



UNIVERSITY OF NOVI SAD | FACULTY OF SCIENCES

# The Scientific Research at the University of Novi Sad, Faculty of Sciences, Serbia





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## The Scientific Research at the University of Novi Sad, Faculty of Sciences, Serbia

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# University of Novi Sad

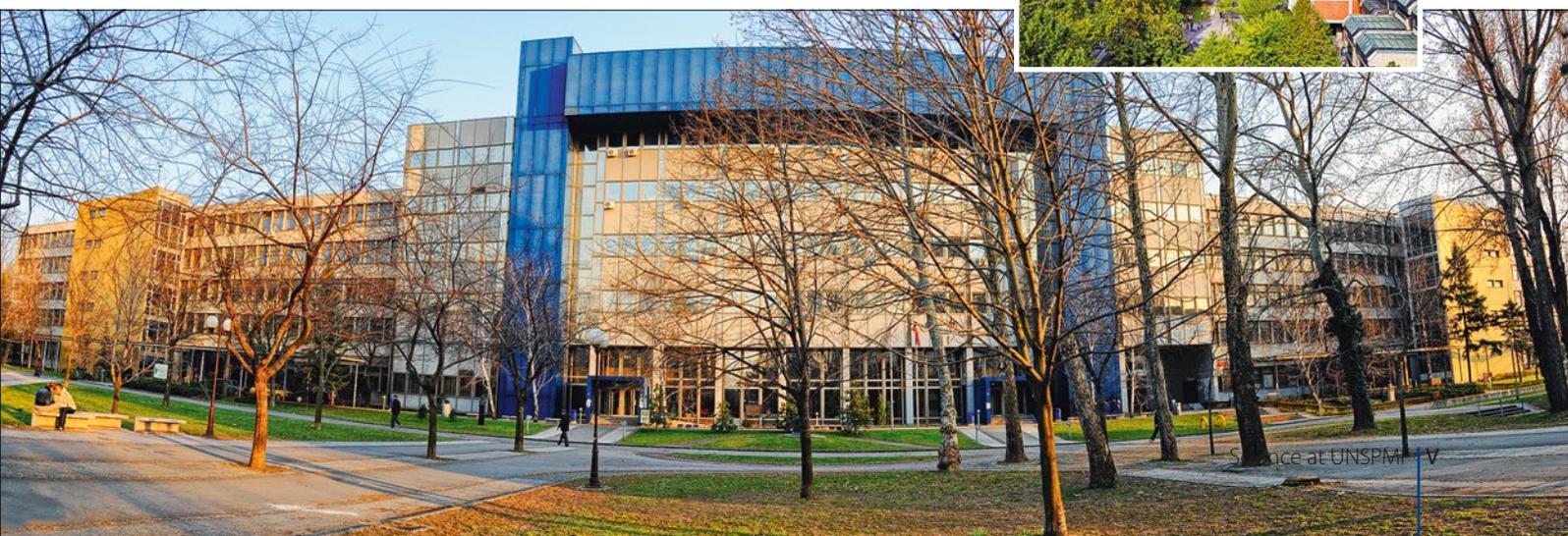
## Faculty of Sciences



University of Novi Sad, Faculty of Sciences (UNSPMF) is an educational and research institution with 5 departments, around 600 employees and 6,000 students, comprising education and research in the following disciplines: chemistry, biochemistry, environmental protection, biology, ecology, physics, computer science, mathematics, geography, and tourism. The Faculty was founded in 1969 and has been the country's strong base of science and teaching ever since. Teaching is conducted through 50 accredited study programmes at all three study levels (bachelor, master, PhD but also vocational and integrated studies). UNSPMF is experienced in managing and implementing both international and national projects, which significantly improved its institutional capacities. The Faculty participates in more than 50 international and around 100 nationally/locally funded projects and actions, therefore proving the capacity to manage and logistically support various project management schemes and demands. UNSPMF is strategically oriented to the EU and other external funding (H2020, Interreg IPA CBC Programmes, Danube Interreg Transnational Programme, Erasmus Plus, COST Actions, SCOPES, EUREKA, etc.), trying to fully employ its excellence and results achieved through previous programmes (FP5, FP6, FP7, European Agency for Reconstruction and Development, FP7-SEERANET Plus Joint Call, South East Europe Programme, IPA Cross-border Cooperation Program, TEMPUS, Erasmus Mundus), together with many bi- and multilateral education and research projects. The research strategy is directed towards internationalization, improving human resources and capacity building. UNSPMF is committed to principles of The European Charter for Researchers and Code of Conduct for the Recruitment of Researchers and is a member of the EURAXESS project thus providing supporting services to researchers wishing to pursue research career in Serbia. Research and teaching staff of the UNSPMF are productive with more than 250 scientific papers annually published in international scientific journals. More than a hundred of those are rated as exceptional on SCI list (ranked among the first 50%). An overview of research groups, projects and activities is available at: <https://www.pmf.uns.ac.rs/en/research/>

### UNS – modern, comprehensive university in Central Europe

UNS has great potential for innovation thanks to a well-developed research infrastructure. Around 250 state-of-the-art laboratories offer students and researchers an ideal environment for applying their knowledge and expanding the scope of their research. The University supports its alumni in capitalising on the knowledge and skills acquired through years of study. With around 140 start-up and spin-off companies founded by former graduates, Novi Sad became internationally recognised as a new "Software Valley" because these companies are mostly in the field of ICT.



## CONTACTS IN THE DEAN'S OFFICE

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DEPARTMENT OF  
**BIOLOGY AND ECOLOGY**



FACULTY OF  
SCIENCES  
1969–2019

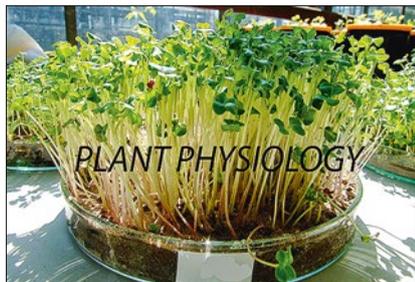
# Laboratory for Plant Physiology

*phytoremediation, abiotic stress, photosynthesis, redox homeostasis*

Research group has vast experience in phytoremediation research (analyzing willows, poplars and other woody species, but also some herbal model plants), abiotic stress (drought and heavy metals especially), physiological analyses of medicinal and allergenic plants, vegetable cultivars, sugar beet, corn and some other commercial plant species. In the past years, research was initiated to target influence of selected carbon based nanomaterials to plants.

The Lab has standard equipment for biochemical and molecular analyses. Parameters of photosynthetic activity (CO<sub>2</sub> assimilation, photochemical efficacy, pigment content) and water regime (transpiration rate, stomata properties, water potential, indicators of water deficit), along with oxidative enzyme activity and nutrient assimilation of plants are investigated in relation to different types of stress. Recently, the group has also started some biochemical and molecular tests on model plants such as Arabidopsis, Brassica, etc.

Several teaching courses are provided: Plant Physiology, Instrumental Methods in Biology, Mechanisms of Ecological Plant Development, Physiology of Woody Plants, Phytoremediation and Phytoindication.



## COLLABORATIONS

- Institute of Lowland Forestry and Environment, University of Novi Sad, Novi Sad, collaborations takes place in frame of two National projects (III43002 and III43007).
- Institute of Field and Vegetables Crops (IFVCNS), Novi Sad, Serbia, collaborations takes place through joint research and publication.
- „13 Jul Plantaže“, Podgorica, Montenegro, bilateral project Serbia-Montenegro 2017-2018, 2019-2020 through joint research application of new carbon nanoformulations in order to increase the resistance of grape vines to drought stress.



## CONTACT PERSON

**Dr Milan Borišev**, Associate Professor; milan.borisev@dbe.uns.ac.rs; tel: +381214852651  
[https://www.dbe.uns.ac.rs/o\\_departmanu/laboratorije/laboratorija\\_za\\_fiziologiju\\_biljaka/plant\\_physiology](https://www.dbe.uns.ac.rs/o_departmanu/laboratorije/laboratorija_za_fiziologiju_biljaka/plant_physiology)

## SELECTED PROJECTS

**Title:** "Biosensing technologies and global system for continuous research and integrated management of ecosystems"

**Type:** III43002, Integrated Interdisciplinary Research Project, Ministry of Education, Science and Technological Development, Republic of Serbia.

**Duration:** 2011-

**Contact person:** Slobodanka Pajević (slobodanka.pajevic@dbe.uns.ac.rs)

**Title:** Investigating the climate changes and their impact to environment: tracking impact, adaptation and reduction

**Type:** III43007, Integrated Interdisciplinary Research Project, Ministry of Education, Science and Technological Development, Republic of Serbia.

**Duration:** 2011-

**Contact person:** Slobodanka Pajević (slobodanka.pajevic@dbe.uns.ac.rs)

**Title:** Active biological components and medicinal potential of functional food grown in Vojvodina Province

**Type:** Provincial project no. APV 114-451-2149/2016-0

**Duration:** 4 years

**Contact person:** Slobodanka Pajević (slobodanka.pajevic@dbe.uns.ac.rs)

## SELECTED EQUIPMENT

- LCpro+ field portable photosynthesis systems developed and manufactured by ADC BioScientific Ltd, UK
- PFP7 Industrial Flame Photometer, developed and manufactured by Jenway, supplied with Na, K, Ba, Ca and Li filters.
- XRF analyzer, energy-dispersive X-ray fluorescence EDXRF spectrometer developed and manufactured by Elvatech, Ukraine.
- Molecular facility (PCR, Electrophoresis, Centrifuges etc.)

# Laboratory for Plant Systematics and Phytogeography - LaPSyPh

*taxonomy, flora, vegetation, macrophytes, bryology*

With a 70-year-old tradition of research, the Lab is today oriented towards plant taxonomy and phylogeny, research of flora and vegetation, and bryology. The Lab focuses on taxonomy and phylogeny of selected plant taxa, infra- and intraspecific variations, as well as revealing of adaptive mechanisms. The aim is to resolve systematic problems of critical taxa and aggregates using methods of morphometry (linear and geometric), phytochemistry and cytotoxicity. Researchers are dealing with natural resources, primarily medicinal plants, and searching for molecules that can be used in chemotaxonomy and as novel pharmaceutical components. Floristic and ethnobotanical studies are carried out in Serbia and Balkan Peninsula, mainly in Montenegrin coastal region. The second centre of interest is aquatic, sand, steppe and forest flora and vegetation, as well as floristic research of mosses. Methodology that is used in research of aquatic vegetation is based on continuum/gradient concept, which is in line with The Water Framework Directive 2000/60/EC and standard methods. Sand and steppe vegetation are studied using classical phytocological methodology and modern software for data analyses.



## SELECTED PROJECTS

**Title:** *Plant diversity of Serbia and Balkan peninsula - assessments, sustainable use and protection*

**Type:** National

**Duration:** 2011-

**Contact person:** Dr Goran Anačkov

**Title:** *Biosensing Technologies and Global System for Long-Term Research and Integrated Management of Ecosystems*

**Type:** National

**Duration:** 2011-

**Contact person:** Dr Saša Orlović

**Title:** *"Data for red lists/red books and ecological network of Serbia"*

**Type:** National

**Duration:** 2016-2019

**Contact person:** Dr Goran Anačkov

## COLLABORATIONS

- Biotechnical Faculty, University of Ljubljana, Ljubljana, Slovenia
- The Faculty of Biology, Belarusian State University, Minsk, Belarus
- Academy of Science and Arts of Slovenia, Ljubljana, Slovenia



## SELECTED EQUIPMENT

- Encoded stereo microscopes Leica M205C with Leica camera DFC290 HD and LAS V4.11 software
- Microscope Zeiss with Axio Imager.A2
- Thermal Cycler Applied Biosystem 2720
- Electrophoresis equipment Bio-Rad

## CONTACT PERSONS

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# Herbarium BUNS

*Herbarium, Serbia, Pannonia, the Balkan Peninsula, Plants*

The herbarium of the University of Novi Sad (herbarium acronym BUNS), is a part of extensive biological collections that are deposited at the Faculty of Sciences, Department of Biology and Ecology. Founded only 60 years ago, it represents the collection of all plant groups – flowering plants, ferns, mosses, liverworts, and algae, as well as fungi and lichens in Vojvodina Province. The most important collection of preserved specimens belongs to flora of Vojvodina. In addition, it holds collections of plants from the Adriatic coasts and other regions in the Balkan Peninsula. Apart from general collection, the herbarium includes specialized collections: historical collection (1947-1963), collection of the former project “Mapping the vegetation of Vojvodina Province” (1980-1989), teaching collection, and collections of dried fruits and seeds, wood samples, plant galls and specimens preserved in alcohol. Herbarium with its logistics is a part of various botanical studies, mainly floristic and vegetation research, and plant systematics. In recent decades, objectives are conservation, restoration and research valorization of other herbarium collections.



## SELECTED PROJECTS

**Title:** „Herbarium Wolnyanum – 220-year-long process, from creation to digital records”

**Type:** National

**Duration:** April – December 2017

**Contact person:** Milica Rat

**Title:** Restoration and digitization of herbarium collection of National museum in Kikinda

**Type:** National

**Duration:** April – December 2012

**Contact person:** Dr Goran Anačkov

**Title:** Restoration and digitization of herbarium collection of City museum in Sombor

**Type:** National

**Duration:** April – December 2002

**Contact person:** Dr Goran Anačkov

## COLLABORATIONS

- Hungarian Natural History Museum, Budapest, Hungary
- Natural History Museum in Belgrade, Belgrade, Serbia
- Karlovci Grammar School, Sremski Karlovci, Serbia



## SELECTED EQUIPMENT

- Binocular stereomicroscope BIOOPTIKA SMZ 2000; equipped with Camera Leica EC3
- Archive cabinets on rails
- StiroLab herbarium dryer - heat flow system
- Herbarium presses (wooden, manual system) for laboratory work

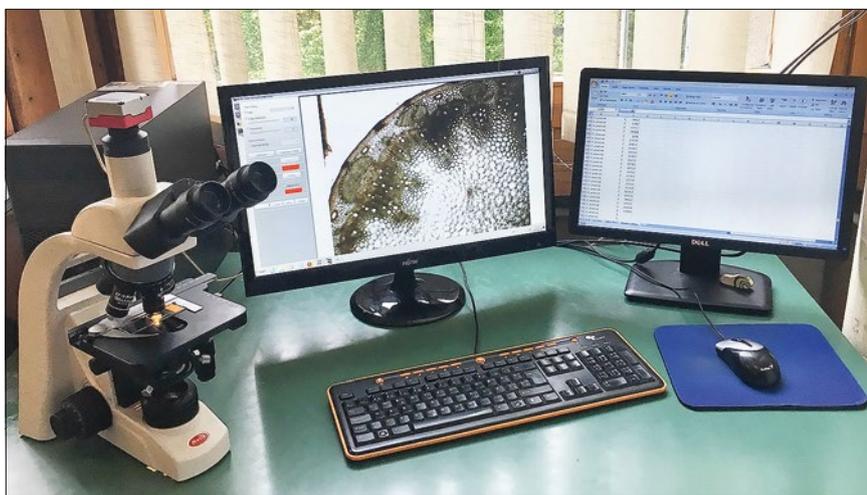
## CONTACT PERSON

**Milica Rat**; herbarium.buns@dbe.uns.ac.rs; tel: 00381 21 485 2666

# Laboratory for Plant Anatomy and Morphology

*Plant anatomy, Plant morphology*

**R**esearch group for plant anatomy and morphology performs research in the field of functional and applied plant anatomy, using classic anatomical as well as stereological method. Comparative morpho-anatomical examinations of different systematic groups of plants are conducted, with the aim of clarifying taxonomic issues, as well as determination of relationships within the groups. Investigations are also directed towards structural characteristics of plant organs of cultivated species (industrial and forage crops, cereals, fruit and vegetable species) and their wild relatives, aimed to determination of characteristics which could be useful in selection and breeding process. Research is also conducted into the structural adaptations of plants to specific environmental conditions and effect of environmental factors, anatomical and micromorphological characteristics of medicinal plants, as well as the effect of heavy metals on the structure of vegetative organs of cultivated plants and species perspective for phytoremediation of fields contaminated with heavy metals.



## SELECTED PROJECTS

**Title:** *Anatomical characterization of the collection of wild sunflowers, as a potential gene pool for breeding cultivated sunflower in Vojvodina*

**Type:** Projects Funded by the Provincial Secretariat for Higher Education and Scientific Research

**Duration:** 2016 – 2019

**Contact person:** Dr Jadranka Lukovic

**Title:** *Increasing market significance of forage crops by breeding and optimizing seed production technology TR-31024*

**Type:** Projects Funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia

**Duration:** 2011-

**Contact person:** Dr Djura Karagic

**Title:** *Conservation strategy for preservation of protected and strictly protected species in Serbia – hoverflies (Insecta: Diptera: Syrphidae) as a model organisms OI 173002*

**Type:** Projects Funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia

**Duration:** 2011-

**Contact person:** Dr Ante Vujic

## SELECTED EQUIPMENT

- Cryostat Leica CM 1850
- Image analyzing system: Motic Images Plus 2.0.
- Stereomicroscope Nikon SMZ 745T

## COLLABORATIONS

- Aristotle University of Thessaloniki, Faculty of Agriculture, Thessaloniki, Greece

## CONTACT PERSON

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<https://www.pmf.uns.ac.rs/istrazivanja/istrazivacke-grupe/>

[https://www.dbe.uns.ac.rs/o\\_departmanu/laboratorije/laboratorija\\_za\\_anatomiju\\_i\\_morfologiju\\_biljaka](https://www.dbe.uns.ac.rs/o_departmanu/laboratorije/laboratorija_za_anatomiju_i_morfologiju_biljaka)

# Laboratory for Invasive and Allergenic Plants - LIAP

*Alien, Neophytes, Allochthonous, Weeds, Monitoring*

Invasive alien species formerly recognized as allochthonous or neophytes are second most important threats to natural habitats and autochthonous flora, after fragmentation. Recorded species withdrawal and habitats changing under the influence of alien species pursued reform of floristic research. New research topic ended in developing a research group that works mainly with alien (invasive and potentially invasive) plant taxa. The main objectives are recognition of alien flora in Serbia and wider region, and detection of main inland pathways of alien species.

Research activities include population monitoring of selected invasive alien plants, as well as their biology and ecological plasticity, with special emphasis on mechanical and biological control. Research potential of the Lab is oriented toward research of problems caused primarily by spreading of invasive alien species in altered urban and semi urban areas, that are in the same time allergenic plants and important for human health. The Lab intensively cooperates with public administrations and utilities, international, pan-European and non-governmental organizations.



