

Dr Branko Bugarski

Dr Branko Bugarski graduated in 1983 from the Faculty of Technology and Metallurgy of the University of Belgrade (TMF-UB) at the Department of Chemical Engineering. In the same year, he enrolled in postgraduate studies at Iowa State University, where he defended his master's thesis in 1986 with the title: "Pharmacokinetic model of Anesthesia". He worked on his doctoral dissertation entitled: "Immobilized bioreactor systems for the propagation of animal cells" in Canada at Queens University, Kingston, Ontario and at TMF at the Department of Chemical Engineering where he obtained the title of PhD in Chemical Engineering in 1992.



From 1988 until he was elected to the position of assistant professor in 1994, he was employed as a research associate on MNTS projects. In the period from 1992 to 1994, as part of his postdoctoral training, he worked at Queens University, Kingston, Ontario, Canada as a "post doc fellow". He was elected to the position of associate professor in 1999. He was elected to the position of full professor at the Department of Chemical Engineering in 2006, and to the position of Research professor at the Institute for Medical Research in 2001. He was the Head of the Department of Chemical Engineering, TMF from 2011 to 2014, and Program Coordinator for the study area of Pharmaceutical Engineering, TMF from 2007 to 2013.

During 1998, he was on a study stay at MIT, Boston and Oregon State University. He had several study stays in Canada and the USA in 2006, and in Greece (Agricultural University of Athens and University of Patras in 2010, 2011 and 2016).

He was the assistant minister for technological development and innovation of the Ministry of Education, Science and Technological Development of the Republic of Serbia in the period from 2014 to 2016. He is a member of several professional associations: EFCE (European Federation of Chemical Engineering) Working Party on Chemical Reaction Engineering, AIChE (American Institute of Chemical Engineering, USA), Biencapsulation Research Group, France, and President of the Society for Biochemical Engineering in Belgrade from 2003 to 2010.

Professor Branko Bugarski achieved significant results in pedagogical work. This can be seen from the fact that he fully prepared and implemented the teaching program for subjects at all three levels of study (basic, master's and doctoral), whereby fully prepared and teaching program for 15 courses since he was employed as Assistant professor till now. Prof. B. Bugarski also provided high-quality and modern textbook material for the subjects he taught. He is the author of two (4) textbooks, as a compulsory contribution to the of students.

He was also Head of the Department of Chemical Engineering from 2011-2014. And Program Coordinator for the field of study Pharmaceutical Engineering at TMF (2007-2013).

Throughout his career, prof. B. Bulgarski made a significant contribution in the field of promoting young students resulting in mentorship of 20 defended doctoral dissertations, 5 master of science theses, 12 master's theses and 63 diploma for BS -basic studies.

He participated in a large number of commissions for the preparation summary for election of candidates for teaching or scientific positions.

Prof. Dr B. Bugarski also participated in the implementation of graduate studies at the University of Belgrade within the Biomedical Engineering and Technology study program in the period from 2009 to the present day teaching two subjects.

In addition to teaching at TMF-UB, prof. B. Burarski also taught at foreign universities. As part of a scholarship for doctoral studies at Queen's University, Canada, he was involved in exercises in subject of "Biochemical Fundamentals" at the Department of Chemical Engineering from 1987-1988. Queens University, Canada

He also taught at the Zvornik Faculty of Technology, University of East Sarajevo on the subjects: "New achievements in the science of food and nutrition" 2020/2021, "Protection Management Systems" Sc. 2020/2021, "Separation processes" sch. 2019/2020 and "Fundamentals of food engineering" 2018/2019.

He was a member of the commissions of a large number of defended doctoral theses, master's theses, at the Universities in Serbia, University of East Sarajevo, University of Banja Luka as well as at University of Zagreb. He was the president or member of the committee in a large number of elections for teaching and scientific positions, at Universities in Serbia and other faculties and institutes, as well as abroad (Cyprus University of Technology).

SCIENTIFIC-RESEARCH AND PROFESSIONAL WORK ANALYSIS AND CONTRIBUTION

Area of interest

Dr. Branko Bugarski's research work belongs to the technical-technological field and narrower scientific fields of chemical engineering, biotechnology and biochemical engineering. The research focus is on the development of immobilized/encapsulated cell systems, systems for the controlled delivery of bioactive components, and design of bioreactor systems for biotechnological processes for the removal of waste materials.

Scientific and professional activity

His expertise in the above-mentioned was confirmed by publishing more than 250 works printed in refereed papers, monographic publications and 5 published patents. He was PI in 18 scientific research or development projects (of which 6 are international). These activities resulted in high citations and corresponding scientific recognitions and awards.

