



## Editorial

The beginning of a great age for the small Slovenian nation:  
the hearth and home of science and (technical) culture is born

### Centenary of the University of Ljubljana and the study of mechanical engineering

On 23 July 1919, Prince Regent Alexander Karađorđević came to Ljubljana to sign an act with only three articles, founding the University of the Kingdom of Serbs, Croats and Slovenes, today known as the University of Ljubljana (UL). It was that simple in the newly established Kingdom of Serbs, Croats and Slovenes. The founding members were the Faculty of Arts, Faculty of Medicine, Faculty of Law, Technical Faculty and Faculty of Theology. Brushing aside some objections that the Slovenian university was founded more than a hundred years ago – there are even opinions that it happened three centuries ago – we are celebrating one of the first milestones in the arrival of higher education on our soil.

Special credit for the foundation of a Slovenian University in Ljubljana goes to its mayor Ivan Hribar (holding office between 1896 and 1910). In 1912, he initiated the establishment of the University sector with the Ljubljana City Council, which sought young and talented Slovenian specialists and provided them financial support to prepare for an academic career. Special mention also goes to Dr. Mihajlo Rostohar, assistant professor at the Prague university, who founded the University Commission under the National government in November 1918, and Dr. Danilo Majaron who was elected to become its president on 5 December 1919. Dr. Danilo Majaron became the first honorary doctor at the University of Ljubljana on 22 June 1929.

First lectures were held on 3 December 1919 and this is also the official birth date of the UL. However, if the official birth of the UL was moved back to the time when the first chairs for the study of philosophy were opened in Ljubljana (for logic and canon law and for physics and mathematics), UL would now be more than three hundred years old. UL is now celebrating the hundredth anniversary of university in Slovenian language. On Wednesday, the 3<sup>rd</sup> of December 2019 from 9 to 10am, Dr. Fran Ramovš held the first lecture in Slovenian language in the hall of the Provincial Mansion, today's University assembly hall. His lecture about the historical grammar of Slovenian language began with the following address: "On this day, as we are expecting a new era, a new life, as we are establishing a Slovenian university, allow me to greet you as the first students of our Alma mater. In this holy moment, our nation is entering history that can never be erased."

This was the beginning of a great age for the small Slovenian nation and our hearth of science and culture was born.

The first rector was Dr. Josip Plemelj, one of the most important mathematicians at the beginning of the 20<sup>th</sup> century, the first dean of the Technical faculty was Dr. Karol Hinterlechner, a geologist and external member of the Czechoslovak Academy of Sciences, and the first doctoral student was Ana Mayer, who

successfully defended her thesis “The effects of formalin on starch” on 15 July 1920.

In the first academic year, the five founding faculties accepted 942 students, and only 3 percent of them were women. On 31 August 1919, the first 18 professors of UL were appointed by royal decree, one person not accepting the professorship. In the first decade of the University, more than ten top Russian scholars joined the ranks after fleeing their homeland during the revolution. The Russian lecturers introduced several new scientific fields, thereby bringing the UL to the level of other comparable European universities despite its young age. The quality of lectures on the university was significantly influenced both by Slovenian scientists who were previously active in the international academic circles, like mathematician Dr. Josip Plemelj, chemist Dr. Maks Samec and Dr. Milan Vidmar, and the foreign scientists.

Money was important then as it is today, and there were attempts to abolish the Technical faculty and ideas to establish departments of technical faculties in Beograd, Zagreb and Ljubljana. This would curtail the activities of the Technical faculty in Ljubljana, which was almost entirely equipped by the private capital of Slovenian industrialists. At the end of the 1930s, construction of the institutes of mechanical and chemical engineering under the Technical faculty began.

For the sake of comparison: there are 37,874 students enrolled at 26 member faculties of the UL in 2019, 60 percent of them women, placing the institution among the top 3% universities worldwide. In the ARWU ranking (Academic Ranking of World Universities, one of the most important academic rankings), the UL has had a spot among the 500 best universities for a number of years, in the CWUR ranking (The Center for World University Rankings) it holds the 370. spot, and in the THE ranking (Times Higher Education) it ranks in the 601–800 group.