## SELECTED PROJECTS

**Title:** *East and South European Network for Invasive Alien Species - a tool to support the management of alien species in Bulgaria (ESENIAS - TOOLS)*

**Type:** International - Multilateral

**Duration:** 2015-2017

**Contact person:** Milica Rat

**Title:** *Mapping areas with ambrosia and other allergenic plants on the territory of Novi Sad, laboratory and field research, monitoring*

**Duration:** 2006-2019

**Contact person:** Dr Goran Anačkov

**Title:** *Mapping areas with ambrosia – field research, monitoring and supervision of work on the territory of Bačka Palanka*

**Duration:** 2010-2019

**Contact person:** Dr Ružica Igić



## COLLABORATIONS

- IUCN/SSC Invasive Species Specialist Group
- Republic of Serbia, Ministry of Environmental Protection, Environmental Protection Agency
- The East and South European Network for Invasive Plant Species (ESENIAS network)

## SELECTED EQUIPMENT

- GPS Garmin etrex 20 (4)
- GPS Garmin etrex 30 (2)

## CONTACT PERSON

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[https://www.dbe.uns.ac.rs/o\\_departmanu/laboratorije/laboratorija\\_za\\_invazivne\\_i\\_alergijske\\_biljke](https://www.dbe.uns.ac.rs/o_departmanu/laboratorije/laboratorija_za_invazivne_i_alergijske_biljke)

# Laboratory of Biochemistry and Molecular Biology

*oxidative stress, antioxidative defense system, insects, structural biology, molecular docking*

Research in the laboratory of biochemistry and molecular biology focuses on two main themes: 1) the molecular basis of antioxidant protection mechanisms and redox homeostasis in a variety of organisms and 2) the study of protein-ligand interactions using structural biology and biophysical methods. The laboratory has been investigating the molecular basis of cellular response to various stress factors in economically important insects (e.g. *Ostrinia nubilalis*, *Apis mellifera*), such as low temperature, heavy metals and other pollutants. Of particular interest are molecular mechanisms of insect cold hardiness and dormancy, such as metabolic changes and the role of protein structural disorder in these processes. The laboratory is also developing a database on gene and protein expression in animal dormancies. Another focus of our group is the use of structural and biophysical methods for identification of bioactive compounds for treatment of hormone-dependent cancers, as well as protein-ligand interactions important in redox homeostasis, cell signaling and biomedicine. Research in the laboratory is conducted through collaborations with researchers in Serbia and around the world.



## COLLABORATIONS

- British Antarctic Survey, Cambridge, United Kingdom Melody Clark, Roger M. Worland
- Research Centre for Natural Sciences, Hungarian Academy of Sciences, Budapest, Hungary
- Institute of Organic Chemistry and Biochemistry, CAS, Praha, Czech Republic, Laboratory of Structural Biology



## SELECTED PROJECTS

**Title:** *Molecular mechanisms of redox signaling in homeostasis, adaptation and pathology*

**Type:** Fundamental research project financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia

**Duration:** 2011-

**Contact person:** Dr Duško Blagojević

**Title:** *Synthesis, characterization and biological activities of steroidal derivatives and their molecular aggregates*

**Type:** Fundamental research project financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia

**Duration:** 2011-

**Contact person:** Dr Marija Sakač

**Title:** *Supplementation of honey bee diet with selected physiologically active substances: effects on antioxidative and immune systems*

**Type:** Research project financed by the Provincial Secretariat for Higher Education and Scientific Research, Autonomous Province of Vojvodina, Republic of Serbia

**Duration:** 2018-2019

**Contact person:** Dr Jelena Purać

## SELECTED EQUIPMENT

- Equipment for electrophoresis and Western blotting
- Gas chromatography mass spectrometry (GC-MS)
- PCR thermocycler
- UV/VIS spectrophotometer

## CONTACT PERSON

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# Laboratory of Microbiology

*microbiology, cyanobacteria, mycology, bacteriophages*

Our microbiology group is currently focusing its research on the following topics: microbiological quality of surface water, groundwater and wastewater, ecophysiology of microorganisms, bioremediation, water toxicology with special emphasis on cyanotoxins, biodiversity protection of microorganisms, biotechnological application of microorganisms and their bioactive metabolites, conventional and alternative antimicrobial agents, microbial biofilms, bacteriophage biology and the potential for their application in different areas. Group members: Assoc. Professors: Jelica Simeunović PhD, Maja Karaman PhD, Petar Knežević PhD, Research Associate Ivica Tamaš PhD; Assistants: Verica Aleksić Sabo PhD, Dajana Blagojević PhD, Milana Rakić MSc, Dragana Tamindžija MSc; Research Trainees: Jelena Narančić MSc, Isidora Nikolić MSc, Petar Davidović MSc, Jovana Marić MSc, Damir Gavrić MSc, Ana Volarić MSc; Expert assistant Miloš Bokorov; Lab technician Sanda Savić and Full Professor Dragan Radnović PhD.



## COLLABORATIONS

- Laboratory of Gene Technology, KU Leuven, Belgium
- University of Applied Sciences and Arts Northwestern Switzerland, Muttenz, Switzerland
- Department of Agricultural and Food Sciences, University of Bologna, Bologna, Italia
- Institute of Molecular Biology, Slovak Academy of Sciences, Bratislava, Slovakia
- Ruđer Bošković Institute, Croatia
- Department of Biotechnology, University of Szeged, Hungary

## SELECTED EQUIPMENT

- Thermocycler T Professional Biometra
- Compact M Gel Electrophoresis System Biometra
- Gel Imaging and Documentation Systems Biometra
- Fluorescence Microscope Olympus BX51,
- Thermo Scientific™ Multiskan™ FC Microplate Photometer
- Deep freeze Brunswick Scientific
- Freeze Dryer ALPHA 2-4LDplus SELECTED

## CONTACT PERSON

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## SELECTED PROJECTS

**Title:** „Novel Natural Antimicrobial Agents for Bacterial Pathogen Control” (NNAA; HUSRB/1203/214/250) implementing in the frame of IPA CBC Programme Hungary-Serbia.

**Type:** Scientific project

**Duration:** 2013-2014

**Contact person:** Dr Petar Knežević

**Title:** „Identification and characterization of cyanobacterial toxins based on their interaction with basic cellular detoxification systems in zebrafish (*Danio rerio*) and zooplankton (*Daphnia magna*)”

**Type:** Scientific project financed by Swiss National Science Foundation.

**Duration:** 2014-2017

**Contact persons:** Dr Karl Fent, Dr Tvrtko Smital and Dr Jelica Simeunović (Switzerland, Croatia, Serbia)

**Title:** „The role of metal homeostasis, reduction and sporulation in the metal resistance of Gram-positive bacteria”

**Type:** Scientific project financed by Swiss National Science Foundation.

**Duration:** 2014-2017

**Contact persons:** Dr Rizlan Bernier-Latmani, Dr Imrich Barak and Dr Dragan Radnovic (Switzerland, Slovakia, Serbia)



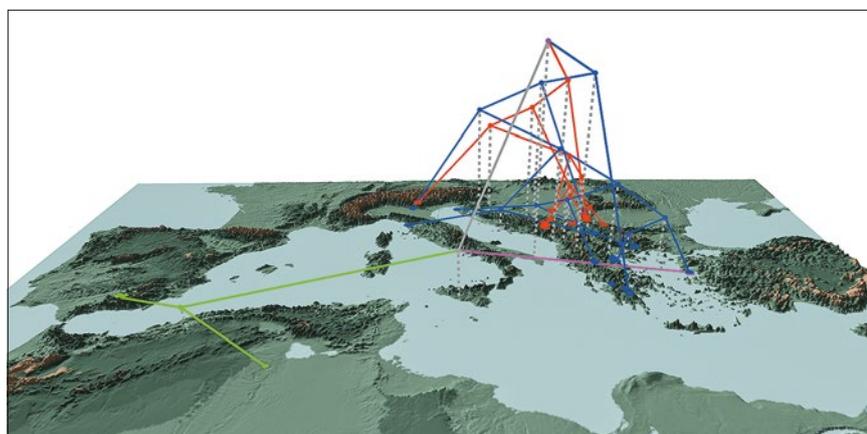
# Laboratory for Biodiversity Research and Conservation

*Biodiversity, Conservation, Evolution, Biogeography, Taxonomy*

The aim of research group for biodiversity research and conservation is to raise the level of knowledge about the natural heritage of the Balkan Peninsula and contribute to its efficient protection. Through the implementation of various projects, we determine the causes, trends and extent of changes in ecosystems and plan actions that might help stopping degradation processes. Multidisciplinary research is focused towards the taxonomic analyses of hoverflies (Diptera: Syrphidae), wild bees and bumblebees (Hymenoptera: Apoidea), small mammals (Rodentia: Spermophilus) and birds (Aves) in the Balkan Peninsula, biodiversity monitoring (especially in protected areas), the studies of endemic, relict and endangered species, and determination of its genetic diversity, changes in populations, as well as the analyses of the general conditions of ecosystems in protected areas. Also, we assess the value of ecosystem services (e.g. pollination), deal with species distribution modelling and analyse the effects of climatic changes to species distributions.

## Objectives:

- Conservation of Biodiversity of the Balkan Peninsula
- Using selected groups of invertebrates as indicators of ecosystems perturbations caused by global changes, as part of monitoring biodiversity.
- Analyzing complex interactions between plants and selected groups of invertebrates.
- Impacting practical conservation measures through the provision of expertise, proposals for protection of individual biodiversity centers and hotspot areas and by establishing conservation priorities.
- Estimation of the value of ecosystem services.



## COLLABORATIONS

- Finnish Museum of Natural History, University of Helsinki, Helsinki, Finland
- University of Alicante Institute for Biodiversity (CIBIO), Alicante, Spain
- University of the Aegean, Mytilene, Lesvos, Greece

## CONTACT PERSON

**Dr Ante Vujčić**, Full Professor; ante.vujic@dbe.uns.ac.rs; +381 64 2830317 and +381 21 4852669  
<https://cbbc.pmf.uns.ac.rs/en/groups/laboratory-for-biodiversity-research-and-conservation/>

## SELECTED PROJECTS

**Title:** *European Red List of Hoverflies*

**Type:** International project

**Duration:** 2019-2021

**Contact person:** Dr Ante Vujčić

**Title:** *HORIZON 2020: Insect-plant relationships: insights into biodiversity and new applications (Fly High)*

**Type:** International project

**Duration:** 2015-2018

**Contact person:** Dr Ante Vujčić

**Title:** *Conservation strategy for protected and strictly protected hoverflies (Insecta: Diptera: Syrphidae) species in Serbia - Case study*

**Type:** National project

**Duration:** 2010-2019

**Contact person:** Dr Ante Vujčić



## SELECTED EQUIPMENT

- Nikon Stereo Microscope smz 745 trinocular DIA - EPI LED lighting
- Stereo Microscope Ceti
- DSLR Camera Nikon 7100
- Nikon field Stereoscopic microscope
- Entomological equipment

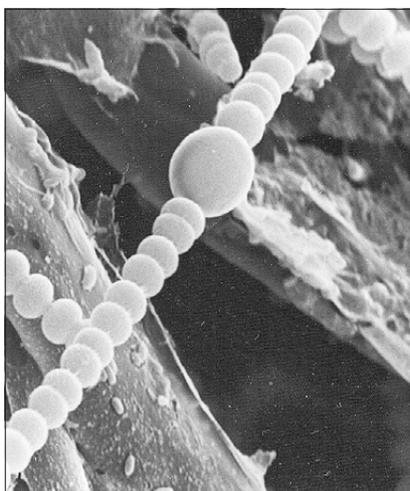


# Laboratory for Paleoenvironmental Reconstruction - LAPER

*BLOCDUST, GoL, cyanotoxins, biomarkers, recultivation*

LAPER is recognized for establishing two new theories – the BLOCDUST model based on a role of cyanobacterial activities in the process of loess formation in semi-arid regions and Graph of Life Theory, a new concept and definition of life and living system. High-quality research focused on cyanobacteria, both in aquatic and terrestrial environments, is based on international collaboration with more than 20 countries and verified through publishing in highly-cited journals. LAPER also stands out by finding solutions for some of the biggest environmental problems of today (decline in water quality, desertification, human exposure to natural toxins, etc) and by applying the results of its fundamental research. LAPER members are also engaged in the reconstruction of past aquatic and terrestrial ecosystems.

The main topics of research: Cyanotoxin research and epidemiological study; Cyanobacterial culture collection; Cyanobacterial database in Serbia; Ecoremediation; Recultivation; Paleoenvironmental and paleoclimate reconstruction; Cyanobacterial sedimentary biomarkers.



## CONTACT PERSON

**Dr Zorica Svirčev**, Full Professor; zorica.svircev@dbe.uns.ac.rs; +381 21 485 2688

## SELECTED PROJECTS

**Title:** *Cyanobacterial blooms and toxins in water resources: Occurrence, impacts and management*

**Type:** COST Action ESSEM (ES1105)

**Duration:** 2012-2016

**Contact person:**

Prof. dr Zorica Svirčev

**Title:** *Comparative study of past climate changes at multi-timescale in East Asian monsoon region and West-erly zone*

**Type:** Bilateral cooperation  
China-Serbia

**Duration:** 2017-2019

**Contact person:**

Prof. dr Slobodan Marković

**Title:** *Transformation of geospace in Serbia - past, current problems and solution proposals*

**Type:** National

**Duration:** 2011 - today

**Contact person:**

Prof. dr Slobodan Marković

## SELECTED EQUIPMENT

- BMG Labtech Nitrogen Evaporator 12 position Oasis heating system;
- BUCHI Rotavapor® R-215;
- Vacuum Pump V-700;
- Autoklav LabCompanion ST-85G;
- Microplate reader SPECTRstar Nano, BMG Labtech.

## COLLABORATIONS

- Faculty of Science and Engineering, Åbo Akademi University, Turku, Finland
- Cyprus University of Technology, Limassol, Cyprus

# Laboratory for Ecophysiology and Ecotoxicology (LECOTOX)

*Xenobiotics, Aquatic ecosystems, Toxicity tests, Biomarkers, Effect-based tools*

**S**tudy of adverse effects of xenobiotics, their mixtures and environmental cocktails at different levels of biological organisation by a combination of biomarkers, bioassays and toxicity tests, *in vitro*, *in vivo* and *in situ*, using various cell lines and aquatic species.

- Cellular biomarkers and mode-of-action studies of xenobiotics and their mixtures *in vitro* with human, rat and fish hepatoma cells: expression of selected genes, signalling pathways, metabolic activity, biotransformation enzymes, cytotoxicity and cell proliferation.
- Adaptive, general and specific response of aquatic organisms to chemical stress *in vivo* and *in situ*, using free living and caged fish: expression of target genes, activity of enzymes involved in oxidative stress response and biotransformation of xenobiotics, markers of neurotoxic effects, endocrine disruptive, growth and reproduction inhibitory properties of selected xenobiotics / mixtures, environmentally realistic chemical cocktails and environmental samples.
- Cause-effect studies under multi-stress condition, linking adverse biological effects observed *in vitro*, *in vivo* and *in situ* with environmentally realistic contamination profiles.



## COLLABORATIONS

- Department for Effect-Directed Analyses, UFZ-Helmholtz Centre for Environmental Research, Leipzig, Germany
- Department for Ecosystem Analyses, Institute for Environmental Research, RWTH Aachen University, Germany
- Wageningen Environmental Research (Alterra), Wageningen University and Research Centre, Netherlands

## SELECTED EQUIPMENT

- Facilities and equipment for *in situ* and *in vivo* experiments with aquatic organisms
- Facilities and equipment for *in vitro* assays using various cell lines
- Facilities and equipment for gene expression analysis (RNA isolation and quantification, cDNA synthesis, relative quantification of gene expression)

## SELECTED PROJECTS

**Title:** Solutions for present and future emerging pollutants in land and water resources management (acronym Solutions)

**Type:** European Commission Work Program 7 Collaborative Project No. 603437

**Duration:** 2013-2018

**Contact person:** Dr Ivana Teodorovic

**Title:** Endocrine disrupting compounds: reproductive, metabolic, and developmental responses and mechanism(s) of action in selected model organisms and cell lines

**Type:** National

**Duration:** 2011-ongoing

**Contact person:**

Dr Radmila Kovacevic, prof. emeritus

**Title:** Water matrix and physico-chemical properties of relevant organic xenobiotics: implications on ecotoxicity and water treatment processes

**Type:** National

**Duration:** 2011-ongoing

**Contact person:** Dr Ivana Ivancev

Tumbas, Dept. Chemistry, Biochemistry and Environmental Protection



## CONTACT PERSON

**Dr Ivana Teodorović;**

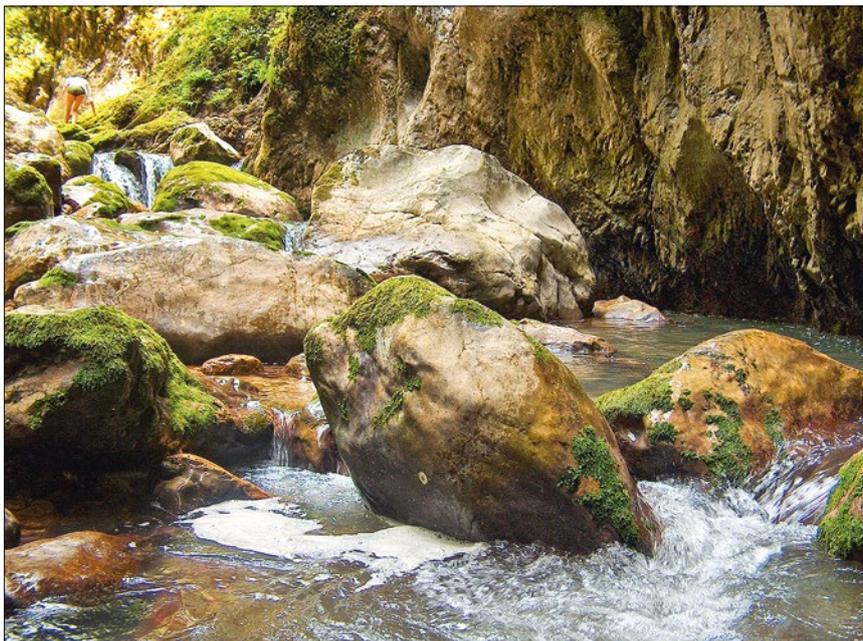
ivana.teodorovic@dbe.uns.ac.rs; tel:

+381 21 485 2690

# Freshwater Ecology Lab

*Freshwater, Ecology, Biology, Hydromorphology, Modelling, Plants*

Research in our Lab applies novel approaches in plant comparative ecology to give insights into patterns and processes underlying plant function at multiple scales, focused primarily on freshwater ecosystems. Our lab conducts pioneering research on the ecological functioning of lake and river ecosystems, GIS and remote sensing in environmental engineering, protocols for monitoring rivers and lakes for conservation and, most recently, ANN data modelling. Taking a whole of catchment approach to freshwater ecology, our researchers have the expertise to study the holistic ecology of ecosystems, restoration and management. One of the most recognizable international activities is 15-year long work within CEN, the European Committee for Standardization (TC 230 Technical Committee on 'Water Analysis' in biology, ecology and hydromorphology), developing, producing and applying European standards for monitoring aquatic environments, directly applicable to work on EU directives, especially to help meet the monitoring requirements of the EC Water Framework Directive. The group has strong research ties to the Faculty of Technical Sciences UNS and Faculty of Sciences University of Nis, Serbia.



## COLLABORATIONS

- University of Southern Mississippi (USA), host lab for Fulbright scholar Profesor Mac Alford, including common publications
- FBA (Freshwater biological Association UK), Profesor Philip Boon, external research advisor and common publications
- KWR Water Institute Delfts (The Netherlands), Profesor Dragan Savic, external research advisor.

