

## IN MEMORIAM

### PROF. DR. FRANC VODOPIVEC (1931-2021)



Prof. dr. Franc Vodopivec was employed at the Institute of Metals and Technology (IMT) from 1958 until his retirement in 1996. As director, he headed IMT from 1990 to 1996.

Prof. dr. Franc Vodopivec was born on October 8<sup>th</sup>, 1931 in Rakitnik near Prestranek. He graduated from the Technical Faculty in Ljubljana in 1956 and was employed at the Metallurgical Institute. Prof. Ciril Rekar enabled him to study at the IRSID Institute in France in 1960, where he received his doctorate in 1962 from the University of Paris. After returning to the Metallurgical Institute, he became head of the Department of Metallography and later of the Department of Metal Technology. At the Metallurgical Institute, which in 1991 was renamed the Institute of Metals and Technology (IMT), prof. dr. Vodopivec was employed for over 40 years. He was an excellent metallurgist, engineer and top researcher, and therefore a great role model for many generations of metallurgists, engineers and other researchers.

Prof. dr. Franc Vodopivec worked in the metallurgical profession for more than five decades, where he left a great impression, both in industry and in the academic world, in which he directed his scientific and professional work towards connecting these two segments of society. He focused his top scientific work at the institute on the research and development of those segments of metallurgy that could be used to advantage by the Slovenian economy. His life motto, which he advocated

Prof. dr. Franc Vodopivec je bil na Inštitutu za kovinske materiale in tehnologije (IMT) zaposlen od leta 1958 pa do upokojitve leta 1996. Kot direktor je vodil IMT od leta 1990 do leta 1996.

Prof. dr. Franc Vodopivec se je rodil 8. oktobra 1931 v Rakitniku pri Prestranku. Diplomiral je na Tehniški fakulteti v Ljubljani leta 1956 in se zaposlil na Metalurškem inštitutu. Prof. Ciril Rekar mu je leta 1960 omogočil izpopolnjevanje na Inštitutu IRSID v Franciji, kjer je leta 1962 doktoriral na Univerzi v Parizu. Po vrnitvi na Metalurški inštitut je postal vodja Oddelka za metalografijo in pozneje Oddelka za tehnologijo kovin. Na Metalurškem inštitutu, ki se je leta 1991 preimenoval v Inštitut za kovinske materiale in tehnologije (IMT), je bil prof. dr. Vodopivec zaposlen skupaj dobrih 40 let. Prof. dr. Franc Vodopivec je bil izvrsten metalurg, inženir in vrhunski raziskovalec in zaradi tega velik vzor številnim generacijam metalurgov, inženirjem, kakor tudi drugim raziskovalcem.

Prof. dr. Franc Vodopivec je več kot pet desetletij deloval v metalurški stroki, kjer je pustil velik pečat, tako v industriji kot v akademskem svetu, v katerem je usmerjal svoje znanstveno in strokovno delo k povezanju teh dveh segmentov družbe. Svoje vrhunsko znanstveno delo na inštitutu je ciljno usmerjal v raziskave in razvoj tistih segmentov metalurgije, ki jo je lahko s pridom uporabilo slovensko gospodarstvo. Njegov življenjski moto, ki ga je vodil od začetka do konca

from the beginning to the end of his remarkable career, was that research should be aimed at industry, "because that's how we do something beneficial for society." The results of science must be innovation, and new industrial products lead to higher added value and to the well-being of our society. "

He was aware that knowledge of the microstructure of metals and alloys is crucial for understanding the properties of metallic materials and for the development of the metallurgical profession. He was also one of the main initiators of the purchase of the first electronic micro-analyser, purchased in 1969, as the first of its kind in this part of Europe. The purchase of scanning electron microscope in 1977 was also the result of his intensive efforts in this field. The Institute of Metals and Technology was thus a pioneer in the field of electron microscopy in Slovenia and the former Yugoslavia. All these are the unequivocal merits of prof. dr. Franc Vodopivec.

When he became the director of the Institute of Metals and Technology in 1990, he took over the Institute in very difficult times for Slovenian metallurgy, but with his wisdom and visionary work he managed to strengthen and maintain ties with the Slovenian ironworks and expand its activities to other areas, such as in the field of energy.

Prof. dr. Franc Vodopivec was the initiator of international cooperation from the very beginning, by organizing the first international scientific conference in Portorož in 1959, called the Colloque de Portorož, which was organized in cooperation with the Max-Planck-Institute for Steel Research in Düsseldorf, Germany, and the IRSID Institute, France. Later, in the 1990s, thanks to him, intensive collaboration was established with the Max Planck Institute for Steel Research, which continues to this day.