Organisational development of the Technical faculty and the Faculty of mechanical engineering:

- 1919–1945: UL, Technical faculty, Department for electrical and mechanical engineering (two-year study of mechanical engineering)
- 1945–1950: UL, Technical faculty, Department of mechanical engineering (full study of mechanical engineering)
- 1950–1954: Technical college, Faculty of mechanical engineering
- 1954–1957: UL, Technical faculty, Department of mechanical engineering
- 1957–1960: UL, Faculty of electrical and mechanical engineering

- From 1960: UL, Faculty of mechanical engineering.

Even before the UL was formally founded, higher-education lectures of mechanical, electrical and construction engineering began on 19 May 1919. By autumn, the students were delivered the whole subject matter for year one. In 1919, Dobromil Uran, Albert Struna and Franc Smolik were among the enrollees in the “Temporary technical college course”. After World War II, they were appointed higher-education teachers at the Technical faculty. Previous to that, all of them had successful careers in the industry. The Technical faculty’s curriculum was divided as follows: mathematical courses, natural sciences, construction and architecture, mechanical and electrical engineering, mining and blast-furnace practice, political science and law courses, as well as two courses in the “various” category.

One of the first 18 professors was Dr. Milan Vidmar, an expert in electrical and mechanical engineering who earned his PhD in classical mechanical engineering in 1922 with his thesis “Theory of centrifugal pumps” (Theorie der Kreiselpumpe). Dr. Vidmar – also a chess grandmaster – loved electrical engineering, but he was aware of the significance of mechanical engineering and therefore lectured the Theoretical mechanical engineering course. The enrolment at the UL’s Technical faculty was relatively good, with two ladies attending the first study year. The enrolment figures dropped in the 1930s, probably due to the Great Depression.

Dr. Milan Vidmar personally invited Feliks Lobe to come to the Technical faculty. Due to his vast experience in the industry, Lobe was immediately appointed associate professor. The arrival of Feliks Lobe significantly invigorated the field of mechanical engineering at the Technical faculty, but it has not gained full momentum for several reasons. Dr. Milan Vidmar is regarded as the initiator of the study of mechanical engineering at the UL. He understood the importance of our profession and supported Feliks Lobe throughout. Lobe invested several years of personal efforts to realise the study of mechanical engineering in full extent and started to lecture the Thermodynamics and Prime movers courses, adding the Mechanical technology course after 1937. His assistant was Leopold Andrée and his associate Boris Černigoj. Both became higher-education teachers after World War II. The great spirit of Feliks Lobe, who later became an academician and was awarded an honorary PhD degree by the UL, envisaged two major branches of mechanical engineering: – solid body

mechanics and fluid mechanics, meaning a parallel development of technological and energy engineering.

The lecturers in the 1940/41 study year were: assoc. prof. Romeo Strojnik (Mechanical drafting, Machine elements II, Elevators), full prof. Feliks Lobe (Prime movers I, Prime movers II, General mechanical technology II), assist. prof. Dr. Dušan Avsec (Thermodynamics), part-time lecturer Albert Struna, later full professor and rector at the UL (Construction and theory of motor vehicles) and part-time lecturer Ciril Rekar (General mechanical technology II). After World War II, the Technical faculty was divided into six departments, one of them being the mechanical engineering department. The study of mechanical engineering in full extent brought an expanded syllabus and several new lecturers, most of them picked by Feliks Lobe. In 1946, the following lecturers were appointed to higher-education titles and became fully employed: assist. prof Leopold André, full prof. Leon Kavčnik, assoc. prof. Franček Kovačec, assoc. prof. Bojan Kraut, full prof. Zoran Rant and full prof. Anton Vakselj. Nine institutes were founded under the department of mechanical engineering at the Technical faculty, about a half of them devoted to energy engineering and the other half to technology.

On 31 July 1948, Jožef Herman and Josip Kuralt graduated as the first mechanical engineers, and Zoran Rant was one of the first to obtain a doctoral degree (in 1950).

In addition to everyone mentioned above, the following lecturers have left a great mark on the development of the study of mechanical engineering in the period until 1960 (in alphabet order): Josip Boncelj, Jože Hlebanja, Leon Kavčnik, Branko Kozina, Anton Kuhelj, Boleslav Likar, Ervin Prelog, Stane Premelč, Ciril Rekar, Viktor Savnik, Franc Smolik, Albert Struna, Vladimir Staněk, Dobromil Uran, Anton Vakselj and Ivo Vušković.