## CONTACT PERSON

**Dr Snežana Radulović**, Full Professor; snezana.radulovic@dbe.uns.ac.rs; +381607012212

## SELECTED PROJECTS

**Title:** *Joint Danube Survey 4, ICPDR (International Commission for the Protection of the Danube River)*

**Type:** Research

**Duration:** 2019-2021

**Contact person:**

Dr Momir Paunović, BU

**Title:** *Biosensing Technologies and Global System for Long-Term Research and Integrated Management of Ecosystems*, MNTR 043002

**Type:** Research

**Duration:** 2010-2019

**Contact person:** Dr Saša Orlović, UNS

**Title:** *FP7 SOLUTIONS (for present and future emerging pollutants in land and water resources management)*

**Type:** Research

**Duration:** 2015-2017

**Contact person:** Dr Ivana Teodorović, UNS, Dr Werner Brack, Germany



## SELECTED EQUIPMENT

- Trimble Nomad GPS mobile computer

# Animal Ecology Lab

*Ecology, parasites, helminths, small mammals*

The Animal Ecology Lab predominantly focuses on studies of helminth fauna of various vertebrate groups. The emphasis is on intestinal parasites (roundworms, digeneans and tapeworms) of small mammals, especially rodents. Topics of research include all aspects of parasite ecology, including population and community ecology, distribution and diversity, host specificity, sex ratio, and the influence of intrinsic and extrinsic factors such as season, locality and host sex on the abundance and composition of communities.



## SELECTED PROJECTS

**Title:** *Genetic and phenetic diversity in natural populations across different environments – contribution of B chromosome polymorphism*

**Type:** national

**Duration:** ongoing (2011-)

**Contact person:** Olivera Bjelić Čabrilo

## COLLABORATIONS

- Institute for Biological Research “Siniša Stanković”, Belgrade, Serbia: collaboration on project activities
- Pasteur Institute of Novi Sad, National reference laboratory for rabies, Novi Sad, Serbia: research and monitoring of intestinal helminthes of carnivores

## SELECTED EQUIPMENT

- Zeiss Primo Star microscope
- Leica MZ6 stereomicroscope



## CONTACT PERSON

**Dr Olivera Bjelić Čabrilo;** [olivera.bjelic-cabrilo@dbe.uns.ac.rs](mailto:olivera.bjelic-cabrilo@dbe.uns.ac.rs); tel +381214852694

# Laboratory for Mycology - ProFungi Laboratory – Professionally for the Fungi

*Fungi, Biodiversity, Medicinal, Culture, Cultivation*

Laboratory for Mycology **ProFungi** comprises research in the field of mycology on the following research topics: Biology and ecology of fungi: Diversity and protection of fungi, Bioactive metabolites from fungi, Medicinal fungi, Fungi in cultural heritage, Mycomonitoring and mycoremediation, Molecular identification of fungi, Population genetics, Phylogeny of fungi, Commercial cultivation of fungi. **ProFungi** Laboratory aims to further enhance the research in terms of diverse fields of mycology and intensify collaboration with various institutions and organizations in the region as well as global universities. The Laboratory is involved in planning the management and participation in local and international projects. Furthermore, one of the important objectives of the Laboratory for Mycology **ProFungi** is maintenance and development of the existing fungal culture collections which currently comprise 129 autochthonous fungal isolates belonging to two different phyla (Basidiomycota and Ascomycota) and about 70 isolates of molds and 340 exsiccates of macrofungi within the Herbarium BUNS, the Department of Biology and Ecology.



## COLLABORATIONS

- University of Belgrade, Serbia, Faculty of Chemistry, Chair of Analytical Chemistry
- University of Belgrade, Serbia, Faculty of Biology, Chair of General Physiology and Biophysics, Institute of Physiology and Biochemistry
- University of Palermo, Italy, Scienze Agrarie, Alimentari e Forestali
- University of Bologna, Italy, Dipartimento di Scienze e Tecnologie Agro-Alimentari – DISTAL – Alma Mater studiorum Università di Bologna
- Bialystok University of Poland, Bialystok University of Technology, Politechnika Białostocka, Faculty of Forestry in Hajnowka

## CONTACT PERSON

**Dr Maja Karaman**, Associate Professor, [maja.karaman@dbe.uns.ac.rs](mailto:maja.karaman@dbe.uns.ac.rs), [maja.karaman@gmail.com](mailto:maja.karaman@gmail.com); +381-21-485-2682, +381-64-342-6331

## SELECTED PROJECTS

**Title:** *Bio-sensing Technologies and Global System for Continuous Research and Integrated Ecosystem Management, III43002*

**Type:** Ministry of Education, Science and Technological Development of the Republic of Serbia

**Duration:** (2010-2015/2016/2018/2019)

**Contact person:** Dr Maja Karaman

**Title:** *Fungi Database Creation as a Basis for Preserving their Biodiversity*

**Type:** Provincial Secretariat for Science and Technological Development

**Duration:** (2013- 2014)

**Contact person:** Dr Maja Karaman

**Title:** *Novel Antimicrobial Agents in Pathogenic Control –*

**Type:** IPA project HUSRB 1203/214/250

**Duration:** (2012-2013)

**Contact person:** Dr Maja Karaman

## SELECTED EQUIPMENT

- growth chamber (BINDER, Austria),
- incubator shaker (IKA KS 4000i, Germany),
- freeze-dryer (lyophiliser) (CHRIST ALPHA 2-4 LDplus Freeze Dryer, Germany),
- equipment for molecular-biological analysis (horizontal and vertical electrophoresis system, gel documentation system and thermal cycler, Biometra),
- rotary evaporator (BUCHI Rotavapor R-210, Switzerland)

# Laboratory for Chronobiology and Aging

*Reproduction, Circadian Rhythm, Aging, Testosterone, Steroidogenic Cells*

Laboratory for Chronobiology and Aging (ChronAge) investigates circadian and homeostatic regulation of reproduction and physiological processes governed by reproductive hormones.

The aim of our research is to understand the temporal organization of signaling network in cells that produce reproductive hormones during life and especially in aging. We also study metabolic changes in aging caused by low level of reproductive hormones in order to provide novel ways to intervene in the aging process and potentially ameliorate health decline that occurs at advancing ages.

Current topics:

- Ways of synchronization of peripheral clocks located in cells of reproductive axis with master regulator of rhythm;
- Effects of aging and stress on circadian system and rhythmic gonadal function;
- Circadian signaling and puberty;
- Signaling network involved in development of age-related hypogonadism (pharmacological manipulation of different metabolic processes);
- Low testosterone as a marker of aging: slowing-down age-related hypogonadism by pharmacological manipulation of cGMP signaling.



## SELECTED EQUIPMENT

- Accredited animal facility (*Wistar* rats and mice) enabling performance of experiments in different environments (light regime, temperature...); equipped with tools for monitoring the rat physical activity at given time intervals (Running wheels);
- Equipment for *in vitro* experiment with tissue cultures as well as primary and immortalized cell lines from mice, rats and humans.
- Equipment for molecular investigation of the expression of the genes, as well as proteins interactions and functions within the cells.

## SELECTED PROJECTS

**Title:** "Molecular mechanisms and signal transduction pathways involved in regulation of steroidogenesis and adaptation of Leydig cells on disturbed homeostasis".

**Type:** Basic research project.

**Duration:** 01.01.2011.-31.12.2019.

**Contact person:**

Prof. Dr Tatjana Kostic.

**Title:** "Are the reproductive hormones link between stress, metabolic syndrome and aging?"

**Type:** Basic research project.

**Duration:** 01.06.2014.-31.12.2019.

**Contact person:**

Prof. Dr Silvana Andric

**Title:** "The CNG channels in Leydig cell - identification, characterization and functional coupling to testosterone production".

**Type:** Basic research project.

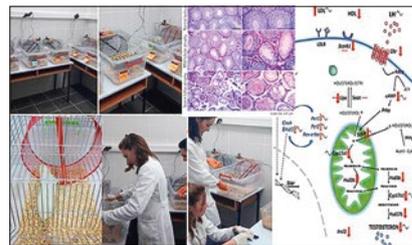
**Duration:** 01.01.2015.-31.12.2020.

**Contact person:**

Prof. Dr Silvana Andric

## COLLABORATIONS

- National Institute of Child Health and Human Disease; National Institutes of Health (Bethesda, Maryland, USA)
- Department of Biology, University of Fribourg, Fribourg, Switzerland
- Institute of Biochemistry, Faculty of Medicine, University of Ljubljana, Slovenia



## CONTACT PERSON

**Dr Tatjana Kostic**, Full Professor; [tatjana.kostic@dbe.uns.ac.rs](mailto:tatjana.kostic@dbe.uns.ac.rs); tel: +381 21 485 2674

# Laboratory for Endocrine Disruptors and Signaling (ENDOS)

*endocrine disruptors, reproduction, cell signaling, granulosa cells, zebrafish development, vascular endothelial cells*

Laboratory research objectives are focused on deciphering mechanism of action of chemicals known as endocrine disruptors (ED), which are routinely found in our environment and which are known to interfere with hormone homeostasis. The emphasis is on detecting affected cellular events, signaling pathways, altered gene expression and epigenetic marks.

Main research topics include:

- Impact of ED on reproduction. Impact on reproduction is being assessed by investigating mechanism of ED action in human and rat ovarian steroidogenic granulosa cells and in human spermatozoa. Both signaling and different reproductive parameters are evaluated.
- Impact of ED on development. Impact on development is studied by exposing zebrafish embryos (*Danio rerio*) to ED and evaluating effects both while in embryonic stage and in adulthood, with the emphasis on gene expression, epigenetics and histology.
- Impact of ED on vascular endothelial cells, both in chronic and acute experimental set ups. Signaling and different cellular events are evaluated.



## SELECTED PROJECTS

**Title:** *Curricula development in the fields of reproductive biology/assisted reproductive technologies and regenerative medicine in Serbia (ART-REM), 586181-epp-1-2017-1-rs-eppka2-cbhe-jp*  
**Type:** ERASMUS+ KA2 program - Cooperation for innovation and the exchange of good practices –Capacity Building in the field of Higher Education  
**Duration:** 2017-2020  
**Contact person:** Dr Nebojsa Andric

**Title:** *Endocrine disrupting compounds: reproductive, metabolic, developmental responses and mechanisms of action in selected model organisms and cell lines. Project No. 173037*  
**Type:** Research grant, Ministry of Education, Science and Technological Development of Republic of Serbia  
**Duration:** 2011-  
**Contact person:** Dr Nebojsa Andric

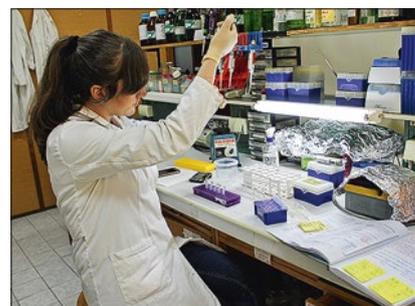
**Title:** *Endocrine disruptors and reproductive health: effects and mechanisms of action on human granulosa cells and spermatozoa. Project No. 114-451-2573/2016-03 (2016-2019)*  
**Type:** Research grant, Provincial Secretariat for Higher Education and Scientific Research  
**Duration:** 2016–2019  
**Contact person:** Dr Kristina Pogrmic-Majkic

## SELECTED EQUIPMENT

- MSC-Advantage™ Class II Biological Safety Cabinets, Thermo Scientific;
- Fluorimeter Fluoroscan Ascent Plate Reader, Thermo–Labsystems;
- MyECL, Thermo Scientific;
- BioSpec-nano, Shimadzu Biotech,
- Zebrafish Facility

## COLLABORATIONS

- Swiss Federal Institute of Aquatic Science and Technology, Switzerland
- Department of Physiology and Toxicology of Reproduction, Jagiellonian University, Kraków, Poland
- Faculty of Biology, University of Sofia, Bulgaria



## CONTACT PERSON

**Dr Nebojsa Andric**, Assistant Professor; [nebojsa.andric@dbe.uns.ac.rs](mailto:nebojsa.andric@dbe.uns.ac.rs); +381 21 485 2675  
<https://endos.pmf.uns.ac.rs/about-us/>

# Laboratory of Genetics

*Population Genetics, Conservation Genetics, Molecular taxonomy, Phylogenetics, Phylogeography*

The research of the Laboratory of Genetics integrates various aspects of population genetics, phylogenetics, molecular taxonomy, phylogeography and conservation genetics, with the goal of understanding genetic variation and its role in ecological and evolutionary processes. In order to estimate the potential of populations to respond to climate changes and turbulent and continuously changing environment, the Laboratory's research focus is on the application of various molecular markers in plant and animal species, with the aim of estimating genetic diversity and structuring, gene flow, inbreeding, demography, phylogenetics, phylogeography, as well as the development of conservation and sustainable management plans. The research is primarily oriented toward mammal species (mostly game species), while an important research segment also focuses on solving taxonomical problems within diverse hoverfly species. In addition, the group explores human genetic polymorphisms and conducts associative studies based on genotype-phenotype interactions in multifactorial complex disorders, such as cardiovascular or oncological diseases.



## COLLABORATIONS

- Department of Integrative Biology and Evolution, University of Veterinary Medicine Vienna, Austria – Phylogeography, genetic structure and immunogenetic diversity in brown hares from Europe and Asia Minor
- Wildlife Research Unit, Department of Biology, University of Aveiro, Portugal – Genetic structuring and phylogeography of wild boars from Europe
- Finnish Museum of Natural History, University of Helsinki, Finland – Phylogenetics and molecular taxonomy of hoverflies (Diptera: Syrphidae)

## CONTACT PERSON

**Dr Mihajla Djan**; mihajla.djan@dbe.uns.ac.rs; +381 21 485 2799  
<https://www.researchgate.net/lab/Laboratory-of-Genetics-Mihajla-Djan>

## SELECTED PROJECTS

**Title:** *Genomic Biodiversity Knowledge for Resilient Ecosystems – G-BIKE*

**Type:** COST Action

**Duration:** 2019-2023

**Contact person:**

Dr Nevena Veličković,  
Science Communication Manager

**Title:** *Insect-plant relationships: insights into biodiversity and new applications - FlyHigh*

**Type:** Horizon2020, Marie Skłodowska-Curie Actions

**Duration:** 2015-2018

**Contact person:** Dr Mihajla Djan,  
Dr Nevena Veličković, participants

**Title:** *Conservation strategy for protected and strictly protected hoverflies (Insecta: Diptera: Syrphidae) species in Serbia – Case study*

**Type:** Serbian Ministry of Education, Sciences and Technological Development of Republic of Serbia

**Duration:** 2011-

**Contact person:** Dr Mihajla Djan



## SELECTED EQUIPMENT

- Eppendorf Mastercycler ep RealPlex 4
- Eppendorf Mastercycler Personal
- Eppendorf 5417R Refrigerated Centrifuge
- Equipment for horizontal and vertical gel electrophoresis (SERVA and Hoeffer)

# Laboratory for Human Biology

*Human biology, Physical Anthropology, Growth, Development, Maturation*

Research is dedicated to solving problems related to the study of human biology, with the aim of understanding the interaction processes of genetic and ecological factors which the human organism is exposed to. In the field of somatic growth and development of children and adolescents, the main research directions are quantitative traits, maturation and a secular trend. The studies determine the growth models for each anthropometric characteristic and the specificity of the morphological growth of different body characteristics in relation to age and gender. Physical growth and development change over time and studying the dynamics of these changes in particular population enables the identification of factors that affect growth and development. Child-growth indicators are useful not only for monitoring a population's nutritional status, but are also suitable markers of population health and useful for gauging inequalities in human development among different populations. The results of the research, in addition to theoretical, have practical significance: in medicine, psychology, pedagogy, industrial anthropology and physical education.



## SELECTED PROJECTS

**Title:** "The impact of physical activity on risk factors in the working population".

**Type:** Scientific Project (Provincial Secretariat for Science and Technological Development)

**Duration:** 2011-2016

**Contact person:**  
Prof. Milena Mikalački

**Title:** "The variability of morphofunctional indicators in the population of Belarus and Vojvodina (Serbia)"

**Type:** bilateral cooperation

**Duration:** 2013-2016

**Contact person:** Prof. Verica Božić-Krstić, Prof. Branislava Belić

## COLLABORATIONS

- National Academy of Science Belarus, Anthropology, Minsk, Belarus
- „Francisc I. Rainer“ Anthropological Institute of the Romanian Academy, Bucharest, Romania
- University „Pajsije Hilendarski“ Biologija Plovdiv, Bulgaria

## SELECTED EQUIPMENT

- Set of Anthropological instruments SieberHegnerMaschinen AG Zürich Switzerland

## CONTACT PERSON

**Dr Pavlica Tatjana**, Associate professor; tatjana.pavlica@dbe.uns.ac.rs; tel. +381641838887

# Laboratory for Reproductive Endocrinology and Signaling

*Signal-transduction pathways, Steroidogenic cells, Spermatozoa, Mitochondrial dynamic, Psychophysical stress*

LaRES investigates molecular events and signaling pathways involved in the regulation of functions, mainly of the cells of reproductive axis, but also other cells of organism with altered homeostasis of testosterone or other hormones. The aim of the research is to reveal the mechanisms in the basis of infertility, post traumatic stress disorder (PTSD), insulin resistance, polycystic ovary syndrome (PCOS), metabolic syndrome (MetS).

Current research directions/topics:

- The role of signaling from insulin and IGF1 receptors in the regulation of mitochondrial dynamics and the function of steroidogenic cells of testes, ovaries, adrenal glands, placenta;
- Mitochondrial biogenesis as mechanism of spermatozoa adaptation during the condition of changed testosterone homeostasis (stress/PTSD, disrupted biological clock, aging, treatment with Viagra®, treatment with Metformin®, insulin resistance, MetS);
- Markers of mitochondrial dynamic as indicators of the energetic and functional status of energy-producing, energy-consuming and energy-storing cells, during normal and disturbed homeostasis of organism.

The results have a significant translational aspect and application in biomedicine.



## COLLABORATIONS

- National Institute of Child Health and Human Disease; National Institutes of Health (Bethesda, Maryland, USA)
- Laboratory of Cellular and Molecular Neuroendocrinology, Institute of Physiology, Academy of Sciences of the Czech Republic
- Department of Genetic Medicine and Development, Faculty of Medicine, University of Geneva, Switzerland

## CONTACT PERSON

**Dr Silvana Andrić**, Full Professor; silvana.andric@dbe.uns.ac.rs; +381-63-748-4403; www.dbe.uns.ac.rs/en/nauka-eng/lares

## SELECTED PROJECTS

**Title:** "Molecular mechanisms and signal transduction pathways involved in regulation of steroidogenesis and adaptation of Leydig cells on disturbed homeostasis".

**Type:** Basic research project.

**Duration:** 01.01.2011.-31.12.2019.

**Contact person:**

Prof. Dr Tatjana Kostic.

**Title:** "Are the reproductive hormones link between stress, metabolic syndrome and aging?"

**Type:** Basic research project.

**Duration:** 01.06.2014.-31.12.2019.

**Contact person:**

Prof. Dr Silvana Andric

**Title:** "The CNG channels in Leydig cell - identification, characterization and functional coupling to testosterone production".