In 1984 he received the Kidrič Lifetime Achievement Award in the field of science and innovation. He received the award for his work "Microstructural processes and reactions before and during hot steel forming". At that time, the Kidrič Award was the highest Slovenian recognition for scientific achievements or for scientific research work and was awarded in the years from 1957 to 1991.

In 2003, prof. dr. Franc Vodopivec received the Zois Award for Scientific Achievement. It was awarded because he had achieved top results in the field of metal and alloy properties. His work in the fields of solid-state chemistry, physical metallurgy, the methodology of metallographic research of materials and forensic research is also resounding.

Prof. dr. Franc Vodopivec was one of the initiators of the organization of metallurgical conferences, from which the traditional metallurgical conference later emerged. The conference has since grown into an international conference with a broader agenda.

For many years, prof. dr. Franc Vodopivec was also the editor-in-chief of the scientific journal Materials and

njegove izjemne kariere je bil, da morajo biti raziskave namenjene industriji, "ker tako delamo nekaj koristnega za družbo. Rezultati znanosti morajo biti inovacije in novi industrijski produkti in to vodi do višanja dodane vrednosti in do blagostanja naše družbe."

Zavedal se je, da je poznavanje zgradbe mikrostrukture kovin in zlitin ključnega pomena za razumevanje lastnosti kovinskih materialov in za razvoj metalurške stroke. Bil je tudi eden glavnih pobudnikov nakupa prvega elektronskega mikro-analizatorja, ki je bil kupljen leta 1969, kot prvega tovrstnega v tem delu Evrope. Tudi nakup vrstičnega elektronskega mikroskopa leta 1977 je plod njegovih intenzivnih prizadevanj na tem področju. Inštitut za kovinske materiale in tehnologije je bil tako pionir na področju elektronske mikroskopije v Sloveniji, oziroma v takratni Jugoslaviji. Vse to so nedvomno zasluge prof. dr. Franca Vodopivca.

Ko je leta 1990 postal direktor Inštituta za kovinske materiale in tehnologije, je prevzel Inštitut v zelo težkih časih za slovensko metalurgijo, vendar ga je uspel z modrostjo in s svojim vizionarskim delovanjem okrepiti in ohraniti povezave s Slovenskimi železarnami ter razširiti njegovo delovanje še na druga področja, kot na primer na področje energetike.

Prof. dr. Franc Vodopivec je bil že od začetka pobudnik mednarodnega sodelovanja, tako z organizacijo prve mednarodne znanstvene konference leta 1959 v Portorožu, ki se je imenovala Colloque de Portorož, in je bila organizirana v sodelovanju z Max-Planck-Institute for Steel Research iz nemškega Düsseldorfa ter Inštitutom IRSID iz Francije. Pozneje, v devetdesetih letih prejšnjega stoletja, se je po njegovi zaslugi vzpostavilo intenzivno sodelovanje z Inštitutom Max Planck for Steel Research, ki traja še danes.

Leta 1984 je prejel Kidričevo nagrado za življenjsko delo na področju znanosti in inovacij. Nagrado je prejel za delo: "Mikrostrukturni procesi in reakcije pred in med vročim preoblikovanjem jekel." Kidričeva nagrada je bila takrat najvišje slovensko priznanje za znanstvene dosežke oziroma za znanstveno-raziskovalno delo, in se je podeljevala v letih od 1957 do 1991.

Leta 2003 je prof. dr. Franc Vodopivec prejel Zoisovo nagrado za znanstvene dosežke. Nagrado je prejel z utemeljitvijo, da je dosegel vrhunске rezultate na področju lastnosti kovin in zlitin. Odmevno je tudi njegovo delo na področjih: kemije trdnega stanja, fizikalne metalurgije, metodologije metalografskih raziskav materialov in forenzičnih raziskav.

Prof. dr. Franc Vodopivec je bil eden od pobudnikov organizacije metalurških posvetov, iz katerih je pozneje nastalo tradicionalno metalurško posvetovanje. Njegova glavna zasluga je, da je konferenca prerasla v mednarodno konferenco s širšim programom.

Prof. dr. Franc Vodopivec je bil dolga leta tudi glavni urednik znanstvene revije Materials in Tehnologije (MIT), ki jo IMT izdaja. Pod njegovim vodenjem je revija dosegla znanstveni ugled in visok faktor vpliva in

Technology (MIT), published by IMT. Under his leadership, the journal achieved a scientific reputation and a high impact factor, and prof. dr. Vodopivec undoubtedly deserved the journal's international reputation and wider recognition.

