechanics	4	5	4	1	4	6	2	–	4	8	2
Focus Fluid Mechanics and Thermodynamics	1	1	1	2	–	–	2	1	2	1	1
Field Automated Control Systems in Engineering	**14**	**10**	**2**	**7**	**4**	**4**	**3**	**4**	**3**	**1**	**2**
Focus Engineering Automation	14	10	2	7	4	4	3	4	1	–	2
Focus Automatic Control of Technical Processes	–	–	–	–	–	–	–	–	2	1	–
Field Design of Machines and Equipment	**41**	**36**	**46**	**33**	**22**	**34**	**18**	**15**	**19**	**19**	**23**
Focus Wheeled and Transport Handling Machines	18	14	18	12	10	14	6	5	7	4	5
Focus Machine Tools and Assembly Machinery	5	–	3	2	2	1	3	2	1	1	2
Focus Reciprocating Internal Combustion Engines	9	8	7	3	5	6	3	4	3	5	8
Focus Glass and Ceramic Machinery	4	1	7	–	4	6	3	1	1	–	2
Focus Heat Technology	3	6	10	10	–	3	2	3	3	4	5
Focus Textile machines	2	7	1	6	1	4	1	–	4	5	1
Field Engineering Technology	**61**	**30**	**56**	**55**	**50**	**32**	**24**	**23**	**17**	**20**	**20**
Focus Materials Engineering	19	17	8	13	8	15	8	4	2	5	4
Focus Machining and Assembly	19	7	11	9	13	8	6	2	9	5	4
Focus Engineering Metallurgy	7	5	10	16	9	7	6	3	2	3	3
Focus Metal and Plastic Moulding	18	10	22	22	13	9	9	14	4	7	9

Field Flexible Manufacturing Systems for Engineering Production	**12**	**5**	**3**	**8**	**10**	**11**	**9**	**11**	**7**	**10**	**6**
Field Innovative Engineering	**–**	**–**	**–**	**4**	**13**	**9**	**10**	**10**	**13**	**13**	**6**
Focus Product Innovation	–	–	–	4	13	9	10	10	13	13	6
Focus Process Innovation	–	–	–	–	–	–	–	–	–	–	–
Field Design of Machines and Equipment											**25**
Focus Textile Machine Design											5
Focus Glass Machinery and Robotics											3
Focus Manufacturing Machines											3
Focus Motor Vehicles											12
Focus Power Engineering Equipment											2
Focus Instrumentation											0
Field Engineering Technology and Materials											**36**
Focus Plastics Processing											10
Focus Casting, Welding, and Metal Forming											11
Focus Materials Engineering											6
Focus Machining and Assembly											9
Field Production Systems and Processes											**8**
Focus Manufacturing Systems											6
Focus Automated Control Systems											2
CELKEM P2301+P2302+P2303	**12**	**21**	**9**	**16**	**9**	**17**	**12**	**14**	**5**	**23**	**8**
P2301 Mechanical Engineering	**1**	**7**	**5**	**6**	**3**	**8**	**9**	**5**	**1**	**10**	**4**
Field Applied Mechanics	**–**	**4**	**3**	**1**	**–**	**5**	**4**	**2**	**–**	**3**	**2**
Focus Engineering Mechanics	–	4	3	–	–	5	3	1	–	2	–
Focus Fluid Mechanics and Thermodynamics	–	–	–	1	–	–	1	1	–	1	2
Field Materials Engineering	**–**	**–**	**1**	**3**	**2**	**2**	**4**	**3**	**–**	**5**	**1**
Field Production Systems and Processes	**1**	**3**	**1**	**2**	**1**	**1**	**1**	**0**	**1**	**2**	**1**
Focus Applied Cybernetics	1	1	2	–	–	1	–	–	1	1	1
Focus Automation of the Technical Preparation of Production	–	–	–	–	–	–	–	–	–	1	–

Focus Automation of Machines and Manufacturing Processes in Mechanical Engineering	–	1	–	–	–	–	–	–	–	–	–
Focus Manufacturing Systems with Industrial Robots	1	1	–	–	1	1	–	–	–	–	–
P2302 Machinery and Equipment	**7**	**6**	**2**	**5**	**2**	**3**	**1**	**3**	**3**	**10**	**1**
Field Design of Machines and Equipment	**7**	**6**	**2**	**5**	**2**	**3**	**1**	**3**	**3**	**10**	**1**
Focus Machine Elements and Mechanisms	–	2	2	1	–	1	–	2	1	1	–
Focus Wheeled Transport and Handling Machines	2	–	–	–	1	1	1	–	1	4	–
Focus Machine Tools and Assembly Machinery	–	1	–	–	–	–	–	–	–	1	–
Focus Reciprocating Internal Combustion Engines	–	–	–	2	1	1	–	1	–	1	–
Focus Glass and ceramic Machinery	3	–	–	2	–	–	–	–	–	–	–
Focus Technical Diagnostics of Machines	–	1	–	–	–	–	–	–	–	–	–
Focus Textile and Sewing Machines	2	2	–	–	–	–	–	–	–	3	–
Focus Thermal Equipment	–	–	–	–	–	–	–	–	1	–	1
P2303 Engineering Technology	**4**	**8**	**2**	**5**	**4**	**6**	**2**	**6**	**1**	**3**	**3**
Field Engineering Technology	**4**	**8**	**2**	**5**	**4**	**6**	**2**	**6**	**1**	**3**	**3**
Focus Materials Engineering	1	3	1	–	–	–	–	–	–	–	–
Focus Machining and Assembly	–	–	–	–	1	1	–	–	–	1	1
Focus Casting	–	3	1	2	1	1	2	3	–	1	–
Focus Welding	–	–	–	1	–	2	–	–	–	–	–
Focus Metal Forming	3	2	–	1	2	2	–	3	–	–	–
Focus Plastics Processing	–	–	–	1	–	–	–	–	1	1	2
Annual total	**181**	**148**	**175**	**164**	**165**	**216**	**194**	**207**	**206**	**202**	**187**

Table 3.4.6 Numbers of students in doctoral study programmes as at 31/10/2015

Department	Full-time	Part-time	Total	Defended in 2015
KMP	5	1	6	0
KSP	9	18	27	2
KMT	17	9	26	1

KEZ	11	6	17	3
KST	6	6	12	0
KOM	1	5	6	1
KVM	10	8	18	0
KSR	4	0	4	0
KTS	6	2	8	0
KSA	8	11	19	1
Total	**77**	**66**	**143**	**8**

3.6 Scholarships

Table 3.6.1 Scholarships paid in 2015

Scholarship type	Number of students
For excellent study results	96
For excellent research, development, or other creative results contributing to the deepening of knowledge	247
Due to a difficult social situation	9
Accommodation scholarship	438
In support of study abroad	26
In support of study in the Czech Republic	54
To students in doctoral study programmes:	55
Total	**925**

Table 3.6.2 Other scholarships paid in 2015

Scholarship funds	Scholarship type	Amount (thousands of CZK)
State budget	To students in DSPs	3,607
State Budget – Government Scholarships	To foreign students	644
Scholarship Fund of the Faculty of Mechanical Engineering, TUL		5,322
	Of which: Merit Scholarships Extraordinary Scholarships In support of study abroad In support of study in the Czech Republic	 1,826 1,814 599 1,083
Others (SGS, IP, grants, gifts)		2,969
Total		**12,542**

3.9 Quality of instruction

Table 3.9.1 Publishing activities in 2015

Year	Number of published titles							
2015	Book Czech language	Book AN	Instructional text	Web application	Textbooks Czech language	Textbooks foreign language	Didactic aid	Exp. equipment
Total	6	1	5	1	25	2	15	–

Documented in detail in the annual reports of the individual departments.

3.10 Lifelong education

Table 3.10.1 CŽV courses in 2015 – education for the corporate sector

Technical sciences and disciplines		
Scope of the course	Number of courses	Number of participants
15 hours or under	15	174
16–100 hours	31	313
101 hours and over	1*	17

*Master's school.