**Type:** Basic research project.

**Duration:** 01.01.2015.-31.12.2020.

**Contact person:**

Prof. Dr Silvana Andric

## SELECTED EQUIPMENT

- Accredited animal facility (*Wistar* rats and mice with conditional knock-out) enabling design of in vivo models that simulate the situation/cases in the clinical practice and investigation of the effects of different factors on activity of animals.
- Equipment for detection of willing activity of laboratory rats at given time intervals.
- Equipment for *in vitro* experiment with tissue cultures as well as primary and immortalized cell lines from mice, rats and humans.
- Equipment for molecular investigation of the expression of the genes, as well as proteins interactions and functions within the cells.

# Laboratory of Evolutionary Biology (LEB)

*Conservation Genetics, Evolutionary Systematics, Evolutionary Genetics, Phenotypic variation*

Our interests include systematics, phylogeny and speciation of various groups of species, landscape and conservation genetics of cryptic, endemic, rare, spatially fragmented and widespread taxa.

Research topics of LEB are:

1. To use integrative approach to resolve taxonomic uncertainties and to define species borders and evolutionarily significant units;
2. To apply integration of empirical genetic and ecological data in Landscape genetics approach and adaptive potential estimates in order to achieve a better comprehension of the relative importance of geographical barriers and recent evolutionary events versus contemporary factors in shaping intra-specific patterns of biological diversity;
3. To study population genetic structure and phenotypic variation of public health pest taxa. Our results provide insights into phenotypic plasticity, evolutionary potential and deeper understanding of vector dispersion pattern and therefore, they are essential for designing vector control strategies;
4. To employ the integrative approach in studies of phylogenetic relationships and genetic distinctiveness of species groups as well for evaluating the phylogenetic signal of different markers.



## COLLABORATIONS

- Virological Research Group, Szentágothai Research Centre, University of Pécs, Hungary;
- Groningen Institute for Evolutionary Life Sciences, Faculty of Science and Engineering, University of Groningen, The Netherlands;
- Finnish Museum of Natural History, University of Helsinki, Finland.

## SELECTED PROJECTS

**Title:** *Dynamics of gene pool, genetic and phenotypic variability of populations, determined by the environmental changes (#O1173012)*

**Type:** scientific

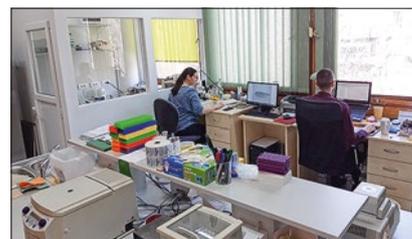
**Duration:** 2011- present

**Contact person:** Dr Vesna Milankov



## SELECTED EQUIPMENT

- Mastercycler personal, Eppendorf;
- Centrifuge 5415 R, w/o rotor refrigerated, Eppendorf;
- Thermomixer compact, Eppendorf;
- Apparatuses for acrylamide and agarose gel electrophoresis: Sub-Cell agarose gel electrophoresis systems, Bio-Rad; Hoefer SE 600 Standard dual cooled gel electrophoresis units, Pharmacia Biotech; Electrophoresis power supply EPS 3500, Pharmacia Biotech;
- Stereomicroscope Leica MZ 12.5 with 320DFC Camera.



## CONTACT PERSON

**Dr Vesna Milankov**, Full Professor; vesna.milankov@dbe.uns.ac.rs; +38121 485 2671  
[http://www.dbe.uns.ac.rs/o\\_departmanu/laboratorije/laboratorija\\_z\\_a\\_evolucionu\\_biologiju\\_\(leb\)](http://www.dbe.uns.ac.rs/o_departmanu/laboratorije/laboratorija_z_a_evolucionu_biologiju_(leb))

# Research Group for Teaching Methods in Biology

*Biology Education, Educational Efficiency, Approaches to Biology Teaching and Learning*

Research work in the field of Teaching Methods in Biology and Ecology is oriented towards educating Biology teachers in accordance with the modern didactic and methodological requirements, introducing modern didactic models in Biology teaching and monitoring their efficiency, and professional training and development of Biology teachers.



## SELECTED PROJECTS

**Title:** *The quality of education system in Serbia from European perspective*  
**Type:** National Project, Basic research  
**Duration:** 2011-  
**Contact person:** Olivera Gajić, PhD, Full Professor, Faculty of Philosophy, University of Novi Sad

**Title:** *European dimensions of changes in the educational system in Serbia*  
**Type:** National Project, Basic research  
**Duration:** 2006-2010  
**Contact person:** Olivera Gajić, PhD, Full Professor, Faculty of Philosophy, University of Novi Sad

**Title:** *Science teacher education revision and upgrading (STERU)*  
**Type:** Tempus Project  
**Duration:** 2006-2009  
**Contact person:** Srećko Trifunović, PhD, Full Professor, Faculty of Science, University of Kragujevac



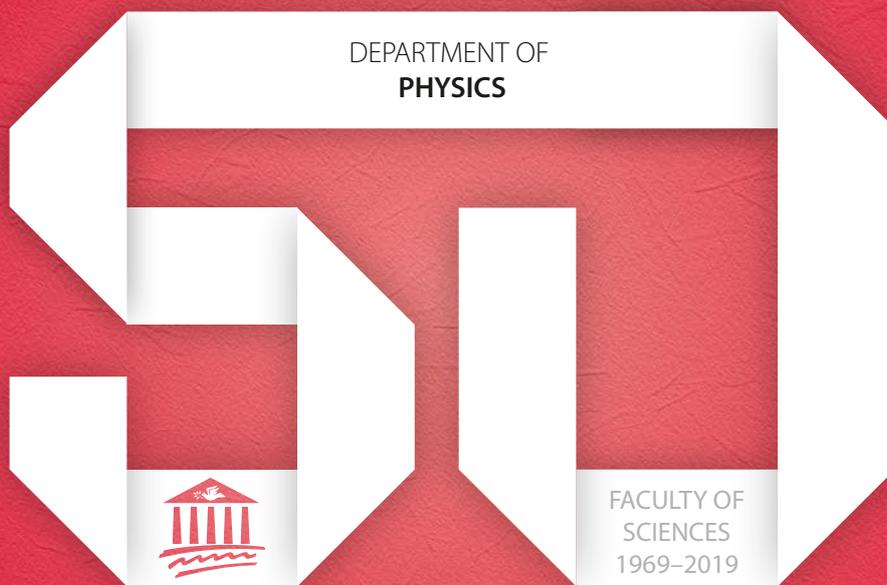
## SELECTED EQUIPMENT

- Multimedia Laboratory

## CONTACT PERSON

**Vera Županec;** vera.zupanec@dbe.uns.ac.rs; +381214852699





DEPARTMENT OF  
**PHYSICS**



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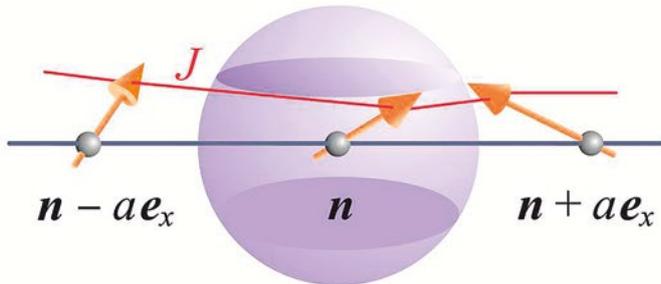
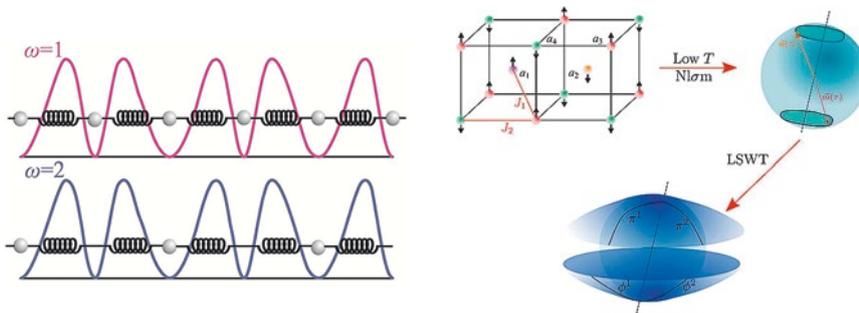
# Theoretical Physics Group

Quantum theory of magnetism, Spin qubits, Nonlinear dynamics, Fractional calculus, Environmental modeling

The group's main areas of research include theoretical condensed matter physics, especially quantum theory of magnetism, nonlinear dynamics in condensed matter systems, quantum phase transitions and quantum informatics. The research is based on standard models and their generalizations: Heisenberg model, Ising model, Frenkel – Kontorova model, etc. The results are obtained with different perturbative and nonperturbative methods: Green's function method, Monte Carlo simulations, diagram technique, etc.

On the other hand, problems including wave and heat conduction in nonlocal and memory sensitive materials are modeled with the help of fractional calculus.

Finally, one member of theoretical physics group investigates environmental modeling. This research is based on WRF, WRF-Chem and CALPUFF models.



## COLLABORATIONS

- Institute of nuclear sciences – Vinča, Belgrade, Serbia
- Joint Institute for nuclear research, Bogoliubov Laboratory for theoretical physics, Dubna, Russia
- Mathematical Institute SANU, Belgrade, Serbia

## CONTACT PERSON

**Dr Milica Pavkov-Hrvojević;**  
milica@df.uns.ac.rs

## SELECTED PROJECTS

**Title:** *The influence of elementary excitations and conformations to physical properties of the new materials based on strongly correlated low-dimensional systems (OI 171009)*

**Type:** National project

**Duration:** 8+ years

**Contact person:** Dr Milan Pantić (mpantic@df.uns.ac.rs)

**Title:** *Perturbative and nonperturbative aspects of complex many body systems (APV 114-451-2201)*

**Type:** Provincial project

**Duration:** 4 years

**Contact person:** Dr Slobodan Radošević (slobodan@df.uns.ac.rs)

**Title:** *Analytical, numerical and statistical tools in mathematical models (APV 114-451-2894)*

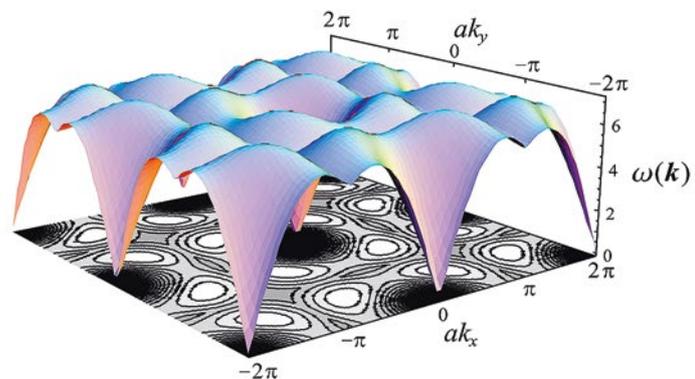
**Type:** Provincial project

**Duration:** 4 years

**Contact person:** Dr Sanja Konjik (sanja.konjik@dmi.uns.ac.rs)

## Group members

- Dr Milica Pavkov – Hrvojević, Full Professor
- Dr Milan Pantić, Full Professor
- Dr Dušan Zorica, Associate Professor
- Dr Milica Rutojnjski, Assistant Professor
- Dr Slobodan Radošević, Associate Professor
- Dr Zorica Podračanin, Associate Professor
- Dr Petar Mali, Assistant Professor



# Nuclear Physics Group

*nuclear physics, low-level spectroscopy, cosmic-ray physics, environmental radioactivity, muon imaging*

The main activities are:

1. Investigation of rare nuclear events, double beta decay, cosmic ray physics, muon induced events, Monte-Carlo simulations
2. Public services in radiation protection (gamma spectrometry, alpha, beta, gamma, neutron dosimetry, non-ionizing radiation, radon)
3. Expertise in low-level alpha, beta and gamma spectroscopy

A part of several nuclear applied research and educational networks: EU-TERP–European Training and Education in Radiation Protection Foundation, ALMERA–Analytical Laboratories for the Measurement of Environmental Radioactivity, INSEN–International Nuclear Security Education Network.

Two accredited laboratories according to ISO/IEC 17025: Laboratory for radioactivity and dose measurements and Laboratory for gamma spectrometer and source activity calibration.



## COLLABORATIONS

- JRC-different areas of applied nuclear physics;
- ISOLDE-CERN-nuclear structure;
- JINR DUBNA-neutron physics and applied nuclear physics

## CONTACT PERSONS

**Dr Dusan Mrdja**, Full Professor; mrdjad@df.uns.ac.rs; tel: +381 21 459368  
<http://lira.df.pmf.uns.ac.rs/>; <https://www.pmf.uns.ac.rs/en/research/laboratories/>

## SELECTED PROJECTS

**Title:** *Improving Non-Destructive Laboratory Based and In-Situ Measuring Methods to Respond to a Nuclear Security Event*

**Type:** IAEA Coordinated Research Project

**Duration:** 2019–2023

**Contact person:**

Prof. Dr Jovana Nikolov

**Title:** *Vojvodina and Bács-Kiskun Night Sky as a Novel Touristic Attraction-VoBaNISTA*

**Type:** Interreg-IPA Cross-border Cooperation Programme Hungary-Serbia

**Duration:** 2018–2020

**Contact person:** Prof. Dr Dusan Mrdja

**Title:** *Imaging techniques with cosmic-ray muons*

**Type:** Bilateral Scientific and Technological Cooperation Programme Hungary-Serbia

**Duration:** 2017–2019

**Contact person:** Dr Kristina Bikit

## SELECTED EQUIPMENT

- Three HPGe detectors of 32%, 36% and 100% relative efficiencies in lead passive shields.
- The big low-background iron chamber of a useful volume of 1 m<sup>3</sup>, with 25 cm thick walls, made out of pre-WWII iron (free of Co60). The chamber accommodates another HPGe detector of 23% relative efficiency
- Alpha, Beta liquid scintillation spectrometer Quantulus 1220.
- MUCA (MUon CAmera) system - muon MWPC-based tracking system developed by WignerRCP of Budapest combined with 4 (50 cm x 50 cm x 5 cm) plastic scintillators detecting in coincidence the secondary radiation created by muons in the object.
- Alpha-ray spectrometer dedicated to the measurement of low levels of radon in air, soil gas and water, RAD7.

# Chair of Physical Electronics

*Plasma, Spectroscopy, Stark parameters, Ion-Molecule collisions, UV radiation*

The main objectives and topics are directed to the plasma spectroscopy and plasma diagnostics. The work is mainly devoted to determination of Stark parameters of different atomic and ionic lines with the purpose of using it for plasma electron density determination. Furthermore, the members of the chair worked in the field of RF plasma sources, plasma dynamics, measurements of transition probabilities in atoms and ions, effects of ion dynamics on plasmas as well as the effects on Debye screening effect. The great part of the work is devoted to the hydrogen spectral lines and plasmas. Experiments are done using two plasma sources: the T-tube as pulsed plasma source and the wall stabilized electrical arc which can work in DC and pulsed regime when higher plasma electron densities are reached.

In addition, some members of the group work on measurements of absolute cross sections of ion-molecule collisions at energies up to 10 eV that are of great interest for fundamental physics, astrophysical plasmas and in general for plasma modeling.

One of the research topics is monitoring solar UV radiation and stratospheric ozone layer thickness and artificial UV sources.



## SELECTED EQUIPMENT

- Plasma sources with spectroscopy equipment (high resolution fast ICCD camera, 1-m monochromators etc)
- NOVlon – Guided Ion Beam instrument for measurements of absolute cross sections between ions and neutrals
- Instruments for monitoring solar UV radiation and ozone layer thickness
- Simulator of solar UV radiation
- Different electronic instruments (DC and AC sources, oscilloscopes, function generators, spectrum analyzers, high voltage DC sources etc)

## CONTACT PERSONS

**Dr Zoran Mijatović**, Full Professor; mijat@uns.ac.rs; +381 21 4852817

## SELECTED PROJECTS

**Title:** *Determination of atomic regularities Stark parameters for np-nd transitions in the homologous series of ionized noble gases (FIS205-03155)*

**Type:** Scientific. Plasma physics

**Duration:** 2006 - 2008

**Contact person:** Stevica Djurović

**Title:** *Spectroscopic diagnostics of low-temperature plasmas and gas discharges: Spectral line shapes and interaction with surfaces (NIO 171014)*

**Type:** Scientific. Plasma physics

**Duration:** 2011 -

**Contact person:** Stevica Djurović

**Title:** *Astrophysics and plasma relevant experimental studies of hydrogen and helium chemistry in high and low temperature ion traps and guides (SCHL 341/17-1)*

**Type:** Scientific. Collisional cross section measurements for atoms, ions and molecules

**Duration:** 2017 - 2019

**Contact person:** Igor Savić

## COLLABORATIONS

- Faculty of Sciences, University of Valladolid (Spain), Experimental investigations in plasma spectroscopy
- CORIA French combustion laboratory, University of Rouen (France), Experimental investigations in plasma spectroscopy
- Institute of physics I, University of Cologne (Germany), Collisional cross section measurements



# Group for Investigation and Modeling of Materials (GIMM)

*Nanomaterials, Characterization, Experiment, Computational Modeling, DFT*

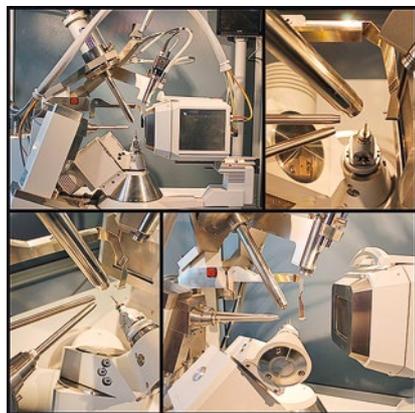
**G**roup for Investigation and Modeling of Materials (GIMM) performs characterization and computational modeling of various materials that include, but are not limited to: (in)organic nanostructures (ferrites, perovskites, fullerenes, nanotubes, graphenes), pharmaceuticals, photovoltaic and OLED molecules, photocatalysts, ionic liquids, buckbowls, liquid crystals, etc.

We are interested in materials with potential for practical applications in the areas of electronics, (bio)sensors, environmental protection, clean energy sources, pharmacy, etc.

The objective of GIMM is to provide high quality characterization and computational modeling services for the University of Novi Sad and for research groups all over the world. We tend to use high quality experimental procedures based on X-ray diffractometry, Raman spectroscopy and conductivity measurements in order to characterize materials. Computational modeling by DFT calculations, molecular dynamics simulations and molecular docking is used to investigate and optimize structural, reactive, adsorption, transport, opto-electronic and other properties of materials of interest.