For his life's work, IMT awarded him the Ciril Rekar Lifetime Achievement Award in 2017, on the occasion of the institute's 70th anniversary, because his role established the institute in Slovenia and internationally, because the Materials and Technology journal became internationally recognized and because the Materials Conference became an international conference that still connects domestic and foreign researchers today.

In his life path, he always chose the harder way. His position was that in Slovenia it is necessary to intensively direct research intended for industry. Because he decided early on to conduct research with potentially useful value, he thus became indispensable for industry, and at the same time the system did not allow him to gain an equal foothold in the scientific spheres. The role of prof. dr. Franc Vodopivec in the field of physical metallurgy, which enables continuous improvements of syntheses and technologies in the field of metallic materials, is irreplaceable.

His professional path did not end with his retirement, because he constantly passed on his extremely broad knowledge in the field of metallurgy to the younger generations with his invaluable advice and experience. He has always helped young researchers in preparing doctorates, researchers in preparing projects and everyone else with irreplaceable advice about research work.

In 2018, he was the first to receive the Puh Lifetime Achievement Award in the field of metallurgy. He received the award for his extremely successful integration of two segments of society, both academic and industrial. His decisions had a major impact on the development of the metallurgical industry.

Prof. dr. Franc Vodopivec was, first and foremost, an Engineer with a capital letter. He was sought after and appreciated in industry throughout Yugoslavia and Slovenia. His engineering knowledge and the need to establish engineering in Slovenia led him to a group of some very enthusiastic experts who, following the example of countries in the West, started with the idea of establishing the Slovenian Academy of Engineering. Prof. dr. Franc Vodopivec was undoubtedly one of the most deserving members of the Slovenian Academy of Engineering, which unites elected members from the technical sciences of the public research sphere, economy and technological development. He was also its president from 2002 to 2003.

He was also the founder, idea leader and long-term president of the Slovenian Materials Association (SDM).

Prof. dr. Franc Vodopivec was the one who brought me to the Institute of Metallic Materials and Technology and introduced me to research. He was extraordinarily hardworking. I still remember his words in connection

ravno prof. dr. Vodopivec je najbolj zaslužen za to, da ima revija mednarodni ugled in širšo prepoznavnost.

Za njegovo življenjsko delo mu je IMT leta 2017, ob praznovanju 70-letnice inštituta, podelil nagrado Cirila Rekarja za življenjsko delo z utemeljitvijo, da je z njegovo vlogo inštitut postal uveljavljen v slovenskem in mednarodnem prostoru, da je revija Materiali in tehnologije postala mednarodno prepoznavna in konferenca o materialih mednarodna konferenca, ki še danes povezuje domače in tuje raziskovalce.

Na njegovi življenjski poti se je vedno odločal za težjo pot. Njegovo stališče je bilo, da je v Sloveniji potrebno intenzivno usmerjati raziskave namenjene industriji. Ker se je že zgodaj odločil za raziskave s potencialno uporabno vrednostjo, je tako postal nepogrešljiv za industrijo, hkrati pa mu sistem ni omogočal enakovredne uveljavitve v znanstvenih sferah. Nenadomestljiva je vloga prof. dr. Franca Vodopivca na področju fizikalne metalurgije, ki omogoča stalne izboljšave sintez in tehnologij na področju kovinskih materialov.

Njegova profesionalna pot se tudi z upokojitvijo ni končala, ker je svoje izredno široko znanje s področja metalurgije s svojimi neprecenljivimi nasveti in izkušnjami, neprekinjeno prenašal na mlajše generacije. Vedno je pomagal mladim raziskovalcem pri pripravi doktoratov, raziskovalcem pri pripravi projektov in vsem ostalim z nenadomestljivimi nasveti pri raziskovalnem delu.

Leta 2018 je prvi prejel Puhovo nagrado za življenjsko delo na področju metalurgije. Nagrado je prejel zaradi izredno uspešnega povezovanja dveh segmentov družbe, tako akademskega kot industrijskega. Njegove odločitve so imele velik vpliv na razvoj metalurške industrije.

Prof. dr. Franc Vodopivec je bil, najprej in predvsem, inženir z veliko začetnico. Iskan in cenjen je bil v industriji širom po Jugoslaviji in Sloveniji. Njegovo inženirsko znanje ter potreba po uveljavitvi inženirstva v Sloveniji, ga je pripeljala v skupino nekaj zelo zagnanih strokovnjakov, ki so po vzoru zahodnih držav začeli z idejo o ustanovitvi Inženirske akademije Slovenije. Prof. dr. Franc Vodopivec je bil nedvomno eden najbolj zaslužnih za ustanovitev Inženirske akademije Slovenije, ki združuje voljene člane iz tehniških ved javne raziskovalne sfere, gospodarstva in tehnološkega razvoja. V letih 2002 do 2003 je bil tudi njen predsednik.