He published 176 papers in international journals from the M20 category, where 25 belong to the M21a category, 49 belong to the M21 category, 48 to the M22 category, 46 to the M23 category, and 8 to the M24 category.

He was the editor of 1 prominent monograph of international importance in the M11 category, he also published 25 chapters in the monographic edition belonging to the M13 category and 5 chapters in the monographic edition from the M14 category.

According to the Scopus database, the current **h-index** is 37 (March 1, 2024).

398 works and 9257 citations are registered in the Google Scholar database, while the h-index is 49 and the i10 index is 150 (March 1, 2024).

In the database AD Scientific index 2024 he is ranked within the top 3% best researchers in Serbia, with a total H index of 49 with total citation of 9497 (05.04.2024).

<https://scholar.google.com/citations?hl=sr&user=wbLz11wAAAAJ>

Prof. Branko Bugarski is the author/co-author of four textbooks.

He was the principal investigator of 11 national projects (projects within basic research, technological development and innovation), 7 international projects (2 from the EUREKA program and 1 strategic Serbian-Chinese and 4 bilateral projects). He was a participant in several national projects, as well as several COST actions (Management Committee COST 840, 865, FA0907, CA17129, CA18113).

Award and scholarship winner:

1. Master of Science Scholarships, Iowa State University, Iowa, USA, 1983-1986.
2. Ph.D. Fellowship, Queen's University, Kingston, Ontario, Canada, 1987-1988.
3. Postdoc fellowship, Queen's University, Kingston, Ontario, Canada, 1992-1994.
4. Award of the Ministry of Science and Environmental Protection of the Republic of Serbia according to the achieved research results in 2004 (top 5% projects)
5. Paper chosen as paper of the month: B. Bugarski, Q. Li, M.F.A. Goosen, D. Poncelet, R.J. Neufeld, G. Vunjak, Electrostatic droplet generation: mechanism of polymer droplet formation, AIChE Journal 40(6) (1994) 1026-1031
- 6. Team leader of the "Technological Innovation" finalist in 2006, "Obtaining a high-value product for the prevention of anemia by outdated blood ". From the money award as a prize we investet that to found spin off company Bioekotehnologije d.o.o. (2007-2013).**

Analysis of scientific and professional contribution

Although the mentioned scientific and professional activity within the technical-technological field belongs to both chemical engineering and biotechnology and biochemical engineering and biomedicine he established long time collaboration in research and development with pharma industry.

1) This include Cooperation with the company Hemofarm 1992-2002 resulted in two international patents.

2) Development of immobilized/encapsulated cell systems

Contribution and development of the scientific field of encapsulation for the needs of the food, pharmaceutical and biotechnology industries had a special focus on the integrated

bioreactor systems for the production of active molecules. These technologies were developed through dozens national and international projects where prof. Bugarski made a personal contribution with his leadership and managerial abilities.

CONTRIBUTION IN PEDAGOGICAL WORK PROVIDING IMPROVEMENT TO YOUNG STUDENTS

Prof. Branko Bugarski In his career, achieved significant results in pedagogical work. This can be seen from the fact that he fully prepared and implemented the teaching program for subjects at all three levels of study (basic, master's and doctoral), whereby he fully prepared and implemented teaching program for 15 subjects. He was also was Head of the Department of Chemical Engineering from 2011-2014 and Program Coordinator for the field of study Pharmaceutical Engineering at TMF (2007-2013).

Throughout his career, prof. B. Bugarski made a contribution in the field of providing scientific and professional research to the young students since he was the mentor of 20 defended doctoral dissertations, 5 master of science degree theses, 12 master's theses and 63 BS diploma /basic studies. He participated in a large number of commissions for the doctoral dissertations, master's, diploma and BS diplomas. He was also the president or member of commissions for promotion of candidates for teaching or scientific positions.

Prof. B. Bugarski has written 4 books providing high-quality and modern textbook material for the subjects he taught.

Prof. Dr. B. Bugarski also participated in the implementation of postgraduate studies at the University of Belgrade within the Biomedical Engineering and Technology study program in the period from 2009 to the present day teaching two course s.

In addition to teaching at TMF-UB, prof. B. Bugarski also taught at foreign universities. As part of a scholarship for doctoral studies at Queen's University, the Department of Chemical Engineering Canada, he was involved in exercises in the subject: "Biochemical Fundamentals“.

