WBCInno

Catalogue of research and innovation potential of the University of Novi Sad

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Tempus

Novi Sad, August 2013

Impressum

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Preface

This Catalog is created as one of the significant results achieved within the project entitled: "Modernization of WBC universities through strengthening of structures and services for knowledge transfer, research and innovation", with the acronym WBCInno and no. 530213-TEMPUS-1-2012-1-RS-TEMPUS-JPHES.

An important objective of the WBCInno project is the mapping of innovation potential at Western Balkan universities. It is foreseen that this mapping of innovation potential should be presented in the form of 5 regional catalogues for UKG, UNS, UBL, UZ, UM, in printed and HTML version for easy access of interested parties. Mapping of innovation potential at WBC universities has been conducted in terms of identifying/collecting data on research infrastructure, laboratories, centres, research teams with noteworthy results, developed technologies and knowledge, offered commercial services and training, licenses, patents etc. The Catalogue includes well-structured information about available capacities and capabilities to be involved in knowledge transfer, applied research and potential for innovations into market for University of Novi Sad, Serbia. This activity is a prerequisite for the development of University Innovation Platform (UIP) which will be suited to the WBC environment and identified needs and constraints.

This Catalogue is structured in four chapters: (1) Basic information about the University of Novi Sad, (2) Innovation potential of the University of Novi Sad, (3) Overview of the successful centres / laboratories / offices / teams, and (4) Appendix 1 – research field classification. The second chapter is devoted to the University of Novi Sad, Serbia innovation potential, described through the following sub-chapters: Structures and mechanisms for support of knowledge transfer, research and innovation, IPR protection and submission of patent applications at the University, Clusters, science and technological parks, business incubators, Events devoted to promotion of innovation and Success stories at the University - innovations transferred in products, services, software on the market. The third chapter represents presentations or overview of the successful centres / laboratories / offices / teams (two pages per entity).

This overview is made based on the fulfilled questionnaires obtained from excellent centres / laboratories / offices / teams / groups from the University of Novi Sad, respecting their innovation potential and achieved results as well as number of EU funded projects, published papers, patents, etc. The ways of collecting data have been: electronically (by email), using face-to-face interviews (on the field), by telephone and by browsing web-sites of selected entities.

Printed version of this Catalogue will be distributed to all partners as well as universities authorities and other stakeholders in the field and should be very useful as a part of broader efforts to improve consistency and relevance of national information on innovation potentials and to make the comparability within the WBCs.

We would like to thank to all colleagues from the University of Novi Sad, who contributed that this Catalogue has the content and form as it is.

Prof. Goran Stojanović, PhD

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1. University of Novi Sad

As the main research and higher education institution of the Autonomous Province of Vojvodina, Serbia - the University of Novi Sad is one of the very rare campus-oriented universities in the SEE region. With its inherent diversity (6 official languages and 23 nationalities) and long-lasting tradition in entrepreneurship, the Autonomous Province of Vojvodina has been always in the forefront of the economical development in the region, with the strong ambition to keep this place in future, by supporting new developments and emerging areas in research and technology.

The University of Novi Sad (UNS), http://www.uns.ac.rs, was established during 60-ies. It is a center for higher education and research for the region of Vojvodina. Presently, it consists of 13 faculties. Nine faculties are located in Novi Sad (seven in one campus), two faculties are in Subotica, one is in Zrenjanin and one in Sombor. It has often been referred to as a leader in Bologna process reforms in Serbia. The University of Novi Sad (UNS) is the second largest among six state universities in Serbia with around 48000 students (at three level of study) and 4500 employees. Having invested considerable efforts in intensifying international cooperation and participating in the process of university reforms in Europe, the University of Novi Sad has come to be recognized as a reform-oriented university in the region and on the map of universities in Europe. The University of Novi Sad in Serbia is taken as an example of how one University in a transition country, which was lacking tradition in entrepreneurial practices, is striving to become an entrepreneurial university.

UNS led many European projects dedicated to innovation and technology transfer and ideas commercialization. Three units of knowledge transfer were established at the university level: an Innovation Center, a Technology Transfer Center, and a Novi Sad Incubation Center as the first phase of the Science Technology Park.

University of Novi Sad (UNS) - Facts & Figures	
Students (3 levels of studies)	47815
Teaching staff	3430
Non-teaching staff	1278
Students enrolled in the first year of bachelor studies in 2011/2012	7529
Total number of PhD obtained at UNS	3300
Total number of study programmes (3 levels of studies)	324
Other important information	
460 different on-going science and research projects, knowledge transfer projects, international research and student mobility projects at UNS	
About 50% of all science and research projects at UNS funded by the Ministry of Education and Science of the Republic of Serbia	
About 17% of all science and research projects at UNS funded by the Provincial Secretary for Science and Technological Development of the Autonomous Province of Vojvodina	
About 114 science and other conferences and symposiums organized by the UNS faculties and R&D institutes annually	

The basic facts for the University of Novi Sad, related to the research projects, published papers, defended doctoral thesis, etc. are given in Table below.

The University of Novi Sad – basic scientific facts and figures	
Activity	**Number**
On-going international projects	COST (34), TEMPUS (20), FP7 (19), Multilateral (17), IPA (15), CEEPUS (11), EUREKA (5), NATO (2), CIP (1)
Peer-reviewed journal papers (ISI ranked) (in 2012)	845 + 150 (without UNS affiliation)
Patents (in 2012)	54
Defended doctoral thesis (total)	3100

The most developed research fields at the University of Novi Sad, in accordance with the classification (FOS 2007) are:

- FOS202 - Electrical engineering, electronic engineering, information engineering;
- FOS203 - Mechanical engineering;
- FOS205 - Materials engineering;
- FOS210 - Nano-technology;
- FOS211 - Other engineering and technologies;
- FOS304 - Health biotechnology;
- FOS401 - Agriculture, forestry, and fisheries.

Faculties and Institues in the framework of the University of Novi Sad are shown below.

Academy of Art Novi Sad

Đure Jakšića No. 7
21000 Novi Sad, Serbia

tel: +381 (0)21 42 21 77
fax: +381 (0)21 42 01 87
http://www.akademija.uns.ac.rs/
e-mail: aofarts@uns.ac.rs

Faculty of Economy Subotica

Segedinski put No. 9-11
24000 Subotica, Serbia

tel: +381 (0)24 62 80 00
fax: +381 (0)24 54 64 86
http://www.ef.uns.ac.rs/
e-mail: dekanat@ef.uns.ac.rs

Faculty of Sport and Physical Education, Novi Sad

Lovćenska 16
21000 Novi Sad, Serbia

tel: +381 (0)21 45 01 88
fax: +381 (0)21 45 01 99
http://www.fsfvns.rs
e-mail: fsfv@uns.ac.rs

Faculty of Technical Sciences, Novi Sad

Trg Dositeja Obradovića No. 6
21000 Novi Sad, Serbia

tel: +381 (0)21 48 52 055
fax: +381 (0)21 45 81 33
http://www.ftn.uns.ac.rs
e-mail: ftndean@uns.ac.rs

Faculty of Phylosophy Novi Sad

dr Zorana Đinđića 2
21000 Novi Sad, Serbia

tel: +381 (0)21 45 06 90
fax: +381 (0)21 45 09 29
http://www.ff.uns.ac.rs
e-mail: dekanat@ff.uns.ac.rs

Faculty for Civil Engineering, Subotica

Kozaračka 2a
24000 Subotica, Srebia

tel: +381 (0)24 55 43 00
fax: +381 (0)24 55 45 80
http://www.gf.uns.ac.rs
e-mail: dekanat@gf.uns.ac.rs

Institute for Lowland Forestry and Environment, Novi Sad

Antona Čehova 13
21000 Novi Sad, Srebia

tel: +381 (0)21 54 03 83
fax: +381 (0)21 54 03 85
http://www.ilfe.org
e-mail: poplar@polj.uns.ac.rs

Faculty of Medicine Novi Sad

Hajduk Veljkova 3
21000 Novi Sad, Serbia

tel: +381 (0)21 42 06 77
fax: +381 (0)21 62 41 53
http://www.medical.uns.ac.rs
e-mail: dekanmf@uns.ac.rs

Institute of Food Technology, Novi Sad

Bulevar Cara Lazara 1
21000 Novi Sad, Serbia

tel: +381 (0)21 48 53 845
fax: +381 (0)21 45 07 25
http://www.fins.uns.ac.rs
e-mail: fins@fins.uns.ac.rs

Faculty of Education Sombor

Podgorička 4
25000 Sombor, Serbia

tel: +381 (0)25 46 05 95
fax: +381 (0)25 26 461
http://www.pef.uns.ac.rs
e-mail: dekanat@pef.uns.ac.rs

Faculty of Agriculture, Novi Sad

Trg Dositeja Obradovića 8
21000 Novi Sad, Serbia

tel: +381 (0)21 48 53 500
fax: +381 (0)21 45 97 61
http://polj.uns.ac.rs
e-mail: dean@polj.uns.ac.rs

Faculty of Law, Novi Sad

Trg Dositeja Obradovića 1
21000 Novi Sad, Serbia

tel: +381 (0)21 63 50 377
fax: +381 (0)21 45 04 27
http://www.pf.uns.ac.rs
e-mail: dekanat@pf.uns.ac.rs

Faculty of Sciences, Novi Sad

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21000 Novi Sad, Serbia

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fax: +381 (0)21 45 56 62
http://www.pmf.uns.ac.rs
e-mail: dekanpmf@uns.ac.rs

Technical Faculty "Mihajlo Pupin" Zrenjanin

Đure Đakovića bb
23000 Zrenjanin, Serbia

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fax: +381 (0)23 55 05 20
http://www.tfzr.uns.ac.rs
e-mail: dekanat@tfzr.uns.ac.rs

Faculty of Technology, Novi Sad

Bulevar Cara Lazara 1
21000 Novi Sad, Serbia

tel: +381 (0)21 48 53 600
fax: +381 (0)21 45 04 13
http://www.tf.uns.ac.rs
e-mail: deantf@uns.ac.rs

Faculty for Teachers on Hungarien Language, Subotica

Štrosmajerova 11
24000 Subotica, Serbia

tel: +381 (0)24 62 44 44
fax: +381 (0)24 62 44 24
http://www.magister.uns.ac.rs
e-mail: office@magister.uns.ac.rs

2. Innovation potentijal of the University of Novi Sad

2.1. Structures and mechanisms for support of knowledge transfer, research and innovation

The following structures/services are established at the University of Novi Sad with the aim to support knowledge transfer, research and innovation:

1. EEN – Enterprise Europe Network (CIP project) – University in Novi Sad, Financed by Competitiveness and Innovation Framework Programme;
2. Business Incubator Novi Sad – Faculty of Engineering (aka Technical Sciences) of the University in Novi Sad;
3. The Best Technology Innovation Competition – Faculty of Engineering (aka Technical Sciences) of the University of Novi Sad, with support from Ministry of Education, Science and Technological Development of the Republic of Serbia;
4. UNESCO Chair for Entrepreneurial Studies (UCES) - University in Novi Sad;
5. Science and Technology park of the University in Novi Sad, part at the Faculty of Engineering (aka Technical Sciences);
6. Center for competitiveness and clusters – Faculty of Engineering (aka Technical Sciences) of the University in Novi Sad;
7. Center for Development in Financial Sector - Faculty of Engineering (aka Technical Sciences) of the University in Novi Sad;
8. The University Center for Intellectual property (IP Center) - Faculty of Engineering (aka Technical Sciences) of the University in Novi Sad;
9. Numerous projects realized at the University of Novi Sad: IPA (COMPLEXIM, ECORYS, COMP-COMP, MORDIC), TEMPUS (S&T Park, KNOWTS), and others.

2.2. IPR protection and submission of patent applications at the University

The University of Novi Sad has the University Center for Intellectual property (IP Center) which is mission to educate and inform academic, research, business and student society at Novi Sad and Vojvodina in order to promote the role of intellectual property and raise awareness about importance of IP in knowledge based society. Overall goal of the IP Center is to help in IP protection, mainly through writing patent documentation and tracking procedures, as well as to support transfer and commercialization of the knowledge developed through research and creative work at the University of Novi Sad.

Consultations between researchers from the University interested in protecting their knowledge developed through research and creative work at the University of Novi Sad in form of intellectual property and IP Center experts about potential invention, procedures and possibilities of applying. If an idea is attractive and promising, the next step is to suggest the inventor to prepare detailed invention disclosure. IP Center representative and inventor are signing the document for confidentiality of invention which contains invention disclosure.

Profitability evaluation - analysis of the technical trends and searching through international patent data bases, scientific and other professional literature. An evaluation of commercialization potential of potential invention.

From the detailed invention disclosure and result of the profitability evaluation, experts from the IP Center will decide whether to further support patent idea or not. If the answer is yes, the following step is to sign a contract between IP Center and inventor which contains mutual right and obligation, in the other word:

- IP Center takes over obligation to prepare patent application.
- IP Center recommends patent procedures - selection of countries, order, and dynamics.
- IP Center takes over obligation to carry procedure of filing and managing procedures toward all international and national IP offices.
- Inventor will give professional assistance in process of preparation patent application.
- Inventor and IP Center will make their own arrangement regarding paying the expenses made during the period of preparation, applying, tracking and maintaining patent.
- Inventor and IP Center make their own arrangement regarding rights in case of potential commercialization of patent.

In the case that IP Center experts estimate that idea is not promising enough to patent, the IP Center will issue a statement and inventor could continue his work on his own.

IP Center submits patent application, guides and tracks patent procedure.

On demand, IP Center is taking part in procedures for commercialization of patent.

2.3. Clusters, science and technological parks, business incubators

1. Vojvodina ICT Cluster - VOICT

Vojvodina ICT Cluster - VOICT provides a single point of contact with the best companies in Serbia, with the total workforce of 1,700 experienced IT professionals. We build long-term relationships based on trust and quality, bringing expertise, experience and *passion for excellence* to each and every project.

Vojvodina ICT Cluster is a business association founded through a bottom-up initiative of ICT companies and several supporting institutions. It is a fast-growing organization, strongest in its field in Serbia.

Over 90% of of the members' businesses are tied to foreign markets – EU, North America and Middle East. The companies from this cluster exhibited strong growth in recent years, regardless of the global recession. Serbian IT companies in general made a noticeable breakthrough on world markets, putting Serbia on the map as a very interesting alternative location for development of sophisticated software. Vojvodina ICT Cluster gives institutional support to this trend, mobilizing players from the triple helix business–education–government.

Strategic objective of Vojvodina ICT Cluster is to increase visibility of Serbian ICT and put Novi Sad on the regional and European map as the hotbed for ICT in this part of the world.

Activities toward this objective include further strengthening of the association, its positioning as the most relevant Serbian ICT institution within the country and abroad, building ever stronger network of international contacts, creating new business opportunities for the members, compiling and delivering sets of services to members and third parties, lobbying for improvement of business environment in Serbia, and popularization of ICT both in terms of generating more ICT professionals and enabling more penetration of these technologies throughout other sectors of Serbian economy.

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web: www.vojvodinaictcluster.org

2. Vojvodina Metal Cluster - VMC

Vojvodina Metal Cluster - VMC, jwas created as an initiative of companies from metal sector in Vojvodina and that is the main strength and value of the cluster.

The project "Vojvodina Metal Cluster - VMC" is financed from the technical assistance of the European Union, the regional program of socio-economic program RDEPR2. The University of Novi Sad - Faculty of Engineering (or Faculty of Technical Sciences) is one of the partners and founders of this cluster.

Guarantee for achieving the objectives of the VMC is support of local and provincial government of Vojvodina, the Serbian government through the Ministry of Economy and Regional Development, Chamber of Commerce, VIP Fund - Fund of Vojvodina Investment Promotion and the Regional Centres for Standardization and Certification.