Prav tako je bil ustanovitelj, idejni vodja in dolgoletni predsednik Slovenskega društva za materiale (SDM).

Prof. dr. Franc Vodopivec je bil tisti, ki je na Inštitut za kovinske materiale in tehnologije pripeljal tudi mene in me vpeljal v raziskave. Bil je zelo delaven in izreden garač. Še danes se spominjam njegovih besed v povezavi z mojim doktoratom. Dejal je: *»... poleg doktorata se bo potrebno vključiti tudi v ostala dela na inštitutu, pa saj to ne bo problem, saj ima dan 24 ur.«* Kljub vsemu je bil pripravljen nuditi neskončno pomoč, za karkoli si ga

with my doctorate. He said: "... in addition to the doctorate, it will be necessary to get involved in other work at the institute, but this will not be a problem, as the day has 24 hours." Nevertheless, he was ready to offer endless help for whatever you pleased or asked. Having him as a tutor was a great reward for everyone.

Despite his greatness, both in research and in managerial terms, he remained a humble but very critical and constructive speaker. Prof. dr. Franc Vodopivec has left many marks on metallurgy, in the science of materials and technologies, in the meaning of the Institute of Metals and Technology, in the field of written Slovene work as well as in interpersonal relations.

All of us who knew him will cherish his memory, and he will be an inspiration for our future work.

In Ljubljana, January 2021

Assoc. prof. dr. Matjaž Godec

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I met prof. dr. Franc Vodopivec as a final-year student of metallurgy, when we organized the traditional "Jump over the skin" event of the Montanists, where he became my godfather. Of course, at that time I did not even imagine that our paths would be so closely and, over the long run, intertwined in the professional field.

Given that Franci had an extremely broad and in-depth knowledge of metallic materials and a sophisticated sense of their characterization, he constantly directed basic research in this field in the direction of the latest findings in the world. Accordingly, he encouraged and stimulated his colleagues in various fields in the direction of developing and equipping individual laboratories with the latest research equipment, with which our research results were comparable, and often even world leading in each field.

Compared to other researchers, Franci also had a very good overview and a great affinity for Slovenian industry in the field of the production and processing of metallic materials. He always focused part of his research on new technologies or products with higher added value in the case of new findings.

In the years 1984 to 1986, he came to the realization that a new approach was needed in the field of the heat treatment and surface engineering of tool and high-speed steels. Namely, toolmaking was already very developed in Slovenia at that time, and Metal Ravne, as one of the leading steelworks, produced top-quality tool and high-speed steels. It is known that the quality of the tools for working in cold and hot conditions largely depends on a properly selected and performed heat treatment.

prosil ali vprašal. Imeti njega za mentorja je bila za vsakega velika nagrada.

Kljub njegovi veličini, tako v raziskovalnem kot v menedžerskem smislu, je ostal skromen, vendar zelo kritičen in konstruktiven sogovorec. Prof. dr. Franc Vodopivec je pustil mnoge sledi v metalurgiji, v znanosti o materialih in tehnologijah, v pomenu Inštituta za kovinske materiale in tehnologije, na področju pisane slovenske besede in tudi v medčloveških odnosih.

Vsi, ki smo ga poznali, ga bomo ohranili v lepem spominu, saj nam bo navdih za naše nadaljnje delo.

V Ljubljani, januar 2021

Izr. prof. dr. Matjaž Godec

Prof. dr. Franca Vodopivca sem spoznal že kot študent zadnjega letnika metalurgije, ko smo organizirali tradicionalno prireditev montanistov "Skok čez kožo", na kateri je postal moj boter. Seveda si takrat nisem niti predstavljal, da se bodo najine poti tako tesno in dolgoročno prepletle na strokovnem področju.

Glede na to, da je imel Franci izredno široko in poglobljeno znanje na področju kovinskih materialov ter prefinjen občutek za njihovo karakterizacijo, je osnovne raziskave s tega področja ves čas usmerjal v smeri najnovejših spoznanj v svetu. Temu primerno je vsa leta spodbujal in opogumljal svoje sodelavce na različnih področjih v smeri razvoja in opremljanja posameznih laboratorijev z najnovejšo raziskovalno opremo, s pomočjo katere so bili tudi naši raziskovalni rezultati primerljivi, nemalokrat pa na posameznem področju celo vodilni na svetovnem nivoju.