## COLLABORATIONS

- University of Leeds, School of Electronic and Electrical Engineering, Leeds, UK
- Fatima Mata National College, Kollam, Kerala, India
- Hacettepe University, Faculty of Pharmacy, Ankara, Turkey



## SELECTED EQUIPMENT

- *Experimental equipment:* The Gemini S single crystal X-ray diffractometer, Thermo Scientific DXR for Raman spectroscopy, Rigaku MiniFlex 600 diffractometer for polycrystalline samples, DuPont DEA 2970 dielectrometer.
- *Computational modeling packages:* Schrödinger Materials Science Suite, Quantum Espresso, GAMESS, PSI4, ATK

## SELECTED PROJECTS

**Title:** *The Synthesis of nanopowders and processing of ceramics and nanocomposites with specific electrical and magnetic properties for an application in the integrated passive components, grant III45021*

**Type:** Integral Interdisciplinary Research

**Duration:** 2011 -

**Project leader:** Dr Vladimir Srđić, Full Professor, email: srđicvv@uns.ac.rs

**Contact person at Faculty of Sciences:** Dr Željka Cvejić, Full Professor, email: zeljka.cvejic@df.uns.ac.rs

**Title:** *Phase transitions and characterization of inorganic and organic systems, grant O171015*

**Type:** Fundamental Research

**Duration:** 2011 -

**Project leader:** Dr. Sunčica Elezović-Hadžić, Full Professor, email: suki@ff.bg.ac.rs

**Contact person at Faculty of Sciences:** Dr Maja Stojanović, Full Professor, email: maja.stojanovic@df.uns.ac.rs

**Title:** *Virtual human osteoarticular system and its application in preclinical and clinical practice, grant III41017*

**Type:** Integral Interdisciplinary Research

**Duration:** 2011 -

**Project leader:** Dr. Miroslav Trajanović, Full Professor, email: miroslav.trajanovic@masfak.ni.ac.rs

**Contact person at Faculty of Sciences:** Dr Stevan Armačić, Assistant Research Professor, email: stevan.armakovic@df.uns.ac.rs

## CONTACT PERSONS

**Dr Željka Cvejić**, Full Professor, zeljka.cvejic@df.uns.ac.rs

**Dr Stevan Armačić**, Assistant Research Professor, stevan.armakovic@df.uns.ac.rs

web site: <https://gimm.pmf.uns.ac.rs>

# Research Group for New Materials

*Chalcogenide glasses, nanocrystalline oxide semiconductors, thermophosphors, photocatalysis*

Some of the team members are engaged in the area of preparation of chalcogenide glasses and glass ceramics and investigation of their physical properties in view of possible applications in infrared region of spectrum or as memory devices. The aim of investigation of the nature of processes in non-crystalline structures by means of different experimental techniques such as transmission, photoluminescence and impedance spectroscopy and thermal analyses is to search correlations between physical properties of synthesized glasses and designing models for description of the processes.

The rest of the team is engaged in synthesis (by mechanochemical, solid-state, sol-gel and combustion methods) and characterization of nanocrystalline oxide semiconductors. In the field of photocatalysis, mixed oxides catalysts for photodegradation of some pharmaceutically active organic pollutants are prepared. Also, the ternary oxide semiconductors doped with rare earth ions are synthesized and characterized as new phosphor materials. Additionally, preparation and investigation of properties of polymer nanocomposites, mainly in the form of thin films, is a part of our activities.

One part of research is dedicated to single crystal structure determination by X-ray diffraction methods where most attention is paid to metal-organic frameworks (MOFs) and biologically active compounds.



## SELECTED EQUIPMENT

- Raman Centice MMS with CCD detector
- UV-VIS Spectrometer Lambda 950
- DSC-TG instrument SDT Q600
- Fisherscope HM2000
- Rigaku Gemini S diffractometer

## CONTACT PERSON

**Dr Svetlana Lukić-Petrović**, Full Professor; svetlana@df.uns.ac.rs; tel: +381 21 4852812

## SELECTED PROJECTS

**Title:** *Physics of amorphous and nanostructured materials*

**Type:** Republic

**Duration:** 2011-

**Title:** *Reduced Dimensional Materials for Efficient Light Absorption and Energy Conversion*

**Type:** Republic

**Duration:** 2011-

**Title:** *Physical properties of glasses designed for applications in the infrared region of spectrum and memory devices*

**Type:** International

**Duration:** 2016-2018

## COLLABORATIONS

- Department of Physics of Condensed Matter, Faculty of Science, University of Cadiz, Spain-research on optical and structural properties of chalcogenides (bulk form and thin film)
- Department of Laser Chemistry and Laser Materials, Sankt Petersburg, Russia -new techniques of preparation of amorphous materials, investigation of electrical and magnetic properties.
- Slovak University of Technology in Bratislava, Faculty of Materials Science and Technology in Trnava, Institute of Materials Science- RBS, Raman and IR spectroscopic characterization of chalcogenide semiconductors, nanocrystalline oxides and polymer films



DEPARTMENT OF  
**GEOGRAPHY, TOURISM  
AND HOTEL MANAGEMENT**



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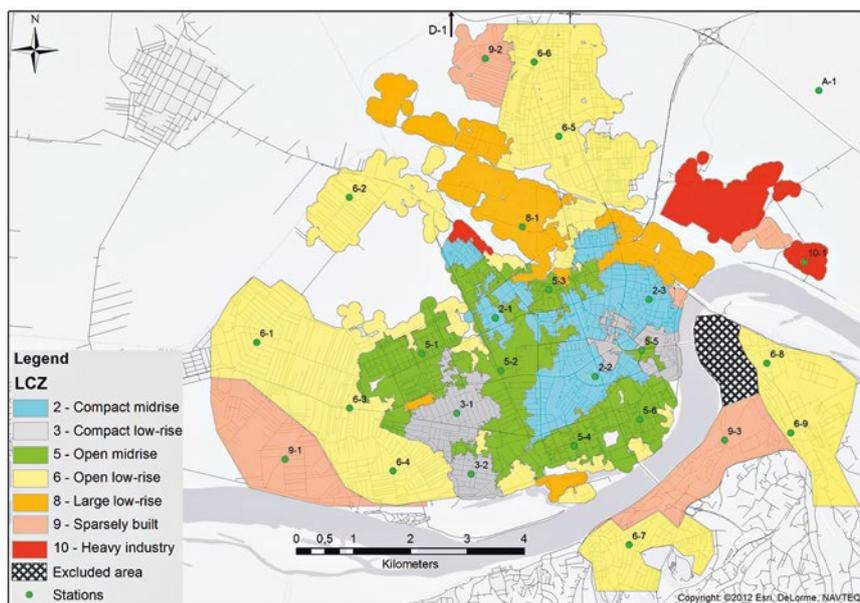
# Climatology and Hydrology Research Centre

*Climatology, Hydrology, Geoecology*

Climatology and Hydrology Research Centre (CHRC) was founded on 21st March 2008 by the decree of Council of the Faculty of Sciences University of Novi Sad, at the proposal of present members of the Centre. The CHRC is primarily concerned with gathering, processing, analysing and publishing of data on climatology, hydrology and geoecology. Moreover, scientific and research papers that introduce the phenomena and processes on both local and regional levels are produced and published.

The basic aims of the Centre are to:

- Commence and intensify cooperation with researchers and institutions;
- Motivate and involve students in the research programme of the Centre;
- Organize specialist studies and development at renowned institutions in Europe for university staff, members of the Centre and young professionals;
- Joint proposals with partner institutions for projects with the aim of providing funding for research and equipment;
- Offer professional services to industrial subjects and organizations whose activities are directly or indirectly dependant on climatological, hydrological or geoecological circumstances over the area.



## SELECTED EQUIPMENT

- NSUNET - 27 stations network with air temperature and relative humidity sensors in urban and hinterland area of Novi Sad (Serbia)
- URBAN-PREX network - 20 precipitation stations network in urban and hinterland area of Novi Sad (Serbia)
- Automatic weather stations - 3 stations in urban and hinterland area of Novi Sad (Serbia)

## CONTACT PERSON

**Dr Stevan Savić**; [stevan.savic@dgt.uns.ac.rs](mailto:stevan.savic@dgt.uns.ac.rs); +381 60 50 28 979; [www.clihyd.com](http://www.clihyd.com)



## SELECTED PROJECTS

**Title:** Evaluations and public display of URBAN PATterns of Human thermal conditions – URBAN-PATH

**Type:** international, cross-border, IPA project

**Duration:** 2013-2014

**Contact person:** Dr Stevan Savić

**Title:** Monitoring, forecasting and development of online public early warning system for extreme precipitations and pluvial floods in urban areas in the Hungarian-Serbian cross-border region – URBAN-PREX

**Type:** international, cross-border, IPA project

**Duration:** 2017-2019

**Contact person:** Dr Stevan Savić

**Title:** Improvement of drought and excess water monitoring for supporting water management and mitigation of risks related to extreme weather conditions – WATERatRISK

**Type:** international, cross-border, IPA project

**Duration:** 2017-2019

**Contact person:** Dr Dragoslav Pavić

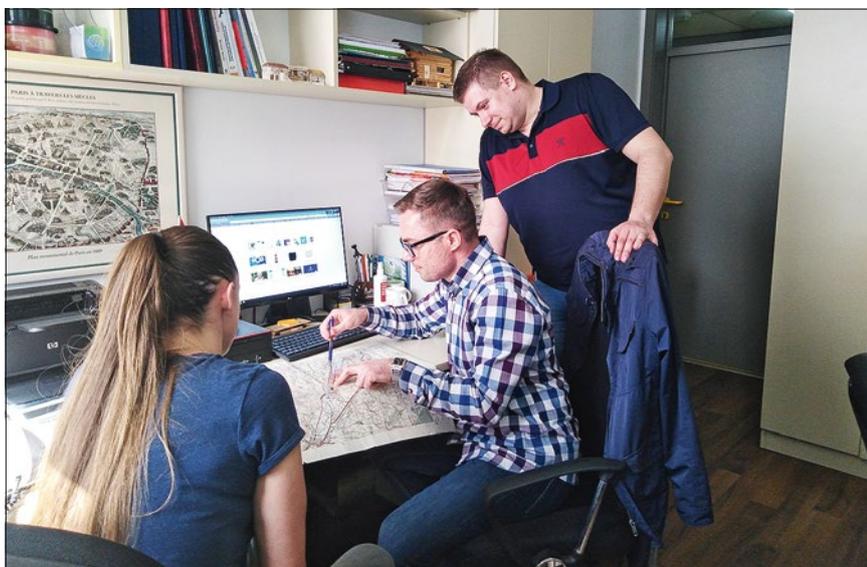
## COLLABORATIONS

- University of Szeged, Hungary
- University of Ljubljana, Slovenia
- University of Gent, Belgium

# Regional Geographic Research Group

*Regional geography, regional development*

**R**egional Geographical Research Group is focused on the analysis of the physical and social characteristics of the regions on the territory of Serbia. Members of the regional geographic research team analyze and determine the climate regions, demographic, urban and rural problems of the regions in Serbia, as well as the possibilities of their revitalization. The study of urban problems has also directed some of the team's members to the study of urban noise and light pollution. In the following period, the team will continue to address these problems, but will also focus on regional development. The team will focus on analyzing the potentials and problems of individual regions and determining the possibilities of sustainability and their development.



## SELECTED PROJECTS

**Title:** *Demographic problems of smaller ethnic groups in Vojvodina*

**Type:** Scientific

**Duration:** 2013-2014

**Contact person:** Dr Tamara Lukić

**Title:** *Ethnic groups of Vojvodina in the 21st century - state and perspectives of sustainability*

**Type:** Scientific

**Duration:** 2016-2019

**Contact person:** Dr Tamara Lukić



## SELECTED EQUIPMENT

- SQM - L - sky quality meter
- UNI-T UT353 digital noise meter
- Garmin eTrex Vista HCx

## COLLABORATIONS

- Department of Geography, University of Kentucky, USA
- Chair of Urban Planning and Settlement Processes, Faculty of Architecture, Wrocław University of Technology, Poland
- Department of Geography, Faculty of Science, University of Sarajevo, Bosnia and Herzegovina

## CONTACT PERSON

**Dr Milka Bubalo-Živković**, Full Professor; milka.bubalo.zivkovic@dgt.uns.ac.rs; tel. +381214852838

# Nature Protection and Ecotourism Research Group

*Nature Protection, Sustainable Development, Ecotourism, Protected areas, Biosphere Reserves*

**N**ature Protection and Ecotourism Research group investigates the following topics: (1) Sustainable use of protected area resources; (2) Interpretation of natural and cultural phenomena and processes through education and (3) Sustainable development of ecotourism.

The basis of such an approach is the examination of the relationship between environment, protected areas and human beings. The encouragement of the positive impact and behaviour towards natural and protected areas in the process of resource usage and tourism development is the main objective of the research. Studies conducted by the Research group of nature protection and ecotourism insist on the conservation of landscapes, biodiversity, geodiversity and cultural heritage in protected areas.

Practical realization of the research results is achieved through: (1) Strategies, plans and feasibility studies; (2) Consulting services and 3) Education in the field of the tourism development in natural and protected areas as well as ecotourism.



## SELECTED PROJECTS

**Title:** *Wetland Conservation Danube-Drava-Mura Transboundary Biosphere Reserve DDM*

**Type:** International

**Duration:** 2012-2013

**Contact person:**

Dr Vladimir Stojanović, Full Professor

**Title:** *European Charter for Sustainable Tourism in Protected areas (Special Nature Reserve Gornje Podunavlje – Strategy for Sustainable Tourism, Action plan, Application report)*

**Type:** International

**Duration:** 2013-2014

**Contact person:**

Dr Vladimir Stojanović, Full Professor

**Title:** *Jegrička Nature Park – monograph (Eco-friendly Water Management Against Extreme Weather Conditions in the Cross-border Area, Interreg – IPA CBC, Hungary Serbia)*

**Type:** International

**Duration:** 2018-2019

**Contact person:**

Dr Lazar Lazić, Full Professor

**Title:** *Local Action Plan for Karadjordjevo Special Nature Reserve (Transboundary Management Programme for the Planned 5-country Biosphere Reserve „Mura-Drava-Danube”, Interreg Danube Transnational Programme)*

**Type:** International

**Duration:** 2019

**Contact person:**

Dr Vladimir Stojanović, Full Professor

## COLLABORATIONS

- Institute for Nature Conservation of Vojvodina Province
- Public Company „Vojvodinašume“
- Public Water Management Company „Vode Vojvodine“
- WWF Serbia

## SELECTED EQUIPMENT

- Various photographic equipment

## CONTACT PERSON

**Dr Vladimir Stojanović**, vladimir.stojanovic@dgt.uns.ac.rs, +381 21 485 2834

# Geography Teaching Methodology Research Group

*Geography teaching, Teaching innovations, Teachers*

The group does the research in different segments of teaching methodology in geography: methods and techniques of work, teaching principals, contemporary teaching, innovations in teaching, activation in teaching and historical development of geography teaching, teaching objects and tools, professional development of the teachers, etc.

Members of the group are, within the Society of Subject Didactics, members of the geography subject section and participated in several national and international conferences on the teaching methodology topic.

Group members are as well involved in the work of the Institute for the Promotion of Education as assessors for the professional evaluation of the quality of manuscripts of textbooks and monitoring and evaluation of the results of using textbooks in educational work. Group members are engaged:

- as textbooks reviewers for the subject of geography for primary and secondary school
- in giving an expert opinion to the National Education Council
- as the members of Licensing Commission at the Provincial Secretariat for Education
- as the proofreaders of professional and scientific works.



## COLLABORATIONS

- The Department of geography teaching methodology, Department of Geography, Maribor, Slovenia
- Geography teachers, Palacky University of Olomouc, Faculty of Science, Section of Human Geography
- The Aristotle University Thessaloniki, Faculty of Education, School of Primary Education

## SELECTED PROJECTS

**Title:** *Contemporary geography - advancement in teaching and access to geographical content and the strengthening of teachers' professional capacities*

**Type:** national (No 591)

**Duration:** 2014-2015

**Contact person:**

Dr Andjelija Ivkov Dzigurski

**Title:** *Game as the motivation factor in geography teaching*

**Type:** national (No 910)

**Duration:** 2014-2018

**Contact person:**

Dr Andjelija Ivkov Dzigurski

**Title:** *Mind maps as an innovative tool for adoption of concepts and rules while learning geography content*

**Type:** national (No 810)

**Duration:** 2019-2021

**Contact person:**

Dr Andjelija Ivkov Dzigurski

**Title:** *Integrated teaching of natural sciences and ICT through various forms of work in primary school, with special emphasis on inclusion*

**Type:** national (No 179)

**Duration:** 2019-2021

**Contact person:**

Dr Andjelija Ivkov Dzigurski



## CONTACT PERSON

**Dr Andjelija Ivkov Dzigurski**, Full Professor; andjelija.ivkov@dgt.uns.ac.rs; tel. +381214852834

# Cultural Tourism and ICT Research Group

*Cultural tourism, information and communication technology, digital transformation, heritage management, experiences*

Cultural tourism and cultural heritage is an important research area, since 40% of international tourists are motivated by cultural motives. This is why the main objective of our research group is to contribute to the theory in cultural tourism and generate some practical implications in this field through collaboration with various cultural tourism stakeholders. Our research group deals with different aspects of cultural tourism and cultural heritage from sustainable management, branding and marketing of cultural heritage sites, psychological and social aspects of cultural tourism such as motivation, behavior and experiences of cultural tourists, identification of the cultural tourist's profile, evaluation and conservation of cultural heritage as well as measuring the impacts of the European Cultural Capitals, past and present. The special focus of our research activities is also on rapidly growing Information and Communication Technology (ICT) solutions in cultural tourism which becomes of great importance in cultural industry. From small art galleries to internationally recognized museums, local craftsmen to global creative industry, rural and peripheral areas to world class destinations, the use of ICT has become paramount for the effective creation and delivery of experiences and management in cultural tourism. This research group equally treats both poles of the cultural tourism market - consumers and tourism providers. ICT has imposed a particularly large impact on the tourism demand side where consumers have become empowered with various ICT solutions closely integrated into all travel phases. Ultimately, ICT has revealed unique opportunities that reshaped the nature of cultural tourist experience and the new smart tourism agenda will lead further diffusion and globalization of cultural tourism, enabling digital transformation, that is, different alternations, enhancements and reinvention of the original postulates of cultural tourism.