Companies from the metal sector are becoming members of the VMC on the basis of self-interest. By joining the VMC, all members are eligible to vote and have certain obligations and rights in accordance with the Statute of the cluster. Today VMC has more than 50 companies as its members.

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Zoran Pekez, Project manager,
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e-mail: zpekez@vmc.rs
web: http://www.vmc.rs/en/sajt: http://www.vmc.rs/en/

3. Creative Industries Cluster of Vojvodina (CICV)

Creative Industries Cluster of Vojvodina (CICV) is founded in 2010 as a business model in creative economy. The Creative Industries Cluster of Vojvodina (CICV) will act as generator of economic empowerment of small and medium-sized enterprises from the field of creative industry by documenting the economic impact and contribution of these industries to Vojvodina and Serbia. Business services for small to medium businesses and events. Cluster offers a business review and other strategic development services. The review is a complete diagnostic of business taking in aspects including HR, marketing, finance and strategy. The reviews are conducted by specialist who have extensive experience in business management and creative industries. CICV gives business support for creative businesses of all sizes. In collaboration with its partners, this cluster provides a central point for creative businesses to access business development opportunities, information, events and resources relating to: commercialisation and finance; education and training; research and technology; and industry knowledge and networks.

Creative Industries Cluster of Vojvodina is dedicated to supporting the potential of Serbia's creative businesses.

Creative Industries Cluster of Vojvodina is supported by the University of Novi Sad and Center for competitiveness and Cluster development as part of its commitment to supporting Vojvodina's creative industries.

The Creative Industries Cluster of Vojvodina therefore aims to improve networking and innovation in the cultural and creative industries sector in Vojvodina, and enhance the image and profile of creative industries at regional and international market. Its mission is to develop a regional framework for creating new products and services with high profit potential and become regional coordinator of business initiatives and policies of creative industries.

Contact data:
Creative Industries Cluster of Vojvodina KVIK
Hajduk Veljkova 11, Novi Sad, Vojvodina, Serbia
tel: +381 63 70 64 596
e-mail: kreativniklaster@gmail.com, info@kvik.rs.org
web: www.kreativniklaster.com

4. Centre for Competitiveness and cluster development

Centre for Competitiveness and cluster development is founded in 2007. Formed by the Faculty of Engineering (or Faculty of Technical Sciences) in June 2007, with the aim to actively participate in the programs of promoting the copetitiveness of the industry in the Republic of Serbia. Strategic goal of the Centre is to create environment which can support creation of added value strengthening the material products and services sector, raising the comepitiveness of companies, promotion and introduction of all forms of quality management systems, securing of full functionality of cluster networking, and influence positively on their sustainability.

Contact data:
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Faculty of Engineering, Trg Dositeja Obradovića 7, 21000 Novi Sad, Serbia
tel: +381 21 48 52 154, +381 21 459 740
e-mail: moraca@uns.ac.rs

5. UNESCO Chair for Entrepreneurial Studies (UCES)

UNESCO Chair for Entrepreneurial Studies (UCES) otvorena je na Univerzitetu u Novom Sadu 2006. godine, kao deo UNITWIN programa sa ciljem da promoviše i ohrabrwas established at the University of Novi Sad in 2006, as a part of UNITWIN programme with the aim to promote and encourage education, research and exchange of academic staff and to create a platform for information exchange in all the most important UNESCO activities.

UCES aims to become a centre of excellence in teaching and research in the field of entrepreneurship and tends to work on capacity building at different levels:

- Professional and personal development of both students and teachers (regional and international conferences, summer schools, workshops organized together with regional international partners in the field of entrepreneurship);
- Development and promotion of entrepreneurial culture among students and young staff as well as in the wider environment (organization of public lectures on entrepreneurship and other forms of lifelong learning at UNS; workshops, seminars, conferences, training organized together with chambers of commerce, NGOs and other stakeholders; publications, textbooks and different materials for entrepreneurship promotion);
- Investment in educational and research resources (from infrastructure to teaching / learning materials, databases, softwares, books, journals);
- Development of career guidance services for students;
- Enhancement of the university - alumni relationships by involving alumni in teaching and research projects as learning resource (through shared experience and good practice) as well as funding source (based on a "giving back" approach).

UCES has the support of the Serbian National Commission for UNESCO.

Together with the UNESCO Chair for Entrepreneurship Studies at the University "J.J.Strossmayer" in Osijek, Croatia, UCES is the only Chair of that kind in the region of South - East Europe.

UCES also became a part of European network of UNESCO Chairs in Entrepreneurship under the leadership of the UNESCO Chair on Entrepreneurship and Intercultural Management at the University of Applied Sciences in Gelsenkirchen, Germany. Presently there are 634 UNESCO chairs in different fields of activities.

Contact data:
UNESCO CHAIR FOR ENTERPRENEURIAL STUDIES
Address: Dositej Obradović Square 5, 21000 Novi Sad
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e-mail: unescochair@uns.ac.rs
web: http://www.unescochair.uns.ac.rs/eng/

6. Business Incubator Novi Sad

Business Incubator Novi Sad is founded by Municipality of Novi Sad, Vojvodina Investment promotion fond, Faculty of engineering and public company Informatika. The main goal of this institution is to provide business help to young entrepreneurs with good ideas. Most of the companies in Business incubator are from ICT cluster of Vojvodina.

Contact data:
Vojvođanskih brigada 28 21000 Novi Sad, Serbia
tel: +381 21 21 00 303
e-mail: office@businessincubatorns.com
web: www.businessincubatorNS.com

2.4. Events devoted to promotion of innovation

1. The Best Technology Innovation Competition (BTI)

The Best Technology Innovation Competition (BTI) (http://www.inovacija.org/) is one of the ways by which the Faculty of Engineering (or Faculty of Technical Sciences), the University in Novi Sad, has started educational process of high-tech would-be and existing entrepreneurs in Serbia in order to change current entrepreneurial knowledge and innovative culture. Since 2005 it has gained a continual support from Ministry of Science of the Republic of Serbia and Serbian Chamber of Commerce. Thus BTI has become national open competition for inventors, small high-tech entrepreneurs, researchers, etc.

The mission of BTI Competition is promotion of innovativeness, education of its participants how to enter into the market and strives to ensure media promotion and financial support.

In order to fulfil its mission, Organizational Board of BTI each year delivers significant number of promotional and educational trainings in high-tech area.

Taking into account a few-years experience in creating and realization of business and marketing trainings of researchers in high-tech area, we noticed a large number of obstacles/problems which enables them to successfully enter into the market with theirs high/level research and scientific work. Thus, whishing to release themselves from fear of unknown, as good as to make some even incremental improvements of whole economic situation, Organizational Board of BTI make an adjustment of educational trainings to general goals. After educational trainings, researchers and innovators were successfully:

- reliable/educated to realize their research and scientific works on their inventions into the market, with fully responsibility and without waiting to someone from outside to help them (i.e. governance, state, financial funds, etc.), totally self-reliant
- capable to make a map of their innovative business
- stimulated enough to start their own company and find a place to their innovations on the market
- capable of checking their scientific and research results into the market, instead to be satisfied with prizes, plackets or acceptance of patents from different institution.

In order to meet all these overall objectives, BTI educational program has the following specific objective: educating would-be and existing high tech entrepreneurs in the market and business area.
For the last three years, the following results of this educational program that has been achieved:

- over 1900 innovators, researchers and company representatives attended educational program for innovative business, created and held by young, innovative professionals from the University of Novi Sad in 42 cities in Republic of Serbia and Republic of Srpska
- 164 promotional and educational trainings (43 promotional, 121 educational trainings)
- over 35 new registered innovative high-tech companies
- 282 teams (more than 846 people) finished their Business Plan.

This Competition is an excellent example of how University should have an active, responsible role in the processes of gaining support from state institutions on one side, and developing innovative entrepreneurial ways of thinking and acting in society on the other.

It has proved to be a very good way for reinforcing the entrepreneurial way of commercializing innovations, providing financial and educational support.

Additional direct and indirect results are:

- Changed climate at the University of Novi Sad, which can be seen through start-up a lot of spin-out companies. These companies are not direct result of the competition but shows changed climate and readiness of university researchers to become entrepreneurs and test their knowledge in real life.

Starting-up consultancy for high-tech companies Konekta consulting founded by Organizational team from Faculty of Engineering, as a direct result of the Competition.

2. Tesla fest

Tesla fest (http://www.teslafest.com/) – international festival of innovation and patents is annually held in Novi Sad, Serbia. Many exhibitors from all over the world take this festival as a chance to present their patents, technological achievements, technical solutions, etc. Members of the Jury for the Tesla Fest are usually professors from the University of Novi Sad, Serbia.

2.5. Success stories at the University - innovations transferred in products, services, software on the market

Drinkomat

At the Faculty of engineering (or the Faculty of Technical Sciences) a **DRINKOMAT** (http://www.youtube.com/watch?v=VW47X4oYzkk) was developed. Public and private sector cooperated in this project in order to develop a good model (CAM Engineering, FESTO, Faculty of engineering, TEMPUS project, etc.). DRINKOMAT (please see figure below) is automatic machine for taking the drinks from the box which uses wireless communication to select desirable drink and to perform the electronic payment.

RT-RK Computer Based Systems LLC

RT-RK Computer Based Systems LLC (www.rt-rk.com) is Research & Development Company for offers services for product development in the fields of consumer electronics, communications and multimedia. RT-RK was officially founded in 2005, although a its predecessor which is now a daughter company, FTN-IRAM-RT, was established in 1991. Today RT-RK Computer Based Systems has become the main operational company for international markets. As a result of active market approuch number of employees grew to 250 at the end of 2010. The total turnover is now 8 millions EUR, while 10 years ago it was 0.5 million EUR. Current share of exports in total sales revenues is 95%, while 10 years ago it was just 30%. One of the company's innovations comprises TV Testing solutions. Advantages over existing testing frameworks include reusability of existing infrastructure with different software IP blocks and hardware solutions, which provides significant cost and time savings. RT-RK Computer Based Systems invests 15% of its revenue in research and development. As a result, it has 12 patents. Average product life on the market is slightly above 5 years.

DMS Corporation comprises DMS Group

DMS Corporation comprises DMS Group (http://www.telventdms.com), founded in 2000, and joint venture Telvent DMS, founded in 2008 and owned by DMS Group (51%) and Telvent (49%). Today DMS Corporation (DMS Group and Telvent DMS), gathers a total of 750 experienced engineers – experts in information technology and power engineering and management. It therefore represents the largest pool of knowledge used in the development of smart grid software for electricity distribution management. They are focused on developing DMS (Distribution Management System) and EMS (Energy Management System, used for optimization of transmission networks) solutions, and have other parts of Smart Grid solutions underway. Several professors from the Department of Electrical Engineering of the Faculty of Technical Sciences, University of Novi Sad – scientists and entrepreneurs, together with outstanding engineers experienced in technical and management field, invested decades of work and analysis into design of its main product - DMS Software – a unique, innovative product, for improving, monitoring and optimizing distribution networks. DMS Software is cutting-edge software system for performing all technical tasks in distribution utilities in an efficient and optimal way. Its innovation lies in its unique algorithm. DMS Software provides tools for dynamic visualization, monitoring and control of electric distribution network, together with wide set of power applications for operation analysis, planning and optimization. DMS Software is built on Smart Grid solution concept.

3. Overview of the successful centres / laboratories / offices / teams

- AlfaNum
- BioSense Centre
- Chemical Technology and Environmental Protection Group
- Centre for Identification Technologies – CIT
- Centre for Integrated Microsystems and Components
- Centre for Mathematics and Statistics
- Centre for New Materials/Chair of Experimental Physics of Condensed Matter
- Centre for Renewable Energy Sources and Power Quality – CRESPQ
- Chair for metrology, quality, fixtures, tools and ecological engineering aspects
- Department of Applied Mechanics
- FP7 Centre of Excellence in Food Safety and Emerging Risks
- Group for Artificial EM Materials and Microwave Engineering
- Group for Systems Analysis and Decision Making
- Humanoid Robotic Group - HRG
- Institute for Lowland Forestry and Environment - ILFE
- Laboratory for Advanced Materials
- Laboratory for Intelligent Control and Biomedical Engineering
- Laboratory for investigation of natural resources of biologically and pharmacologically active compounds
- Laboratory for Nano and Printed Electronics
- Laboratory for the study of xenobiotics in biological systems
- Loess and Geoheritage Research Group
- The Novi Sad Nuclear Physics Group
- Reproductive Endocrinology and Signaling research group - RES group

AlfaNum

Research field – classification code:
FOS202 - Electrical engineering, electronic engineering, information engineering

The main objectives and activities

The main objective of the "AlfaNum" team is to reaffirm the leading position in the development of quality speech technologies for most South Slavic languages and their applications in the Western Balkans. The main activities of "AlfaNum" are:

- The development of high-quality and more advanced text-to-speech synthesis (TTS)
- The development of large vocabulary continuous automatic speech recognition (ASR)
- The development of speaker identification and verification systems
- The research and development of emotion speech recognition
- The development of natural language processing modules including dialogue management
- The application of the developed speech technologies in Western Balkan countries:
  - in multimodal human-machine dialogue systems (IVR, smart phones, smart homes)
  - for purposes such as: text reading, text dictation, speech transcription
  - within aids for the physically disabled, visually impaired, speech impaired, hearing impaired

The most important innovative results

- "AlfaNum" has already developed both small-to-medium vocabulary ASR and high-quality concatenation-based TTS in Serbian, Croatian and Macedonian.
- A number of valuable speech and language resources for Serbian and kindred South Slavic languages have been created within several projects over the last decade. Apart from these resources, a number of expert systems, machine learning systems as well as mathematical models have been developed and deployed in the first speech enabled products in Serbia, Croatia, Bosnia and Herzegovina, Montenegro, and Macedonia - the countries where kindred South Slavic languages are predominantly spoken. For example, one can listen to news at a number of speech-enabled web sites (Radio Television of Serbia - RTS, Radio Television of Vojvodina - RTV, eUprava, as well as several municipalities) using a computer or a smart phone. The visually impaired can listen to any text displayed on the screen using anReader (AlfaNumTTS). The AlfaNumASR and AlfaNumTTS components have provided smart phones with basic speech generation and understanding functionalities in Serbian.
- Further development of both large vocabulary ASR and more advanced TTS is based on the aforementioned speech and language resources. Both technologies will enable a much wider range of applications and will contribute to the preservation of Serbian and kindred languages in this new domain of human-machine speech communication.

List of the international projects

- COST Action 2102 – "Cross-Modal Analysis of Verbal and Non-Verbal Communication"
- COST Action IC1207 – "PARSEME: PARSing and Multi-word Expressions."
- EUREKA Σ!3864 – " iTEMA: Intelligent Telephone E-mail Access"
- EUREKA Σ!4965 – "TESTED: TExt-to-Speech Technology for Embedded Devices"
- EUREKA Σ!8719 – " S-VERIFY: Advanced Speaker Verification"

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

- The main products of "AlfaNum" team are speech technology software components for ASR and TTS which have been launched into the market by the company "AlfaNum - Speech Technologies":
  - AlfaNumASR - medium-sized vocabulary ASR for Serbian and kindred South Slavic languages
  - AlfaNumTTS - high-quality concatenation-based TTS in Serbian, Croatian and Macedonian
- The speech technologies are developed based on speech and language resources:
  - Annotated speech corpora for Serbian ASR (200 hours), Serbian TTS (4 hours) and Croatian TTS (4 hours)
  - Morphological dictionaries of Serbian and Croatian (more than 4 million inflected word forms)
  - POS-tagged text corpora for ASR (100,000,000 words) and TTS (200,000 words)
  - Expert systems and machine learning systems: Text preprocessor, POS tagger, Detector of prosodic cues from text, Predictor of pitch and phone durations for TTS
  - Mathematical models of speech for Serbian and kindred South Slavic languages used in ASR: Acoustic model, Pronunciation model, and Language model

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Vlado Delić, PhD (1964) is a professor, researcher, and project manager at FTN-UNS. He has created distinguished curricula in the field of acoustics, audio signal processing, and speech technologies. His research focuses on innovative applications of speech technologies: voice portals, assistive technologies, cognitively-inspired human-machine dialogue systems, etc. He has published more than 200 research and technical articles and got several prestigious awards.