4.1 Scientific research activities

Table 4.1.1 Total grants for scientific and research activities in 2015

Resources	Share (%)	Grants (thousands of CZK)		
		NIV	INV	Total
Institutional support	63.4	28,820	–	28,820
Grant support	22.6	10,268	–	10,268
Support for specific research (SG)	14.0	6,388	–	6,388
Total		45,476	**–**	45,476
Of which: done by co-solvers		951		951
Non-public resources		+ 615		+ 615

Table 4.1.2 Development of financial resources for scientific research activities

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
(millions of CZK)	69.3	74.1	79.1	76.2	64.9	73.7	57.1	59.7	63.5	44.5
of which: INV				4.9	3.9	5.8	2.9	4.7	2.8	
of which: non-public				2	1.8	2.1	0.9		0.5	0.6

4.4 Scientific research projects

Table 4.4.1 Overview of scientific and research projects solved in 2015

Provider	Programme	FME, TUL in the position of		Of which: in 2015	
		Beneficiary	Co-beneficiary	End of solution	Start of solution
Grant Agency of the Czech Republic	GA – Standard projects	0	2	1	0
TACR	ALFA (2011–2016)	1	5	3	0
TACR	EPSILON (2015–2025)	0	1	0	1
EU/Ministry of the Environment	LIFE+	1	0	0	0
Total		**2**	**8**	**4**	**1**

4.4.2 Grants for scientific and research projects in 2015 – Faculty of Mechanical Engineering

Provider	Programme	Grants (thousands of CZK)		
		NIV	INV	Total
Grant Agency of the Czech Republic	GA – Standard projects	1,669	–	1,669
TACR	ALFA (2011–2016)	7,048	–	7,048
TACR	EPSILON (2015–2025)	1,551	–	1,151
Ministry of the Environment Czech Republic / EU	LIFE+	0	–	0
Total support		10,268	–	10,268
Of which: done by co-solvers				951

4.4.3 Grants for scientific and research projects in 2015 – CNATI TUL

Provider	Programme	Grants (thousands of CZK)		
		NIV	INV	Total
TACR	ALFA (2011–2016)	4,129	–	4,129
TACR	TE Competence Centres (2012–2019)	1,165	–	1,165
TACR	EPSILON (2015–2025)	1,686	–	1,686
MEYS Czech Republic	NPU			
Total		**6,980**		**6,980**

Note: Projects solved by the academic staff of the Faculty of Mechanical Engineering, TUL – submitted under CNATI.

Table 4.4.4 Development of the tied grants for scientific research projects of the Faculty of Mechanical Engineering, TUL (grants and specifics)

Source (thousands of CZK)	Year								
	2007	2008	2009	2010	2011	2012	2013	2014	2015
Tied Grants of the FME	10,269	19,552	76,186	63,783	49,431	39,349	35,884	34,590	15,700
Of which non-public funds	1,800	1,200	2,000	900	749	900	*	499	615

* Note: In previous years, the contractual research project of the Department of Glass Machinery and Robotics, AR, and Centre were calculated.

4.4.5 Grants for scientific research projects in 2015 – share of the solution of projects under other components of TUL

Provider	Programme	Grants (thousands of CZK)		
		NIV	INV	Total
TACR	ALFA (2011–2016)	282	–	282
TACR	EPSILON (2015–2025)	259	–	259
Ministry of Health of the Czech Republic	Programme for support of applied medical research	123	–	123
Ministry of the Interior of the Czech Republic	Security research	252	–	252
MEYS	GESHER/MOST	184	–	184
Total		1,100	**–**	1,100

4.5 Student grant contest

Table 4.5.1 List of projects in the student grant contest in 2015

Int. ID.	Name of the project Solver	Solution time	Grants (thousands of CZK)
21000	Experimental and numerical research in the mechanics of fluids, thermodynamics, and heat-sharing Ing. Petra Dančová, PhD	2013–2015	501
21001	Research and development of the control systems of pneumatic, hydraulic, and electrical elements Ing. Radek Votrubec, PhD	2014–2016	250
21002	Research of new materials and treatment procedures for use in medical practice, structures with shape memory, composites, and optimisation of mechanical and mechatronic systems Ing. David Cirkl, PhD	2013–2015	301
21003	Modern trends in materials engineering Prof. Ing.Petr Louda, CSc.	2013–2015	472
21004	Research in the processes of machining and assembly in terms of improving their quality Ing. Jaroslav Votoček	2013–2015	208

21005	Research on effects of process quantities on the quality of the resulting products of technological processes Ing. Jaromír Moravec, PhD	2013–2015	716
21006	Research and development in the field of automation, robotisation, and glassmaking machines Ing. Vlastimil Hotař, PhD	2013–2015	259
21007	Innovation of the product and equipment in engineering practice Prof. Ing. Ladislav Ševčík, CSc.	2013–2015	484
21008	Research on the structures and processes of textile and single-purpose machines Ing. Jiří Komárek	2013–2015	389
21009	Development and testing of vehicles and their components Ing. Robert Voženílek, PhD	2013–2015	579
21010	Comprehensive optimisation of manufacturing systems and processes Ing Petr Zelený, PhD	2013–2015	264
21012	Research and development of nanofibre-making machines Ing Jan Valtera	2013–2015	526
21013	The possibilities for use of higher alcohols as a quick replacement for petrol Ing. Martin Pechout	2013–2015	249
21014	Monitoring of dimensional objects by 3D scanning and their evaluation Ing. Radek Havlík	2013–2015	268
21070	Development of equipment for production of nanofibre yarn and its optimisation for ophthalmological implants Ing. Andrii Shynkarenko	2015–2016	250
21071	Development and production of a compatible prototype DLP 3D printer Ing Iaroslav Kovalenko	2015–2017	365
21072	Determining the forces on the spine of a cutting tool Ing Andrey Dugin	2015	167
21016	SGS – DFS organisation	2015	161
Faculty of Mechanical Engineering, TUL – Total			**6,408**

4.6 Contractual research and development

Table 4.6.1 Overview of revenues from contractual and supplementary activities in 2015

Department	Contractual research under the Faculty of Mechanical Engineering (thousands of CZK)		Contractual research under CNATI (thousands of CZK)		DČ under the FME (thousands of CZK)	DČ under the CNATI (thousands of CZK)
	N	U	N	U		
DAM	171.5	146.0	–	–	14.6	–
DET	–	1,687.9	–	–	999.6	–
DMS	–	–	–	–	255.6	–
DPE	165.3	2,550.9	–	–	–	–

DMM	511.5	1,600.9	–	631.0	–	45.0
DMA	–	–	–	–	71.0	–
DVE	–	1,574.3	–	2,599.4	292.6	–
DGE	26.0	120.0	–	325.0	–	–
DTD	48.6	237.5	–	–	79.9	300.0
DMA	304.0	489.0	40.2	–	–	–
Total	1,226.9	8,406.5	40.2	3,555.4	1,713.3	345.0

Note: U – results shall be applied in RIV; N – results shall not applied in RIV.

Table 4.6.2 Development of the volume of funds from contractual research and supplementary activities

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Revenue (thousands of CZK)	13,502	11,720	11,597	9,499	9,600	8,171	8,131	9,373	12,115	11,692
Share of the profit on the revenues (%)	10.6	16.9	17.7	16.5	22.2	22.1	22	29	21.5	20.2

4.9 Results of scientific research and development activities

Table 4.9.1 Assessment of Faculty of Mechanical Engineering, TUL results according to Methodology 2014 (assessed period 2009–2013)

Evaluation of the results of research organisations in 2014			
Export data for the organisation: Technical University of Liberec/ Faculty of Mechanical Engineering			
	Number of results	Result points	Points adjusted according to Annexe No. 8 – Methodology
Pillar I	347.862	4,361.007	4,392.981
Pillar II *			1,171.074
Pillar III			1,263.500
H12apl	232.463	10,645.182	6,399.792
Overall evaluation			13,227.347
*Pillar II for 2013 was initiated with an allocation of 1/9 of the total points of Pillar I, Pillar III, and points for applied research results from the previous evaluations. For 2014, this allocation was reduced by 10%.			