## CONTACT PERSON

**Dr Tatjana Pivac**; [tatjana.pivac@dgt.uns.ac.rs](mailto:tatjana.pivac@dgt.uns.ac.rs); tel. +381641759344

## SELECTED PROJECTS

**Title:** *Strengthening Capacities for Tourism Changes in WB – Building Competences for Quality Management of Heritage and Cultural Tourism - CulturWB*

**Type:** Erasmus+ KA2 CBHE

**Duration:** 2016-2019

**Contact person:** Prof. Tatjana Pivac

**Title:** *Digitisation and Culture for new generations (DiCultYouth)*

**Type:** Erasmus+ KA2 Strategic Partnership for Youth

**Duration:** 2018-2020

**Contact person:** Prof. Miroslav Vujičić

**Title:** *„Strengthening of WB Identity by Exploiting Cultural Cross-roads to Brand New Tourist Destinations – SeeCulture“*

**Type:** Regional Cooperation Council grants

**Duration:** 2018-2019

**Contact person:** Prof. Miroslav Vujičić



## COLLABORATIONS

- Sarajevo Meeting of Cultures (Sarajevo, B&H)
- Breda University of Applied Science (BUAS, The Netherlands)
- Department of Geography, Tourism and Territorial Planning, University of Oradea (Romania)

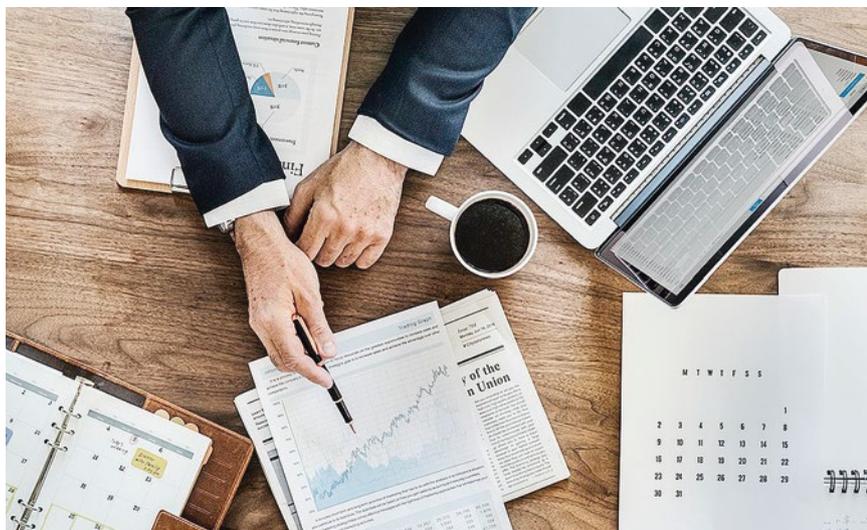
## SELECTED EQUIPMENT

- SPSS Statistics is a software package
- ArcGIS Educational License

# Management and Marketing in Tourism Research Group

Management, marketing, tourism, quantitative research, qualitative research

**M**anagement and Marketing in Tourism Research Group deals with quantitative and qualitative research of different segments of tourist demand and supply. Research work includes the following fields of activity: research of domestic and foreign tourist market, presentation of case studies, development of destination strategy, analysis of market performance of companies and competitiveness, preparation of project applications and management projects, planning of promotion of companies and tourist organizations, implementation of digital marketing in tourism, development brand, marketing plan development, and marketing research in tourism. The research group consists of full-time and associate professors of the Department of Geography, Tourism and Hotel Industry at the Faculty of Natural Sciences. They have many years of experience in scientific and cross-border cooperation projects.



## SELECTED PROJECTS

**Title:** *Regeneration of industrial heritage in the context of sustainable tourism development and profiling of new thematic routes in Vojvodina (project number: 114-451-1485 / 2014),*

**Type:** scientific project

**Duration:** 2014/2015 year

**Contact person:** Dr Nevena Ćurčić

**Title:** *Digital guide through the tourist attractions of Vojvodina (project number: 142-451-3727 / 2017)*

**Type:** cooperation project

**Duration:** 2017/2018

**Contact person:** Dr Mirjana Mikalački

**Title:** *European integrations and social and economic changes in Serbian economy on the way to the EU (project number 47009)*

**Type:** scientific project

**Duration:** 2011-2019

**Contact person:**  
Dr Olja Munitlak Ivanović

## COLLABORATIONS

- Tourist Organization of Vojvodina
- Austrian Development Cooperation
- Center for Strategic Economic Research "Vojvodina-CESS"



## CONTACT PERSON

**Dr Nevena Ćurčić;**  
nevena.curcic@dgt.uns.ac.rs;  
tel. +381-64-221-9795

# Rural Tourism Research Group

*rural tourism, rural development, rural tourism destinations, rural areas*

Rural tourism is one of the priorities in tourism development in Serbia and considered to be one of the appropriate instruments for the revitalization of rural areas and ensuring a sustainable future.

Rural Tourism Research Group investigates following topics: use of natural and cultural resources in rural tourism, sustainable development of rural tourism destinations, competitiveness of rural tourism destinations, strategy of tourist destinations (marketing, human resources, policy of planning and destination development, management of service quality etc.), perspectives of the development of rural tourism in Serbia and surrounding countries.

Other activities: strengthening cooperation with other researchers and institutions dealing with rural tourism issues, in order to exchange positive experiences and joint application on international projects, participating in workshops, providing consulting services, and organizing educational seminars.

Results of the research are published in strategies, action plans, feasibility studies, monographs, scientific papers etc.



## SELECTED PROJECTS

**Title:** "Effects of development rural tourism in Vojvodina", Provincial Secretariat for Higher Education and Scientific Research.

**Type:** National

**Duration:** 2017-2018

**Contact person:** Dr Kristina Košić

**Title:** "Preparation of two regions, (1) Srem and (2) Sumadija and Pomoravlje of the establishment of the DMO, definition of tourist space and technical support for entities that sell destinations in targeted regions", Swiss Agency for Development and Cooperation SDC.

**Type:** International

**Duration:** 2018

**Contact person:** Dr Kristina Košić

**Title:** "Development of water tourism on waterways connecting Hungary and Serbia", INTERREG-IPA Cross-border Cooperation programme Hungary-Serbia", HUSRB/1602/31/0204,

**Type:** International

**Duration:** 2018-2019

**Contact person:** Dr Kristina Košić

## COLLABORATIONS

- Regional Development Agency Srem
- Provincial Secretariat for Economy and Tourism
- Geographical institute „Jovan Cvijić“ of Serbian Academy of Sciences and Art, Belgrade



## CONTACT PERSON

**Dr Kristina Košić**, Associate Professor;  
kristina.kosic@dgt.uns.ac.rs;  
tel. +381214852835

# Wildlife and Hunting Ground Management Research Group

*Hunting tourism, Hunting ground management, Wildlife management, GIS in hunting management*

The research group deals with the development of wildlife and hunting tourism. Some of the topics include hunting tourism, game keeping and hunting management plans. Great attention is paid to sustainable methods of hunting management and GIS application with the use of new technologies in hunting. Part of the research also covers the field of habitat evaluation and determination of hunting ground capacity which is a necessary part of game management. Research group also, deals with consulting and plan development within the hunting management. The group focuses on promoting sustainable use of natural resources, as well as promotion of hunting culture and values.



## CONTACT PERSON

**Dr Zoran Ristić**; zoran.ristic@dgt.uns.ac.rs; +381214852786

## SELECTED PROJECTS

**Title:** *Monitoring of health conditions of game and introducing new biotechnological methods of detecting contagious zoonosis – analysis of risk for population, domestic and wild animals health and environment contamination*

**Type:** National

**Duration:** 2011-2014

**Contact person:** Dr Zoran Ristić

**Title:** *Determination of real growth and trophy structure of roe deer population in hunting grounds in Vojvodina*

**Type:** Provincial

**Duration:** 2013-2014

**Contact person:** Dr Zoran Ristić

**Title:** *Determination of genetic structure, real growth, trophy structure and spatial dispersion of roe deer in hunting grounds in Vojvodina*

**Type:** Provincial

**Duration:** 2014-2015

**Contact person:** Dr Zoran Ristić

## COLLABORATIONS

- Hunting association of Serbia (Vojvodina, Central Serbia)
- Hunting tourism agencies and hunting clubs
- National parks
- PC (Vojvodinašume and Srbijašume)
- Novi Sad Fair



# Gastronomy Research Group

*gastronomy, catering, food, beverage, diet, quality, F&B management, hospitality*

**G**astronomy is an interdisciplinary science. For this reason, the Gastronomy Research Group is engaged in hospitality and catering services from different aspects, such as quality (sensory, nutritive, microbiological, technical-technological), food safety, as well as popularization and creation of authentic offers. The focuses of the research are all agricultural and commercial facilities that participate in the production chain, distribution and sale of food and beverages (from a field to a dining table). The research focuses on both large and small commercial and subsidized catering facilities (a la carte restaurants, canteens) and encompasses all segments of management. Through the research, the aim is to obtain data on problems that arise in the market in food preparation (procurement, storage, proper preparation, proper heat treatment) and service (experience, pairing food and beverage), as well as on the most effective ways to overcome the problems in order to achieve successful business in tourism and hospitality industry.



## SELECTED PROJECTS

**Title:** HACCP

**Type:** Scientific and practical

**Duration:** 2012-2019

**Contact person:**

Dr Dragan Tešanović

**Title:** *Agricultural, food and gastronomic products contributing to development of tourism in Vojvodina aimed at authentic, healthy and safe food*

**Type:** Scientific

**Duration:** 2017-2018

**Contact person:** Dr Bojana Kalenjuk

**Title:** *Pairing food and wine*

**Type:** Practical

**Duration:** 2017-2019

**Contact person:**

Dr Dragan Tešanović

## COLLABORATIONS

- Metropolitan University, Manchester, UK
- Culinary Arts Institute, Varna, Bulgaria
- Biotechnical Educational Centre, Ljubljana, Slovenia



## CONTACT PERSON

**Dr. Bojana Kalenjuk**, Assistant professor; bojana.kalenjuk@dgt.uns.ac.rs; +38121450602

## SELECTED EQUIPMENT

- Gastronomic laboratory with up-to-date equipment

# Centre for Languages for Specific Purposes

*Applied linguistics, pragmatics, contrastive linguistics, LSP, EAP*

The Centre has been established to foster research in the fields of applied linguistics, pragmatics, contrastive linguistics, corpus linguistics, practice and theory of teaching and learning languages for specific purposes, meta-discourse analysis, multimodal discourse analysis, terminology and translation topics, language and culture interface, etc.

Our main research topics include investigating the experience of learning languages in the specific context – professional and/or academic, language learning strategies and teaching methodology, all aspects of the language of science and the language of tourism and hospitality, developing specific communicative competences in LSP, evaluating theoretical positions in applied linguistics and LSP, cultural aspects of learning/teaching LSP, needs analysis.

Other professional interests include continuous improvement and development of special language curricula and the elements of the teaching process at tertiary level in accordance with the CEFRL and the Bologna Process. Finally, the Centre also facilitates establishing cooperation with other similar centres in our country and internationally.



## MEMBERS

- Dr Ljiljana Knezević, Assistant Professor
- Dragana Vuković Vojnović, MA Philology, Lecturer
- Stanka Radojičić, MA, Lecturer
- Marija Nićin, Lecturer
- Dejan Knezević, Lecturer

## CONTACT PERSON

**Dragana Vuković Vojnović;** dragana.vukovic.vojnovic@dgt.uns.ac.rs;  
tel. +381 21 485 2844

## SELECTED PROJECTS

**Title:** *Using Dictionaries in Teaching English for Specific Purposes in Tertiary Education*, Project No. 142-451-3684/2017- 01/01

**Type:** National

**Duration:** 2017-2018

**Contact person:** Dr Ljiljana Knezević

## COLLABORATIONS

- University of Eastern Finland, Finland
- University of Minho, Portugal





DEPARTMENT OF  
**CHEMISTRY, BIOCHEMISTRY  
AND ENVIRONMENTAL PROTECTION**



FACULTY OF  
SCIENCES  
1969–2019

# Coordination Compounds – Design, Synthesis, Characterization, and Assessment of Practical Application

*Complexes; Schiff bases; Crystal structure; Biological activity; OLED materials*

Scientific research of this group involves the syntheses, physicochemical and structural characterization of novel coordination compounds of d-metals with different classes of new O-, N-, S-, Se- and P-donor ligands. Among these ligands, the emphasis is on the Schiff bases and derivatives of pyrazole due to their expected biological potential (e.g. antioxidant, antimicrobial, antiproliferative activity). Besides, our aim is to explore other possible practical applicability of the newly obtained compounds like photoluminescence, electrochemical or biosensoric potential, etc. One of the tasks is to optimize the synthetic route in order to obtain the compounds in the form of single crystals suitable for X-ray structure analysis and to increase the yield and purity. By comparison of structures of new compounds and their physicochemical and biological properties, the relationships between the structures and the selected function are studied. This process involves the utilization of Cambridge Structural Database with data to reveal the structural trends in investigated classes of compounds. Besides DFT calculations are carried out to find the correlations between the experimental data and up-to-date theoretical approaches.

## SELECTED EQUIPMENT

- Thermoanalytical equipment TA Instruments SDT Q600;
- Spectrophotometer T80+UV/vis PG Instruments Ltd;
- Magnetic balance Magway MSB-Mk1;
- Conductivity Meter Jenway 4510;
- X-ray crystallography equipment GEMINI S Oxford Diffraction.



## COLLABORATIONS

- University of Szeged, Faculty of Medicine, Department of Medical Microbiology and Immunobiology, Dóm tér 10, Szeged H-6720, Hungary – Investigation of biological potential of the obtained compounds.
- National Centre for Scientific Research “Demokritos”, Institute of Nanoscience and Nanotechnology, Terma (End) Patriarhou Gregoriou Str, PO Box 60228 Aghia Paraskevi, 15310 Athens, Greece – Investigation of photoluminescence of the ligands and obtained complexes and assessment of possible application as OLED materials.



## SELECTED PROJECTS

**Title:** *Synthesis, structural and biological characterization of new complex compounds*

**Type:** National project

**Duration:** 2006-2010

**Contact person:** Prof. Dr Vukadin Leovac and Prof. Dr Ljiljana Vojinović Ješić

**Title:** *Design, synthesis, characterization and assessment of practical applications of coordination and organometallic compounds*

**Type:** National project

**Duration:** 2006-2011

**Contact person:** Prof. Dr Katalin Mészáros Szécsényi, Prof. Dr Ljiljana Vojinović Ješić and Dr Mirjana Radanović

**Title:** *Synthesis and characterization of metal complexes with ligands with biological activity*

**Type:** Bilateral project of Provincial Secretariat for Science and Technological Development of Vojvodina

**Duration:** 2011-2015

**Contact person:** Dr Vukadin Leovac and Prof. Dr Ljiljana Vojinović Ješić

## CONTACT PERSONS

**Dr Katalin Mészáros Szécsényi**, Full Professor. mskz@uns.ac.rs, tel: +381214852740

**Dr Mirjana Radanović**, Assistant Professor, mirjana.lalovic@dh.uns.ac.rs, tel: +381214852750

<https://www.dh.uns.ac.rs/kompleksna-jedinjenja-dizajn-sinteza-karakterizacija-procena-practicne-primene/>

# Research Group for Spectroscopic Examination of Intermolecular Interactions and Adsorption Processes

*FTIR spectroscopy, Hydrogen bonding, Adsorption*

The research of this group is focused on three areas:

- The first and basic research of this group is focused on spectroscopic, thermodynamic and theoretical investigation of the hydrogen bonding of N-substituted amides and biologically active compounds.
- Testing the adsorption-diffusion characteristics of activated carbon, mesoporous silicates and other sorbents in the presence of amides as a model of organic matter of lower molar mass.
- The third research area presents FTIR spectroscopic investigation of soils, the development of new rapid and non-destructive methods for soil analysis.

## SELECTED EQUIPMENT

- FTIR/NIR Spectrometer Nexus 670, Thermo Nicolet,
- AutosorbiQ Surface Area Analyzer (Quantochrome Instruments, USA)
- UV/VIS Spectrometer (UV -1800 EU Instruments)
- Densitometer DE 40 Mettler Toledo, Japan

## COLLABORATIONS

- Faculty of Technology and Metallurgy, University of Belgrade
- Institute Biosense, University of Novi Sad
- Faculty of Engineering, University Duisburg-Essen

## SELECTED PROJECTS

**Title:** *The study of the synthesis, structure and activity of organic compounds of natural and synthetic origin*

**Type:** Basic research project

**Duration:** 2010-2019

**Contact person:**

Saša Drmanić, Faculty of Technology and Metallurgy, University of Belgrade

**Title:** *The influence of the water matrix and the physico-chemical properties of the relevant organic xenobiotics on ecotoxicity and behavior in the selected water purification processes*

**Type:** Basic research project

**Duration:** 2010-2019

**Contact person:**

Ivana Ivančev-Tumbas, Faculty of Sciences, University of Novi Sad



## CONTACT PERSON

**Branislav Jović**, Associated Professor; [branislav.jovic@dh.uns.ac.rs](mailto:branislav.jovic@dh.uns.ac.rs); +381 21 4852731

# Design and Biological Investigation of Novel Nanoparticles and Nanoformulations

*Nanoparticles, nanoformulations, nanocomposites, nanodrug delivery, agronanochemistry*

Research group is focused on multidisciplinary experimentation and investigation in basic and applied nanoscience. The first scope involves synthesis and physico-chemical characterization of novel nanoparticles and novel fullerene-based nanoformulations of commercial antineoplastics as well as of other active components. Biological investigation of novel nanoparticles and nanoformulations are conducted on *in vitro* models of human malignant cell lines, as well as on different *in vivo* animal models, complemented with monitoring of enzymes activity, gene expression and investigation of genotoxicity and pathology. Group also deals with synthesis and physico-chemical characterization of nanomaterials with potential photocatalytic activity and also nanomaterials with potential application in agriculture.



## COLLABORATIONS

- University of Belgrade, Institute for Nuclear Sciences "Vinča", Serbia
- University of Belgrade, Institute of Molecular Genetics and Genetic Engineering, Serbia
- University of Novi Sad, Medical Faculty, Oncology Institute of Vojvodina, Sremska Kamenica, Serbia



## SELECTED PROJECTS

**Title:** *Functional, functionalised and enhanced nanomaterials*

**Type:** Ministry of Education, Science and Technological Development of the Republic of Serbia.

**Duration:** 2011–2019

**Head of the Project:** PhD Zlatko Rakočević.

**Subproject leader:** PhD Aleksandar Đorđević, Full Professor

**Title:** *Cancer nanomedicine – from the bench to the bedside*

**Type:** CA COST Action CA17140, 2018–2022

**Head of the UNS unit:** PhD Aleksandar Đorđević.

**Title:** *Application of new carbon nano formulations in order to increase the resistance of grape vines to water stress*

**Type:** Bilateral project Serbia-Montenegro.

**Duration:** 2019–2020

**Head of the Project:** PhD Milan Borišev.

**Title:** *Application of gold nanoparticles in order to decrease radioresistant potential of tumor cell lines*

**Type:** The Provincial Secretariat for Higher Education and Scientific Research.

**Duration:** 2014–2015

**Head of the Project:** PhD Aleksandar Đorđević.

## SELECTED EQUIPMENT

Gel permeation chromatography (*Viscotek GPCmax*) system with four detectors (*Triple Detector Array-TDA 305, UV Detector 2000*).

## CONTACT PERSON

**Dr Aleksandar Đorđević**, Full Professor; [aleksandar.djordjevic@dh.uns.ac.rs](mailto:aleksandar.djordjevic@dh.uns.ac.rs); tel: +38121458243, +38121454065  
<http://wwwold.dh.pmf.uns.ac.rs/nanobiomedicina/>

# Laboratory for the Synthesis of Natural Steroid Hormone Derivatives

*synthesis, androgens, estrogens, structural modifications*

Steroids are the compounds with good pharmacological capacity. Modifications of the steroidal skeleton can result in the development of novel synthetic derivatives with major biological response. The main goal of our research is the synthesis of new steroidal derivatives, starting from natural, primarily, androgenic and estrogenic hormones. Another important subject of our research is biological testing of synthesized compounds. In collaboration with colleagues from other research groups the testing of antihormonal and antitumor potentials is carried out. Our research group is open for cooperation in order to investigate further biological activity of the synthesized compounds.