- Delić V, Sečujski M, Jakovljević N, Janev M, Obradović R, Pekar D. (2010) "Speech Technologies for Serbian and Kindred South Slavic Languages", In Advances in Speech Recognition, N. Shabtai (Ed.), SCIYO, pp. 141-164.
- Popović B, Janev M, Pekar D, Jakovljević N, Gnjatović M, Sečujski M, Delić V. (2012) "A Novel Split-and-Merge Algorithm for Hierarchical Clustering of Gaussian Mixture Models", Applied Intelligence, ISSN: 0924-669X, Springer-Verlag New York, Inc., Vol. 37, No. 3, pp. 377-389, DOI: 10.1007/s10489-011-0333-9
- Gnjatović M, Janev M, Delić V. (2012) "Focus Tree: Modeling Attentional Information in Task-Oriented Human-Machine Interaction", Applied Intelligence, ISSN: 0924-669X, Springer-Verlag New York, Inc., Vol. 37, No. 3, pp. 305-320, DOI: 10.1007/s10489-011-0329-5
- Delić V, Bojanić M, Gnjatović M, Sečujski M, Jovičić S. (2012) "Discrimination Capability of Prosodic and Spectral Features for Emotional Speech Recognition", Electronics and Electrical Engineering, ISSN 1392-1215, Vol. 18, No. 9, pp. 51-54, DOI:10.5755/j01.eee.18.9.2806.
- Jakovljević N, Mišković D, Janev M, Sečujski M, Delić V. (2013) "Comparison of Linear Discriminant Analysis Approaches in Automatic Speech Recognition", Electronics and Electrical Engineering, ISSN 1392-1215 (in press).



BioSense Centre

Research field – classification code:
FOS211 - Other engineering and technologies

The main objectives and activities

- To provide necessary and currently not available state-of-the-art ICT solutions for agriculture, water management, forestry and environmental protection in line with EU regulations, that will help integration of Serbia into EU.
- To be a regional networking institution and to present a backbone of the regional GEOSS and national LTER (Long-Term Ecosystem Research and Monitoring in Europe) network.
- To be recognized as a preferred networking partner of other European institutions.
- To foster substantially new research directions, which could lead to scientific and technological breakthroughs.
- To develop a systematic approach to management and exploitation of Intellectual Property Rights (IPR), and to serve as a lighthouse in this field to other institutions in the region.
- To be a strongpoint of technological development, eco-innovation, and knowledge & technology transfer in the region as well as in Europe, contributing to the European economy and growth.
- To attract, develop and retain the best researchers with different educational backgrounds, with an emphasis on hiring young researchers and their inclusion in state-of-the-art multi- and inter-disciplinary research.
- To provide sustainable development of the Centre through commercialization of its IPR and its research results, as well as through various national and international funding schemes,
- To foster integration of researchers from the West-Balkan Countries (WBC) into European Research Area (ERA).
- To influence the policy-makers and governmental institutions.

The most important innovative results

- System for estimation of flooded agricultural land based on high-resolution satellite imagery
- System for automated crop classification based on high-resolution satellite imagery
- Integrated system for optimization of irrigation management with the combined use and integration of high precision satellite data, advanced modeling, process control and business innovation
- Miniature sensors for soil moisture independent of the soil type
- Visual system for automated classification of pollinators (Syrphidae:Diptera)

List of the international projects

- FP7-REGPOT-2012 Project InnoSense – Innovation in Sensing Through Reinforcement of the BioSense Center, 2013-2016, coordinator
- FP7-ENV-2010 Project BalkanGEONet - Balkan GEO Network – Towards Inclusion of Balkan Countries into Global Earth Observation Initiatives, 2010-2013, coordinator
- FP7-ENV-2010 Project ENORASIS - Environmental Optimization of Irrigation Management with the Combined Use and Integration of High Precision Satellite Data, Advanced Modelling, Process Control and Business Innovation, 2012-2015
- FP7-INFRASTRUCTURES EXPEERE - Experimentation in Ecosystem Research, 2010-2014.
- FP7 IRSES Project MultiWaveS - Multiband Electronically Reconfigurable Microwave Devices and Antennas for a New Generation of Wireless Systems, 2009-2013, coordinator

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

- Various software packages for design and simulation of electronic circuits, components and devices
- State-of the-art systems for prototyping and manufacture of electronic circuits and components
- Measurement devices for testing and characterization of electronic circuits, components and devices
- Various development kits for wireless sensors networks
- Unmanned aerial vehicles (UAVs) of various payloads
- Oracle server with GIS support

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Prof. Dr Vladimir Crnojević, received BSc degree in telecommunications and electronics from the Faculty of Technical Sciences, University of Novi Sad, Serbia in 1995, and MSc degree on the same Faculty in1999. He received PhD degree in telecommunications and signal processing from the University of Novi Sad in 2004. Dr Crnojević joined Faculty of Technical Sciences at the University of Novi Sad after graduation. From 2010 he is Associate Professor, introducing and teaching a number of courses in the field of signal processing, pattern recognition and computer vision. He is founder of the BioSense Centre, a multidisciplinary research Centre devoted to application of ICT in agriculture, Earth observation, forestry and ecology. Since it's foundation, in the 2008. the BioSense Centre gathered a large number of young researchers and with 13 FP7, 4 EUREKA and numerous COST and national projects become recognizable in the international scale. Prof. Crnojević has also realized a number of projects for international and national industry. He has authored more than 50 conference and journal papers and two chapters in international books. He has more than 200 citation and h-factor of 8. Prof. Crnojević is an author of two patent applciaitons (one US and one European) and of one internationally recognized software improvement. Prof. Crnojević is a reviewer for the most prestigious scientific journals in his field.

References

- V. Crnojevic, V. Senk, Z. Trpovski, "Advanced impulse detection based on pixel-wise MAD", Signal Processing Letters, IEEE 11 (7), 2004.
- Petrovic, N.I.; Crnojevic, V.: Universal Impulse Noise Filter Based on Genetic Programming, IEEE Transactions on Image Processing, 2008, Vol. 17, No. 7, str. 1109- 1120, ISSN 1057-7149
- D. Culibrk, M Mirkovic, V. Zlokolica, M. Pokric, V. Crnojevic, D. Kukolj, "Salient motion features for video quality assessment", Image Processing, IEEE Transactions on Image Processing , Volume: 20 Issue:4, pp(s): 948 - 958, ISSN: 1057-7149.
- Cedomir Stefanovic, Dejan Vukobratovic, Francesco Chiti, Lorenzo Niccolai, Vladimir Crnojevic, Romano Fantacci: "Urban Infrastructure-to-Vehicle Traffic Data Dissemination Using UEP Rateless Codes", IEEE Journal on Selected Areas in Communications, Vol. 29, No. 1, pp. 94-102, January 2011.
- Dejan Vukobratovic, Cedomir Stefanovic, Vladimir Crnojevic, Francesco Chiti, Romano Fantacci: "Rateless Packet Approach for Data Gathering in Wireless Sensor Networks", IEEE Journal on Selected Areas in Communications, Vol. 28, No. 7, pp. 1169-1179, September 2010.

Chemical Technology and Environmental Protection Group

Research field – classification code:
FOS104 - Chemical sciences

The main objectives and activities

In the frame of fundamental areas of chemical technology and environmental protection, the research activities of the Chemical Technology and Environmental Protection Section are directed towards the study of water treatment processes; waste treatment technologies; environmental monitoring; remediation and bioremediation of contaminated soil, sediment and water.
In the frame of an FP6 project, the Centre of Excellence for Environmental Chemistry and Risk Assessment was established.
Cooperation with local industry is realized through particular projects providing chemical environmental investigations and expertise, as well as through performing analyses of particular environmental samples at the request of service users.

The most important innovative results

- Pilot project remediation of sediments from Krivaja - the choice and optimization of treatment techniques
- Research and semi-industrial (pilot) plant for drinking water preparation in Zrenjanin.
- Implemented a system of polluter fees for wastewater for water management company "Vode Vojvodine".
- Research and semi-industrial (pilot) plant for drinking water preparation in Kikinda, I and II phase.
- Research and semi-industrial (pilot) plant for drinking water preparation in Kikinda, III phase.
- Research and semi-industrial (pilot) plant for drinking water preparation from surface water (river Vrbas), Banjaluka (2004)
- Strategy for water supply and water protection in AP Vojvodina, (Official Paper of AP Vojvodine, 1/2010).
- Research and semi-industrial (pilot) plant for drinking water treatment investigation obtained from IPA - ARSENICPLATFORM project

List of the international projects

- 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, in cooperation with the Fraunhofer-Gesellschaft - Gemany, University of Oxford, Department of Earth Sciences - UK and Clausthaler Umwelttechnik-Institut GmbH - Germany. Project No.: 043741. Project duration: 2007-2009. Project leader Prof. Dr Božo Dalmacija.
- Cost-effective technologies for wastewater treatment and waste biodegradation in agro-industries with reclamation of resources, FP5 project, RTD project for INCO-COPERNICUS-Balkans A2 with Wageningen University-The Netherlands, CUTEC Institute-Germany, ENEA-Italy, Hydroinstitute-Bijeljina and HEIS-Sarajevo, Bosnia and Herzegovina. Project No.: ICA2-CT-2002-10010. Project duration: 2003-2005 (3 years). Project leader for the Faculty of Sciences Novi Sad: Prof. Dr Božo Dalmacija.
- Arsenic and pesticide removal from natural water by an effective, safe and compact-sized separation system, EUREKA project No. E! 3644, in cooperation with ELKEDE - Greece, ENNEA - Italy, LIMNOS - Slovenia, ECOIND - Romania and JKP Waterworks and Canalization, Zrenjanin. Project No.: E! 3644. Project duration: 2006-2009. Project leader: Prof. Dr Božo Dalmacija.
- Development of new materials for application in environmentally friendly technologies for the cost-effective remediation of contaminated sites threatening cross-border regions – MATCROSS, Hungary-Serbia IPA Cross border Co-operation Programme, Project No.: HUSRB/1002/214/188. Project duration: November 1, 2011 to October 31, 2013. Project leader: Dr Srđan Rončević
- Arsenic and ammonium in drinking water: implementation of a cross-border platform for safe water – ARSENICPLATFORM, Hungary-Serbia IPA Cross border Co-operation Programme, Project No.: HUSRB/1002/121/075 Project duration: November 1, 2011 to October 31, 2013. Project leader: for Hungary Dr Zoltán Melicz, Eötvös József College (Baja), and for Serbia Prof. Dr Jasmina Agbaba.

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

- GC – Hewlett Packard 5890 Series II/MSD 5971A, 1990; GC - Agilent technologies 6890N/Micro ECD and FID, 2001; GC - Agilent technologies 7890A/MSD 5975C, 2007; Purge & trap Tekmar Dohrmann 3100 Sample Concentrator, 2003; TOC analyzer, Elementar, 2007; UV/VIS 1800, Shimadzu
- AA spectrometer Perkin Elmer Analyst 400, 2007; ICP/MS - Perkin Elmer ELAN 5000, 1992; Microwave digestion and extraction unit - Milestone Star E, 2007; IC – ICS 3000, Dionex, 2008
- Centrifuge Sigma 3-16P
- Quantachrome: Autosorb iQ2 automated gas sorption analyzer
- Pilot plant for drinking water treatment; Pilot plant for PAC/UF processes; Laboratory equipment for soil and sediment remediation
- Software Academic HyperChem Release 8.0 for Windows
- Sediment sampler, Beeker sampler for undisturbed sediment sampling, Eijkelkamp 04.20.SA; Submersible pump sets, suitable for purging and sampling monitoring wells, Eijkelkamp 12.27; Bailer sampler, Eijkelkamp 12.16; Portable pump ISCO PTP-150; Automatic wastewater sampler ISCO 3700FR/3720

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Dr Božo Dalmacija, full professor. PhD in Chemistry, University of Novi Sad, 1984. Current position: Head of the Department of Chemistry, Biochemistry and Environmental Protection. Full Professor of Chemical Technology, Environmental Protection, Technology of Environmental Protection and Drinking Water Quality at UNSPMF. Strong background in environmental engineering, especially in water technology (both drinking water and wastewater treatment). Experience in environmental chemistry and risk assessment and in the introduction of environmental protection legislation in Serbia gained through more than 60 projects and studies. References: 34 peer reviewed papers and more than 200 papers presented at national and international scientific conferences.

- Dalmacija, B., Prica, M., Ivancev-Tumbas, I., van der Kooij, A.,Roncevic, S., Krcmar, D., Bikit, I., Teodorovic, I. (2006) Pollution of the Begej Canal sediment – metals, radioactivity and toxicity assessment, Environmental International, 32, 606-615.
- Maletić, S., Dalmacija, B., Rončević, S., Agbaba, J., Petrović, O. (2009) Degradation Kinetics of an Aged Hydrocarbon-Contaminated Soil, Water Air Soil Pollut., 202, 149-159.
- Dalmacija M., Prica M., Dalmacija B., Rončević S., Klašnja M. (2011) Quantifying the environmental impact of As and Cr in stabilized/solidified materials, Science of the Total Environment, 412-413, 366-374.
- Rajić, Lj., Dalmacija, B., Dalmacija, M., Rončević, S., Ugarčina Perović, S. (2012) Enhancing electrokinetic lead removal from sediment: Utilizing the moving anode technique and increasing the cathode compartment length, Electrochimica Acta, 86, 34-40.
- Molnar, J., Agbaba, J., Dalmacija, B., Tubić, A., Krčmar, D., Maletić, S., Tomašević, D. (2013) The effects of matrices and ozone dose on changes in the characteristics of natural organic matter, Chemical Engineering Journal, 222, 435-443.