Franci je imel v primerjavi z drugimi raziskovalci tudi zelo dober pregled in veliko afiniteto do slovenske industrije s področja izdelave in predelave kovinskih materialov. Vedno je del svojih raziskav usmerjal tako, da je v primeru novih spoznanj le-te usmeril tudi v nove tehnologije ali v izdelke z višjo dodano vrednostjo.

V letih 1984 do 1986 je prišel do spoznanja, da je na področju toplotne obdelave in inženiringa površin orodnih in hitroreznih jekel potreben nov pristop. Namreč, v Sloveniji je bilo že takrat zelo razvito orodjarstvo, v Metalu Ravne so, kot eni vodilnih jeklarn, izdelovali vrhunska orodna in hitrorezna jekla. Poznano je, da je kakovost orodij za delo v hladnem in vročem v

Well, here our paths met again, because in 11 years of working in the automotive industry (IMV Novo mesto and Renault) I gained the most modern theoretical and practical knowledge of the heat treatment of metal materials. In 1986, Franci invited me to participate and offered me the opportunity to set up a state-of-the-art centre for vacuum heat treatment of tool and high-speed steels at the Institute, thus acquainting Slovenian toolmakers with the latest technology. Of course, I gladly accepted the offer. What really motivated me was his complete trust.

Within a year, we equipped the centre, as we bought the most modern vacuum furnace with great commitment from France and with the help of industry, in which we heat-treated the most demanding tools made by Slovenian toolmakers from Slovenian tool steels, as well as for clients from abroad. Based on good results and a great commitment, we equipped the centre with the help of industry with a state-of-the-art aggregate for nitriding metallic materials in a pulsating plasma. Franci always supported and encouraged me in this development.

After 35 years of operation of the centre, today in Slovenia we have quite a few very well-equipped commercial centres for the heat treatment and engineering of surfaces of metallic materials, which is also a great tribute to prof. dr. Franc Vodopivec.

Of course, in parallel with the promotion of state-of-the-art technologies, which fall within the framework of energy-saving and environmentally friendly technologies, research work in the field of process optimization continues to be carried out. Namely, in the past, the quality criterion was only the achieved hardness, which we know does not show whether the achieved properties of the steel after heat treatment are optimal. Therefore, to optimize the heat-treatment process of tool steels, we introduced an additional parameter, namely the fracture toughness. As the measurement of the fracture toughness of brittle tool and high-speed steels is very demanding, we at IMT, also on the basis of his initiatives, developed a very useful, non-standard methodology for measuring fracture toughness. This approach has been established in quite a few foreign centres and laboratories, and has also been recognized as very appropriate by the International Federation for Heat Treatment and Surface Engineering (IFHTSE).

Franci, despite the fact that you passed on many of your ideas to us, we will greatly miss your suggestions and our conversations with you.

In Ljubljana, January 2021

Prof. dr. Vojteh Leskovšek

veliki meri odvisna od pravilno izbrane in izvedene toplotne obdelave.

No, tu pa sta se najini poti zopet srečali, saj sem v enajstih letih dela v avtomobilski industriji (IMV Novo mesto in Renault) za tisti čas pridobil najsodobnejša teoretična in praktična znanja spodročja toplotne obdelave kovinskih materialov. V letu 1986 me je Franci povabil k sodelovanju in mi ponudil možnost, da na Inštitutu postavim najsodobnejši center za vakuumsko toplotno obdelavo orodnih in hitroreznih jekel ter na ta način slovenske orodjarje seznanimo z najnovejšo tehnologijo. Seveda sem ponudbo z veseljem sprejel, tisto kar me je še posebej motiviralo, je bilo njegovo popolno zaupanje.

V roku enega leta smo center usposobili, saj smo zveliko zavzetostjo Francija in s pomočjo industrije kupili najsodobnejšo vakuumsko peč, v kateri smo kar nekaj let toplotno obdelovali najzahtevnejša orodja, izdelana v slovenskih orodjarnah iz slovenskih orodnih jekel, tudi za naročnike iz tujine. Na osnovi dobrih rezultatov in njegove velike angažiranosti, smo center s pomočjo industrije opremili še z vrhunskim agregatom za nitriranje kovinskih materialov v pulzirajoči plazmi. Pri tem razvoju me je Franci vseskozi podpiral in spodbujal.

Po petintridesetih letih obratovanja centra imamo danes v Sloveniji kar nekaj zelo dobro opremljenih komercialnih centrov za toplotno obdelavo in inženiring površin kovinskih materialov, kar je tudi velika zasluga prof. dr. Franca Vodopivca.