Table 4.9.2 Allocation of points to faculty workplaces according to Methodology 2014 (assessed period: 2009–2013)

Workplaces	Year					Total	Share (%)
	2009	2010	2011	2012	2013		
2190-DAM	204.49	173.30	197.93	273.92	142.56	992.21	8.26
2200-DET	115.20	931.54	738.39	236.08	365.06	2386.27	19.86
2210-DMS	321.33	264.56	302.24	410.52	101.32	1399.97	11.65
2220-DPE	102.42	312.30	390.6	112.90	183.57	1101.79	9.17
2310-DAC	462.40	113.83	216.86	6.21	1.89	801.18	6.67
2340-DMM	417.55	319.66	279.74	50.26	61.53	1128.73	9.39

2360-DMA	123.34	55.25	75.89	55.82	229.89	540.18	4.50
2370-DVE	425.48	152.10	574.69	148.62	135.88	1436.78	11.96
2380-DGR	425.73	210.81	125.29	24.51	54.43	840.76	7.00
2390-DTD	394.80	132.37	205.93	79.00	168.22	980.32	8.16
2400-DMA	136.67	59.32	124.66	0.00	86.45	407.10	3.39
KSA	599.07	173.16	341.52	6.21	88.33	1208.29	10.06
Total	3129.4	2725.0	3232.2	1397.8	1530.8		
	12015.30						

Table 4.9.3 Allocation of points to faculty workplaces according to Methodology 2013 (assessed period 2013)

Distribution of the results by individual workplaces for the results of 2013					
	Pillar I	Pillar III patents	Pillar III projects	Total	Share (%)
DAM	57.689	0.000	84.874	142.563	9.31
DET	101.804	0.000	263.260	365.064	23.85
DMS	80.085	0.000	21.231	101.316	6.62
DPE	84.545	0.000	99.028	183.573	11.99
DMM	0.000	47.143	22.032	69.175	4.02
DMA	220.623	0.000	9.264	229.887	15.02
DVE	84.065	18.000	33.818	135.883	8.88
DGR	52.641	0.000	1.792	54.433	3.55
KTS	20.485	49.000	98.736	168.221	10.99
DMA	71.835	0.000	16.495	88.330	5.77
Total	773.772	114.143	650.530	1530.795	100

Table 4.9.4 Allocation of points to faculty workplaces according to the methodology of the Faculty of Mechanical Engineering, TUL (assessed period 2013)

Publishing results according to the methodology of the Faculty of Mechanical Engineering, TUL for 2015									
Department	Type of result in the RIV								
	B Professional book	D Article in the collection			J Article in a professional periodical				Total
		D	neu	Total	Jimp	Jsc	neu	Total	
DPE	2.878	68.703	8.500	77.203	6.574	6.89	6	19.464	99.545
DAC		1.603	5.000	6.603			1	1	7.603
DAM		33.989	4.250	38.239	24.7		1	25.7	63.939
DMS		17.619	7.500	25.119	30.584	31.882	19.4	81.866	106.985
DMA			0.500	0.499	162.258	58.364	2	222.623	223.123
DET		30.34	8.500	38.839		71.464	8.6	80.064	118.904

DGR		1.261		1.261		1		1	2.261
DMM			9.083	9.083			3	3	12.083
DTD			1.665	1.666	20.485			20.485	22.152
DVE		4.009	8.500	12.509	51.951	17.818	4	73.769	86.278
DMA		70.232	7.000	77.232					77.232
Total	2.878	227.756	60.499	288.256	296.552	187.418	45	528.971	820.105

5.2 International cooperation in education

Table 5.2.1 Overview of cooperation underpinned by interinstitutional agreements 2015

Type of contract Country	Partner institutions
Interinstitutional cooperation	
Brazil	Pontifícia Universidade Católica do Rio de Janeiro
Bulgaria	Technical University of Sofia
Indonesia	Diponegoro University
Kazakhstan	Kazakh-British Technical University
Norway	Østfold University College
Romania	'Gheorghe Asachi' Technical University of Iasi
SG	Trenčianska univerzita Alexandra Dubčeka
Serbia	University of Novi Sad
Germany	Hof University of Applied Sciences
India	Kumaraguru College of Technology
Taiwan	National Taiwan University
USA	Northern Illinois University
Canada	University of Waterloo, Ontario
Canada	Conestoga College Institute of Technology and Advance Learning, Ontario
Thailand	King Mongkuts's University of Technology North Bangkok
Vietnam	Nha Trang University, Faculty of Mechanical Engineering
Contracts with institutes	
PL	Institute for Engineering of Polymer Materials and Dyes, Torun
USA	ATCC – negotiation of a Materials Transfer Agreement is in progress
Erasmus – bilateral contracts	
See table 5.3	47 institutions
Total	**65**

5.3 International cooperation in the area of scientific research

Table 5.3.1 Overview of international projects

Provider	Programme	Number	Foreign partner	Type of cooperation
MEYS	7MB	1	Technical University Košice	Mobility R&D
MEYS	Norway Funds	1	Østfold University College	Institutional
MEYS	AKTION	1	Technische Universität Graz	Mobility R&D

Note: Mobility R&D projects – with objective to establish R&D cooperation.

5.4 International mobility

Table 5.4.1 Foreign mobility under various programmes in 2015

Programme	ERASMUS			CEEPUS	IAESTE	AKTION	Norway Funds
	C	U	Z				
Number of dispatched students	34*	24	10	2	0	2**	2***
Number of students enrolled	73	52	21	5****	8	0	3*****
Number of dispatched acad./other staff	9******	9	0	3	0	4*******	3********
Number of received acad./other staff	16*********	16	0	3	0	0	2**********
Total	**132**	**101**	**31**	**13**	**8**	**6**	**10**

C – total, U – completed, Z – started
* of which: 5 PhD, 1 residency shorter than 28 days in 2015
** PhD students, residencies shorter than 28 days in 2015
*** PhD students, residencies shorter than 28 days in 2015
**** of which: 2 PhD
***** inbound residencies shorter than 28 days in 2015
****** of which: 6 outbound residencies of duration 5 days
******* 2 outbound residencies of 2 academic staff members shorter than 5 days
******** of which: 2 outbound residencies of 1 academic staff member, 1 outbound residency shorter than 5 days, excluded 2 outbound residencies under the project of the Norwegian Fund project under the CxI
********* of which: 9 inbound residencies shorter than 5 days and 3 inbound residencies of duration = 5 days
********** inbound residencies of duration 5 days

Note: Including the residencies of students that started in the preceding year and residencies shorter than 4 weeks (28 days) and residencies of academic/other staff of duration shorter than 5 days.
Norwegian funds – Faculty of Mechanical Engineering, TUL Project NF-CZ07-ICP-1-030-2014.

Table 5.4.2 Other international activities not included in programmes in 2015

Activity	Conference Active attendance	Conference Passive attendance	Meeting about cooperation	Other
Students dispatched	8	8	4	20*
Students received	6	0	0	7**
Acad./other staff dispatched	30	11	25	26***
Acad./other staff received	23	0	1	2****
Total	**67**	**19**	**30**	**55**

* fairs, professional courses, parallel study, miscellaneous
** of which: 3 residencies, of which 1 residency shorter than 28 days in 2015; 4 workshops
*** professional internships, fairs, training, miscellaneous, of which: 7 outbound residencies of other staff
**** workshop

Table 5.4.3 Mobility within the scope of government scholarships, development projects, other funds in 2015

Programme	Government scholarships	Development projects	Other Sources	Self-payers
Number of dispatched students	1	10*	6**	0
Number of students enrolled	5***	1****	0	26*****
Number of dispatched acad./other staff	0	15******	9*******	0
Number of received acad./other staff	0	4********	1*********	0
Total	**6**	**30**	**16**	**26**

***** 6 students supported under the IRP TUL Mobility Fund 2015 – of which: 2 outbound residencies shorter than 28 days, 2 outbound residencies terminated under the TUL Mobility Fund 2014, 2 students supported under the IRP Faculty of Mechanical Engineering, TUL 12208.