Centre for Identification Technologies - CIT

Research field – classification code:
FOS202 Electrical engineering, electronic engineering, information engineering

The main objectives and activities

Main objecitves and astivities of CIT are:
- system design,
- consulting,
- equipment selection,
- integration with other systems,
- implementation of the system,
- installation,
- commissioning and maintenance,
- training

The most important innovative results

The most important innovative results of CIT:
- DRINKOMAT (vending machine)
- IML robot (In Mould Labelling robot)
- Rent a bike systems (implemented in Novi Sad, Subotica)
- 3 Patents
- 4 Inovations- Prototypes

List of the international projects

- FP7- APOSTILLE- Reinforcement of research potentials of the Faculty of technical sciences in the field of post silicon electronics
- MAS-PLM 144959-TEMPUS- Master Studies and Continuing Education Network in Product Lifecycle Management with Sustainable Production
- JP 511084-2010-TEMPUS-Production and Profitability improvement in Serbia Enterprises by adopting Lean Thinking Philosophy and strengthening Enterprise - Academia connections
- 145009-2008 TEMPUS-Conversion Courses for Unemployed University Graduates in Serbia
- RFID (Internet of Thing) based animal individual identification technology and its application on quality traceability system

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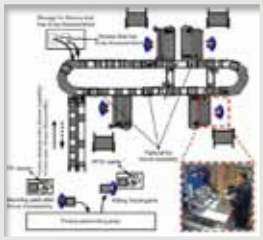
Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

- RFID readers for LF, HF and UHF tags
- Motion control equipment

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Prof. Dr Stevan Stankovski, earned undergraduate degree in Computer Sciences and Automation from the Faculty of Technical Sciences, University of Novi Sad, Serbia in 1987, and MSc degree from the Faculty of Electrical Engineering, University of Belgrade, Serbia in 1991. He received PhD degree in Intelligent automation from the Faculty of Electrical Engineering, University of Belgrade in 1994. He is professor at Chair of Mechatronics, Robotics and Automatization Chair, Department of Industrial Engineering and Management, at Faculty of Technical Sciences, University of Novi Sad. He is Head of Department of Industrial Engineering and Management and Mechatronics curriculums and associate expert of FESTO company in field of Control systems. Also, he realized over 150 scientific and industrial projects. Currently, he is Managing Editor of International Journal of Industrial Engineering and Management and Associate Editor of Scientific Journal Facta Universitatis: Mechanical Engineering.
References:

- Stankovski S., Tarjan L., Škrinjar D., Ostojić G., Šenk I.: Using a Didactic Manipulator in Mechatronics and Industrial Engineering Courses, IEEE Transactions on Education, 2010.
- Gajić G., Stankovski S., Ostojić G., Tešić Z., Miladinović Lj.: Method of evaluating the impact of ERP implementation critical success factors – a case study in oil and gas industries (DOI:10.1080/17517575.2012.690105), Enterprise Information Systems, 2012.
- Stankovski S., Ostojić G., Šenk I., Rakić-Skoković M., Trivunović S., Kučević D.: Dairy cow monitoring by RFID, Scientia Agricola, 2012.
- Lazarević M., Ostojić G., Stankovski S., Ćosić I.: Method of Product Life Management Using RFID Tag, Number of patent grants: 51796, date of grants: 24.10.2011., Beograd, Republic of Serbia, Zavod za intelektualnu svojinu, 2011.
- Tarjan L., Šenk I., Ostojić G., Stankovski S., Lazarević M.: Process for food product traceability by using a two-dimensional QR code (Adopted patent application P-2012/0478, Date: 05/11/2012), Beograd, Republic of Serbia, Zavod za intelektualnu svojinu, 2012.



Centre for Integrated Microsystems and Components - CIMC

Research field – classification code:
FOS202 - Electrical engineering, electronic engineering, information engineering

The main objectives and activities

CIMC is recognized as a regional leader in the fields of design and optimization of high-performance integrated micro- and nano-systems and components, such as inductors, varistors, termistors, electromagnetic interference (EMI) suppressors, sensors, super-compact high-performance microwave passive devices, novel integrated hybrid circuits, MEMS, nanotubules, etc. It is also acknowledged to be one of the two leaders in the country in the emerging field of metamaterials and their microwave and optical applications. Research performed at CIMC also incorporates integrated digital systems and embedded systems, such as programmable, configurable and reconfigurable components. CIMC staff is active in scientific research and publish regularly in recognized international journals and at leading conferences.

The most important innovative results

CIMC has developed expertise in the field of design and fabrication* of electronic components and sensors in LTCC technology, design and fabrication of electronic components and circuits on the PCB using modern rapid prototyping machine LPKF ProtoMat S62 also it has sucessfully fabricated components circuits and systems like RFID tagsm ID cards, sensors using Dimatix ink-jet material deposition printer.
Design of complex microprocessor electronic systems, embedded systems and algoriths is one of CIMC's research fields. Additionaly detailed functional and formal verification of digital hardware, analog and mixed signals and systems is perforemed in our facilities.

*** In cooperation with: TU Vienna, ISAS, AEM**

List of the international projects

- FP6-INCO project „Reinforcement of the Center for Integrated Microsystems and Components, coordinator Ljiljana Živanov, 2007-2010.
- FP7, REGPOT project: "Reinforcement of Research Potentials Of Faculty of Technical Sciences in the Field of Post Silicon Electronics" (APOSTILLE-no. 256615, coordinator prof. Goran Stojanovic) 2010-2013.
- FP7, ICT-2009, 6.3. b, project: "Smart Control of Demand for Consumption and Supply to Enable Balanced Energy-Positive Buildings and Neighborhoods" (SmartCoDe-no.247473, coordinator: prof. Veljko Malbasa), 2010-2013.
- FP7, IRSES project: "Multiband Electronically Reconfigurable Microwave Devices and Antennas for New Generation of Wireless Systems" (MultiWaveS, coordinator: prof. Vesna Crnojevic-Bengin), 2010-2013.
- Realization of new integrated passive devices (REANIPD), Littelfuse, Ireland, 2002.

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

Available equipment* in Laboratory for nano and printed electroncis is listed below:
FUJIFILM Dimatix DMP-3000 (www.dimatix.com), Agilent Vector Network Analyzer N5230A (10 MHz-50 GHz), Agilent Vector Network Analyzer E5071B (300kHz-8.5GHz), Agilent 85070E Dielectric Probe Kit, RF Wafer Probe Station (PM5), High Performance Cluster computer, HP4194A Impedance Analyzer (100Hz-40 MHz), HMS-3000 Hall Efect Measurement System, Tektronix 576 Curve Tracer, HP 4277 A LCZ Meter (10 KHz-1 MHz), Spectrum Analyzer HP 8590A, IC camera T1160, Nanoindenter G200 , SEM JEOL 6460LV, AFM, etc.
Concerning software tool Laboratory for nano and printed electronics is eqipped with next tools: COMSOL, Cadence, CST Studio Suite, Microwave Office, HFSS, ADS, Mentor Graphics, Xilinx ISE 12.3, ModelSim SE 6.5, dspFlash, MPLAb, Keil uVision, Micro-Cap, Protel 99, Matlab 2010, etc.

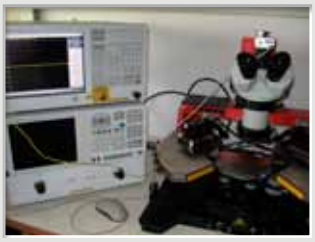
*** more details at www.cimc.rs/equipment**

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Ljiljana D. Živanov, a full profesor at the Faculty of Technical Sciences in Novi Sad. Autor of several courses in FTS, 6 books, and numerous workpapers and articles. She was mentor for more than 10 MSc and 5 PhD students. Ljiljana is head of CIMC centre andcoordinator of several international and domestical projects. She developed cooperation with following institutions: Interuniversity Center Como, Milan Polytechnic, Como, Italy; Integrated Microsystems Austria, Wr. Neustadt, Austria; Vienna University of Technology, Institute of Sensor and Actuator Systems, Austria.

- A. Menicanin, Lj. Zivanov, M. Damnjanovic, A. Maric,"Low-Cost CPW Meander Inductors Utilizing Ink-Jet Printing on Flexible Substrate for High-Frequency Applications", IEEE Transactions on Electron Devices, vol. 60, no. 2, pp. 827-832, 2013.
- M. Lukovic, M. V. Nikolic, N. Blaz, Lj. Zivanov, O. Aleksic, L. Lukic, "Mn-Zn Ferrite Round Cable EMI Suppressor With Deep Grooves and a Secondary Short Circuit for Different Frequency Ranges", IEEE Transactions on Magnetics, vol. 49, no. 3, pp. 1172-1177, 2013.
- A. Menicanin, M. Damnjanovic, Lj. Zivanov, O. Aleksic,"Improved Model of T-Type LC EMI Chip Filters Using New Microstrip Test Fixture", IEEE Trans. on Magnetics, vol. 47, no. 10, pp. 3975-3978, 2011.
- A. Menicanin, M. Damnjanovic, Lj. Zivanov, "Parameters Extraction of Ferrite EMI Suppressors for PCB Applications Using Microstrip Test Fixture", IEEE Trans. on Magnetics, vol. 46, no. 6, pp. 1370-1373, 2010.
- G. Radosavljevic, Lj. Zivanov, W. Smetana, A. Maric, M. Unger, L. Nadj, "Wireless Embedded Resonant Pressure Sensor Fabricated in the Standard LTCC Technology" IEEE Sensors Journal, vol. 9, no. 12, pp. 1956-1962, 2009.





Center for Mathematics and Statistics

Research field – classification code:
FFOS101 - Mathematics

The main objectives and activities

The Center for Mathematics and Statistics exists and acts within the Department for Fundamental Disciplines of the Faculty of Technical Sciences, University of Novi Sad. The Center has been founded in 2004 with the objective of offering researchers working at the Department a scientific research institution to gather around. Besides the professors and teaching assistants of the Department, graduate students, young researchers, and external partners participate in the activities of the Center.
Our researchers coordinate and participate in several national and international scientific projects. In addition to the general seminar of the Center for Mathematics and Statistics, there are several specialized thematic seminars organized. The Center also takes part in organizing courses for undergraduate, graduate and PhD studies at the Faculty of Technical Sciences. The organization of international conferences and summer schools is one of the main activities of the Center.

The most important innovative results

- Types and roles for web security
- Security types for dynamic web data
- Characterizing strong normalization in lambda calculus
- Resource control term calculi
- An approach to call-by-name delimited continuations
- Behavioural inverse limit lambda models
- Theory of hyperclones
- Partitioning Finite d-Dimensional Integer Grids with Applications
- Separating Points by Parallel Hyperplanes – Characterization Problem
- Coverage Segmentation based on Linear Unmixing and Minimization of Perimeter and Boundary Thickness
- Regularized image denoising based on spectral gradient optimization
- Defuzzification of spatial fuzzy sets by feature distance minimization
- High Precision Boundary Length Estimation by Utilizing Gray-Level Information
- Shape Signatures of Fuzzy Star-shaped Sets Based on Distance from the Centroid
- Measurements of digitized objects with fuzzy borders in 2D and 3D

List of the international projects

- COST IC1201 BETTY - Behavioural Types for Reliable Large-Scale Software Systems (2012-2016)
- COST IC0901 REACH-MODEL TOOLKIT - An Infrastructure for Reliable Computer Systems (2009-2013)
- SEMACODE - Stratégies d'Évaluation, Machines Abstraites et COntrôle DElimité, INRIA équipe associée
- TYPES - Types for Proofs and Programs, FP6 ICT (2004-2008)
- DEUKS - Doctoral School towards European Knowledge Society, TEMPUS (2007-2009)

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

- RDP 2011 – The Sixth Federated Conference on Rewriting, Deduction, and Programming (http://www.rdp2011.uns.ac.rs/)
- FIT 2009 - Foundations of Information Technologies (http://cms.uns.ac.rs/fit2009/)

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Silvia Gilezan, PhD.
Education:1993 Ph.D. - University of Novi Sad, Yugoslavia. Research interests: Theoretical Computer Science (lambda calculus, type theory), Global computing (process calculi, security types), Logic (proof theory, logic in computer science), Mathematical Linguistics. Positions held: 2005-present Full Professor, University of Novi Sad, Faculty of Technical Sciences 1994-present Researcher at the Mathematical Institute, Serbian Academy of Sciences and Arts, Belgrade, Serbia Visiting positions: 2001-2002, 2007 École Normale Superieure de Lyon, France. 2000-2001 Computing Science Department, Radboud University, Nijmegen, The Netherlands. Publications: 5 book chapters, over 40 publications in international journals, over 30 communications at international conferences, over 20 communications as a guest speaker
References:

- S. Ghilezan: Proof Theory. In "Lambda Calculus with Types" by H.P. Barendregt, R. Statman, W. Dekkers. Cambridge University Press 2013.
- M. Dezani-Ciancaglini, S. Ghilezan, S. Jaksic, J. Pantovic: Types for Role-Based Access Control of Dynamic Web Data (WFLP 2010), Lecture Notes in Computer Science 6559: 1-29 (2011) (invited paper).
- M. Dezani-Ciancaglini, S. Ghilezan, J. Pantović, D. Varacca: Security types for dynamic web data, Theoretical Computer Science 402 (2-3): 156-171 (2008).
- D. Dougherty, S. Ghilezan, P. Lescanne: Characterizing strong normalization in the Curien-Herbelin symmetric lambda calculus: extending the Coppo-Dezani heritage. Theoretical Computer Science 398: 114-128 (2008).
- H. Herbelin and S. Ghilezan: An approach to call-by-name delimited continuations, POPL 2008 - The 35th Annual ACM SIGPLAN - SIGACT Symposium on Principles of Programming Languages, ACM SIGPLAN Notices 43 (1): 383-394 (2008).
- M. Dezani-Ciancaglini, S. Ghilezan, J. Pantovic: Security Types for Dynamic Web Data (TGC 2006), Lecture Notes in Computer Sciences 4661: 263-280 (2007).

Centre for New Materials / Chair of Experimental Physics of Condensed Matter

Research field – classification code:
FOS205 - Materials engineering

The main objectives and activities

- Studying new materials from the group of amorphous semiconducting systems and nanostructural materials.
- Preparation and optimization of technological procedures of amorphous semiconducting systems and nanostructural materials synthesis.
- Studies that should demonstrate the possibilities of application of amorphous chalcogenides, thin films and nanostructural materials, aiming at the preparation of samples with predefined characteristics.
- Investigations of some other types of both crystalline and non-crystalline structures, using modern methods of thermal, magnetic and optical measurements, first of all for the research purpose but also for the needs of the building, ceramic and machine industries.

The most important innovative results

Member of the Centre for New Materials have participated in more than 10 national, interregional and international projects in the field of material science. As a result more than 80 papers in leading world journals from the area of materials characterization and applications, more than 80 reports at international conferences, about 30 works in domestic journals, more than 70 reports at domestic conferences and one monograph of national importance in the area of new materials has been published. Group has a long-standing successful cooperation with several very important institutions. Joint research has been carried out with the corresponding teams from the Vinca Institute of Nuclear Sciences, Institute of Physics in Zemun, Faculty of Physics, Faculty of Electrical Engineering, Faculty of Technology and Metallurgy from Belgrade, Faculty of Technical Sciences and Faculty of Technology from Novi Sad, as well as with the Faculty of Electrical Engineering from Niš, all in Serbia. Direct cooperation has also been established with the following institutions from Europe: Departamento de Fisica de la Materia Condensada, Facultad de Ciencias, Department of Physics of Condensed Matter, Faculty of Science, University of Cadiz, Spain; St. Petersburg State University, Petersburg, Russia; Department of Solid State Electronics, Uzhgorod National University, Ukraine; National Institute of Materials Physics, Bucharest, Romania and Department of Physics of the India Institute of Technology, Guwahati, India.

List of the international projects

- „Amorphous nano-composite chalcogenides“
- „Correlation between composition and properties of metal-doped noncrystalline chalcogenides“
- „Bile Acid Nanosystems as Molecule Carriers in Pharmaceutical Applications”
- “Physics of amorphous and nanostructural materials”
- “Materials with reduced dimensions for efficient light absorption and energy conversion”

Contact:

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

- DSC 822-e METTLER TOLEDO;
- LAMBDA 950 UV/VIS/NIR SPECTROMETER PERKIN ELMER;
- HM 2000 FISCHERSCOPE;
- TMA-7 PERKIN ELMER thermomechanical analyzer
- DERIVATOGRAPH 1000 Paulik-Paulik-Erdey;
- OCEAN OPTICS MMS RAMAN SPECTROMETAR
- OCEAN OPTICS QE65000;
- CARL ZEISS AXIOSKOP 40 A POL.

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Dr. Svetlana R. Lukić-Petrović, full professor of the University of Novi Sad. She teaches several courses of basic studies of physics, astronomy and astrophysics and mathematics, as well at the level of MS and PhD studies. She also supervised the work of 20 BS, 10 MS, and 3 PhD theses. Prof. Lukic-Petrovic is one of editors of the scientific journal Journal Research in Physics and reviewer of several journals from the SCI list. Author of 8 books of textbook and handbook type, more than 70 papers in leading world journals from the area of materials characterization and applications, more than 60 reports at international conferences, about 30 works in domestic journals, more than 60 reports at domestic conferences and one monograph of national importance in the area of new materials.