## SELECTED PROJECTS

**Title:** *Synthesis, characterization and biological investigation of steroid derivatives and their molecular aggregates, Ministry of Education, Science and Technological Development of the Republic of Serbia*

**Type:** basic research

**Duration:** 2011-2019

**Contact person:** Dr Marija Sakač

## SELECTED EQUIPMENT

- Bruker Avance III 400 MHz NMR spectrometer
- Perkin-Elmer SpectrumTwo FTIR spectrometer
- Microwave Synthesis Sistem-CEM Discover BenchMate
- High-pressure laboratory autoclave Roth Karlsruhe (100 mL)

## COLLABORATIONS

- Laboratory of biochemistry and molecular biology, Department of Biology and Ecology, Faculty of Sciences, University of Novi Sad, Serbia
- Oncology Institute of Vojvodina, Faculty of Medicine, University of Novi Sad, 21204 Sremska Kamenica, Serbia

## CONTACT PERSON

**Dr Marija Sakač**, full professor; marija.sakac@dh.uns.ac.rs; tel: +381 21 4852772



# Research Group for the Synthesis of Natural Products and Medicinal Chemistry

*Antitumour agents, Styryl lactones, tiazofurin, analogues, cytotoxicity*

Basic research directed to the development of novel routes for the total synthesis of natural cytotoxic lactones and their analogues, as well as for the de novo synthesis of potential bioisosteres of antineoplastic C-nucleoside tiazofurin. In addition, the evaluation of in vitro anti-tumour activity of synthesized compounds toward the selected human neoplastic cell lines is currently under way.



## SELECTED EQUIPMENT

- Bruker 400 MHz NMR spectrometer,
- BUCHI Laboratory Vacuum System,
- BUCHI 510 Melting Point apparatus,
- JULABO FT902 Immersion Cooler.



## COLLABORATIONS

- Oncology Institute of Vojvodina, Sremska Kamenica (evaluation of antitumour activity),
- Institute for Oncology and Radiology of Serbia, Belgrade (detection of apoptosis),
- Department of Chemistry ICTM, Belgrade (HR mass spectra, elemental microanalysis).

## SELECTED PROJECTS

**Title:** *Synthesis and biological testing of new mimics or derivatives of selected cytotoxic lactones, antitumor agent tiazofurin and natural naphthenic acids.*

**Type:** Basic research

**Duration:** 2011-2019

**Contact person:** Velimir Popsavin  
(velimir.popsavin@dh.uns.ac.rs)

**Title:** *Synthesis and biomedical evaluation of anticancer agents obtained from naturally abundant monosaccharide*

**Type:** Project of strategic interest for AP Vojvodina.

**Duration:** December 2012 – December 2013

**Contact person:** Mirjana Popsavin  
(mirjana.popsavin@dh.uns.ac.rs)

**Title:** *Synthesis and application of novel chemotherapeutics based on natural products and metal complexes*

**Type:** Strategic project of the Serbian Academy of Science and Arts.

**Duration:** 2019-2021

**Contact person:** Velimir Popsavin  
(velimir.popsavin@dh.uns.ac.rs)



## CONTACT PERSON

**Dr Velimir Popsavin**, Full Professor; velimir.popsavin@dh.uns.ac.rs; tel: +381 21 4852768

# Laboratory for Investigation of Natural Resources of Pharmacologically and Biologically Active Compounds (LAFIB)

*natural products; medicinal plants; chemical characterisation; biological activity*

LAFIB's main research directions are:

1. Isolation and chemical characterization of biomolecules from medicinal and edible plants, spices, plant extracts, commercial phytopreparations, essential oils and other products;
2. Determination of biological and pharmacological activities of biomolecules from medicinal and edible plants, spices, plant extracts, commercial phytopreparations, essential oils and other products.

Research conducted at LAFIB is of both fundamental and applied nature. Fundamental research is related to plant chemotaxonomy and the influence of various ecological factors on plant chemical composition. Also, fundamental research includes mechanistic studies of the role of plant biomolecules in complex biochemical pathways in animal cells, such as oxidative stress defence, inflammation, cancerogenesis. Applied research is focused on the possible utilization of plant biomolecules, plant extracts and phytopreparations in pharmaceutical, food and cosmetic industries.

Thanks to successful participation in many national and international projects, LAFIB obtained the state-of-the-art laboratory equipment which is the basis for conducting the high quality scientific research.

## SELECTED EQUIPMENT

- High-performance liquid chromatograph with DAD detector (Agilent Technologies 1100 Series);
- High-performance liquid chromatograph Agilent Technologies 1200 Series coupled with DAD detector and 6410 TripleQuad mass detector with electrospray ion source (ESI);
- Centrifugal partition chromatography system (Waters semi-preparative liquid chromatograph, coupled with Kromaton centrifuge);
- Multiskan Spectrum microplate reader (Thermo Scientific);
- Cell culture lab.



## COLLABORATIONS

- Biological Research Center of Hungarian Academy of Sciences, Szeged, Hungary;
- University of Regensburg, Institute of Pharmacy, Department of Pharmaceutical Biology, Regensburg, Germany;
- Prince of Songkla University, Faculty of Sciences, Hat Yai, Thailand.

## CONTACT PERSON

**Prof. Neda Mimica-Dukić**, neda.mimica-dukic@dh.uns.ac.rs, tel: +381 21 4852757  
<https://www.dh.uns.ac.rs/lafib/english/>



## SELECTED PROJECTS

**Title:** *Biologically active natural products as potential sources of new drugs and dietary supplements*, project number: OI 172058

**Type:** Fundamental Project financed by Ministry of Education, Science and Technological Development of the Republic of Serbia

**Duration:** 2011-2019

**Contact person:**  
Prof. Neda Mimica-Dukić

**Title:** *Biologically active components and medicinal potential of functional foods grown in Vojvodina*, 114-451-2149/2016-03

**Type:** Research project financed by Provincial Secretariat for Science and Technological Development, Autonomous Province of Vojvodina, Serbia

**Duration:** 2016-2019

**Contact person:**  
Prof. Neda Mimica-Dukić



# Laboratory for Green Chemistry & Ionic Liquids

*Ionic liquids; Green chemistry; Synthesis; Properties; Molecular dynamics*

The group deals with the synthesis, characterization, toxicity and application of ionic liquids in the analytical chemistry and separation techniques, then investigates the interactions, optimization and application of new electrolytes with improved safety in a new generations of lithium ion batteries, agriculture, food and pharmaceutical industry, as well as the reactions of association and complex formation in ionic liquids. Group members implemented several bilateral international projects in the field of ionic liquids and green chemistry and are open to any new scientific cooperation and challenges.



## SELECTED PROJECTS

**Title:** *Sustainable and green chemistry approach for environmental friendly analytical methods and energy storage*

**Type:** Scientific project

**Duration:** 2011-2019

**Project leader:**

Prof. Dr Slobodan Gadžurić

**Title:** *New liquid formulations for the repair of the arable land structure and their impact on the growth and yield of selected plant species of importance for the sustainable development of the Autonomous Province of Vojvodina*

**Type:** Scientific project

**Duration:** 2018-2019

**Project leader:** Prof. Dr Milan Vraneš

**Title:** *Optimization of industrial and technological processes using solvents with improved safety*

**Type:** Scientific bilateral French-Serbian project

**Duration:** 2016-2017

**Project leader:**

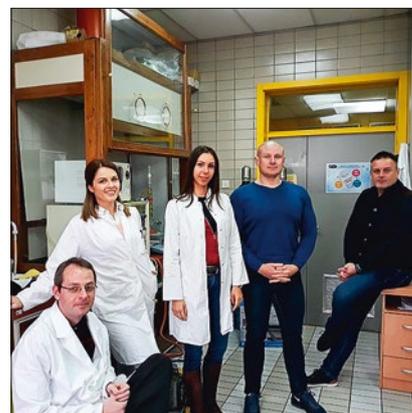
Prof. Dr Slobodan Gadžurić

## SELECTED EQUIPMENT

The group has valuable laboratory equipment necessary for analytics, characterization, synthesis and investigation of various newly synthesized substances and materials such as: HPLC, UV/VIS spectrophotometer, electrochemical measurement device VOLTA LAB, densimeter, conductometer, viscosimeter.

## COLLABORATIONS

- Faculty of chemistry and chemical technology, Ljubljana, Slovenia (Prof. Dr Marija Bešter Rogač)
- Laboratory for spectroscopy, University of Lille, Lille, France (Prof. Dr Abdenacer Idrissi)
- Laboratory for ionic liquids, University of Aveiro, Aveiro, Portugal (Prof. Dr Mara G. Freire)



## CONTACT PERSONS

**Prof. Dr Milan Vraneš & Prof. Dr Slobodan Gadžurić;**

milan.vranes@dh.uns.ac.rs; slobodan.gadzuric@dh.uns.ac.rs; tel: +381 21 485 2741; +381 21 485 2744

# Research Group of Environmental Quality Improvement – Development of the Method of Monitoring and Removal of Biological Active Substances

*Advanced Oxidation Processes, Photodegradation, Pesticides, Drugs, Mycotoxins*

The group deals with analytics and the development of efficient, cheap, and green methods of degradation of pesticides, pharmaceutically active components, ionic liquids, paints, and mycotoxins. Great attention is paid to the optimization of energy, construction of various types of reactors, and environmentally acceptable methods of advanced oxidation processes for the removal of biologically active pollutants from wastewater. The efficiency of degradation of selected pesticides (herbicides, fungicides, and insecticides), pharmaceutically active components (beta-blockers, diuretics, antidepressants, antihypertensives, and antibiotics), as well as mycotoxins (aflatoxins and fumonisins), which cannot be removed by traditional biological and chemical treatments are research topics. Also, newly-synthesized nanopowders of improved spectral properties, i.e. higher solar sensitivity ( $\text{TiO}_2$  doped with different elements, composite oxides of  $\text{TiO}_2$ , nanohybrid  $\text{TiO}_2$ /carbon nanomaterials (powder and thin film), ZnO thin films,  $\text{TiO}_2$  modified with fullerene) are objectives of our group. The robustness of methods, as well as the cytotoxic effect of the resulting intermediates are studied.

## SELECTED EQUIPMENT

- Liquid chromatograph UFLC Shimadzu Nexera™ with diode array detector (UV/VIS), fluorescence detector and conductivity detector;
- T80 + UV/VIS spectrophotometer;
- ultra pure water, ANDRONA SIA, mode: Crystal ex; and
- batch and flow reactors for the removal of organic pollutants and other necessary small equipment.



## COLLABORATIONS

- Research Group of Environmental Chemistry, Institute of Chemistry, University of Szeged, Hungary;
- National Institute for Research and Development in Electrochemistry and Condensed Matter, Timisoara, Romania; and
- Center for Solid State Physics and New Materials, Institute of Physics, and Department of Catalysis and Chemical Engineering, Institute of Chemistry, Technology and Metallurgy, University of Belgrade.



## SELECTED PROJECTS

**Title:** *Development of Methods of Monitoring and Removal of Biologically Active Substances Aimed at Improving the Quality of the Environment*

**Type:** national

**Duration:** 2011-2019

**Contact person:**

Dr Biljana Abramović, Full Professor

**Title:** *Comparison of photocatalytic efficiency of  $\text{Zr/Fe}_2\text{O}_3$  and  $\text{Si/ZrO}_2$  nanopowders in degradation of biologically active substances present in the environment using simulated solar light*

**Type:** national

**Duration:** 2017-2018

**Contact person:**

Dr Biljana Abramović, Full Professor

**Title:** *Optimization of Cost Effective and Environmentally Friendly Procedures for Treatment of Regional Water Resources (OCEEFPTRWR)*

**Type:** Hungary-Serbia IPA Cross-border Co-operation Programme

**Duration:** 2010-2011

**Contact person (Leader):**

Dr Biljana Abramović, Full Professor

## CONTACT PERSON

**Prof. Dr Biljana Abramović**, biljana.abramovic@dh.uns.ac.rs, tel: +381 21 485 2753

<https://www.dh.uns.ac.rs/unapredenje-kvaliteta-zivotne-sredine-razvoj-metoda-pracenja-i-uklanjanja-bioloski-aktivnih-supstanci/>

# Environmental Protection Research Group

*environmental chemistry, environmental monitoring, water treatment, contaminated sites remediation, risk assessment*

The Environmental Protection Research Group (EPRG) has more than 40 years of experience in the field of environmental science and technology with expertise in environmental monitoring, environmental chemistry (transport processes and physical-chemical interactions of organic and inorganic contaminants and microplastic), remediation technologies (solidification/stabilization, electrokinetic remediation, bioremediation, phytoremediation), wastewater treatment technologies, drinking water treatment technologies (e.g. arsenic and NOM removal), risk assessment (water-sediment systems, contaminated sites, bioavailability of organic pollutants) and eco-management (introduction of EU WFD and IPPC Directives to Serbia). The research group has participated in more than 100 scientific and professional projects - more than 30 national and international projects and 80 projects for the needs of industry. In addition to its educational and scientific activities, EPRG also carries out routine analysis of environmental samples in the accredited Laboratory for environmental chemical analysis "Dr Milena Dalmacija" according to ISO 17025.



## SELECTED EQUIPMENT

- GC/MSD (Agilent technologies 7890A/MSD 5975C);
- GC/ $\mu$ ECD/FID (Agilent technologies 6890N);
- ICP-MS/HPLC (Agilent Technologies 7700 Series, HPLC Agilent Technologies 1260 Infinity);
- IC (ICS 3000 Dionex); Accelerated solvent extractor (Thermo Scientific Dionex ASE 350).

## COLLABORATIONS

- University of Szeged, Hungary
- IWA – International Water Association
- Fraunhofer-Gesellschaft, Germany
- Water management companies ("Vode Vojvodine") and water supply companies (waterworks in Belgrade, Novi Sad etc.)



## SELECTED PROJECTS

**Title:** CECRA - Reinforcement of the laboratory for environmental protection at the Faculty of Science of the University of Novi Sad as a centre of excellence for environmental chemistry and risk assessment; FP6 project.

**Type:** international project

**Duration:** 2007-2009

**Contact person:**

Prof. Dr Božo Dalmacija

**Title:** MATCROSS - Development of new materials for application in environmentally friendly technologies for the cost-effective remediation of contaminated sites threatening cross-border regions; Hungary-Serbia IPA Cross border Co-operation Programme, Project No.: HUSRB/1002/214/188.

**Type:** international project

**Duration:** 2011-2013

**Contact person:**

Prof. Dr Srđan Rončević

**Title:** ARSENICPLATFORM - Arsenic and ammonium in drinking water: implementation of a cross-border platform for safe water; Hungary-Serbia IPA Cross border Co-operation Programme, Project No.: HUSRB/1002/121/075;

**Type:** international project

**Duration:** 2011-2013

**Contact person:**

Prof. Dr Jasmina Agbaba

## CONTACT PERSON

**Prof. Dr Božo Dalmacija**, Full Professor; environment@dh.uns.ac.rs; tel: + 381214852720; www.dh.uns.ac.rs/zastita-zivotne-sredine/

DEPARTMENT OF  
**MATHEMATICS AND INFORMATICS**



FACULTY OF  
SCIENCES  
1969–2019

# Optimization Methods for Big Data and Machine Learning

*big data, machine learning, numerical optimization, distributed optimization*

The increasing generation of vast amounts of data everyday from various sources, including, e.g., internet, social networks, astronomy observations, weather/climate and geo-spatial data, to name a few, creates many new opportunities for extraction of hidden knowledge, but it also poses several new challenges to data analytics in today's Big Data era. Efficient tools, frameworks, and methods for acquisition, modeling/representation, preparation, analysis, and visualization of Big Data remain important challenges. Among those, the design of new mathematical methods applicable for analysis of very large data sets is one of the pressing research challenges. Many data analysis problems, arising, e.g., in machine learning, can be formulated as nonlinear programming (optimization) problems defined over the available data sets. In this context, a key challenge is the development of new optimization algorithms which are able to process huge amounts of data in an admissible time, and which can scale well with the increase of the available computing power and communication bandwidth. Within our group, continuous optimization, in particular distributed and stochastic optimization are main research topics. Specifically, we developed parallel and distributed optimization algorithms parallel which can harness the inherent parallelism over a cluster/network of computing resources and which can adapt to various computing and communication infrastructures. The large volume of data which may not be feasible to manipulate in memory 'as a whole' further motivates stochastic and subsampled methods in this context. The problems we study range from numerical optimization methods for large scale problems, distributed first and second order methods on different types of computer networks, and stochastic optimization, to various applications like machine learning and prediction models in economics, finance and science. We carry out research on the development of state of the art numerical methods, their convergence analysis, convergence and convergence rate guarantees, as well as their efficient implementation in relevant software and frameworks for parallel and distributed processing. We are working on a number of projects which involve multidisciplinary teams and aim at providing practical solutions for several Big Data challenges in many disciplines, including finance, telecom, manufacturing, and bio-systems.



## SELECTED PROJECTS

**Title:** *Industrial-Driven Big Data as a Self-Service Solution - I-BiDaaS*

**Type:** H2020-ICT-2017-1, Research and Innovative Action

**Duration:** 2017-2020

**Contact person:** Dušan Jakovetić

**Title:** *Big Data Challenges for Mathematics - BIGMATH*

**Type:** H2020 Marie Skłodowska Curie action, European Industrial Doctorate

**Duration:** 2018-2022

**Contact person:** Nataša Krejić

**Title:** *C4IoT*

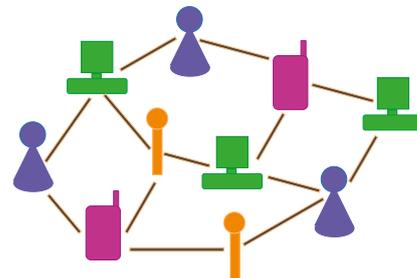
**Type:** H2020-SU-ICT-2018-2020 Innovation Action

**Duration:** 2019-2021

**Contact person:** Dušan Jakovetić

## COLLABORATIONS

- Tax Administration of the Republic of Serbia: Development of risk factors and machine learning algorithms for detecting tax evasion
- European Consortium for Mathematics in Industry Special Interest Group: Mathematics for Big Data
- Sioux Lime, Eindhoven: Deep learning methods



## CONTACT PERSONS

**Prof. Dr Nataša Krejić,**

natasak@uns.ac.rs

**Dr Dušan Jakovetić,**

dusan.jakovetic@dmi.uns.ac.rs

# Data Analysis Group

*Data Mining, Temporal Data Analysis, Complex Network Analysis, Smart Environments, Internet of Things*

Every day we are witnessing enormous growth of available data in all walks of life. Data gathered from sensors, cameras, log files and Web pages grow at an exponential rate, and it is becoming harder to extract information that can be useful in decision making. Our Group applies techniques for Data Mining, Temporal Data Analysis, as well as Complex Network Analysis to deal with such problems and to solve them.



Activities of the Group are tied to the fields of Data Science and Data Engineering with the motto “Data Science poses questions, and Data Engineering helps answer them.”

Backed by extensive research experience, the Group implemented numerous practical applications in the fields of economics, psychology, digital databases, medicine, and smart environments in cooperation with various institutions. This rich theoretical and practical experience of the Group opens many possibilities for further cooperation with different institutions.