Seveda je vzporedno s promocijo najmodernejših tehnologij, ki sodijo v okvir energetsko varčnih in okolju prijaznih tehnologij, potekalo in še vedno poteka, tudi raziskovalno delo na področju optimizacije postopkov. Namreč, v preteklosti je bilo merilo kakovosti le dosežena trdota, za katero pa vemo, da ne pokaže ali so dosežene lastnosti jekla po toplotni obdelavi optimalne. Zato smo za optimiziranje postopka toplotne obdelave orodnih jekel uvedli dodaten parameter, in sicer lomno žilavost. Ker je merjenje lomne žilavosti krhkih orodnih in hitroreznih jekel zelo zahtevnosmo na IMT, tudi na osnovi njegovih pobud, razvili zelo uporabno nestandardno metodologijo merjenja lomne žilavosti. Ta pristop se je uveljavil v kar nekaj tujih centrih in laboratorijih, kot zelo primerno pa jo je pripoznal tudi International Federation for Heat Treatment and Surface Engineering (IFHTSE).

Franci, navkljub temu, da si na nas prenesel veliko svojih idej, bomo zelo pogrešali tvoje sugestije in pogovore s teboj.

V Ljubljani, januar 2021

Prof. dr. Vojteh Leskovšek

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Prof. Dr. Franc Vodopivec was born on the 8<sup>th</sup> of October 1931 in Rakitnik near Postojna. He successfully completed his studies of metallurgy at the Faculty for Mining and Metallurgy of the University of Ljubljana in 1956. Professor Ciril Rekar invited him to join the Metallurgical Institute (MI) in 1958 and enabled him to receive training at IRSID (Institut de Recherches de la Sidérurgie) in Saint Germaine-en-Laye near Paris. Prof. Vodopivec obtained his PhD "Etudé de comportement de l'arsenic et du phosphore pendant l'oxydation des alliages de fer faiblement alliés en ces éléments" at the Université de Paris, Faculté de Sciences in 1962.

Prof. Vodopivec was nominated as the head of Metallographic Laboratory for the research field of solid-state physics and in 1969 he initiated the purchase of the first electron microprobe, the first in Central Europe, which was put into operation at MI Ljubljana, and in 1978, the first scanning electron microscope in former Yugoslavia was purchased for the chemical analysis of metallic materials.

From 1980 Prof. Vodopivec was responsible for the research work of the MI. In the 1980s Prof. Vodopivec engaged new and already-recognized engineers and researchers, as well as young metallurgical experts to participate.

The first was Dr. Vojteh Leskovšek, an expert in the field of tool steels' thermal treatment at IMV and Renault, Dr. Borivoj Šuštaršič, expert in the field of powder metallurgy at Iskra Magneti, and the late Dr. Boris Ule, who was a leading expert at Litostroj Foundry. Later, when the institute began investigations in energetics, Dr. Jelena Vojvodič Tuma took over the research and expertise of the Centre for the Revitalization of Industrial Facilities, which she founded. Prof. Vodopivec invited me to come to MI, and my classmates and my colleagues Dr. Vasilij Prešern and Dr. Vojteh Leskovšek convinced me to take the job in 1989. With the initiative of the director, Dr. Jože Rodič, and Dr. Dušan Kveder, MI decided to take over the scientific Journal of Iron and Steel (Železarski zbornik), of which Aleš Lagoja was then editor-in-chief. As I had some experience with Vacuum, the journal for vacuum science and technology, vacuum metallurgy, surface science and plasma physics, I was invited to the editorial board together with Dr. Jože Gasperič, an expert in vacuum technology and a great supporter of the Slovene technical word and a very fast and excellent reviewer. Jana Jamar joined as the technical editor of the journal, and later Cvetka Irt and Miro Pečar. Later, Dr. Paul McGuinness took over the proofreading of English manuscripts. Soon, there was a need for a new name for the journal, and it was renamed Metals Alloys & Technology (Kovine zlitine in tehnologije-KZT), and then more recently Materials and Technology (MIT). The design was taken care of by academic painter and designer Ignac Kofol. On the advice of a friend Prof. Joe Green from the USA and editor-in-chief of Thin Films, we slowly, and with a lot of work, succeeded in publishing contributions in an English-language journal and all the articles were reviewed.

Prof. dr. Franc Vodopivec se je rodil 8.10. 1931 v Rakitniku blizu Postojne. Leta 1956 je uspešno zaključil študij metalurgije na Fakulteti za rudarstvo in metalurgijo na Univerzi v Ljubljani. Profesor Ciril Rekar ga je leta 1958 povabil na Metalurški inštitut (MI) in mu omogočil, da se je izobraževal na IRSID (Institut de Recherches de la Sidérurgie) v Saint Germaine-en-Laye blizu Pariza. Leta 1962 je doktoriral na Univerzi v Parizu z doktoratom: "Etudé de comportement de l'arsenic et du phosphore pendant l'oxydation des alliages de fer faiblement alliés en ces éléments."

