

Professor Milan Radovanović, Ph. D.
80th birthday

54-year scientific career

**15 years as president of
the Society of Thermal Engineers of Serbia**



The Fuel and Combustion Laboratory of the University of Belgrade – Faculty of Mechanical Engineering and the Society of Thermal Engineers of Serbia have the great honour and privilege to present this special jubilee issue of *Thermal Science* on the occasion of the 80th birthday of Prof. Milan Radovanović, president of the Society of Thermal Engineers of Serbia, and celebrating his active involvement in science for 54 years. This year he has completed 15 successful years at the helm of and contributing to the development of the Society of Thermal Engineers of Serbia.

Prof. Milan Radovanović contributed significantly to the work and development of the Fuel and Combustion Laboratory, creating new generations of mechanical engineers, opening new fields of research, involving new, young researchers, and establishing cooperation with numerous institutions in Serbia and abroad. Due to his dedication, scientific and systematic approach, and relationships with colleagues, he instigated a completely new spirit in the work of the Laboratory, improving the quality of lectures, scientific research and international cooperation. He offered his colleagues in the Laboratory his non-conditional expert and scientific support, which was always complemented by his strong intellectual and broad cultural knowledge and versatility.

This special issue of *Thermal Science* journal is prepared in cooperation with colleagues from the University of Twente, Enschede, the Netherlands, where Prof. Radovanović spent several years as a professor and researcher. His work at the University of Twente additionally influenced his understanding of scientific research and the importance of international collaboration. This successful collaboration is continued till today.

Colleagues of Prof. Radovanović have prepared articles for this special edition of *Thermal Science* journal that are from the fields of his scientific expertise. All authors submitted their papers on the basis of an invitation from the Fuel and Combustion Laboratory. Many of the authors are researchers who were mentored by Prof. Radovanović for their master's and/or Ph. D. theses, while for others, he was a member of their examination committee.

Prof. Milan Radovanović was born in 1938 in Belgrade. He completed his pre-university schooling at the Third Male Gymnasium in Belgrade. He enrolled in the Faculty

of Mechanical Engineering in 1956, and graduated in 1962 at Department of Internal Combustion Engines and his graduation study was in the field of fuel for Diesel engines. From 1962 until 1964, he was employed at the Rakovica Motor Industry. He was elected to the position of assistant for the subject Fuel, Lubricant and Industrial Water in 1964. In 1968, under the supervision of Prof. dr Dušan Veličković, he successfully defended his M. Sc. thesis, entitled Fuel for Multi-Fuel Engines. In 1971, he was elected as assistant professor at the Faculty of Mechanical Engineering, Belgrade. During 1975-1976, he held a Netherlands government scholarship at University of Twente, where he prepared the basis for his Ph. D. thesis. In 1977, he successfully defended his Ph. D. thesis, entitled Contribution to the Study of Combustion of Domestic Coals in Conditions Similar to the Boiler, with examination committee members being Jovan Šel, Josip Verčon, Milan Vesović, Milan Antić, and Dušan Drašković. He was awarded a prize from the Belgrade City Chamber of Commerce for this Ph. D. thesis. In 1978, he became an associate professor, and from 1982 until 1985, he holds the position of a Head of the Department of Thermal Processes, University of Twente and visiting professor at University of Twente. He became a full Professor at the Faculty of Mechanical Engineering, University of Belgrade in 1986, and taught the subjects Fuel, Lubricant and Industrial Water and Combustion. During 1994-1997, he led and participated in scientific research projects in the field of pyrolysis at the University of Twente.

He contributed significantly to authoring the books in the fields of fuel and combustion, as the author of several books intended for undergraduate and postgraduate lectures: Combustion, Part 1 (authors D. Drašković and M. Radovanović, 1973), Combustion (authors M. Radovanović, M. Adžić and D. Drašković, 1986), Fuel – Part 1 (1978, 1986, 1989), Industrial Water – Part 2 (1979, 1987, 1989), Fuels (1994, 1997), Industrial Water (1996), and Manual for Laboratory Exercises in Combustion (1976, 1986). Special attention must be drawn to two books published by esteemed international publishing houses: Fluidized Bed Combustion, Ed. Hemisphere Publishing Corporation, New York, 1986, and; Szganie topliva v psevdoozizenom sloe, Energoatom publisher, Moscow, 1990.