He also taught at the Zvornik Faculty of Technology, University of East Sarajevo courses at the master level: "New achievements in the science of food and nutrition" .Sc 2020/2021, "Production Management Systems" Sc. 2020/2021, "Separation processes" sch. 2019/2020 and "Fundamentals of food engineering" 2018/2019.

He was a member of the commissions of a large number of defended doctoral theses, master's theses, final theses and graduate theses at the University of Belgrade, others Universities in Serbia, as well as at universities in the region (University of Zagreb and University of east Sarajevo). He was the president or member of the committee in a large number of elections for teaching and scientific positions for Faculties and institutes in Serbia, as well as abroad (Cyprus University of Technology).

1) Process design

He has been participating in teaching since 1994, where he also contributes to the conception and implementation of new models of work with students, which contributed to intensive and

modern teaching at the Department of Chemical Engineering (use of specialized software in process design - "Chemshare" and "SuperPro Designer", modernization of courses). Since his election to the position of assistant professor in 1994 for the subjects: Process Design and Process Design in Biotechnology, he has introduced a number of innovations related to various forms of engineering training, working with students in smaller groups and creating projects at the level of conceptual technological solutions for processes and devices.

2) Pharmaceutical engineering

A new curriculum and program of basic studies was adopted in 2003, where Pharmaceutical Engineering was included as a new study program in Chemical Engineering,. Since 2005, application of the Bologna Convention, Pharmaceutical Engineering has been included in the Chemical Engineering study program module. As the promotor of this profile, Professor Bugarski, with his dedication and knowledge, and made the significant contribution to its development. Compiling the curriculum of modules and courses within Pharmaceutical Engineering profile involved four TMF departments, which was carried out under the coordination of Prof. Bugarski. He has been the coordinator of this module since the beginning. He recognized the needs of the market for engineers in this field and, since 2017, worked intensively on the project "Improvements of teaching" in cooperation with the Hemofarm company and fellow lecturers on this module. Within the project, the subjects of this module were improved and formed so that students who complete this module can quickly and easily fit into the specific requirements of the pharmaceutical industry. In addition, Professor Bugarski organized student visits to companies related to pharma industry within professional subjects, such as the Basics of Pharmaceutical Engineering and Designing in Pharmaceutical Engineering.

In addition to teaching at TMF-UB, prof. B. Bugarski also taught at foreign universities. As part of a scholarship for doctoral studies at Queen's University, Canada, he gave exercises in the subject of postgraduate studies: "Biochemical Fundamentals" at the Department of Chemical Engineering from 1987-1988 years.

He also taught at the Zvornik Faculty of Technology, University of East Sarajevo on the subjects: "New achievements in the science of food and nutrition" šk. 2020/2021, "Protection Management Systems" Sc. 2020/2021, "Separation processes" sch. 2019/2020 and "Fundamentals of food engineering" 2018/2019.

He was a member of the commissions of a large number of defended doctoral theses, master's theses, final theses and graduate theses at the University of Belgrade, as well as at universities in the region (University of Zagreb). He was the president or member of the committee in a large number of elections for teaching and scientific positions, at TMF-UB and other faculties and institutes of the University of Belgrade, as well as abroad (Cyprus University of Technology).

Through his carrier he managed to established multidisciplinary team of young PhD students which significantly improved strength of the lab as well as visibility and recognition worldwide.