** 1 internship under the OP VK, 2 outbound residencies under the MOBILITY project, 3 outbound residencies under Medetox

*** Selma Kunosic, Mohamed Kabl, Anjelynn Guanlao, Shehab Hasan Attia – NMSP study, Alina Sutygina – internships

**** IRP TUL Mobility Fund 2015

***** of which: 23 students – NMSP and PhD studies, 3 students – internships

****** 14 under the TUL Mobility Fund 2015, of which: 8 outbound residencies shorter than 5 days, 1 CRP

******* 1 outbound residency under the post doc project, 2 outbound residencies under the OP VK project, 2 outbound residencies under the project Medetox, 2 residencies under MOBILITY and 2 residencies under project 17170

******** inbound residencies under IRP TUL Mobility Fund 2015, of which: 2 inbound residencies shorter than 5 days, 1 inbound residency duration 5 days

********* termination of 1 residency under the post-doc project

Table 5.4.4 Mobility only under programmes by country in 2015

Country	Number of dispatched students	Number of students received	Number of staff dispatched	Number of staff received
Belgium	2 (Erasmus) + 1 (FOM)		1 (FOM, shorter than 5 days)	
Bosnia and Herzegovina		1 (government scholarship)		
Brazil		2 (self-payer)		
Bulgaria	1 (CEEPUS)	1 (Erasmus) + 1 (CEEPUS)	1 (CEEPUS) + 3 (FOM, shorter than 5 days)	3 (Erasmus) + 2(CEEPUS)
China	1 (government scholarship)			
Montenegro		1 (CEEPUS)		
Egypt		2 (government scholarship)		
Philippines		1 (government scholarship)		
Finland	2 (Erasmus)		1 (FOM)	3 (Erasmus, shorter than 5

				days)
France	3 (Erasmus, of which: 1 residency of duration under 28 days) + 2 (FOM)	12 (Erasmus)	2 (Erasmus, of which: 1 residency of duration 5 days)	1 (Erasmus, shorter than 5 days) + 1 (FOM, shorter than 5 days)
Croatia		1 (IAESTE)		
India		16 (self-payer)		1 (other funds)
Italy	1 (Erasmus) + 3 (Medetox)		1 (FOM, shorter than 5 days) + 2 (other funds)	
Japan		1 (IAESTE)		
Jordan		2 (IAESTE)		
Canada	2 (IRP 12208)			
Kosovo		2 (CEEPUS) + 2 (self-payers)		
Cyprus		1 (IAESTE)		
Lithuania		7 (Erasmus)	1 (Erasmus, residency of duration 5 days)	
Hungary		1 (Erasmus)		
Germany	6 (Erasmus) + 1 (other sources)	3 (Erasmus) + 1 (self-payer)	1 (Erasmus, residency of duration 5 days) + 2 (FOM, residency of duration under 5 days) + 2 (other funds)	1 (Erasmus, residency of duration over 5 days) + 2 (FOM, residency of duration less than or equal to 5 days)
Netherlands			1 (other funds)	
Norway	2 (Norwegian Funds, shorter than 28 days)	3 (Norwegian Funds, shorter than 28 days)	3 (Norwegian Funds,1 outbound residency of duration 5 days)	2 (Norwegian Funds, of duration 5 days)
New Zealand			1 (FOM)	
Poland		6 (Erasmus) + 1 (IAESTE) + 1 (self-payer)	1 (CEEPUS) + 1 (FOM) + 2 (other funds)	1 (Erasmus) + 1 (CEEPUS)
Portugal	9 (Erasmus)	17 (Erasmus)		2 (Erasmus, 1 of duration 5 days, 1 of duration shorter than 5 days)
Austria	2 (AKTION, of duration shorter than 28 days)		4 (AKTION, 2 academics, 2 outbound residencies shorter than 5 days)	
Romania			1 (CEEPUS)	
Russia		1 (government scholarship)		
Greece		2 (Erasmus)	1 (FOM, shorter than 5 days)	
Slovak Republic	1 (Erasmus) + 1 (CEEPUS) + 2 (other funds)	2 (Erasmus) + 1 (CEEPUS)	3 (Erasmus, of duration 5 days) + 1 (FOM, incl. Poland) + 2 (other funds)	3 (Erasmus, shorter than 5 days)

Slovenia			1 (FOM)	
Serbia		1 (IAESTE)		
Spain		5 (Erasmus)	1 (Erasmus)	
Sri Lanka	1 (FOM, duration shorter than 28 days)			
Switzerland	1 (FOM)	1 (IAESTE)		
Thailand	3 (FOM, 1 of duration shorter than 28 days)	1 (FOM) + 1 (self-payers)		1 (FOM)
Turkey	10 (Erasmus)	17 (Erasmus) + 1 (IAESTE) + 1 (self-payer)	1 (Erasmus)	2 (Erasmus, of duration 5 days)
United Kingdom			1 (CRP)	
Vietnam		2 (self-payer)	1 (FOM)	

Note: Including the residencies of students that started in the preceding year and residencies shorter than four weeks (28 days) and residencies of academic/other staff of duration shorter than 5 days.

Table 5.4.5 Development of foreign mobility and other activities

Activity	Number of outbound and inbound residencies in								
	2009	2010	2011	2012	2013	2014	2015		
	Total	Total	Total	Total	Total	Total	P	OA	C
Students dispatched	56	80	91	56	68	111	57*	40	94
Students received	25	44	54	52	78	98	121**	13	134
Acad./other staff dispatched	120	147	95	108	137	117	43***	92	135
Acad./other staff received	63	71	229	31	50	51	26****	26	52
Total	**264**	**342**	**469**	**247**	**333**	**377**	**247**	**171**	**418**

C – total; OA – other activities

P – under the programmes

* of which: 10 outbound residencies – IRP, 1 outbound residency – government scholarship and 6 outbound residencies – other funds

** of which: 5 government scholarships, 1 inbound – IRP, 26 inbound – self-payers

*** of which: 14 IRP, 1 CRP, 9 other funds

**** of which: 4 IRP, 1 other funds

7.1 Academic life, quality, and culture

Table 7.1.1 Overview of additional educational courses for the FME, TUL staff in 2015

Character of courses	Number of courses	Number of participants
Focused on teaching skills	2	9
Courses focused on general skills including language skills*	11	46
Professional courses	25	47

* Dominant language courses.

7.3 Development projects

Table 7.3.1 Faculty of Mechanical Engineering, TUL partial projects

Int. number	Faculty of Mechanical Engineering, TUL project name Solver/workplace	Allocated funds (thousands of CZK)		
		INV	NIV	Total
12203	Faculty of Mechanical Engineering, TUL promotions and presentations Prof Dr Ing Petr Lenfeld, RNDr Iveta Lukášová / DFS	0	513	513
12208	TUL, as a significant partner in the international educational area, strengthened existing cooperation agreements with Canadian and American partner universities Ing Marcela Válková / DFS	0	210	210
12161	Cooperative education at TUL Ing Ivo Matoušek, PhD / DFS	0	80	80
12175	Introduction of new subjects in the field of Biomedical Engineering Ing Vlastimil Hotař, PhD / Department of Glass Machinery and Robotics	253	51	304
Faculty of Mechanical Engineering, TUL – Total		253	854	1,107,000

7.4 Projects co-financed by EU structural funds

Table 7.4.1 Involvement in OP EfC – TUL (FME) projects – beneficiary

Registration number	Name of the project	Implementation
CZ.1.07/2.2.00/28.0311	TK MOST – Improvement of the technical competences of graduates in industrial practice	2013–2015
CZ.1.07/2.2.00/28.0321	CREATex	2012–2015
CZ.1.07/1.1.22/01.0001	Unexcused absences	2012–2015

Table 7.4.2 Involvement in OP EfC – TUL (FME) projects – co-beneficiary

Registration number	Name of the project	Implementation
CZ.1.07/2.3.00/45.0030	Most education	2014–2015
CZ.1.07/2.3.00/20.0139	Building an excellent scientific team for experimental and numerical modelling in fluid mechanics and thermodynamics	2012–2015

TEXT
ANNEXES

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Faculty of Mechanical Engineering

TEXT ANNEXES

2.4 Professorship and habilitation proceedings

Professorship proceedings

First name and surname:	**doc. Ing. Petr Paščenko, PhD**
Workplace:	Faculty of Transport Engineering, University of Pardubice
Field:	Applied Mechanics
Professor's lecture topic:	Stability of thin-walled shell structures – spherical cap with trim ring
Commencement of proceedings:	18/11/2013
Defended before the Scientific Council, FME, TUL:	28/01/2015
Date of appointment:	01/11/2015