- T.B. Ivetić, M. R. Dimitrievska, N. L. Finčur, Lj. R. Đačanin, I. O. Gúth, B. F. Abramović, S. R. Lukić-Petrović, "Effect of annealing temperature on structural andoptical properties of Mg-doped ZnO nanoparticles and their photocatalytic efficiency in alprazolam degradation", Ceramics International, 2013, http://dx.doi.org/10.1016/j.ceramint.2013.07.041
- S. R. Lukić-Petrović, M. D. Vučkovac, G. R. Štrbac, D. D. Štrbac, Study of glass transition process in quasi-binary As2S3-CdS chalcogenides, Journal of Non Crystalline Solids, 2013.
- G. R. Štrbac, S. R. Lukić-Petrović, D. D. Štrbac, D. M. Petrović, Effect of arsenic atom substitute with antimony on crystallization processes and thermal stability of the (Sb, As)-S-I system, Journal of Non Crystalline Solids, 2012.
- D. Štrbac, S. Lukić-Petrović, D. Petrović, G. Štrbac, „Influence of substrate absorption on accuracy of determination of refractive index and thickness of uniform thin chalcogenide $Cu_1[As_2(S_{0.5}Se_{0.5})_3]_{99}$ film", Thin Solid Films, 2010.
- S. R. Lukić, D. M. Petrović, M. D. Dramićanin, M. Mitrić and Lj. Đačanin, „Optical and structural properties of Zn2SiO4:Mn2+ green phosphor nanoparticles obtained by a polymer-assisted sol–gel method", Scripta Materialia, 2008.

Centre for Renewable Energy Sources and Power Quality – CRESPQ

Research field – classification code:
FOS202 - Electrical engineering, electronic engineering, information engineering

The main objectives and activities

- Development of renewable energy sector within Serbia
- Raising the awareness of the community about the benefits of renewable energy and technologies
- Measurements and gathering of information on solar energy potential
- Measurements and gathering of information on wind energy potential
- Measurements and gathering of information on small hydro potential
- Design, development and grid integration of small and large renewable energy systems
- Renewable system performance measurement and analysis
- Control methodology and related topics for power grid with distributed energy sources

The most important innovative results

- Designing, installation and exploitation of PV power system of 8kW at the Faculty of Technical Sciences – in operation from October 25th 2011.
- Realization of electric vehicles in cooperation with company „Globus Auto".
- Organization of several industry sessions at the regional/international conference/symposium (IEEE international conference EPE – PEMC 2012, International symposium on Power electronics 2011 etc.).
- Realization of complete small scale (7.5 kW) wind energy conversion system connected to the power grid – laboratory prototype.
- Designing, techno-economic evaluation, energy potential determination, grid connection and consulting for large number of PV/wind power plant projects of different size (several kW up to 10 MW).

List of the national / international projects

- Scientific project No. III 042004 of Integrated and Interdisciplinary Research entitled "Smart Electricity Distribution Grids Based on Distribution Management System and Distributed Generation", funded by Republic of Serbia, Ministry of Education and Science.
- Scientific project no. 114-451-2248/2011-02 entitled "Research and development of energy efficient power supply systems and electric vehicle drives", funded by Autonomous Province of Vojvodina
- Bilateral research project no. 69-00-160/2009-02/14 entitled "Embedding renewable energy sources into an active distribution network", funded by Republic of Serbia and Republic of Croatia - Ministry of Education and Science.

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

- CRESPQ can offer SMEs or research teams, the access to its "PV laboratory in the open", an 8 kW photovoltaic power plant
- An advanced dSPACE based laboratory setup
- Two small electrical vehicles and one "solar bike", an electrically powered bicycle.
- CRESPQ has a set of metering instruments for wide variety of purposes:
- SEAWARD Solar Survey 200; Flir i7; HT Italia Solar I-V; Metrel MI 2292; flickering and transient shapes and duration analysis; Chauvin Arnoux QualiSTAR 8334B.
- CRESPQ is the licensed user of the following software:
- PVSyst; WasP; Caddy ++.

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Boris Dumnić, was born in Bileca, Bosnia and Herzegovina, in 1976. He received the M.Sc. and Ph.D. degrees in electrical and computing engineering from the University of Novi Sad, Novi Sad, Serbia, in 2007 and 2013 respectively. He joined the Department of Power and Electronics, Engineering of the Faculty of Technical Sciences, University of Novi Sad in 2004. His main research interests are in the area of control of electrical drives, modeling and simulation of electric machines and renewable energy resources.
Most important reference:

- B. Dumnić, V. Katić, V. Vasić, D. Milićević, M. Delimar, "An Improved MRAS Based Sensorless Vector Control Method for Wind Power Generator", Journal of Applied Research and Technology, 2012.
- Z. Corba, V. Katic, B. Dumnic, and D. Milicevic, "In-Grid Solar-to-Electrical Energy Conversion Systems Modeling and Testing, " Thermal Science, 2012.
- V. Katic, B. Dumnic, N. Katic, D. Milicevic, S. Grabic, "Potentials and Market Prospective of Wind Energy in Vojvodina," Thermal Science, 2012.
- B. Dumnić, N. Rikalo, V. Katić, D. Milićević, Z. Čorba, "Wind Resources Analysis Using WAsP at the Particular Site", 16th International Symposium on Power Electronics, 2011.
- B. Dumnić, D. Matić, V. Katić, V. Vasić, M. Delimar, "Optimal MRAS Speed Estimation for Induction Generator in Wind Turbine Application", The 15th IEEE Mediterranean Electromechanical Conference – MELECON 2010.



Chair for metrology, quality, fixtures, tools and ecological engineering aspects

Research field – classification code:
FFOS211 - Other engineering and technologies

The main objectives and activities

The main objectives of the Chair include intensive development through the promotion of new fields and the continuous improvement of competencies and skills within core activities - education of students, research and development, and cooperation with industry. Activities include: coordinate measurements; computer aided inspection (CAI), computer aided quality assurance (CAQ), statistical process control (SPC), Quality Management (QMS) reverse engineering design; design of fixtures and cutting tools; planning and design of maintenance, measurement and control of pollution in living and working environments; environmental management systems (EMS), life cycle assessment (LCA), eco-design and eco-labeling.

The most important innovative results

- System for increasing the measurement accuracy of numerically controlled measuring machines;
- The software for pre-processing of the results of 3D-digitization;
- System for intelligent fixture design; • Database with the software as a support platform for continuous education at FTS
- The methodology for the life cycle assessment of the production of PVC and wood floorings;
- Environmental label of Serbia for five products of Tarkett company;
- The industrial prototype devices for testing static indulgency and load of joint elements for clamping the workpiece.

List of the international projects

- Improvement and Development of the Ecological Attitude in Serbia - IDEAS, TEMPUS Joint European Project, Project No.: SM CSM-C037B06-2006, 2007 - 2008.
- Education and Training of Institutions in Quality Management and Metrology - ETIQUM, TEMPUS Joint European Project, Project No.: JEP 41120 2006, 2007 - 2009.
- Training of Institutions in Modern Environmental Approaches and Technologies - TIMEA, TEMPUS Joint European Project, Project No.: JEP 41156 2006, 2007 - 2009.
- Development and promotion of local systems to support innovative S.M.E. in Albania, Bosnia and Serbia (SVILOPIM), INTERREG, no.: 06SER02/01/08, 2007 – 2009.
- Development of the system for reverse engineering design of products with complex geometry, Bilateral project R. Serbia - R. Slovenia, no.: 451-03-02165, 2005 - 2007.

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

Coordinate Measuring Machine Zeiss Contura RDS; Articulated measuring arm MicroScribe Immersion G2X; Mar Surf PS1 (for measuring the surface roughness); Light meter YK-2005LX and UV Light meter YK-35UV; HOT WIRE ANEMOMETER YK-2005 AH; GAMMA-SCOUT w/ALERT (measurement of alpha, beta and gamma radiation); TES-EM92 (measurement of electro-smog); EMF-823 (measurement of electromagnetic radiation); Brüel & Kjær Type 2250 light noisemeter; ThermoPro™ TP8 - thermovision camera; Refractometer PR-32 Alpha, Brix 0-32%; SimaPro 7 Pre - LCA and ecodesign software; GaBi 4 PE International - LCA and ecodesign software; 3D Doctor, Able Software Corp, software.

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Dr Igor Budak, DrSc, Assistant Professor, University of Novi Sad, Faculty of Technical Sciences. Head of the Chair for Metrology, Quality, Fixtures, Tools and Environmental Engineering Aspects. Manager of the undergraduate academic studies of Production engineering. Lecturer on bachelor, master and doctoral studies of mechanical and environmental engineering, as well as on bachelor studies of biomedical engineering and of animations in engineering. His research interests are focused on 3D digitization, reverse engineering design, CAI, CAQ, as well as on environmental engineering, i.e. Life cycle engineering and Life cycle management tools. Actively works with hardware/software systems for 3D-digitization, reverse engineering design and CAQ, as well as with software systems for life cycle assessment. Participated on more then 10 projects including TEMPUS, Bilateral, Inter-regio and Ceepus Networks. Speaks English and Hungarian. Author and co-author of 8 books and more than 100 scientific and expert articles including 19 with Science Citation Index.

- Budak, I. ; Hodolič, J.; Soković, M.: Development of a programme system for data-point pre-processing in Reverse Engineering, Journal of Materials Processing Technology, 2005, Vol. 162-1, pp.730- 735, ISSN 0924-0136.
- Budak, I., Vukelic, D., Bracun, D., Hodolic, J., Sokovic, M.: Pre-Processing of Point-Data from Contact and Optical 3D Digitization Sensors, Sensors, 2012, Vol. 12, No. 1, pp. 1100-1126, ISSN 1424-8220.
- Budak I., Sokovic M., Barisic B.: Accuracy improvement of point data reduction with sampling-based methods by Fuzzy logic-based decision-making, Measurement, 2011, vol. 44 no. 6, pp. 1188-1200.
- Agarski B., Budak I., Kosec B., Hodolic J.: An Approach to Multi-criteria Environmental Evaluation with Multiple Weight Assignment, Environmental Modeling & Assessment, 2012, vol. 17 no. 3, pp. 255-266.
- Trifkovic B., Budak I., Todorovic A.J., Hodolic J., Puskar T.M., Jevremovic D.P., Vukelic Dj.: Application of Replica Technique and SEM in Accuracy Measurement of Ceramic Crowns, Measurement Science Review, 2012, vol.12 no.3, pp. 90-97.

Department of Applied Mechanics

Research field – classification code:
FOS203 - Mechanical engineering

The main objectives and activities

- Research activities within fields of Applied Mathematics and Mechanics
- Teaching Applied Mechanics and Fractional Calculus at BSc, MSc and PhD levels
- Accident analysis and reconstruction
- Analysis of a shock structure in continuum models of gas dynamics
- Consulting within various engineering and biomedical fields
- Modelling and simulation of the real phenomena
- Passive dampers and active control within seismic base isolating systems

The most important innovative results

- Stability and optimal shapes of micro/nano beams
- Quantification of mitral regurgitation with 2D and Doppler echocardiography
- A model for shrinkage strain in photo polymerization of dental composites
- Compartmental analysis in pharmacokinetics: fractional time evolution
- An expansion formula for fractional derivatives in terms of ordinary derivatives and moments of a function

List of the international projects

- Viscoelasticity of fractional type and shape optimization in rod theories
- Mechanics of nonlinear and dissipative systems: contemporary models, analysis and applications
- Applied biomedical engineering in pre-clinical and clinical practice
- Multiscale methods and their applications in biomedicine
- Parametrically excited oscillators: behaviour, phenomena and benefits

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Tel: +381 21 48 52 243
Fax: +381 21 45 02 07

Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

- Computer software developed for bifurcation analysis, optimal control problems, nonlocal and nonsmooth problems
- Rheological parameters identification for viscoelastic materials

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Dragan T. Spasić.
From 2005 to present, Full Professor, Department of Mechanics, University of Novi Sad, full time
Teaching several courses at the Faculty of Technical Sciences and at the Medical Faculty
Current research projects:

- Mechanics of nonlinear and dissipative systems: contemporary models, analysis and applications
- Seismic waves in laterally inhomogeneous geological media with discontinuities Supervising graduate and postgraduate works Investigator of sponsored research projects
- Challamel Noel Zorica Dusan Atanackovic Teodor M Spasic Dragan T, "On the fractional generalization of Eringen's nonlocal elasticity for wave propagation", COMPTES RENDUS MECANIQUE, vol. 341, no. 3, pp. 298-303, 2013.
- Glavardanov Valentin B Spasic Dragan T Atanackovic Teodor M, "Stability and optimal shape of Pfluger micro/nano beam", INTERNATIONAL JOURNAL OF SOLIDS AND STRUCTURES, vol. 49, no. 18, pp. 2559-2567, 2012.
- Tikhonov AA Spasic Dragan T Antipov KA Sablina MV, "Optimizing the Electrodynamical Stabilization Method for a Man-Made Earth Satellite", AUTOMATION AND REMOTE CONTROL, vol. 72, no. 9, pp. 1898-1905, 2011.
- Spasic Dragan T Glavardanov Valentin B, "Does generalized elastica lead to bimodal optimal solutions?", INTERNATIONAL JOURNAL OF SOLIDS AND STRUCTURES, vol. 46, no. 14-15, pp. 2939-2949, 2009.
- Petrovic Ljubomir M Spasic Dragan T Atanackovic Teodor M, "On a mathematical model of a human root dentin", DENTAL MATERIALS, vol. 21, no. 2, pp. 125-128, 2005.



FP7 Centre of Excellence in Food Safety and Emerging Risks

Research field – classification code:
FOS211 - Other engineering and technologies

The main objectives and activities

Research interests: Food chemical safety; Environment protection; Food quality control; Development of analytical methods for chemical contaminants and residues in abiotic and biotic matrices; Functional food and new food products with enhanced nutritive value; Alternative and gas fuels; Application of chemometric methods in food and environmental protection domains; Risk assessment; Food supply chain waste valorization.
Activities: Participation in the research projects; Experimental work; (analysis of persistent organic pollutants, mycotoxins, emerging pollutants in various samples); Service analysis for third parties by accredited methods for determination of heavy elements, mycotoxins and organochlorine pesticides; Trainings including open-access and customized trainings for PhD students, post-docs and professionals; Organization of the events for promotion and dissemination of research results.

The most important innovative results

The Centre has equipment for the food and environmental contaminants analysis that is unique within Balkan region and leveled with the international research centers, enabling target analysis of regulated, unregulated and emerging pollutants as well as screening of unknowns in various kinds of samples.
The main result achieved after establishing the Centre is development of the advanced and robust analytical methods for analysis of mycotoxins in cereals, cereal-based products, spices, coffee, nuts and milk, generating the first information of simultaneous occurrence of the regulated and unregulated mycotoxins in foodstuffs from the Serbian market. Furthermore, close collaboration of the Centre with eminent EU laboratories resulted in the first data on occurence of emerging pollutants in domestic food items and the environment (i.e. perfluorinated compounds in the Serbian foodstuffs, and pharmaceuticals in surface and waste waters in northern Serbia).