During his career, he lectured at undergraduate level at the Faculty of Mechanical Engineering, Belgrade on the following subjects: Fuels, Lubricants and Industrial Water (also at the Mechanical Engineering Faculty in Kragujevac, the Mechanical Engineering Faculty in Titograd, the Mechanical Engineering Faculty in Kraljevo, and University of Banja Luka – Faculty of Mechanical Engineering), Thermodynamics, Lubrication Techniques, Basics of Tribology, Fuel and Combustion (also in Military technical Academy Žarkovo), Combustion, and Motor Vehicle Maintenance. He lectured Heat Transfer and Combustion at the Faculty of Occupational Safety Niš. At postgraduate level, he lectured on the following subjects: Fuel and Selected Topics in Combustion. As a full professor at University of Twente, he lectured on the following subjects: Fuel (1982-1985), Selected Topics in Thermodynamics – Fluidized Bed Combustion, and he also organized and held lectures for the Royal Netherlands Society of Engineers and Technicians.

In addition to lecturing, he performed numerous other important duties at the Faculty of Mechanical Engineering: Vice-dean for Research and Development (1978-1981), Dean of the Faculty of Mechanical Engineering (1989-1994), member of the Council (1987-1989), and was president or member of various committees. From 2001 until 2003, on the proposal of the President of Serbia, dr Zoran Djindjić, he was a member of the Council of the University of Belgrade, and also member of the UNESCO Commission at the Ministry of Foreign Affairs. For many years, he had cooperation with the Laboratory for Thermal Engineering and Energy at the Institute Vinča Institute of Nuclear Sciences. During his

mandate as a Dean, he was a president of the Joint Society of Technical Faculties (eight faculties from Belgrade and the Technical Faculty in Bor). It must be stressed that he was Dean of the Faculty of Mechanical Engineering during the turbulent conditions wrought by democratic change in society and the economic crisis with unprecedented inflation (1991-1994), and he was one of the first professors at the University of Belgrade to support the student protests in 1991.

During his career, Prof. Radovanović was extensively engaged in developing the Fuel and Combustion Laboratory, improving it for the requirements of lectures, scientific research and collaboration with industry. In that period, a range of laboratory equipment was acquired or formed that enabled a significant increase in quality of research divided into three areas: fuel, combustion, and air protection. This facilitated extensive improvements and resulted in upgraded lectures and improved practical, but the most significant change was the advance in scientific research. These changes were accompanied by the education and development of young scientific researchers who continued their careers at the Faculty or in other scientific institutions. He led a great number of undergraduate (more than 200) and master (12) thesis. He was mentor for nine Ph. D. theses.

Prof. Radovanović was always extremely active in his professional work and scientific research. His professional and scientific work was very productive and thematically broad, being successful both locally and abroad. That work encompassed both independent, fundamental research and leading and being involved in a large number of projects in conjunction with industrial partners.

In the framework of the Netherlands programme for re-including coal in Dutch energy production, he led a project in the field of fluidized bed combustion with five pillars, of which three were the most important: Heat Transfer in Fluidized Beds, Combustion in Fluidized Beds, and Toxic Components and their Prevention Measures in Flue Gases. Prof. Radovanović was invited to be Director of the Advanced Course on Fluidized Bed Combustion which was organized by the International Centre for Heat and Mass Transfer (ICHMT) in Dubrovnik in 1983.

The most significant areas of Prof. Radovanović's research are:

- Characterization and combustion of coal, especially Serbian lignites.
- Alternative fuel and modern engine development for the motor industry.
- Technology of fluidized bed combustion.
- Gas burners and flame stabilization; development of household gas appliances.
- Flue Gas De-sulphurization.
- The GHG effects and utilization of RES.
- Development of pyrolysis technology and combustion of heavy residues from oil processing.
- Development of traditional and novel liquid fuel for the oil industry.
- Characterization of biomass and development of household appliances for biomass combustion.