First name and surname:	**doc. Dr. Ing. Pavel Němeček**
Workplace:	Faculty of Mechanical Engineering, TUL, Department of Vehicles and Engines
Field:	Design of Machines and Equipment
Professor's lecture topic:	Acoustic absorption in automotive constructions
Commencement of proceedings:	31/03/2015 to date
Defended before the Scientific Council FME, TUL:	07/10/2015
Date of appointment:	

First name and surname:	**doc. Dr. Ing František Manlig**
Workplace:	Faculty of Mechanical Engineering, TUL, Department of Manufacturing Systems and Automation
Field:	Production Systems and Processes
Start date of the proceedings:	01/06/2015 to date

Habilitation proceedings

First name and surname:	**Ing. Michal Petrů, PhD**
Workplace:	Faculty of Mechanical Engineering, TUL, Department of the Design of Machine Elements and Mechanisms
Field:	Design of Machines and Equipment
Habilitation paper title:	Numerical modelling for support of the research and development of frames made of composite structures reinforced with long fibres
Habilitation lecture topic:	Modelling of machine elements in CAD systems using parametric equations
Commencement of proceedings:	28/ 5/ 2015
Date of appointment:	proceedings in progress

First name and surname:	**Ing. Jaromír Moravec, PhD**
Workplace:	Faculty of Mechanical Engineering, TUL, Department of Engineering Technology
Field:	Engineering Technology
Habilitation paper title:	Methodical procedures applicable to the acquisition of the input variables of numerical simulations of welding and thermal processing
Habilitation lecture topic:	Bonding of materials by welding – advantages, disadvantages, options, applications
Commencement of proceedings:	01/12/2015
Date of appointment:	proceedings in progress

3.4 List of doctoral graduates in 2015

First name and surname:	**Ing. Jaroslav Fábera**
Field of study:	2302V010 Design of Machines and Equipment
Focus:	Heat Technology
Training site:	Department of Power Engineering Equipment
Trainer:	Prof. Ing. Karel Adámek, CSc
Dissertation topic:	Transport phenomena during the drying of textile materials
Date of defence:	15/01/2015

First name and surname:	**Ing. Kateřina Horáková**
Field of study:	3901V003 Applied Mechanics
Focus:	Fluid Mechanics and Thermodynamics
Training site:	Department of Power Engineering Equipment
Trainer:	doc. Ing. Karel Fraňa, PhD
Dissertation topic:	Numerical simulations of magnetohydrodynamic flows
Date of defence:	13/03/2015

First name and surname:	**Ing. Trinh Thi Linh**
Field of study:	3911V011 Materials Engineering
Focus:	Materials Engineering
Training site:	Department of Materials Science
Trainer:	doc. Ing. Dora Kroisová, PhD
Dissertation topic:	Geopolymer composite systems reinforced with fibres of micrometric, submicrometric, and nanometric dimensions – preparation and mechanical properties
Date of defence:	14/04/2015

First name and surname:	**Ing. Pavel Brdlík**
Field of study:	2303V002 Engineering Technology
Focus:	Plastics Processing
Training site:	Department of Engineering Technology
Trainer:	Prof. Dr. Ing. Petr Lenfeld
Dissertation topic:	CO_2 application to internal cooling in the blowing process
Date of defence:	15/06/2015

First name and surname:	**Ing. Lukáš Stanislav**
Field of study:	2301V031 Manufacturing Systems and Processes
Focus:	Applied Cybernetics
Training site:	Department of Manufacturing Systems and Automation
Trainer:	Prof. Ing. Miroslav Olehla, CSc.
Dissertation topic:	Production of nanofibres using the drawing method
Date of defence:	22/09/2015

First name and surname:	**Ing. Andrey Dugin**
Field of study:	2303V002 Engineering Technology
Focus:	Machining and Assembly
Training site:	Department of Machining and Assembly
Trainer:	Prof. Ing. Alexey Popov, DrSc.
Dissertation topic:	Research of the forces on the spine of cutting tools
Date of defence:	4/11/2015

First name and surname:	**Ing. Jiří Technik**
Field of study:	2303V002 Engineering Technology
Focus:	Plastics Processing
Training site:	Department of Engineering Technology
Trainer:	Prof. Dr. Ing. Petr Lenfeld
Dissertation topic:	Modification of the geometry of the inflow system for the PC/ABS
Date of defence:	04/11/2015

First name and surname:	**Ing. Stanislav Jirouš**
Field of study:	3901V003 Applied Mechanics
Focus:	Fluid Mechanics and Thermodynamics
Training site:	Department of Power Engineering Equipment
Trainer:	doc. Ing. Karel Fraňa, PhD
Dissertation topic:	Identification and cavitation processes on the surfaces of cog wheels
Date of defence:	15/12/2015

4.3 Competence Centre

Josef Božek – Competence Centre for Automotive Industry
Innovations in the design of vehicles and power trains with combustion engines and electric motors for reduction of the consumption of fossil fuels and emissions; the increase of security, comfort, and enjoyment from the ride; adaptation to legislative requirements and interactions with infrastructure and other vehicles; and competitiveness in developing markets. Dual procedure for innovations developed immediate applicable output or background for subsequent development. Utilisation of the knowledge base as an integrating element of the complex topic and a broad team.

Provider:	TA CR
Programme:	TE Competence Centres (2012–2019)
Project Identification Code:	TE01020020
Beneficiary:	Czech Technical University in Prague
Further project participants:	Technical University of Liberec, Cxl VŠB-TU Ostrava Brno University of Technology
Enterprises:	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 time:	2012–2017
Guarantor for TUL:	Prof. Ing. Celestýn Scholz, PhD, Department of Vehicles and Engines
Internal TUL Number:	17880
Grants CNATI 2015:	Total / INV /NIV – CZK 1,165,000 / 0 / 1,165,000

4.4 Scientific research projects

TA CR – ALFA

Development of CDF code for the design of desulphurisation equipment

Provider:	TA CR
Programme:	ALFA (2011–2016)
Project Identification Code:	TA04021338
Beneficiary:	DIZ Bohemia s.r.o.
Co-beneficiary:	TUL, Faculty of Mechanical Engineering
Solver co-beneficiary:	doc. Ing. Tomáš Vít, PhD, Department of Power Engineering Equipment
Internal TUL Number:	17855
Solution time:	2014–2017
Grants FME, TUL 2015:	Total / INV / NIV – CZK 1,274,725 / 0 / 1,274,725

Development of a progressive system for cooling glass-moulding machines

Provider:	TA CR
Programme:	ALFA (2011–2016)
Project Identification Code:	TA03010852
Beneficiary:	Sklostroj Turnov CZ, s.r.o.
Co-beneficiary:	TUL, Faculty of Mechanical Engineering
Solver co-beneficiary:	doc. Ing. Václav Dvořák, PhD, Department of Power Engineering Equipment

Internal TUL Number: 17871
Solution time: 2013–2015
Grants FME, TUL 2015: Total / INV / NIV – CZK 1,000,000 / 0 / 1,000,000

Applied multidisciplinary research and development of progressive methods of cooling in technological processes

Provider: TA CR
Programme: ALFA (2011–2016)
Project Identification Code: TA 01010879
Beneficiary: TUL, Faculty of Mechanical Engineering
Solver beneficiary: doc. Ing. Heinz Neumann, CSc, (up to 2013),
Ing. Iva Nováková, PhD (from 2014),
Department of Engineering Technology
Co-beneficiary: GDK spol. s r.o.; KOH-I-NOOR PONAS s.r.o.; KSM Casting CZ a.s.
Internal TUL Number: 14120
Solution time: 2013–2015
Total grants in 2015: Total / INV / NIV – CZK 2,041,000 / 0 / 2,041,000
Grants in 2015/FME, TUL Total / INV / NIV – CZK 1,090,000 / 0 / 1,090,000
Grants in 2015/DET: Total / INV / NIV – CZK 1,025,000 / 0 / 1,025,000
Beneficiary's grant: Total / INV / NIV – CZK 951,000 / 0 / 951,000