Profesor Bugarski was a mentor of 20 defended doctoral thesis

1. Snežana Pašalić, Micellar systems with controlled release of the active substance, Belgrade, TMF Belgrade, 2010.
2. Jelena Milanović, Optimization of aromatic compound immobilization procedures, Belgrade, TMF Belgrade, 2011.
3. Milan Milivojević, Liquid velocity in two-phase and three-phase pneumatic reactors with external circulation, Belgrade, TMF Belgrade, 2011.
4. Stojanka Petrušić, Macro and micro forms of thermosensitive hydrogels intended for controlled drug release, Belgrade, TMF Belgrade, 2011.
5. Bizana Čolovoć, Bio mimic design of supports; encapsulation of biologically active substances and their controlled release, Belgrade, TMF Belgrade, 2013.
6. Sanja Seratlić, The influence of pulsating electric fields on the growth and activity of *Lactobacillus plantarum* strain 564, Belgrade, TMF Belgrade, 2014.
7. Ivana Kostić, Process-preserved erythrocyte membranes obtained from slaughter blood as systems for prolonged release of active substances, Belgrade, TMF Belgrade, 2015.
8. Bojana Balanč, Liposomes and liposome-alginate systems for controlled release of resveratrol, Belgrade, TMF Belgrade, 2016.
9. Kata Trifković, Hydrogels based on chitosan for controlled release of polyphenols, Belgrade, TMF Belgrade, 2017.
10. Katarina Bukara, Systems with controlled drug release based on mesoporous silica and erythrocyte membranes, Belgrade, TMF Belgrade, 2017.
11. Aleksandra Jovanović, Optimization of the extraction process of the herb *Thymus serpyllum* L., biological activities and encapsulation of extracts, Belgrade, TMF Belgrade, 2018.
12. Una-Jovana Vajić, Optimization of extraction and characterization of *Urtica dioica* L. leaf extract for the purposes of examining the dose-dependent response in experimental hypertension, Belgrade, TMF Belgrade, 2018.
13. Ivana Damnjanović, Biocompatibility and behavior in a corrosive environment of titanium-based materials for the production of dental implants, Belgrade, TMF Belgrade, 2018.
14. Marija Gnjatović, Application of 7C2C5 monoclonal antibody in the development of ELISA tests for detection of infection with *Trichinella* spp. and isolation of parasite components that carry an immunodominant epitope, Belgrade, TMF Belgrade, 2018.
15. Milica Perić, Assessment of the ecological justification of using the fast-growing plant *Miscanthus giganteus* as a renewable energy source using the Life Cycle Assessment method, Belgrade, TMF Belgrade, 2019.
16. Predrag Petrović, Characterization and encapsulation of biologically active components from the mushrooms *Handkea utriformis* (Bull.) Kreisel, *Handkea excipuliformis* (Bull.) Kreisel and *Vascellum pratense* (Pers.) Kreisel, Belgrade, TMF Belgrade, 2019.

17. Nataša Obradović, Characterization and application of natural hydrogels for encapsulation of probiotic starter culture, Belgrade, TMF Belgrade, 24.12.2019.
18. Jasmina Lazarević, Raman spectroscopy of pharmacologically active substances and biocatalysts, Belgrade, TMF Belgrade, 2020.
19. Mina Volić, New hydrogel systems based on alginate and protein for controlled release of essential oils, Belgrade, TMF Belgrade, 2020.
20. Petar Batinić, Controlled release of folic acid from the liposome-biopolymer film system, Belgrade, TMF Belgrade, 2023.

Mentor of defended Master of science thesis , master's thesis and BS diploma thesis **Total 5+12+63=80**

Mentor of Master of science thesis (5)

1. Tatjana Kaluđerović, Transfer Phenomena in Biological Systems: Application of Pharmacokinetic and Pharmacodynamics Models to Protein Distribution, TMF, 1998.
2. Zorana Boltić, Investigation of the kinetics of the controlled release of antibiotics from nanoparticles in membrane systems, TMF, 2002.
3. Svetlana Z. Nikolić, Examining the production conditions of nanoparticle systems for use in medicine, TMF, 2003.
4. Verica Manojlović, The influence of an external electrostatic field on the size of produced micro particles with immobilized biomass, TMF, 2005.
5. Gordana M. Ilić-Sević, Encapsulation of aromas in micro particles of natural waxes, TMF, 2016.

Master theses mentor (12)

1. Zorka Đurić, Morphological characterization of erythrocyte membranes obtained by controlled hemolysis, TMF, 2011.
2. Jovana Ilić, Optimizing the technology of obtaining alginate microparticles with the aim of more efficient controlled release, TMF, 2012.
3. Ana Grujičić, Testing the biocompatibility of commercially pure titanium and titanium alloys using stem cells, TMF, 2015.
4. Milica Trajković, Alginate microparticles and liposomes as a system for prolonged release of polyphenols from rosehip (*Rosa canina*) extract, TMF, 2019.
5. Nataša Čupić, the influence of sterols on the encapsulation of thyme extract (*Thymus serpyllum* L.) in liposomes obtained by the proliposome method, TMF, 2021.
6. Jovana Drdanovski, Encapsulation of clindamycin hydrochloride in liposomal systems, TMF, 2021.
7. Emilija Dimitrijević, Designing a system for storage, distribution and processing of water and transport of compressed air in a beer production facility, TMF, 2021.
8. Milica Milošević, Designing a beer production system, TMF, 2021.

9. Tomislav Marković, Alginate hydrogels for the controlled release of silver nanoparticles stabilized by β -glucan extract of the fungus *Lycoperdon excipuliforme*: characterization and antimicrobial activity, TMF, 2022.
10. Tamara Petrović, Simulation of the vulcanization process in order to recover water vapor and reduce the harmful impact on the environment, TMF, 2022.
11. Sandra Rakin, Synthesis and characterization of bacterial cellulose obtained by *Komagataeibacter xylinus*, TMF, 2023.
12. Tamara Ječmenica, Simulation of the operation of the plant for amine purification of carbon dioxide, TMF, 2023.