List of the international projects

- Project within Hungary-Serbia IPA Cross-border Co-operation programme implemented within the 2007 – 2013 Europan Union financial framework under the Instrument for Pre-accession Assistance (IPA), Development of an enzymological (laccase-based) remediation product and technology (LACREMED), HU-SRB/1002/214/147, 2012-2013.
- FP7 project, Reinforcing research potential in the Laboratory for Chemical Contaminants at the Faculty of Technology towards the establishment of the Centre of Excellence in Food Safety and Emerging Risks- CEFSER, No. 229629, 2009-2012.
- Project within Hungary-Serbia IPA Cross-border Co-operation programme implemented within the 2007 – 2013 Europan Union financial framework under the Instrument for Pre-accession Assistance (IPA), Development of xenobiotic-degrading bioaugmentation products (BIOXEN), HU- SRB/0901/214/150, 2010-2011.
- Bilateral projects with China (Human exposure assessment to heavy elements, phthalic acid esters and persistent organic pollutants through air, water, dust and food, 2013-2014, Partner: College of Environmental Science and Engineering, Nankai University, Tianjin), Spain (Advanced chromatographic and mass spectrometric techniques in food chemical safety analysis, 2012-2013, Partner: Department of Environmental Chemistry, Institute of Environmental Assessment and Water Research, Barcelona), Portugal (Polycyclic aromatic hydrocarbons and biogenic amines in smoked dry traditionally manufactured meat products from Serbia and Portugal, 2011-2012, Partner: Faculty of Veterinary Medicine – Technical University of Lisbon, Lisbon), Croatia (Inorganic and organic pollutants in urban areas, 2011-2012, Partner: Croatian Geological Survey, Zagreb), Hungary (Comparison of various analytical and chemometric methods, 2010-2011, Partner: Chemical Research Centre - Hungarian Academy of Sciences, Budapest) and Slovenia (Heavy metals in the environment as a consequence of the anthropogenic activities, 2010-2011, Partner: Geological Survey of Slovenia, Ljubljana).
- Participation in COST actions TD 1203 (Food waste valorization for sustainable chemicals, materials and fuels (EUBis), 2012-2016) and ES 1202 (Conceiving wastewater treatment in 2020 – Energetic, environmental and economic challenges (Water_2020), 2012-2016).

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

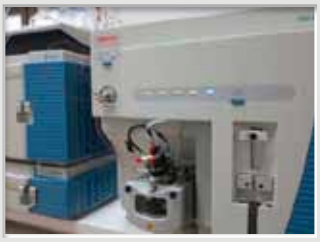
The Centre is equipped with different analytical instruments enabling target and screening analysis of micropollutants of organic and inorganic origin: UHPLC-MS/MS, UHPLC-HRMS, GC-μECD, GC-FID, GFAAS. Moreover, the Centre has a range of equipment for sample preparation, like rotary vacuum evaporator, microwave digestion unit, ultrasound bath, sample concentrator with termoblock, centrifuge, system for ultra pure water, accelerated solvent extractor.

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Prof. dr Biljana Škrbić, full professor of Faculty of Technology, University of Novi Sad, since 1996; founder and coordinator of the Laboratory for Chemical Contaminants in the Food and Environment at the Faculty of Technology; Vice Dean for Science, Faculty of Technology, 1996-1998; Editor in chief of "ACTA PERIODICA TECHNOLOGICA" (annual publication of Faculty of Technology) 1995-1998.; Chief of Oil and Petrochemical Department 1998-2000.; Guest Editor of Central European Journal of Occupational and Environmental Medicine, vol. 9 (4), 2003 and vol. 10 (1), 2004. Coordinator of numerous national, provincial and international projects from 1991.Evaluator of national and international project proposals for the calls of the Serbian Ministry of Science, FP7 and COST programme of EU, Hungarian Fund for Scientific Research, SEE-ERA.NET FP6 project and for the Slovak Research and Development Agency, appointed reviewer of the Commission for Accreditation and Quality Control of the Serbian Ministry for Education; referee in prestigious international journals; President of Scientific and Organizing Committees of numerous open-access meetings at the Faculty of Technology Novi Sad, including 3 international conferences. Research interests: food safety; environment protection; food quality control; development of analytical methods for chemical contaminants and residues; functional food and new food products with enhanced nutritive value; in abiotic and biotic matrices; alternative and gas fuels; application of chemometrics methods in food and environmental protection domains.

- B. Škrbić, S. Koprivica, M. Godula, Validation of a method for determination of mycotoxins subjected to the EU regulations in spices: the UHPLC-HESI-MS/MS analysis of the crude extracts, Food Control , 31, 461-466, 2013.
- B. Škrbić, N. Đurišić-Mladenović, Distribution of heavy elements in urban and rural surface soils: the Novi Sad city and the surrounding settlements, Serbia", Environ. Monit. Assess., 185, 457-471, 2013.
- B. Škrbić, J. Živančev, N. Mrmoš, Concentrations of arsenic, cadmium and lead on selected foodstuffs from Serbian market basket : Estimated intake by the population from the Serbia, Food Chem. Toxic., 58, 440-448, 2013.
- B. Škrbić, J. Živančev, N. Đurišić-Mladenović, M. Godula, Principal mycotoxins in wheat flour from the Serbian market: levels and assessment of the exposure by wheat-based products, Food Control , 25, 389-396, 2012.
- K. Héberger, B. Škrbić, Ranking and similarity for quantitative structure–retention relationship models in predicting Lee retention indices of polycyclic aromatic hydrocarbons, Analytica Chimica Acta , 716, 92-100, 2012.





Group for Artificial EM Materials and Microwave Engineering

Research field – classification code:
FOS202 - Electrical engineering, electronic engineering, information engineering

The main objectives and activities

The main objectives of the Group for Artificial EM Materials and Microwave Engineering are innovative research and development of microwave circuits and devices for wireless communication and sensing applications. The special focus of our research is the development of artificial electromagnetic and acoustic materials (metamaterials) and their application in design of novel, miniature passive microwave and acoustic devices with improved performances such as filters, resonators, antennas etc.

The most important innovative results

- A number of single-band and multi-band (dual-band and tri-band) bandpass and bandstop filters with ultra-compact dimensions, high performance and independent control of passbands/stopbands
- Various electromagnetic and acoustic metamaterials with properties not found in nature
- Compact multi-band planar antennas
- Microwave filters and antennas based on fractal curves
- Compact sensors for measurement of soil moisture independently of the soil type

List of the international projects

- FP7 InnoSense - Reinforcement of BioSense Centre – ICT for Sustainability and Eco-Innovation, 2013-2016., coordinator
- FP7 MultiWaveS - Multiband Electronically Reconfigurable Microwave Devices and Antennas for a New Generation of Wireless Systems, 2009-2013., coordinator
- FP7 BalkanGEONet – Balkan GEO Network – Towards Inclusion of Balkan Countries into Global Earth Observation Initiatives, 2010-2013.
- FP7 EOPOWER - Earth Observation for Economic Empowerment, 2013-2015
- FP7 DANCERS - DANube macroregion: Capacity building and Excellence in River Systems (basin, delta and sea), 2013-2015

Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

We are currently building a laboratory for photolithography, thin film, nano-structured surface and Low Temperature Co-fired Ceramics (LTCC) technologies, which will also serve as a facility for measurement and characterization of materials and sensors. The laboratory will include a clean room and it will allow research, development and fabrication of electronic circuits and devices with a special focus on sensors. The facility should become fully operational until the end of 2013.

Contact:

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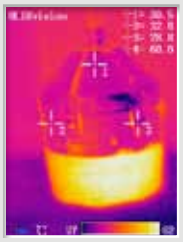
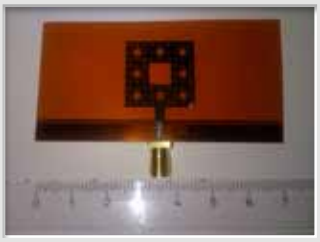
Tel: +381 21 48 52 553
Fax: -

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Prof. Vesna Crnojević-Bengin, received Dipl. Ing. degree in telecommunications and electronics from the Faculty of Technical Sciences, University of Novi Sad, Serbia in 1994, and MSc degree from the Faculty of Electrical Engineering, University of Belgrade, Serbia in 1997. She received PhD degree in electronics and microwave engineering from the University of Novi Sad in 2006. Dr Crnojevic-Bengin joined Faculty of Technical Sciences at the University of Novi Sad, Serbia, in 1998, where she has been elected Assistant Professor in 2006 and Associate Professor in 2011, introducing and teaching a number of courses in the field of microwave engineering. She is the founder and leader of the research Group for Artificial EM Materials and Microwave Engineering, GAME, and the co-founder of the BioSense Centre at the University of Novi Sad, a multidisciplinary research Centre devoted to application of ICT in Earth observation, agriculture, forestry and ecology. She is the coordinator of two FP7 and two EUREKA! research projects, as well as a participant in several other FP7, COST and national research projects. She has authored or co-authored more than 70 scientific papers, 17 of which have been published in international journals with impact factor, and two books. Since 2008, Dr Crnojevic-Bengin has been representing Group 11 in the General Assembly of the European Microwave Association, and since 2012. she has been a member of Institutions and Development Implementation Board of the international organization GEO – Group on Earth Observations. She is the Associate Editor of the International Journal of Electronics, published by Taylor & Francis, member of several international Technical Program Committees, and reviewer for a number of leading scientific journals. Dr Crnojevic-Bengin is the recipient of the special award granted by the European Commission at Marie Curie Actions for an Innovative Europe: Excellence, mobility and skills for researchers inDecember 2010 in Brussels, Belgium, as well as the recipient of the Yugoslav Microwave Theory and Techniques Award for Scientific Contribution in 2005.

- V. Crnojevic-Bengin, N. Cselzusyka, N. Jankovic, and R. Geschke, “Mu-Near-Zero Propagation in Quasi-TEM Microstrip Circuits,” Jour. of Electromagnetic Waves and Application, 2013.(accepted for publication)
- N. Jankovic, R. Geschke, and V. Crnojevic-Bengin, “Compact tri-band bandpass and bandstop filters based on Hilbert-fork resonators,” IEEE Microw. Wireless Compon. Lett., vol. 23, no. 6, pp. 282-284, 2013.
- N. Jankovic, V. Radonic, and V. Crnojevic-Bengin, “Compact tri-band bandpass filter based on quarter-wavelength resonators,” Jour. of Electromagnetic Waves and Application, vol. 27, no. 6, pp. 750-757, 2013.
- V. Crnojevic-Bengin, K. Zamlyakov, N. Jankovic, and I. Vendik, “Dual-band bandpass filters based on dual-mode Hilbert fractal resonator,” Microw. and Opt. Tech. Letters., vol. 55, no. 7, pp. 1440-1443, 2013.
- G. Kitić, V. Crnojević-Bengin, Sensor for measurement of moisture of undisturbed soil samples independently of the soil type, Sensors, vol. 13 br. 2, str. 1692-1705, 2013.





Group for Systems Analysis and Decision Making

Research field – classification code:
FOS401 - Agriculture, forestry, and fisheries

The main objectives and activities

Objectives:
- Implement contemporary systems analysis and decision-making methods and computerized tools in natural resources planning and management
- Develop and implement advanced methodologies for individual and group decision-making

Activities:
- Modeling river basin systems (network modeling; combined optimization and simulation)
- Decision support in water resources and agriculture

The most important innovative results

- Developing decision-making methodologies, methods and tools
- Decision-making in individual and group contexts supported by the analytic hierarchy process (AHP)
- Development and application of combined network simulation-optimization models for simulating large scale river basin systems operation
- Application of heursitics and metaheuristics in natural resources management
- Development and application of evolution based and other stochastic optimization algorithms (genetic, evolutionary strategies, ant colony systems, simulated annealing, etc.)
- SWOT/PESTLE analyses in water resources.

List of the international projects

- COST Action IC1205: Computational Social Choice (2012-2016)
- COST Action ES1106: ESSEM COST Action ES1106: Assessment of EUROpean AGRIculture WATer use and trade under climate change (EURO-AGRIWAT) (2012-2016)
- COST Action ES1102: VALUE - Validating and Integrating Downscaling Methods for Climate Change Research (2011-2015)
- COST Action IC0904: TwinTide- Towards the Integration of Transectorial IT Design and Evaluation (2009-2013)
- Tempus CDP_JEP 4007-2005: Lowland Agricultural Water Management - LOLAqua, Internationally oriented M.Sc. course; Consortium: Agricultural University of Athens (GR), University of Exeter (UK), Conselho National of Spain (ES), University of Novi Sad (SRB), University of Belgrade (SRB), Public Water Management Co. Vode Vojvodine Novi Sad (SRB) (2006- 2010)

Contact:

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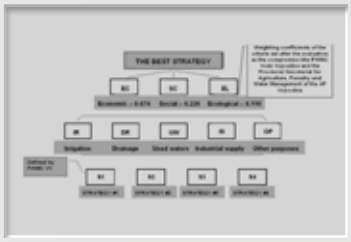
Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

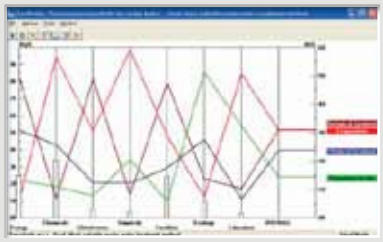
Computers, Notebooks, GPS, Software AHP.

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Dr. Bojan Srđević, a Full Professor in Water Resources Systems Analysis and Informatics is lecturing at all levels of high education (undergraduate, master and doctoral programs) at the Novi Sad University, as well as at several master and doctoral courses at the federal University of Bahia in Salvador (Brazil) and University of Stuttgart (Germany). Major lines of education, research and professional work of B. Srdjevic are in systems analysis, natural resources planning and management, and decision-making techniques and supporting systems. He has more than 30 years of experience in coordinating RTD projects under national and international programs. He serves as an expert to the World Bank and many national and international companies. B. Srdjevic has initiated, assembled consortia, project managed and successfully completed over 20 national projects. He also initiated, assembled consortium and co-managed one multi-national EU project with leading universities in Serbia, UK, Spain and Greece. He has provided both scientific and technical consultancy, and undertaken several project reviews and evaluations for the European Commission. He published over 200 papers in international and national journals and proceedings and is peer reviewer of many international journals published by IWA, Elsevier, Springer, ASCE and else.

- Srdjevic B., Srdjevic Z. (2013): Synthesis of individual best local priority vectors in AHP-group decision making, Applied Soft Computing 13 (2013) 2045-2056, Elsevier.
- Srdjevic B., Srdjevic Z. (2011): Bi-criteria evolution strategy in estimating weights from the AHP ratio-scale matrices, Applied Mathematics and Computation 218, 1254–1266. Elsevier.
- Srdjevic B., and Medeiros Y.D.P. (2008): Fuzzy AHP assessment of water management plans, Water Resources Management 22, 877-894, Springer.
- Srdjevic B. (2007): Linking Analytic Hierarchy Process and Social Choice Methods to Support Group Decision-Making in Water Management, Decision Support Systems 42 (4), 2261-2273, Elsevier.
- Srdjevic B. (2005): Combining different prioritization methods in analytic hierarchy process synthesis, Computers & Operations Research 32 (7), 1897-1919, Elsevier.