Research and development of a delay-free shock-absorber

Provider: TA CR
Programme: ALFA (2011–2016)
Project Identification Code: TA 01010879
Beneficiary: Brano a.s.
Co-beneficiary: TUL, Faculty of Mechanical Engineering
Solver co-beneficiary: prof. Ing. Jan Šklíba, CSc, Department of Applied Mechanics
Internal TUL Number: 17800
Solution time: 2013–2016
Grants FME, TUL 2015: Total / INV / NIV – CZK 1,301,000 / 0 / 1,301,000

Research in ORC technology with a low-volume piston steam-propelled engine for small and waste heat sources

Provider: TA CR
Programme: ALFA (2011–2016)
Project Identification Code: TA02020716
Beneficiary: PolyComp, a.s.
Co-beneficiary: TUL, Faculty of Mechanical Engineering
Solver co-beneficiary: doc. Ing. Karel Fraňa, PhD,
Department of Power Engineering Equipment
Internal TUL Number: 17870
Solution time: 2012–2015
Grants FME, TUL 2015: Total / INV / NIV – CZK 155,173 / 0 / 155,173

New systems of monitoring the length of end measures and evaluating their quality

Provider: TA CR
Programme: ALFA (2011–2016)
Project Identification Code: TA 01010879
Beneficiary: Institute of Scientific Instruments CAS (Brno)
Co-beneficiary: TUL, Faculty of Mechanical Engineering
Further co-beneficiaries: ČMI, Mesing s.r.o.
Solver co-beneficiary: Ing. Štěpánka Dvořáčková, PhD,
Department of Machining and Assembly
Internal TUL Number: 17861
Solution time: 2013–2016
Grants FME, TUL 2015: Total / INV / NIV – CZK 325,000 / 0 / 325,000
Non-public funds 2015: CZK 176,000

TA CR – EPSILON

Development of progressive technology of production of felt hats

Provider:	TACR
Programme:	EPSILON
Project Identification Code:	TH 01010690
Beneficiary:	Tonak, a.s.
Co-beneficiary:	TUL, Faculty of Mechanical Engineering, Department of Textile Machine Design
Solver co-beneficiary:	prof. Ing. Jaroslav Beran, CSc., Department of Textile Machine Design machines
Solution time:	2015–2017
Internal TUL Number:	17009
Grants FME, TUL 2015:	Total / INV / NIV – CZK 1,550,800 / 0 / 1,550,800

Grant Agency of the Czech Republic – GA

Optimisation of the high-temperature mechanical properties of Fe3Al-type iron aluminides with carbide formers

Provider:	Grant Agency of the Czech Republic
Programme:	GA – Standard grant project
Registration Number:	P108/12/1452
Beneficiary:	Institute of Physics of Materials of the CAS Brno
Co-beneficiary:	TUL, Faculty of Mechanical Engineering
Co-solver:	RNDr. Věra Vodičková, PhD, Department of Materials Science
Internal TUL Number:	17660
Solution time:	2012–2015
Grants FME, TUL 2015:	Total / INV / NIV – CZK 658,000 / 0 / 658,000

Control of flow fields using liquid oscillations

Provider:	Grant Agency of the Czech Republic
Project:	GA – standard projects
Project Identification Code:	GA14-08888S
Beneficiary:	Institute of Thermomechanics, Czech Academy of Sciences
Next participant:	Technical University of Liberec
TUL solver:	doc. Ing. Tomáš Vít, PhD, Department of Power Engineering Equipment
Internal TUL Number:	17269
Solution time:	2014–2016
Grants FME, TUL 2015:	Total / INV / NIV – CZK 1,011,000 / 0 / 1,011 000

EU/Czech Ministry of the Environment:

Demonstration of monitoring toxicity of the exhaust gases of diesel engines during real-time operation

Provider:	EU/Ministry of the Environment
Programme:	LIFE+
Registration Number:	17650
Designation of the project:	MEDETOX
Beneficiary:	TUL, Faculty of Mechanical Engineering
Solver:	Michal Vojtíšek M.Sc. PhD, Department of Vehicles and Engines
Co-beneficiary:	Institute of Experimental Medicine CAS
Internal TUL Number:	17650
Solution time:	2011–2016
Grants FME, TUL 2015:	total / INV / NIV – CZK 0
Public funds (14730):	CZK 438,829

R&D projects solved under CNATI and other components of TUL

Academics of the Faculty of Mechanical Engineering, TUL are the solvers, co-solvers, or are involved in the solution.

NP – MEYS CR

See 4.7

OP R&D for Innovations – Commercialisation of results

See 7.4.3

TA CR – Competence Centres

See 4.3

TA CR – ALFA

Research in the useful properties and application possibilities for light polymer composites for bodywork building

Provider:	TA CR
Programme:	ALFA (2011–2016)
Project Identification Code:	TA04011009
Beneficiary:	TUL, CNATI
Co-beneficiary:	Magna Exteriors & Interiors s.r.o.
Solver beneficiary:	Prof. Dr. Ing. Petr Lenfeld, PhD, Department of Engineering Technology
Internal TUL Number:	14141
Solution time:	2014–2017
Beneficiary's grant 2015:	Total / INV / NIV – CZK 3,216,000 / 0 / 3,210,000
Of which CNATI:	Total / INV / NIV – CZK 2,746,110 / 0 / 2,746,110
of which: co-beneficiaries:	Total / INV / NIV – CZK 470,000 / 0 / 470,000

Development and verification of new numerical methods of welding and thermal processing, including simplified numerical prediction of the life of welded joints for progressive materials used in the energy production, aircraft, and possibly the space industry

Provider:	TA CR
Programme:	ALFA (2011–2016)
Project Identification Code:	TA 02010992
Beneficiary:	MECAS ESI s.r.o.
Co-beneficiary:	TUL, CNATI
Solver co-beneficiary:	Ing. Jaromír Moravec, PhD, Department of Engineering Technology
Project solution time:	2012–2015
Internal TUL Number:	17860
Grants CNATI 2015:	Total / INV / NIV – CZK 913,000 / 0 / 913,000

Research and development of the use of nanomaterials during ball production

Provider:	TA CR
Programme:	ALFA (2011–2016)
Project Identification Code:	TA 04010237
Beneficiary:	GALA a.s.
Co-beneficiary:	TUL, CNATI
Solver co-beneficiary:	Ing. Pavel Pokorný, PhD, Faculty of Textile Engineering, KNT
Project solution time:	2015–2016
Internal TUL Number:	17859
Co-solver co-beneficiary:	Prof .Ing. Jaroslav Beran, CSc, Department of Textile Machine Design
Grants FME, TUL 2015:	Total / INV / NIV – CZK 282,161 / 0 / 282,161

TA CR – EPSILON

Improvements in the efficiency of machines and equipment by reduction of the friction losses of the machine and its components

Provider: TA CR
Programme: TE Epsilon – 1st Public tender
Project Identification Code: TH01021093
Beneficiary: VÚHŽ a.s., Dobrá
Further project participants: Technical University of Liberec, CNATI
Solution time: 2015–2017
Guarantor for TUL: Ing Robert Voženílek, PhD
Internal TUL Number: 17007
Grants CNATI 2015: Total / INV /NIV CZK 1,105,000 / 0 / 1,105,000

New matting technology and prototype machine tools for processing glass surfaces
Provider: TA CR
Programme: EPSILON
Project Identification Code: TH01031152
Beneficiary: Sklopan Liberec
Co-beneficiary: TUL, CNATI
Solver co-beneficiary: doc. Ing. František Novotný, CSc.
Solution time: 2015–2017
Internal TUL Number: 17008
Grant 2015 CNATI: CZK 3,876,000
Grants FME, TUL 2015: Total / INV / NIV – CZK 581,000 / 0 / 581,000

Optimisation of the thermal flows on a laminating machine using modern modelling methods
Provider: TA CR
Programme: EPSILON (2015–2025)
Project Identification Code: TH01020796
Beneficiary: KOMFI spol. s r.o.
Co-beneficiary: TUL, CNATI
Solver co-beneficiary: Ing Tomáš Martinec, PhD
Project solution time: 2015–2017
Internal TUL Number: 17000
Co-solver co-beneficiary: Prof. Ing. Ladislav Ševčík, CSc.,
Department of the Design of Machine Elements and Mechanisms
Grants FME, TUL 2015: Total / INV / NIV – CZK 258,600 / 0 / 258,600