Ob vrnitvi na MI je bil profesor dr. Vodopivec imenovan za vodjo Metalografskega laboratorija za raziskovalno področje fizike trdne snovi in je leta 1969 pobudnik za nakup prve elektronske mikrosone, prve v Srednji Evropi, ki je bila dana v obratovanje MI Ljubljana, in leta 1978 je bil kupljen prvi kemijski elektronski mikroskop v nekdanji Jugoslaviji za kemijsko analizo kovinskih materialov.

Od leta 1980 je bil prof. Vodopivec odgovoren za raziskovalno delo MI. K sodelovanju je angažiral nove in že priznane inženirje in raziskovalce ter mlade metalurške strokovnjake.

Prvi je bil dr. Vojteha Leskovšek, ki se je uveljavil v IMV na področju toplotne obdelave, nato dr. Borivoj Šuštaršič, ki se je izkazal v Iskra Magneti na področju metalurgije prahov in pokojni dr. Boris Ule, ki je bil vodilni strokovnjak v Litostroju Livarna in kasneje, ko se je inštitut začel intenzivno ukvarjati z energetiko, še dr. Jelena Vojvodič Tuma, katera je prevzela raziskave in ekspertize v okviru Centra za revitalizacijo, ki ga je ustanovila. Prof. dr. Vodopivec me je povabil, naj pridem na MI, kjer sta bila že moja sošolca in kolega Vasilij Prešern in Vojteh Leskovšek, ki sta me dodatno prepričala, da sem se zaposlila na MI.

MI je na pobudo takratnega direktorja dr. Jožeta Rodiča in dr. Dušana Kvedra sklenil, da prevzame revijo Železarski zbornik, katere glavni urednik je bil Aleš Lagoja. Ker sem imela nekaj izkušenj z revijo Vakuumist, so me pritegnili v uredniški odbor tako kot tudi dr. Jožeta Gasperiča, ki je bil velik ljubitelj slovenske tehniške besede in zelo hiter lektor. Pridružila se nam je še Jana Jamar kot tehnična urednica revije in Cvetka Irt ter kasneje še Miro Pečar. Kasneje je lektoriranje angleških tekstov prevzel dr. Paul McGuinness. Kmalu se je pokazala potreba po novem imenu revije, preimenovali smo jo v Kovine zlitine tehnologije - KZT in nazadnje v Materiali in tehnologije. Za obliko je v tistem času skrbel akademski slikar in oblikovalec Ignac Kofol. Po nasvetu prijatelja prof. Joe Greena iz ZDA in glavnega urednika revije Thin Films, smo z vztrajnim delom počasi le uspeli, da so bili prispevki objavljeni v reviji v angleškem jeziku in da so bili vsi članki recenzirani, kar se je obrestovalo, da je bila nato revija MIT citirana v najbolj pomembnih bazah podatkov za kovinske materiale in tehnologije in da je pridobila faktor vpliva (IF).

Soon MIT was cited in the most important databases of materials and technology and it gained an impact factor (IF).

From 1990 to 2000, I helped organize the autumn symposium on materials and technologies in Portorož, which after 2000 was renamed as the Conference on Materials and Technologies. Dr. Vodopivec agreed that we invited world-known experts in the field of materials and technology to the annual conference in Portorož, and young researchers presented their work in English in a 10-minute talk in front of an international commission who selected the best contribution of the young researchers for an award.

In 2000, prominent Slovenian research institutes, the Jožef Stefan Institute and the National Institute of Chemistry, joined the organization of the Conference. In addition, in 2000 we also introduced a Metallurgical Day for participants from industry.

From 1991 to 1996, Prof. Vodopivec was director of IMT, and then he retired in 1997 with the idea that as a national councilor for science of the parliament of the Republic of Slovenia he would do the most in this field for Slovenia. Vodopivec's younger colleagues engaged in his campaign for election to the National Council of Science. Prof. Vodopivec was a state councilor from 1992 to 2002, for two mandates.

For a short period of time, politics engaged and addicted Prof. Franci Vodopivec. However, his pursuit of politics could not replace his engineering work and the work as a researcher. In 1998 he took over as editor-in-chief of KZT, helping to establish the journal.