Humanoid Robotic Group - HRG

Research field – classification code:
FOS211 - Other engineering and technologies

The main objectives and activities

- Biped gait analysis and synthesis
- Biped gait control under small and large disturbances
- Robot motion in unstructured environment
- Use of robots in human environment
- Design and use of robots as medical assistive technology
- Communication and interaction between humans and robots
- Cognititive activities of robots
- Mechatronic design

The most important innovative results

- Various techniques of biped gait synthesis, particularly for motion in unstructured environment
- Biped gait control synthesis under influence of small and large perturbations (different strategies are required)
- Design and realization of sensor with soft contact surfaces, particularly appropriate for contact tasks.
- Development of humanoid robot as assistive technology in treatment of children with developmental disorders
- Development of humanoid robot as test bed for research of human-robot interaction and of social acceptance of robots

List of the international projects

- 530510-TEMPUS-1-2012-1-RS-TEMPUS-JPCR Assisting humans with special needs: curriculum for Human-Tool Interaction Network (HUTON)
- Development of Anthropomorphic Robotic Platform for Socially Acceptable and Adequate Interaction in Human Working Environment, project financed by APV, RS, contract 114-451-2116/2011
- Design of Robot as Assistive Technology in Treatment of Childreen with Developmental Disorders, project contract III44008

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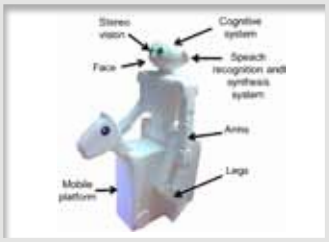
Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

- ABB industrial robot IRB 140
- Motion Capture System with two force plates (procurement in progress)

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Prof. Dr. Branislav Borovac, earned undergraduate degree in ME from the Mechanical Engineering Faculty, and MS and PhD degrees in Robotics from Faculty of Technical Sciences, all of them from UNS. He is Professor and Head of Mechatronics, Robotics and Automatization Chair at Faculty of Technical Sciences, UNS. His research interest is in the field of robotics, ranging from industrial to service and humanoid robotics. From August 1981 till September 1982 he was Visiting Scholar at Stanford University, USA. In 2009. he was Visiting Professor at Versailles University, France, in 2012. and 2013. also Visiting Professor at Prince of Songkla University at Hat Yai, Thailand. Prof. Borovac has published over 150 papers in international journals (mainly from SCI list) and conference proceedings. He is co-author of monograph (with prof. Vukobratović, Dr Stokić and prof. Surla) about biped locomotion published by Springer-Verlag. He also participated in other international monographs contributing chapters, related to humanoid robotics. He organized, participated and chaired many sessions at international conferences. He is currently Associate Editor of the International Journal of humanoid robotics and International Journal of Advanced Robotic Systems. He is member of IEEE.

- Vukobratović M., Borovac B., Surla D., Stokić D. "BIPED LOCOMOTION -Dynamics, Stability, Control and Application", Monograph, Springer - Verlag, 1990, ISBN 3-540-17456-7.
- Vukobratović M., Borovac B., "Zero-Moment Point- Thirty Five Years of its Life", Int. Jour. of Humanoid Robotics, Vol. 1, No.1, March 2004, pp. 157-173, ISSN: 0219-8436.
- Vukobratović M., Borovac B., Raković M., Potkonjak V., Milinović M., "On some aspects of humanoid robots gait synthesis and control at small disturbances", Int. Jour. of Humanoid Robotics, Vol. 5. No. 1., (March 2008), pp 119-156, ISSN: 0219-8436.
- Borovac B., Nikolić M., Raković M., "How to Compensate for the Disturbances that Jeopardize Dynamic Balance of a Humanoid Robot? ", Int. Jour. of Humanoid Robotics, Vol. 8, No.3, (2011), pp. 533-578, DOI No: 10.1142/S0219843611002551.
- Vukobratović M., Herr H., Borovac B., Raković M., Popovic M., Hofmann A., Jovanović M., Potkonjak V., "Biological Principles of Control Selection for a Humanoid Robot's Dynamic Balance Preservation", Int. Jour. of Humanoid Robotics, Vol. 5, No. 4, 2008, pp. 639-678, ISSN: 0219-8436.



Institute for Lowland Forestry and Environment - ILFE

Research field – classification code:
FOS401 - Agriculture, forestry, and fisheries

The main objectives and activities

- Development and application of new technologies in forestry and agroforestry systems
- Sustainable forest management
- Environmental application of forest trees
- Research of climate change impact on forests and adaptation

The most important innovative results

- Development of 18 new poplar and willow cultivars with desired properties
- An establishment the system for intensive monitoring of forest ecosystems
- Development of short rotation plantations for biomass production and phytoremediation

List of the international projects

- FP7-REGPOT-2007-3 (coordinator): „Strengthening of research capacity for poplar and willow multipurpose plantation growing in Serbia“ (STREPOW)
- FP7-REGIONS-2009-1: „Sustainable forest management providing renewable energy, sustainable construction and bio-based products“(RoK-FoR)
- FPS COST Action E42 – ”Growing valuable broadleaved tree species”
- FPS COST Action FP0903 – “Climate Change and Forest Mitigation and Adaptation in a Polluted Environment”
- IPA Cross-border Co-operation Programme Serbia-Hungary. “OXIT - Oxidative stress tolerance in plants: from models to trees”.

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

MultiScan Go spectrophotometer; Centrifuge; Microscope; Olympus Vanox; Vertical and horizontal electrophoresis; Calorimeter; Gas Chromatograph; Atomic Absorption Chromatograph; C flux – Eddy covariance system.

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Saša Orlović, PhD in Biotehnical Sciences – Forestry, MSc in Forestry (Faculty of Forestry Belgrade). Scientific Counsellor and Full proffesor of University of Novi Sad - Institute of Lowland Forestry and Environment; Faculty of Agriculture in the area of Nursery practice and afforestation. Prof Orlovic was involved with numerous projects at national and International level (FP7, IPA). Member of FAO-IPC, IUFRO and member of Editorial boards of numerous national and international journals.
Most important references:

- Orlovic, S., Guzina, V., Krstic, B., Merkulov, L. (1998): Genetic variability in anatomical, physiological and growth characteristics of hybrid poplar (Populus x euramericana DODE (GUINIER)) and eastern cottonwood (Populus deltoides BARTR.) clones. Silvae Genetica 47 (4), 183-190.
- Orlović, S., Pajević, S., Klašnja, B., Galić, Z., Marković, M. (2006): Variability of physiological and characteristics of white willow (Salix alba L.) clones. Genetika 38(2), 145-152.
- Klašnja, B., Orlović, S., Galić, Z., Drekić, M., Vasić, V., Pilipović, A. (2008): Poplar biomass of high density short rotation plantations as raw material for energy production. Wood Research 53 (2) , 27-38.
- Kovačević, B., Orlović, S., Ivanović, M., Čobanović, K., Nikolić-Dorić, E., Katanić, M., Galović, V. (2011): Relationship among eastern cottonwood genotypes according to early rooting traits. Genetika 43(2), 307-320.
- Stojanović, D.B., Kržič, A., Matović, B., Orlović, S., Duputie, A., Djurdjević, V., Galić, Z., Stojnić, S. (2013): Prediction of the European beech (Fagus sylvatica L.) xeric limit using a regional climate model: An example from southeast Europe. Agricultural and Forest Meteorology 176, 94–103.



Laboratory for Advanced Materials

Research field – classification code:
FOS205 - Materials engineering

The main objectives and activities

- Synthesis of nanoparticles and core/shell nanostructures
- Processing of porous and dense ceramics
- Structural and functional characterization
- Processing and characterization of electroceramics - dielectrics/ferroelectrics/multiferroics
- Processing and characterization solid oxide fuel cells
- Processing and characterization mesoporous structures for bioengineering applications

The most important innovative results

- Conductivity of Co and Ni doped lanthanum-gallate synthesised by citrate sol-gel method.
- Synthesis and structural characterization of Ce-doped bismuth titanate.
- Silica coated ferrite nanoparticles: Influence of citrate functionalization procedure on final particle morphology.
- Bismuth titanate thin films prepared by wet-chemical technique: Influence of sol ageing time.
- Effect of surface functionalization on synthesis of mesoporous silica core/shell particles

List of the international projects

- COST project: COST MP0904 SIMUFER, “Single- and multiphase ferroics and multiferroics with restricted geometries” 2010-2014, V.V. Srdić member of MC and coordinator of STSM, (coordinated by Prof. Liliana Mitoseriu).
- FP7-REGPOT-2007-3: DEMATEN 204953, “Reinforcement of research potential of the department of materials engineering in the field of processing and characterization of nanostructured materials”, 2008-2011, coordinated by V.V. Srdić.
- COST project: COST 539 ELENA, “Electro ceramics from nanopowders produced by innovative methods”, 2005-2009, V.V. Srdić member of MC and coordinator of STSM (coordinated by Prof. Biljana Stojanović).
- COST project: COST Action 528, “Chemical solution deposition of thin films”, 2003-2006, V.V. Srdić participant (coordinated by Prof. Maria Kosec).

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Fax: +381 21 45 04 13

Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

Malver Zetasizer Nano ZS; Dilatometer; Gel Permeation Chromatography; LCR Meter; Powder XRD; CVS system for Powder Synthesis; Hydrothermal Synthesis; Dip/Spin Coating; Furnaces; Pressing Equipment; Microscopes

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Dr. Vladmir V. Srdić, full professor. Education: M.Sc in Technology – Chemical Engineering in 1989; Ph.D. in Technology - Advanced Materials, FTUNS in 1995. Research fellowship: Alexander von Humboldt (1997-1998), Materials Science Department, Darmstadt University of Technology (MSD-DUT), Germany. Visiting researcher: MSD-UT, Germany in 2000, 2002 and 2003 (all together 6 months). Coordination of national projects: OI-142059, III-45021. Participation in European projects: FP7-REGPOT-2007-3: DEMATEN 204953 (coordinator), COST Mp0904 (MC member & STSM coordinator), COST 539 (MC member & STSM coordinator); COST 528, Bilateral projects with Romanian and Slovenia. Meetings: Chief organizer of traditional international meeting for young researchers in ceramics - Students Meeting (held since 2001 in Novi Sad). Publishing: Editor of the international journal "Processing and application of ceramics". Membership: Academy of Engineering Sciences of Serbia, Corresponding Member, European Ceramics Society (representative of Serbia), Serbian Chemical Society. References: Two books, more than 50, citation more than 500.

- I. Stijepovic, A.J. Darbandi, V.V. Srdic, "Conductivity of Co and Ni doped lanthanum-gallate synthesised by citrate sol-gel method", Ceram. Inter, 39 (2013) 1495-1502.
- B. Mojić, K.P. Giannokopoulos, Ž. Cvejić, V.V. Srdić, "Silica coated ferrite nanoparticles: Influence of citrate functionalization procedure on final particle morphology", Ceram. Inter, 38 (2012) 6635–6641.
- M.P. Nikolić, K.P. Giannakopoulos, D. Stamopoulos, E.G Moshopoulou, V.V. Srdić, "Synthesis and characterization of silica core/nano-ferrite shell particles", Mater. Res. Bull., 47 [6] (2012) 1513–1519.
- V.V. Srdić, B.Đ. Mojić, B. Bajac, S. Rakić, N.M. Pavlović, "Bismuth titanate thin films prepared by wet-chemical technique: Influence of sol ageing time", J. Sol-Gel Sci. Technol., 62 (2012) 259–265
- M.P. Nikolić, K.P. Giannakopoulos, M. Bokorov, V.V. Srdić, "Effect of surface functionalization on synthesis of mesoporous silica core/shell particles", Micro. Meso. Mater., 155 (2012) 8–13.

Laboratory for Intelligent Control and Biomedical Engineering

Research field – classification code:
FOS202 - Electrical engineering, electronic engineering, information engineering

The main objectives and activities

- rehabilitation engineering;
- control and assessment of movement;
- restoration of movement in humans with disabilities;
- neural prosthesis - functional electrical stimulators;
- design of medical instrumentation;
- biomedical signal processing;
- industrial control systems;
- industrial prototypes design;
- soft computing;
- soft sensors.

The most important innovative results

Development and build-up of new devices and systems for research institutions and industry worldwide.
The most important prototypes are:

- ActiGrip stimulator;
- UNAfet stimulator;
- TremUNA stimulator;
- IntFES V1 stimulator;
- IntFES V2 stimulator;
- MobileEEG device;
- EMG Holter device;
- Multi field surface electrode controller for selective electrical stimulation;
- Two channel USB device for electro-myo-neuro-graphy (EMNG).

List of the international projects

- Assisting humans with special needs: Curriculum for HUman-TOol interaction Network (HUTON), 530510-Tempus-1-2012-RS-TEMPUS-JPCR
- The application of biomedical engineering in pre-clinical and clinical research, III-41007 (2011.- 2014.). The work on this project was supported by the Ministry of education, science and technological development of Serbia.
- Electronic system for control of movement in humans with disabilities (2008.-2011.). The work on this project was supported by the Ministry of Science of Serbia.
- Development of devices and methods for neurorehabilitation in humans with sensory-motor disabilities (2005.-2007.). The work on this project was supported by the Ministry of Science of Serbia.
- Design and development of virtual and telemedical devices (2002.-2004.). The work on this project was supported by the Ministry of Science of Serbia.

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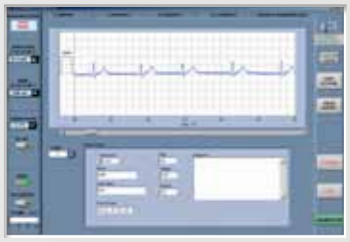
Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

Research equipment for functional electrical stimulation, movement assessment and electrophysiological recording.

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Nikola Jorgovanovic, PhD, was born on 30th of November, year 1966 in Novi Sad, SFR Yugoslavia. He received BSc degree (1992), MSc degree (1996) and PhD degree (2003) in Electrical Engineering at the Faculty of Technical Sciences, University of Novi Sad. He is working as Associate Professor at the University of Novi Sad, Faculty of Technical Sciences. Relevant skills and experience: management, rehabilitation engineering, control of movement, restoration of movement in humans with disabilities, neural prosthesis - functional electronic stimulators, design of medical instrumentation, hardware design.

- Velimir Congradac, Bogdan Prebiracevic, Nikola Jorgovanovic, Darko Stanisic, "Assessing the energy consumption for heating and cooling in hospitals", Energy and Buildings, Vol.48, pp:146-154, 2012.
- Nebojsa M Malesevic, Lana Z Popovic Maneski, Vojin Ilic, Nikola Jorgovanovic, Goran Bijelic, Thierry Keller, Dejan B Popovic, "A multi-pad electrode based functional electrical stimulation system for restoration of grasp", Journal of Neuroengineering and Rehabilitation,Vol 9(66), 2012.
- Dubravka M. Bojanic, Bojana D. Petrovacki-Balj, Nikola D. Jorgovanovic, Vojin R. Ilic, "Quatification of dynamic EMG patterns during gait in children with cerebral palsy", Journal Of Neuroscience Methods 198, pp. 325-331, 2011, ISSN:0165-0270
- Lana Popovic Maneski, Nikola Jorgovanovic, Vojin Ilic, Strahinja Dosen, Thierry Keller, Mirjana B. Popovic, Dejan B. Popovic, "Electrical stimulation for the suppression of pathological tremor", Med Biol Eng Computing, Special issue, Springer, 2011, ISSN:0140-0118
- Popović-Bijelić A, Bijelić G., Jogrovanović N., Bojanić D., Popović MB., Popović DB., "Multi-field surface electrode for selective electrical stimulation", Artificial Organs, Vol 6, pp. 448-452, Jun 2005.



Laboratory for investigation of natural resources of pharmacologically and biologically active compounds (LAFIB)

Research field – classification code:
FOS104 - Chemical sciences

The main objectives and activities

Laboratory for investigation of natural resources of pharmacologically and biologically active compounds (LAFIB) is a part of Department of Chemistry, Biochemistry and Environmental Protection, Faculty of Sciences University of Novi Sad. LAFIB is a recognized, highly qualified and very promising research unit focused on:

- isolation and chemical characterization of natural products originating from medicinal, edible, seasoning and poisonous plants and fungi
- determination of biological activity of isolated compounds, plant extracts, essential oils and herbal formulations
- consulting and quality control services in the LAFIB`s field of research for small and medium enterprises.

The most important innovative results

LAFIB is mainly research oriented. Within the past five years, numerous papers were published in highly ranked international scientific journals. LAFIB participated in the development, optimization and quality control of several herbal formulations.

List of the international projects

- Cross-border cooperation in development of a novel herbal drug targeting Helicobacter pylori (HELICO) HUSRB/1203/214/230; 2013-2015.