The Technical faculty was abolished in 1957 and the departments for electrical and mechanical engineering merged to form the Faculty of electrical and mechanical engineering. However, this association only lasted three years. The Faculty of mechanical engineering (FS) came to existence on 1 October 1960 as an independent unit under the UL. FS began to grow in staff and facilities. The first dean of the independent Faculty of mechanical engineering was Zoran Rant.

When founded, FS had four chairs: Chair for mathematics and other basic courses, Chair for work machines and transport, Chair for technology and Chair for prime movers and heat engines. In academic

year 1960/61, 264 students were enrolled in year one, 167 students in year two, 143 students in year three, and 113 students in year four. There were also 214 graduate year students. The number of chairs rose to six in academic year 1971/72, and then to seven a year later. This number remained unchanged for 25 years. One third of the chairs dealt with energy engineering and two thirds covered technology and manufacturing.

What was then the Faculty council founded in 1962 the Institute of mechanical engineering as a financially independent institution that was inextricably linked to the FS. The purpose of the Institute was to do research work and collaborate with the industry. A three-cycle study programme was introduced in 1960 (bachelor's, master's and doctoral degree). The undergraduate studies were shortened from ten to nine semesters, including the diploma thesis, while completing the master's studies became a requirement for the doctoral studies. It was a change in the tradition of several decades, which extended the path to the doctoral thesis. After approximately 40 years, the study programme was again reverted to the old model: ten semesters including the diploma thesis and then direct transition to writing the doctoral thesis.

In academic year 1996/97, the Faculty started educating students at the university level with a more theoretical approach (10 semesters) and introduced a practically oriented professional higher education study programme (8 semesters, including 6 months of practical training and the diploma thesis). The Faculty Senate consisted solely of full professors and the decision that every full professor can have a chair led to the number of chairs rising from 7 to 13 in the academic year 1997/98. In the academic year 2008/9, the FS has started executing the renewed academic and professional study programmes according to the Bologna principles.

Today, the FS is the leading multidisciplinary research-oriented faculty in the field of mechanical engineering in Slovenia. It recognises young talents and raises them to become excellent scientists and progressive experts. Many famous Slovenians who studied or graduated at the FS are now in leadership positions or work in scientific institutions worldwide, the enterprise sector, politics etc. Internationalization has also enabled international student and young researcher exchange programs.

In academic year 2018/19, there were 1,652 students enrolled in the 1<sup>st</sup> cycle academic programme, the Bologna 2<sup>nd</sup> cycle master study programme and the 1<sup>st</sup> cycle professional study programme, as well as 95 doctoral students in the 3<sup>rd</sup> cycle doctoral study programme. 415 students have graduated and 11

students have earned their doctoral degrees in 2018. Among the staff of 373 there were 44 teachers, 79 assistants and 158 researchers who participated in 45 international research projects and 179 collaborative projects with the industry. They have published 161 original research articles and submitted 6 patent applications. The FS comprised 18 chairs with 39 research laboratories and centres.

The University of Ljubljana rectors recruited from the Technical faculty and the Faculty of mechanical engineering were: Milan Vidmar (1928–1929), Anton Kuhelj (1954–1956), Albert Struna (1964–1967), Ervin Prelog (1976–1978), Polde Leskovar (1987) and Janez Peklenik (1987–1989).

The foundation of the UL 100 years ago made it possible to start educating scientists in Slovenia. Slovenian scientists were very successful even

previous to that, but they were usually active in the Germanic-speaking area and used to write and lecture in German. The birth of the UL also made Slovenian a language of science. Science promotion is indispensable for an educated society, for the usage of Slovenian language in higher education, and for preserving the language of our small Slovenian nation.

This special issue of SV-JME celebrates the 100<sup>th</sup> anniversary of the UL and the studies of mechanical engineering and presents the research achievements of Slovenian UL scientists in the field of mechanical engineering. We have become a part of Slovenian intelligence objectively setting the boundaries for the development and advance of Slovenian nation. A particular nation's culture is based in its entirety on the nuance of the ebb and flow of life.

VIVAT, CRESCAT, FLOREAT!

*Vincenc Butala*  
Editor-in-Chief

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