## CONTACT PERSON

**Prof. Dr Mirjana Ivanović**; mira@dmi.uns.ac.rs; +381 21 4852852

## SELECTED PROJECTS

**Title:** *Intelligent techniques and their integration into wide-spectrum decision support*

**Type:** Ministry of Science, Technologies, and Development (Republic of Serbia)

**Duration:** 2011-2020

**Contact person:** Prof. Zoran Budimac

**Title:** *Humanmachine Harmony Emotional Intelligence Based on the Imitative Brain*

**Type:** China-Serbia bilateral project

**Duration:** 2018-2019

**Contact person:**

Prof. Mirjana Ivanović

**Title:** *CA15109, COSTNET - European Co-operation for Statistics of Network Data Science*

**Type:** COST Action

**Duration:** 2017-2020

**Contact person:**

Prof. Mirjana Ivanović of Serbia

## COLLABORATIONS

- Fudan University, Department of Information Management and Information Systems, Shanghai, China
- Hanyang University, Department of Computer Science and Engineering, Seoul, South Korea
- National Institute of Informatics (NII), Tokyo, Japan.

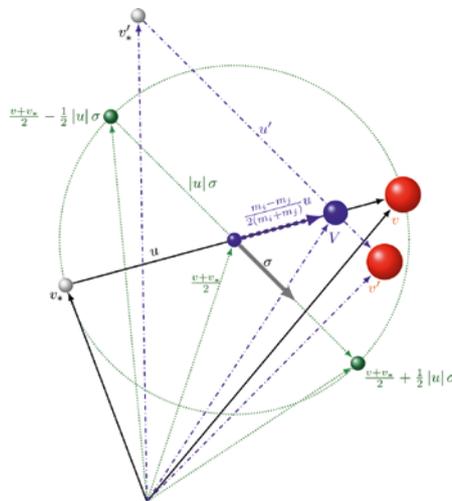
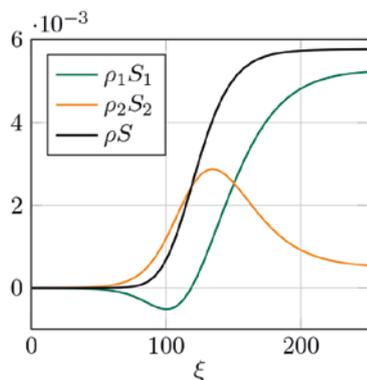
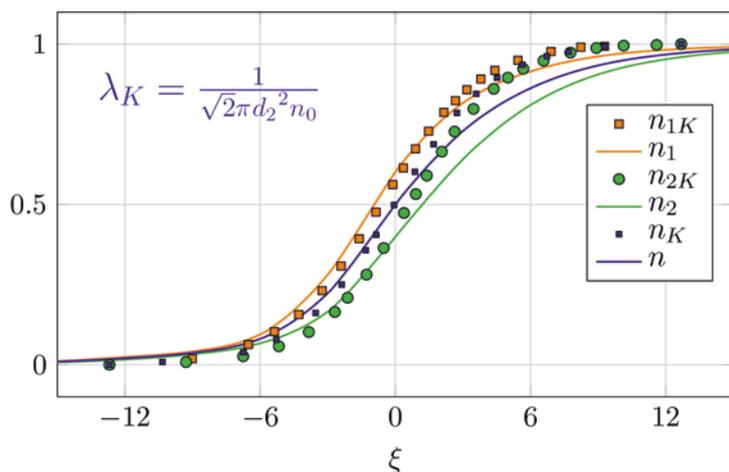
## MEMBERS OF GROUP

- Dr Mirjana Ivanović,
- Dr Vladimir Kurbalija,
- Dr Miloš Radovanović,
- Dr Miloš Savić,
- Brankica Bratić,
- Saša Pešić.

# Mathematical Modelling in the Kinetic Theory of Gases

*kinetic theory, non-equilibrium thermodynamics, mixtures of gases, polyatomic gases*

The research activities of our group focus on mathematical modelling and analysis in the collisional kinetic theory of monatomic and polyatomic gas mixtures, and on study of non-equilibrium phenomena arising in extended thermodynamics. On the one hand, we consider spatially homogenous system of Boltzmann equations for gas mixtures, and analyze its properties, such as existence and uniqueness of its solution, generation and propagation of its  $L^p$  norms, question of convergence towards equilibrium. At the same time, we study linearised problems in a non-homogenous setting and investigate existence of perturbed solution as well as its stability around global equilibrium. On the other hand, we analyze macroscopic models of mixtures from the standpoint of extended thermodynamics – a macroscopic theory which bridges the gap between macro and meso scale. It yields the models in the form of hyperbolic PDEs that are thermodynamically consistent. They are capable of capturing non-equilibrium processes, such as shock waves and detonations, with sufficient accuracy.



## SELECTED PROJECTS

**Title:** ON174016 "Mechanics of nonlinear and dissipative systems - contemporary models, analysis and applications"

**Type:** national project, funded by Ministry of Education, Science and Technological Development of the Republic of Serbia

**Duration:** from 2011

**Contact person:** Dr Srboľjub Simić

**Title:** PICS CNRS No. 278838 "Kinetic and hyperbolic models for gaseous mixtures and granular media",

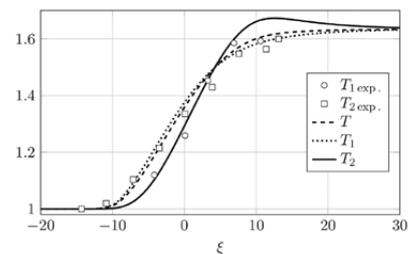
**Type:** bilateral project between France and Serbia

**Duration:** 2 years, 2018-2019

**Contact person:** Dr Milana Čolić, Dr Laurent Boudin

## COLLABORATIONS

- Université Paris Diderot, France (Laurent Desvillettes),
- University of Texas at Austin, USA (Irene M. Gamba)
- University of Minho, Portugal (Ana Jacinta Soares)



## CONTACT PERSONS

**Dr Srboľjub Simić;**  
srboľjub.simic@dmi.uns.ac.rs

**Dr Milana Čolić;**  
milana.colic@dmi.uns.ac.rs

# Center for Mathematical Research of Nonlinear Phenomena (CMRNP)

*functional analysis, linear and non-linear partial differential equations with singularities, numerical optimization*

The principal objectives of research performed at the Center is development of mathematical models and methods for solving nonlinear phenomena from other scientific disciplines, engineering or technology. Significant part of research activities is devoted to problems coming from real-life applications like big data challenges, machine learning, fluid dynamics, material science, pharmacology, signal processing etc. More precisely, the topics of interest and expertise are the following:

- Problems in mechanics and material science. We are developing models in theoretical mechanics and physical models mostly based on fractional calculus and equations. New viscoelastic materials as well as new sophisticated models of classical materials are particularly well described by fractional calculus. A lot of results in this area comes from problems in medicine, waves in different kinds of material and other real life problems.
- A lot of problems in physics and engineering are modeled by partial differential equations with singularities, such as some unknown property modeled by stochastic processes like the well known white noise, some non-homogeneity that induces a lack of regularity or some nonlinear interaction. Different tools from functional analysis, stochastic analysis, distributions and ultradistributions, microlocal analysis and pseudodifferential calculus are used to model these phenomena.
- Fluid dynamics problems. These problems are mostly modeled by conservation law systems, hyperbolic, dispersive or diffusive equations. Due to high diversity of these problems, our approach is not based on the particular model and consists of using different analytical and numerical tools from mathematics, most of them already mentioned above.
- The problems in signal processing, image analysis and similar engineering topics are important part of the research in the recent period. We are using tools like pseudodifferential calculus and its applications, wavelets, Gabor systems and frames.
- Numerical optimization methods for big data analytics and distributed systems. Enormous amount of information obtained by intensive networking in almost all areas of real life requires new mathematical methods for data analytics. We have developed several large scale deterministic and stochastic optimization tools to approach these problems in both centralized and distributed computational framework. Typical problems we deal with include machine learning and prediction models in different areas, ranging from sciences to economics and finance.

The researchers are active in several international organizations like European Consortium for Mathematics in Industry, International Society for Applied Analysis and Computation and International Association for Generalized Functions.

## SELECTED PROJECTS

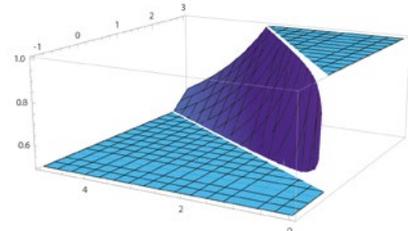
**Title:** *Big Data Challenges for Mathematics – BIGMATH*  
**Type:** H2020: Marie Skłodowska Curie action  
**Duration:** 2018-2022  
**Contact person:** Nataša Krejić

**Title:** *Industrial-Driven Big Data as a Self-Service Solution - I-BiDaaS*  
**Type:** Horizon 2020 H2020-ICT-2017-1  
**Duration:** 2017-2020  
**Contact person:** Dušan Jakovetić

**Title:** *Real-time measurements and forecasting for successful prevention and management of seasonal allergies in Croatia Serbia cross-border region*  
**Acronym:** RealForAll  
**Type:** Interreg IPA CBC Programme Croatia – Serbia  
**Duration:** 2017-2020  
**Contact person:** Nataša Krejić

## COLLABORATIONS

- University of Innsbruck,
- University of Ghent,
- State University of Campinas, SP, Brasil



## CONTACT PERSON

**Academician Prof. Dr Stevan Pilipović**  
stevan.pilipovic@dmi.uns.ac.rs  
<http://cmrnp.pmf.uns.ac.rs>

# Scientific Computing Research Group (SCORG)

*high performance computing, big data analysis, parallel programming, machine learning, neural networks*

Applications of HPC in industry and in problems that originate from various scientific fields:

- Problems of quantum mechanics using parallel computers in cooperation with the Institute of Physics in Belgrade. Density functional theory problems and modeling behaviour of Bose-Einstein condensates using the Gross-Pitaevskii equation.
- Implementation of distributed optimization algorithms using MPI
- Big Data analysis
- Solving classification and regression problems by utilizing modern Machine Learning techniques and modern tools like TensorFlow and PyTorch. Development of experimental neural network models with the goal of improving accuracy and robustness in classification and regression problems.

## SELECTED PROJECTS

**Title:** *High-performance Computing for Effective Innovation in the Danube Region - InnoHPC*

**Type:** Interreg transnational

**Duration:** 30 months

**Contact person:** Srdjan Skrbic

**Title:** *Developing Capacity for High-Productivity Large-Scale Computing*

**Type:** SCOPES

**Duration:** 3 years

**Contact person:** Srdjan Skrbic



## COLLABORATIONS

- Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland
- Prince of Songkla University, Hat Yai, Thailand
- Faculty of Information Studies, Novo Mesto, Slovenia



## CONTACT PERSON

**Dr Srdjan Skrbic**, Assoc. Prof.; [srdjan.skrbic@dmi.uns.ac.rs](mailto:srdjan.skrbic@dmi.uns.ac.rs); tel: +381 21 485 2874  
<http://scorg.pmf.uns.ac.rs>

## SELECTED EQUIPMENT

100 core computer cluster: 16 nodes, 8xNvidia GTX960, 304GB DDR4 RAM, 10Gbps interconnect, 24TB storage

# Set Theory, Model Theory and Topology

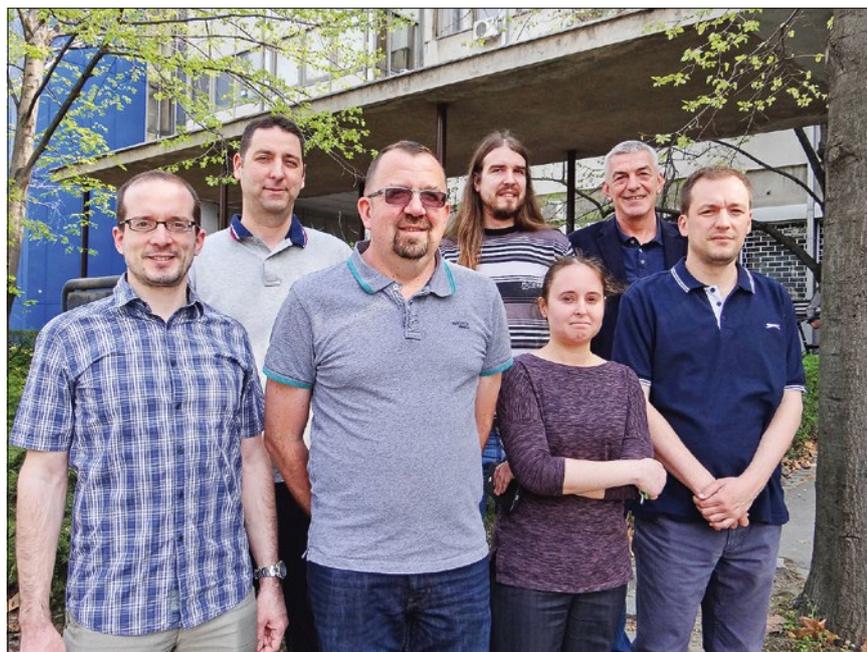
*set theory, model theory and set-theoretic topology*

**POSETS OF SUBMODELS:** We investigate the collections of (elementary) submodels of first order structures ordered by the inclusion and some other natural orderings. These partial orders are observed from the aspect of set theory, their cardinal and order invariants are explored and they are examined as forcing notions as well.

**SET-THEORETIC FORCING:** The conditions under which forcing violates certain structures of a given model of set theory, such as ultrafilters, maximal almost disjoint families and inseparable sequences, are investigated.

**GAMES ON BOOLEAN ALGEBRAS:** The cut-and-choose games on Boolean algebras are examined, searching for equivalent conditions for the existence of winning strategies and for the examples of Boolean algebras on which the games have different outcomes.

**CONVERGENCE STRUCTURES ON BOOLEAN ALGEBRAS:** The topologies on complete Boolean algebras generated by convergence structures are explored. The relations between the topological properties of the spaces obtained in this way and the algebraic and forcing properties of the corresponding Boolean algebras are examined.



## CONTACT PERSON

**Miloš Kurilić PhD**, Full Professor; milos@dmi.uns.ac.rs; tel: +381 21 485 2853  
<https://www.dmi.uns.ac.rs/settop/default.htm>

## SELECTED PROJECTS

**Title:** *Forcing, Model Theory and Set-Theoretic Topology*  
**Type:** Project MNTRS No 111768  
**Duration:** 2002-2005  
**Contact person:** M. Kurilić

**Title:** *Forcing, Model Theory and Set-Theoretic Topology 2*  
**Type:** Project MNŽS No 144001  
**Duration:** 2006-2010  
**Contact person:** M. Kurilić

**Title:** *Set Theory, Model Theory and Set-Theoretic Topology*  
**Type:** Project MPNTR No 174006  
**Duration:** 2011-present  
**Contact person:** M. Kurilić

## COLLABORATIONS

- Project "Set Theory, Ultraproducts and Forcing" (bilateral cooperation „Pavle Savić" Serbia – France, Paris 7) with Boban Veličković, 2004-2005.
- Project "The relationships between the algebraic, topological and forcing related properties of complete Boolean algebras" (bilateral cooperation MNTRS, Serbia–CNRS, France, Paris 7) with Stevo Todorčević, 2009-2010.

## MEMBERS OF GROUP

- Miloš Kurilić PhD,
- Milan Grulović PhD,
- Aleksandar Pavlović PhD,
- Boris Šobot PhD,
- Bojan Bašić PhD,
- Boriša Kuzeljević PhD,
- Nenad Morača PhD,
- Anika Njamcul



## Novi Sad – Multicultural environment where everyone feels welcomed!

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Novi Sad is the capital of the Autonomous Province of Vojvodina and the administrative, educational and cultural centre of Northern Serbia. It is the second largest city in Serbia with around 350,000 people. With over 25 ethnicities, and 6 official languages it represents a truly welcoming, multicultural environment. Located on the river Danube below the National Park of Fruška Gora, Novi Sad is a perfect place for aspiring scholars, nature lovers and global citizens. Novi Sad was elected as the *European Youth Capital for 2019* and the *European Capital of Culture for 2021*! This makes Novi Sad a hub of various activities and events focusing on youth, culture and entertainment. Novi Sad is home to the EXIT Music Festival which won multiple awards as the best European and world festival.



# Interesting facts about Serbia



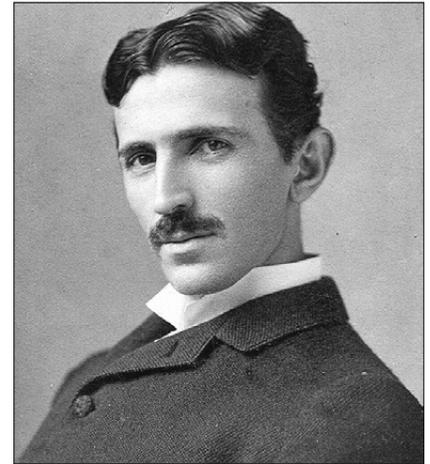
## Novak Đoković

Novak Đoković is a top-ranked and world famous Serbian professional tennis player. He has won many titles, including 14 Grand Slam singles titles, making him one of the most famous and successful athletes in the world! Following his victory at the 2016 French Open, he became the eighth player in history to achieve the Career Grand Slam and the third man to hold all four major titles at once, and the first ever to do so on three different surfaces. He is the first and only male player to have won all nine of the Masters 1000 tournaments.



## Slava

Patron Saint Day (Slava) is an ancient Serbian Orthodox tradition having roots in old Slavic paganism. The Christian saint, the protector of the family is in this way honoured and celebrated in accordance with the church calendar. Slava is celebrated at home, in a close circle of family, relatives and friends.



## Nikola Tesla

Nikola Tesla (1856-1943) is one of the most famous Serbs and one of the greatest minds of all times. He was an inventor, engineer, physicist, and a visionary! He invented the first alternating current (AC) motor and developed AC generation and transmission technology. He made dozens of breakthroughs in the production, transmission and application of electric power.



## Raspberries

Serbia is one of the largest producers and exporters of raspberries in the world. The town of Arilje in Central Serbia is probably the world's raspberry capital!

А а Б б В в Г г Д д  
Е е Ж ж З з И и Ј ј К к  
Л л М м Н н О о  
П п Р р С с Т т Ф ф У у  
Ф ф Х х Ц ц Ч ч Џ џ Ш ш

## Cyrillic alphabet (Ћирилица)

The Republic of Serbia officially uses the Serbian language and the Cyrillic script. However, both Cyrillic and Latin scripts are taught in schools and used equally. Vojvodina (where the University of Novi Sad is located) is especially known for its multicultural and multilingual diversity. Besides Serbian, there are five more official languages in Vojvodina: Hungarian, Slovak, Croatian, Romanian and Ruthenian.



## Exit Festival

Exit Festival began as a social movement in 2000, led by a group of students who fought for Serbian freedom and democracy. Since then it has grown and developed so much that it won numerous awards for the past decade and was ranked as one of the top 10 European festivals in the world. The festival is held at the Petrovaradin Fortress in Novi Sad.

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