Czech Ministry of the Interior – Security Research in the Czech Republic

Development of flood control systems to increase the safety of the population and infrastructure
Provider: Ministry of the Interior of the Czech Republic
Programme: Czech Safety Research Programme 2015–2020 (BV III/1-VS)
Project Identification Code: VI20152018046
Beneficiary: JaP – Jacina, s.r.o.
Co-beneficiary: TUL, CNATI
Solver co-beneficiary: Ing. Michal Petrů, PhD
Project solution time: 2015–2018
Internal TUL Number: 17302
Co-solver co-beneficiary: Prof. Ing. Ladislav Ševčík, CSc.,
Department of the Design of Machine Elements and Mechanisms
Grants FME, TUL 2015: Total / INV / NIV – CZK 157,000 / 0 / 157,000

Application of modern modelling methods to the development and testing of flood barriers
Provider: Ministry of the Interior of the Czech Republic
Programme: Czech Safety Research Programme 2015–2020 (BV III/1-VS)
Project Identification Code: VI20152018046
Beneficiary: JaP – Jacina, s.r.o.
Co-beneficiary: TUL, CNATI
Solver co-beneficiary: Ing Tomáš Martinec, PhD
Project solution time: 2015–2018
Internal TUL Number: 17301

Co-solver co-beneficiary:	Prof. Ing. Ladislav Ševčík, CSc., Department of the Design of Machine Elements and Mechanisms
Grants FME, TUL 2015:	Total / INV / NIV – CZK 94,500 / 0 / 94,500

MEYS Czech Republic – GESHER/MOST

New applications in manufacturing technology using composite fibre frames

Provider:	MEYS Czech Republic
Programme:	LJ – GESHER/MOST (2010–2016)
Project Identification Code:	LJ14005
Beneficiary:	LENAM, s.r.o.
Solver:	doc. Ing. Antonín Potěšil, CSc.
Co-beneficiary:	TUL, CNATI
Solver co-beneficiary:	doc Ing Petr Tůma, CSc
Project solution time:	2014–2015
Internal TUL Number:	17281
Co-solver co-beneficiary:	Prof. Ing. Ladislav Ševčík, CSc., Department of the Design of Machine Elements and Mechanisms
Grants FME, TUL 2015:	Total / INV / NIV – CZK 184,200 / 0 / 184,200

Ministry of Health Czech Republic – Programme for support of applied medical research (2015–2022)

Nanofibre biodegradable small-scale blood vessel replacement

Provider:	Ministry of Health of the Czech Republic
Programme:	Programme for support of applied medical research Project
Identification Code:	NV15-29241A
Beneficiary:	TUL, Faculty of Textile Engineering
Solver:	Prof. RNDr. David Lukáš, CSc.
Co-beneficiary:	Palacký University Olomouc, University of Defence Hradec Králové
Project solution time:	2015–2018
Internal TUL Number:	16300
Co-solver co-beneficiary:	doc. Ing. Lukáš Čapek, PhD Department of Applied Mechanics
Grants FME, TUL 2015:	otal / INV / NIV – CZK 122,468 / 0 / 122,468

4.8 Centre for Nanomaterials, Advanced Technologies, and Innovations

Development of the Institute for Nanomaterials, Advanced Technologies, and Innovations (CNATI++)

The main objective of the project is to support the utilisation of the newly built research infrastructure (see above), the CNATI workplace, the new building, newly acquired high-tech instruments and equipment, as well as the research teams. Implementation of the presented CNATI++ project will significantly contribute to the effective use of this infrastructure, its stability, long-term sustainability, and its future systematically controlled development while retaining the configured structure and professional profile of the university centre. The project deals with seven research topics that are jointly being solved by the academic staff of the Faculty of Mechanical Engineering.

The solution of the project in 2015 involved a total of x academic staff members of the Faculty of Mechanical Engineering, TUL with a total volume of approximately x FTE.

Grant provider:	MEYS
Support program:	NPU
Beneficiary:	Technical University of Liberec, CNATI
Registration Number:	LO1201
Total project grant:	CZK 175,711,000
Implementation period:	2014–2018
Internal TUL Number:	16001

4.10 Commercialisation of the results and outputs of scientific research activities

New technologies and special machine components

Provider: MEYS CR
Programme: R&D for Innovations
Project Type OP R&D for Innovations Pre-seed:
Project Identification Code: CZ.1.05./3.1.00/13.0291
Beneficiary: TUL, CNATI
Responsible Solver: doc. Ing. František Novotný, CSc., Department of Glass Machinery and Robotics
Project solution time: 2012–2015
Total grants: CZK 44,884,000
Internal TUL Number: 16240
Grants 2015: CZK 3,127,000
Individual activities: activity solver / grant

- Service robots for inspections and technological functions on vertical walls
  Ing. Marcel Horák, PhD / CZK
- Application and processing of polymer materials with natural resins
  Prof. Dr. Ing. Petr Lenfeld / CZK 1,110,161
- Progressive technologies for manufacturing self-supporting bottom cocoons for sewing car seat covers Prof. Ing. Jaroslav Beran, CSc. / CZK 1,256,094
- Machine for making special 3D textiles ROTIS II
  Prof. Ing. Ladislav Ševčík, CSc. / CZK

PROSYKO – Proactive System of Commercialisation at TUL

Provider: TA CR
Programme: GAMA, Sub-programme 1
Project Type Proof of concept stage
Project Identification Code: TG01010117
Beneficiary: TUL, CNATI
Responsible Solver: Ing. Stanislav Petrík, PhD
Project solution time: 2014–2018
Total grants: CZK 1,315,500
Internal TUL Number: 17862

- Internal number of partial project:14153
  Partial project solution time: 2014–2015
  Grants in 2015 under FME: CZK 559,745
  Partial FME, TUL project: Program for calculation of the precision cross winding
  Solver: Ing. Petr Žabka, PhD, Department of Textile Machine Design / Laboratory for the Innovation of Textile Machines
- Internal number of partial project: 14155
  Partial project solution time: 2014–2016
  Grants in 2015 under FME: CZK 605,448
  Partial FME, TUL project: Device for determining the limit states of sheet deformation
  Solver: doc. Ing. Pavel Solfronk, PhD, Department of Engineering Technology
- Internal number of partial project: 14157
  Partial project solution time: 2015–2016
  Grants in 2015 under FME: CZK 715,583
  Partial project solved by the FME: High-speed system for feeding yarn to spinning machines
  Solver: prof. Ing. Jaroslav Beran, CSc., Department of Textile Machine Design

5.2 International cooperation in education

TUL, as a significant partner in the international educational area, strengthened existing cooperation agreements with Canadian and American partner universities

Provider: MEYS CR
Programme: Institutional Development Plan
Solver: TUL, Faculty of Mechanical Engineering
Internal TUL Number: 12208
Grant 2015: CZK 210,000
Period: 2015

Project objective:
The objective of the project was to realise study-motivated residencies of selected FME, TUL students at partner Canadian and eventually American universities. The long-term objective is the maintenance and further development of contacts and activities with the given universities.

5.3 International cooperation in the area of scientific research

Education collaboration in mechanical engineering
Provider: MEYS CR
Programme: CZ07 – Scholarship Programme and Bilateral Scholarship
Registration Number: NF-CZ07-ICP-1-030-2014
Partner organisation: Østfold University College
Institutions at the tertiary level of education
Faculty of Engineering
Beneficiary: TUL, Faculty of Mechanical Engineering
Solver: doc. Ing. Karel Fraňa, PhD
Internal TUL Number: 18413
Period: 2014–2015
Total grants: CZK 649,530

Modelling and simulations of electro-pneumatic mechatronic systems based on pneumatic muscles
Provider: MEYS CR
Programme: 7AMB, international cooperation in research and development for support of the mobility of research workers
Partner organisation: Technical University Košice
Beneficiary: TUL, Faculty of Mechanical Engineering
Solver: Ing. Michal Moučka, PhD
Internal TUL Number: 18413
Period: 2014–2015
Grants 2014: CZK 68,000

Interdisciplinary cooperation in the field of research focused on the influence of process parameters on the mechanical properties of diffusion heterogeneous welds
Provider: MEYS CR
Programme: AKTION Czech Republic – Austria
Partner organisation: Technische Universität Graz
Beneficiary: TUL, Faculty of Mechanical Engineering
Solver: Ing Jaromír Moravec, PhD
Internal TUL Number: 1008
Period: 2015–2016
Grants 2015: CZK 18,000

5.4 International mobility

A new educational programme of the European Union for the period 2014–2020, Erasmus+ supports cooperation and mobility in all spheres of education, professional training, sports, and youth.