I was a member of his research group, working on segregation phenomena and the surface analysis of soft magnetic materials. Because we did not have access to cutting-edge research equipment, Prof. Vodopivec re-established in the 1990s a cooperation with Prof. H.J. Grabke from the Max Planck Institute (MPIE) in Düsseldorf. The cooperation has been very successful and is still ongoing today. Prof. Vodopivec proposed Prof. H. J. Grabke as an honorary doctor of the University of Ljubljana because for many years he helped Slovenian researchers prepare an experimental part of their doctoral work and post-doctorally trained on cutting-edge research equipment in a different research environment at MPIE and brought new knowledge and experiences to IMT and Slovenia.

From 2000 to 2011, when I was director of IMT, he was always happy to participate in the training of young researchers and to give them his years of experience in writing doctoral thesis and articles. Prof. Vodopivec was impressed by the new cutting-edge research equipment, which was purchased as part of the Centre of Excellence for Advanced Metallic Materials. He also looked forward to working with the Jožef Stefan International Postgraduate School and was happy to engage with his experience.

After he and his wife moved to the Trnovo Old Citizens' Home, he still liked to come to IMT, to come "for coffee" and explain his new reflections on metal materials, and of course he was very proud of his sons and

Od leta 1990 do 2011 sem pomagala pri organizaciji jesenskega posvetovanja o materialih in tehnologijah v Portorožu, ki se je preimenovalo v Konferenco o materialih in tehnologijah. Prof. dr. Vodopivec se je strinjal, da smo na vsakoletno konferenco v Portorožu povabili vrhunske strokovnjake s področja kovinskih materialov in tehnologij in da so mladi raziskovalci predstavili svoje delo v angleščini v 10 minutnem prispevku. Leta 2000 smo k organizaciji pritegnili še vrhunska slovenska raziskovalna inštituta Institut Jožef Stefan in Kemijski inštitut Ljubljana. Poleg tega smo leta 2000 uvedli tudi Metalurški dan za udeležence iz industrije.

V letih 1991 do 1996 je bil dr. Vodopivec direktor IMT, upokojil se je leta 1997 z mislijo, da bo kot državni svetnik za znanost naredil največ na tem področju za Slovenijo.

Mlajši raziskovalci smo se angažirali v njegovi volilni kampanji za izvolitev v državni svet za področje znanosti. Prof. dr. Vodopivec je bil od 1992 do 2002, v dveh mandatih, državni svetnik. Politika ga je za kratko obdobje očarala in zasvojila. Vendar mu udejstvovanje v politiki ni moglo nadomestiti inženirskega dela in dela raziskovalca, zato je leta 1998 prevzel mesto glavnega urednika revije KZT in tako pripomogel h uveljavitvi revije.

Delala sem v raziskovalni skupini dr. Vodopivca, ukvarjala sem se z analizo površin mehkomagnetnih materialov in ker nismo imeli dostopa do vrhunske raziskovalne opreme, je dr. Vodopivec ponovno vzpostavil sodelovanje s prof. H. J. Grabkom iz Max Planck Instituta (MPIE) v Düsseldorfu. Sodelovanje je bilo zelo uspešno in poteka še dandanes.

Dr. Vodopivec je predlagal prof. H. J. Grabke-ja za častnega doktorja Univerze v Ljubljani, ker je dolga leta pomagal, da so raziskovalci delali na vrhunski raziskovalni opremi v drugačnem raziskovalnem okolju na MPIE in so pozitivne izkušnje prinesli nazaj na IMT.

V letih 2000-2011, ko sem bila direktorica IMT, je vedno z veseljem sodeloval pri usposabljanju mladih raziskovalcev in jim predajal svoje dolgoletne izkušnje pri pisanju doktorskih del in člankov. Bil je navdušen nad novo vrhunsko raziskovalno opremo, ki smo jo takrat nabavili v okviru Centra odličnosti za sodobne kovinske materiale. Prav tako se je veselil sodelovanja z Mednarodno podiplomsko šolo IJS in se je z veseljem vključil s svojimi izkušnjami.

Potem, ko sta se z ženo preselila v Dom starejših občanov Trnovo, je še vedno rad prihajal na IMT, se oglasil "na kavi", ter razlagal svoja nova razmišljanja o kovinskih materialih in seveda je bil zelo ponosen na svoja sinova in vnuke. Ves čas je upal, da se mu bo vid toliko popravil, da bo spet prišel študirat v svojo bivšo pisarno, ki ga je še vedno čakala.

Izgubili smo izvrstnega metalurga, inženirja, raziskovalca, učitelja in dobrega prijatelja. Pogrešamo ga.

V Ljubljani, januar 2021

Dr. Monika Jenko

grandchildren. He was still hoping his eyesight will improve to this point, he would be able to come to his office to study, again.

We have lost an excellent metallurgist, an engineer, a researcher, a teacher and a good friend. We all miss him.

In Ljubljana, January 2021

Dr. Monika Jenko