He established meaningful collaboration with numerous industrial partners, including: Zavodi Crvena Zastava, Industrija Motora Rakovica, Magnohrom Kraljevo, Minel Kotlogradnja, Janko Lisjak, Elektroprivreda Srbije, Rafinerija Nafte Pančevo, Jugopetrol, Naftna Industrija Srbije, Milan Blagojević Smederevo and Energoprojekt-Entel.

He led numerous projects: Alternative fuel for vehicles of Zavodi Crvena Zastava – oxygenate application to reduce lead in petrol (1979-1990), Development and production of gas heaters for household and similar applications (Magnohrom Kraljevo, 1981-1985),

Possibility of replacing boiler fuel in power plants (Elektroprivreda Srbije, 1994-1999), Possibility of utilizing raw Velebit oil in power plants (Elektroprivreda Srbije, 1999), Technical-economic study of the justification of exploiting coals with calorific values below 5250 kJ/kg (Elektroprivreda Srbije, 1998-2000), Technical-technological and methodological bases for establishing input quantity control of and quality of liquid fuel (Elektroprivreda Srbije, 1998-2003), Possibility of applying the additive BASF - Keropur® in gasoline to improve its quality (BASF and Rafinerija Nafta Pančevo, 2005), and during 1987-1992, he led projects financed by the United States Department of Energy: FP 744 DOE – Flue Gas Desulphurisation in Flue Gas Duct, and FP 972 DOE – Flue Gas Desulphurization in Flue Gas Duct.

During his career, Prof. Radovanović was the author or co-author of several monographs, more than 200 scientific papers published in international or national journals, and he participated in numerous international and national conferences. Prof. Radovanović participated in the following scientific and expert organizations: JUGOMA (1967-1990), JUNG (1991-2003), the Society of Thermal Engineers of Serbia (1964-), was a member of the National Programme for Energy Efficiency (2000-2008), UNDP expert for projects in energy sector and is president of the Society of Thermal Engineers of Serbia (2003-).

With respect to his stay in the Netherlands at the Twente University, covering several years spread over different periods and in different roles as researcher, professor and group leader, Prof. Milan Radovanović became widely and highly appreciated for his important contributions to science, technology, leadership, cultural and societal aspects and friendship. This was all firmly based on his deep and wide knowledge and interests, helpful attitude, friendliness and personal charm. This led to meaningful and effective collaboration with Dutch colleagues, staff and students and also with the Dutch and international industry and institutions.

Prof. Radovanović is characterized by his interest in various fields, especially his feeling for art. He also graduated from both lower and higher music schools, playing the violin and guitar. During his study at Faculty of Mechanical Engineering he was football referee in Belgrade too. During his mandate as Dean, he organized, at the Faculty of Mechanical Engineering, two exhibitions of artworks by professors and students from the Academy of Applied Arts, considering it necessary to implement collaboration between technical and art faculties, and enabling students to be directed by and surrounded by art during their studies, thus contributing to their wider knowledge and the development of their interests. With regard to his interests in other spheres, from 2012-2018, he published more than 90 papers in renowned international journals (Netherlands, Great Britain, Germany, Austria) and six books concerning philatelic aspects of World War I: *Silent witnesses – Allies and Serbs During the Great War (1914-1915)*, 2013; *Silent witnesses – Allies and Serbs During the Great War (1916-1918)*, 2015; *Silent Witnesses – the French and Serbs in North Africa (1916-1918)*, 2015; *Silent witnesses – Dutch Mercy and Serbs During the Great War (1914-1915)*, 2017; *The Bulgarian Occupation of Serbia (A Postal History)*, 2017, and; *Dutch Mercy and the Serbs During the Great War*, 2017 published by Dutch Embassy in Belgrade. He also initiated the preparation of a reprint of the tribute dedicated to students and professors from Belgrade University who died during World War I. He obtained several awards for his philatelist work: *International Philatelic Biennial – Gold Medal (Moscow, 2014)*, *World Stamp Exhibition – Large Vermeil (Singapore, 2015)*.

We are grateful to all our colleagues who have contributed their papers and their efforts in reviewing this special edition of *Thermal Science* journal.

We wish Prof. Radovanović health, many happy and joyous moments with his family, active presence and involvement in the work and development of the Fuel and Combustion Laboratory, and continuation of his work with the Society of Thermal Engineers of Serbia.

Belgrade, November 2018

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