Interinstitutional agreements valid in 2015 within the scope of ERASMUS+:
- Universiteit Gent (BE)
- 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)
- 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)
- 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 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)
- Trakya Universitesi (TR)
- Istanbul University (TR)
- USAK University (TR)

New bilateral agreements concluded in 2015 for cooperation in the field of exchange of students, academics, and science and research:

- Groupe ESAIP(FR) – Erasmus+
- Université de Haute Alsace (FR) – Erasmus+
- University POLiTECHNICA of Bucharest (RO) – Erasmus+
- Østfold University College (NO)
- Kazakh-British Technical University (KZ)
- King Mongkuts's University of Technology North Bangkok (TH)

Valid bilateral agreements for cooperation in the area of mutual exchanges of students, academic staff, and science and research in 2015 within the scope of Trans-Atlantic cooperation:

- University of Waterloo (CA)
- Conestoga College Institute of Technology and Advance Learning, Ontario (CA)
- Northern Illinois University (US)

- Nha Trang University (VN)
- Diponegoro University (ID)
- PUC do Rio de Janeiro (BR)
- National Taiwan University (TW)

The negotiation of additional bilateral agreements in the area of mutual exchanges of students, academic staff, and science and research commenced with the following university:

- Apollo Engineering College (India)

7.1 Academic life, quality, and culture

International certificates of accomplishment of the teaching course for technical fields in 2015 and the titles of ING-PAED IGIP were awarded to:

Ing Aleš Ausperger, PhD
Ing Luboš Běhálek, PhD
Ing Aleš Dittrich
Ing František Koblasa, PhD
Ing Michaela Kolnerová, PhD
Ing Pavel Kryštůfek
Doc Ing František Manlig, PhD
Ing Iva Nováková, PhD
Ing Jiří Sobotka, PhD
Ing Peter Zelený, PhD

7.4 Projects co-financed by EU structural funds

7.4.1 OP Education for Competitiveness

Most – Education, science, and practice

Beneficiary:	SVÚM a.s.
Co-beneficiary:	Technical University of Liberec, Faculty of Mechanical Engineering
Solver beneficiary:	Prof. Ing. Petr Louda, CSc., Department of Materials Science
Provider:	Ministry of Education, Youth and Sports – OP VK:
Priority Axis:	2 – Tertiary education, research and development
Area of support:	2.3 – Human resources in research and development
Registration Number:	CZ.1.07/2.3.00/45.0030
Internal TUL Number:	17170
Total grants:	CZK 4,561,014
Solution period:	2014–2015
Grant, FME, TUL 2015:	CZK 1,615,589

TK MOST – Improvement of the technical competences of graduates in industrial practice

Beneficiary:	Technical University of Liberec, Faculty of Mechanical Engineering
Co-beneficiary:	none
Solver beneficiary:	doc. Ing. Tomáš Vít, PhD, Department of Power Engineering Equipment
Provider:	Ministry of Education, Youth and Sports – OP VK:
Priority Axis:	2 – Tertiary education, research and development
Area of support:	2.3 – Human resources in research and development
Registration Number:	CZ.1.07/2.2.00/28.0311
Internal TUL Number:	16820
Total grants:	CZK 23,194,344
Solution period:	2013–2015
Grant, FME, TUL 2015:	CZK 7,118,775

Building an excellent scientific team for experimental and numerical modelling in fluid mechanics and thermodynamics

Beneficiary:	University of West Bohemia, Plzeň
Co-beneficiary:	Technical University of Liberec, Faculty of Mechanical Engineering
Solver co-beneficiary:	doc. Ing. Karel Fraňa, PhD,

	Department of Power Engineering Equipment
Provider:	Ministry of Education, Youth and Sports – OP EC
Priority Axis:	2 – Tertiary education, research and development
Area of support:	2.3 – Human resources in research and development
Registration Number:	CZ.1.07/2.3.00/20.0139
Internal TUL Number:	17150
Total TUL grants:	CZK 1,800,000
Solution period:	2012–2015
Grant, FME, TUL 2015:	CZK 666,496

CREATex – Excellence in systematic creativity methods at macro and micro level

Beneficiary:	Technical University of Liberec, Faculty of Mechanical Engineering
Solver beneficiary:	Ing. Petr Lepšík, PhD, Department of Machine Elements and Mechanisms
Provider:	MEYS CR – OP EC
Priority axis:	2 – Tertiary education, research and development
Area of support:	2.2 – Higher education
Registration number:	CZ.1.07/2.2.00/28.0321
Internal TUL Number:	16190
Total grants:	CZK 10,885,171
Solution period:	2012–2015
Grant, FME, TUL 2015:	CZK 388,847

Unexcused absences

Beneficiary:	TUL, Faculty of Mechanical Engineering
Solver beneficiary:	Ing. Štěpánka Dvořáčková, PhD, Department of Engineering Technology
Provider:	MEYS CR – OP EC – global grant of the Liberec Regional Authority
Priority Axis:	1 – Initial education
Area of support:	1.1 – Improving the quality of education
Project registration number:	CZ.1.07/1.1.22/01.0001
Project solution time:	2012–2015
Internal TUL Number:	15050
Total grants:	CZK 5,859,058
Grant, FME, TUL 2015:	CZK 472,000
Deductible:	CZK 33,111

REK, FTE, CNATI

Support for the creation of excellent research and development teams at TUL

Beneficiary:	TUL, Faculty of Textile Engineering
Provider:	MEYS CR – OP EC
Priority axis:	2 – Tertiary education, research and development
Area of support:	2.3 – Human resources in research and development
Registration Number:	CZ.1.07/2.3.00/30.0065
Professional project guarantor:	doc. Ing. Miroslav Malý, CSc.
Internal TUL Number:	16230
Total grants:	CZK 36,211,059
Solution period:	2012–2015
Grants 2015:	CZK 4,332,923

Project managed under the Department of Engineering Technology, TUL

KA 1 professional guarantor: Ing. David Cirkl, PhD, DET FME, TUL
Key activity A 1: Support for the creation of quality research and development teams and other developments particularly the initialisation working positions and starting working positions

Theory for practice

Beneficiary:	TUL, CNATI
Solver beneficiary:	doc. Ing. Dora Kroisová, PhD, Department of Materials Science
Provider:	Ministry of Education, Youth and Sport – OP EC –

	global grant of the Liberec Regional Authority
Priority Axis:	1 – Initial education
Area of support:	1.1 – Improving the quality of education
Project registration number:	CZ.1.07/1.01:22/02.0006
Project solution time:	2012–2015
Internal TUL Number:	15060
Total grants:	CZK 5,845,000
Grant, Cxl TUL 2015:	CZK 730,427

7.4.2 OP Enterprise and Innovations

Vehicle wheel suspension

Project Solver:	doc. Ing Miroslav Šír, CSc.
Grant provider:	Ministry. of Industry and Trade – OP Enterprise and Innovations
Programme:	Innovations – Patent
Total grants:	CZK 4,234,000
Internal TUL number:	16630
Project registration number:	4.1 INP02/152
Solution period:	2010–2015
Grants in 2015:	CZK 0 – project completed successfully

Method and equipment for binding fishing lures and fish bait

Project Solver:	Prof. Ing. Jaroslav Beran, CSc.
Grant provider:	Ministry of Industry and Trade CR – OP Enterprise and Innovations
Programme:	Innovations – Patent
Internal TUL Number:	16650
Solution time:	2011–2015
Grants in 2015:	CZK 0 – project completed successfully

7.4.3 OP Research and Development for Innovations

Development of the Institute for Nanomaterials, Advanced Technology, and Innovations (CNATI++)
See section 4.8.

New technologies and special machine components
See section 4.9.

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