CONTRIBUTION TO THE ACADEMIC AND WIDER COMMUNITY AND INTERNATIONAL REPUTATION OF THE UNIVERSITY

Prof. Branko Bugarski contributed significantly to the academic and wider community and the international reputation of the University of Belgrade with his activities. At his home faculty, he was Head of the Department of Chemical Engineering (2011-2014) and Program Coordinator for the field of study Pharmaceutical Engineering (2007-2013) and a member of the NN council in several mandates.

Prof. Dr. B.Bugarski actively participated in the work of the Ministry responsible for scientific research. He was the assistant minister for technological development and innovation activities of the Ministry of Education, Science and Technological Development of the Republic of Serbia in the period from 2014 to 2016. He was a member of the Panel Board for Biotechnology evaluation MNTR from 2006 to 2010. In 2011 he was the president of the Panel Board III Biotechnology and Food, till December 2014.

He was a member of the Commission for the Evaluation of Innovation Projects in the Technological Development Sector from 2007-2012. in the AP o Vojvodina - **Capital Investment Fund**.

From 2014-2017. In 2010, he was the representative of the Ministry of Education and Science of the Republic of Serbia for the Eureka program at the EUREKA European intergovernmental initiative. He was a representative in the program committee of IDEAS-EU from 2014 to 2017, and a member of the program committee of the Republic of Serbia at ESFRI (European Strategy Forum on Research) from 2014 to 2017. **Within the COST program, he was a member of the committee for the evaluation of project proposals (Domain committee member for evaluation of COST proposal projects) from 2008 to 2014.**

Prof. Dr. B.Bugarski was the vice-president of the negotiating group of the Republic of Serbia for Negotiating Chapter 25 - Science and Research, in 2016.

B. Bugarski is the founder and President of the spin-off company Bioekotehnologije d.o.o. (2007-2013).

He was a reviewer of a large number of national and international projects and reviews of scientific papers as well as the evaluator for higher education study programs (at NAT, Republic of Serbia).

He was the editor in Chief of the journal Chemical Industry , 2011 until 2014

He is the editor-in-chief of the Journal of Engineering & Processing Management, University of East Sarajevo, from 2018 until today

President of the board of Institute Josip Pancic 1999-

Board member of accreditation committee 2000-

He is a member of several professional associations: EFCE (European Federation of Chemical Engineering) Working Party on Chemical Reaction Engineering, 2009-

Encapsulation Research Group, France, 1994-2022

President of the Society for Biochemical Engineering in Belgrade from 2003 to 2010.

President of spin off company Bioekotehnologije d.o.o. (2007-2013).

Through the scientific research projects of Prof. Bugarski has achieved scientific cooperation with many institutions in the country: Faculty of Agriculture in Belgrade, Institute for Medical Research in Belgrade, Institute of Technical Sciences SANU, Faculty of Chemistry in Belgrade, Faculty of Technology in Novi Sad, Institute of Physics in Belgrade, Faculty of Biology in Belgrade, Institute for Biological Research "Siniša Stanković", Institute for the Study of Medicinal Plants "Dr Josif Pančić".

In addition, he collaborated with the Faculty of Technology of the University of East Sarajevo, where he taught. Also, through numerous scientific and professional works, lectures by invitation, participation in committees for the defense of doctoral theses, and especially through international, and national projects, he achieved cooperation with many faculties and institutes abroad: Faculty of Food and Biotechnology in Zagreb, Faculty of Pharmacy in Ljubljana, IBA (National Institute of Research and Development for Food Bioresources) Institute in Bucharest, Faculty of Biosciences of the University of Teramo in Italy, Department of Chemistry of the University of Patras, Department of Food Chemistry of the Faculty of Agriculture in Athens, Queens University, Kingston, Canada. In addition, his cooperation with the industry with companies such as Hemofarm, Galenika, Albus "Jata-Emona", Slovenia, Iskra Medica Slovenia, Natural Ingredients R&D" Romania , "Expergo Business Network" in Bucharest and Messer Germany resulted in network as a core for international project proposal. He was an active member of scientific networks such as COST actions such as COST 840, 865, FA1001, CA17129, CA18113. The mentioned activities resulted in the efficient acquisition and transmission of new knowledge.