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

- High-performance liquid chromatograph with DAD detector (Agilent 1100 Series)
- High-performance liquid chromatograph Agilent 1200 Series coupled with DAD detector and 6410 TripleQuad mass detector with electrospray ion source (ESI)
- Multiskan Spectrum microplate reader (Thermo Scientific)

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Neda Mimica-Dukić, Dean of University of Novi Sad Faculty of Sciences, Full Professor, PhD in Biochemistry, Head of Laboratory for investigation of natural resources of pharmacologically and biologically active compounds.
Selected references:

- Lesjak, M., Beara, I., Orčić, D., Ristić, J., Anačkov, G., Božin, B., Mimica-Dukić, N. (2013): Chemical characterisation and biological effects of Juniperus foetidissima Willd. 1806. LWT-Food Science and Technology, 53:530-539.
- Beara, I., Lesjak, M., Orčić, D., Simin, N., Četojević-Simin, D., Božin, B., Mimica-Dukić, N. (2012): Comparative analysis of phenolic profile, antioxidant activity and cytotoxic activity of two closely related species: Plantago altissima L. and Plantago lanceolata L. LWT-Food Science and Technology. 47:64-70.
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- Mimica-Dukić, N., Bugarin, D., Grbović, S., Mitić-Ćulafić, D., Vuković-Gačić, B., Orčić D., Jovin, E., Couladis, M. (2010): Essential Oil of Myrtus communis L. as a Potential Antioxidant and Antimutagenic Agents. Molecules. 5:2759-2770.



Laboratory for Nano and Printed Electronics

Research field – classification code:
FOS210 - Nano-technology

The main objectives and activities

Laboratory for nano and printed electronics deals within latest research issues in the field of nanoelectronics and flexible electronics. We mainly focus on modeling and design of flexible electronic devices as well as modeling and simulations of their response. Part of research activities focuses on generation and synthesis of metallic nanoparticles for conductive inks, which is used as material for ink-jet printed device fabrication. In addition we perform different material characterization techniques for determination of electronic and mechanical properties.

The most important innovative results

Within the Laboratory for nano and printed electronics various sensor prototypes were successfully realized, combining flexible and classical electronics fabrication techniques. Some of applications include position sensing, both linear and angular, liquid determination sensing, sensor of moisture content, etc. In addition, we have developed user friendly software tool (called PROVOD) for precise inductance calculations, which is less memory consuming with preserved accuracy comparing to commercial tools. Some interesting demonstrators have been also developed, such as: TAG&FIND, Active shelf, Slalom, memristors, etc.

List of the international projects

- FP7, REGPOT project: ”Reinforcement of Research Potentials Of Faculty of Technical Sciences in the Field of Post Silicon Electronics” (APOSTILLE-no. 256615, coordinator prof. dr Goran Stojanovic) 2010-2013.
- FP7-PEOPLE-2011-ITN: “Low cost and energy –efficient LTCC sensor/IR-UWB transceiver solutions for sustainable healthy environment” (SENSEIVER-no. 289481, coordinator: prof. dr Goran Stojanović), 2011-2015.
- EUREKA project: “New generation of 3D Integrated Passive Components & Microsystems in LTCC (Low Temperature Co-fired Ceramic) Technology” E! 4570 IPCTECH, 2009-2012.
- TEMPUS WBC-VMnet project: “WBC Virtual Manufacturing Network and Fostering an Integration of the Knowledge Triangle”, 2009-2012.
- TEMPUS WBC-Inno project: “Modernization of WBC universities through strengthening of structures and services for knowledge transfer, research and innovation” ,2012-2015.

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

Available equipment in Laboratory for nano and printed electronics is listed below:
FUJIFILM Dimatix DMP-3000 (www.dimatix.com), Agilent Vector Network Analyzer N5230A (10 MHz-50 GHz), RF Wafer Probe Station (PM5), High Performance Cluster computer, HP4194A Impedance Analyzer (100Hz-40 MHz), HMS-3000 Hall Efect Measurement System, Tektronix 576 Curve Tracer, HP 4277 A LCZ Meter (10 KHz-1 MHz), Spectrum Analyzer HP 8590A, IC camera T1160, Nanoindenter G200, etc.
Concerning software tool Laboratory for nano and printed electronics is eqipped with next tools: COMSOL, Cadence, Microwave Office, HFSS, ADS, etc.

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Goran M. Stojanović, received the B.Sc., M.Sc., and Ph.D. degrees from the University of Novi Sad, Novi Sad, Serbia, in 1996, 2002, and 2005, respectively, all in electrical engineering. He is an Associate Professor with the Faculty of Technical Sciences (FTS), University of Novi Sad. He has participated and managed several national and international projects (FP7, EUREKA, and bilateral collaborative projects). He is an author or co-author of 105 scientific papers including 30 published in peer reviewed (ISI ranked) international journals. His research interests include organic/flexible electronics, nanoelectronics, and characterization/application of nanostructured materials. Prof. Stojanović received the "Dr Zoran Djindjic" award for the best young researcher in the province of Vojvodina in 2007.
Selected references:

- G. Stojanovic, M. Radovanovic, M. Malesev, V. Radonjanin, "Monitoring of water content in building materials using a wireless passive sensor", Sensors, vol. 10, no. 5, pp. 4270-4280, 2010.
- N. Jeranče, D. Vasiljević, N. Samardžić, G. Stojanović, "A Compact Inductive Position Sensor Made by Inkjet Printing Technology on a Flexible Substrate", Sensors, vol. 12, pp. 1288-1298, 2012.
- M. Milanovic, G. Stojanovic, Lj. Nikolic, M. Radovanovic, B. Skoric, A. Miletic, "Electrical and structural characterisation of nanostructured titania coatings deposited on interdigitated electrode system", Materials Chemistry and Physics, vol. 130, no. 1-2, pp. 769-774, 2012.
- G. Stojanovic, G. Kitic, S. Savic, V. Crnojevic-Bengin, "Electrical characterization of nickel manganite powders in high-frequency range", Journal of Alloys and Compounds, vol. 554, pp. 264-270, 2013.
- G. Stojanovic, N. Lecic, M. Damnjanovic, Lj. Zivanov, "Electrical and temperature characterization of NiZn ferrites, International Journal of Applied Electromagnetics and Mechanics, vol. 35, no. 3, pp. 165-17, 2011.

Laboratory for the study of xenobiotics in biological systems

Research field – classification code:
FOS304 - Health biotechnology

The main objectives and activities

- Research on drug metabolism in vivo and in vitro
- Development of analytical methods for metabolic studies
- The influence of pharmaceutical formulation on drug pharmacokinetics and metabolism
- New antidiabetic drugs
- New bile acid derivatives
- Genetic and epigenetic studies on nanotoxicology

The most important innovative results

The results of the team show that new derivatives of bile acids, namely monoketocholate (MKC), appears to have the potential to modulate biophysical properties of the cell membrane or membrane-bound transporters and may therefore enhance drug delivery to the brain, MKC increases tramadol absorption and transport to brain and in that way increases its analgesic effect. In addition, the results of the team showed the significant modifications of pharmacokinetic parameters of monoketocholate (MKC) upon probiotic treatment after oral administration, and this increase of MKC bioavailability was especially emphasized in healthy rats, while having no effect in diabetic rats, irrespective of gliclazide.

List of the international projects

- Serbian Ministry of Sciences Grant, integrative and interdisciplinary investigation project, "Interaction of xenobiotics and their effects in biomedical systems" 2011-2014. (Principal investigator Prof dr Momir Mikov)
- "The influence of 3α,7α-dihydroxy-12-oxo-5β cholanate on gliclazide and glucose intestinal permeation in diabetic rats" - University of Otago Grant 2004-2007. (Principal investigator Prof dr Momir Mikov)
- Molecular markers in strategy of sustainable development of health care for patients with malignant hematological diseases in APV", Provincial Secretariat for Science and Technological Development of the Government of Autonomous Province of Vojvodina, 114-451-2198/2012-02, 2012-2013. (Principal investigator Prof dr Karmen Stankov)
- Bilateral project of cooperation between the Ministry of Science, Republic of Serbia and CNRS, France, grant No. 451-03- 2405/2007-02/12-1 "Is KIT a dependence receptor and as such a new guardian of haematological tumorigenesis" 2007-2009. (Principal investigator Prof dr Karmen Stankov)

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

- Software LekAs - Retrieval Software on drugs in Yugoslavia and BBS on Drugs and Poisons in Medical faculty Novi Sad Yugoslavia (Mikov M editor) 1993-1995
- Mikov M. Collaborator in software project team: -Medicines distribution and control – process automation. Montenegro Health Fund 2002 (Project team: Bralic R, Lazovic V, Stankovic Lj, Mikov M, Tomic Z, Mrdak A, Mihaljevic S, Kojicic M, Babic A, Ikovic Z, Glomazic Z)

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Prof dr Momir Mikov, MD, PhD, full professor, Department of Pharmacology, toxicology and clinical pharmacology. Full professor since 1999, PhD in 1986, Specialization in 1988, Master in 1983, M.D. in 1980.
References:

- Al-Salami H, Butt G, Tucker I, Golocorbin-Kon S, Mikov M. Probiotics decreased the bioavailability of the bile acid analog, monoketocholic acid, when coadministered with gliclazide, in healthy but not diabetic rats. Eur J Drug Metab Pharmacokinet. 2012;37(2):99-108.
- Mikov M, Hani Al-Salami, Golocorbin-Kon Svetlana, Skrbic R, Raskovic A, Fawcett J. The Influence of 3α,7α/dihydroxy/12-keto-5-β-cholanate on gliclazide pharmacokinetics and glucose levels in a rat model of diabetes. Eur J Drug Metabol Pharmacokinet. 2008;33(3):137-42.
- Mikov M, Boni NS, Al-Salami H, Kuhajda K, Kevresan S, Golocorbin-Kon S, Fawcett JP Bioavailability and hypoglicaemic activity of the semisynthetic bile acid 3alfa,7alfa - dihydroxy-12- oxo-5beta-cholanate, in healthy and diabetic rats Eur J Drug Metab Pharmacokinet. 2007;32(1):7-12.
- Yang L, Zhang H, Mikov M, Tucker I. Physicochemical and biological characterization of monoketocholic acid, a novel permeability enhancer. Mol Pharm. 2009.
- Mikov M, Fawcett JP (editors) (2007): Bile acids: Chemistry, biosynthesis, analysis, chemical and metabolic transformations. Mediset Publisher, Geneva.



Loess and Geoheritage Research Group

Research field – classification code:
FOS105 - Earth and related environmental sciences

The main objectives and activities

The main research topic of our research team is to provide palaeoenvironmental and palaeoecological reconstruction of Vojvodina region and wider by investigating loess palaeosol sequences.

The most important innovative results

Loess is windblown dust deposited over extensive areas in mid latitudes which covers 10% of Earth land surfaces. Loess dusts are transported and deposited by wind during glacial periods. Loess-palaeosol sequences are indeed interesting geological formations which enclose the Earth's climate history over many glacial and interglacial cycles, or even geological ages. Loess deposits are interlayered with soil bodies, representing the shift from cold and dry to warm and wet climatic conditions. More than 60% of Vojvodina Region (Province in Northern Serbia) area is covered with loess and loesslike sediments. Since the late 1990s, based on the multidisciplinary research approach it has been discovered that the loess deposits in the Vojvodina region are among the oldest and most complete loess-palaeosol sequences in Europe. Consequently, loess-palaeosol sequences in the Vojvodina region could be regarded as one of the most important European terrestrial records of climatic and environmental changes during the last million years.

List of the international projects

- Loess Research in Serbia. Federal German Ministry of Education and Research (BMBF). Grant MOE 04/R01. Project duration: 2004-2005. Coordinators: Ludwig Zöller, University of Bayreuth (Germany) and Slobodan Markovic (Serbia).

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

Bartington MS2 Magnetic Susceptibility Meter

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Slobodan Marković, PhD, Full time professor, Department of Geography, Tourism and Hotel Management, Faculty of Sciences, University of Novi Sad. Group leader. Major research interests are climatic and environmental reconstruction, loess stratigraphy and loess geomorphology. He is a leading researcher in Serbia in the field of geography according to number of published papers in international journals, as well as according to citations in data bases ISI web of knowledge and SCOPUS.
He is President of INQUA Loess Focus Group, and national representative in INQUA and PAGES. He organised numerous international conferences and edited several special issues of leading international journals such us: Quaternary International, Catena and Central European Journal of Geosciences (with contributions presented at these conferences).

- Marković, S.B., Oches, E., Sümegi, P., Jovanović, M., Gaudenyi, T. 2006. An introduction to the Upper and Middle Pleistocene loess-paleosol sequences of Ruma section (Vojvodina, Serbia). Quaternary International 149, 80-86.
- Marković, S.B., Oches, E.A., McCoy, W.D., Gaudenyi, T., Frechen, M. 2007. Malacological and sedimentological evidence for "warm" climate from the Irig loess sequence (Vojvodina, Serbia). Geophysics, Geochemistry and Geosystems 8, Q09008, DOI: 10.1029/2006GC001565.
- Marković, S.B., Bokhorst, M, Vandenberghe, J., Oches, E.A., Zöller, L., McCoy, W.D., Gaudenyi, T., Jovanović, M., Hambach, U., Machalett, B. 2008. Late Pleistocene loess-paleosol sequences in the Vojvodina region, North Serbia. Journal of Quaternary Science 23, 73-84.
- Marković, S.B., Hambach, U., Catto, N., Jovanović, M., Buggle, B., Machalett, B., Zöller, L., Glaser, B. Frechen, M. 2009. The middle and late Pleistocene loess-paleosol sequences at Batajanica, Vojvodina, Serbia. Quaternary International 198, 255-266.
- Marković, S.B., Hambach, U., Stevens, T., Kukla, G.J., Heller, F., William D. McCoy, W.D., Oches, E.A., Buggle, B., Zöller, L. 2011. The last million years recorded at the Stari Slankamen loess-palaeosol sequence: revised chronostratigraphy and long-term environmental trends. Quaternary Science Reviews 30, 1142-1154.



The Novi Sad Nuclear Physics Group

Research field – classification code:
FOS103 - Physical sciences

The main objectives and activities

- Nuclear structure studies
- Studies of rare nuclear events
- Methodological developments:
- Optimization of timing of different counting experiments
- Optimization of different shielding arrangements
- Optimization of detection efficencies for gamma-rays
- Experimental and theoretical studies of different components of background
- Applied research of environmental radioactivity and radiopurity testing

The most important innovative results

- low-background gamma spectrometry systems developed within laboratory
- anticoincidence/ coincidence systems for investigation of rare nuclear processes and cosmic-ray induced events, developed within laboratory

List of the international projects

- ILIAS (Integrated Large Infrastructures for Astroparticle Science) - FP6
- EURONS (EUROpean Nuclear Structure) - FP6

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Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

- Four High-Purity germanium (HPGe) spectrometers of relative efficiencies of 25% - 100%, shielded by lead and iron shields with the Canberra four input Multiport data acquisition system
- Ultra-sensitive high-efficiency well-type NaI(Tl) detector system
- Liquid scintillation alpha-beta spectrometer QUANTULUS
- Alpha-ray spectrometer dedicated to the measurement of low levels of radon
- Multipurpose detection systems for coincidence/anticoincidence measurements based on plastic scintillators and germanium detectors

Short CV of key person of the entity including 5 references (published papers) in peer-reviewed journals

Dr. Istvan Bikit, is a Professor of nuclear physics at the Faculty of Sciences in Novi Sad. He obtained his PhD form the University of Novi Sad in 1976. His international experiences includes visiting positions at Sussex University (Brighton, UK), ICTP (Trieste, Italy), Laue-Langevin Institute (Grenoble, France), NIST (Geithersburg, US), and Institute of Surface Chemistry and Isotopes (Budapest, Hungary). He has led national and international projects in fundamental and applied nuclear physics research in continuity from 1981 onwards, including the bilateral project with US "Improvements on the determination of low-levels of gamma radioactivity" (JF-847 NIST, 1988-90). He was the Dean of the Faculty of Sciences and is the Director of the Department of Physics, University of Novi Sad. His research fields of interest are: nuclear structure, low background gamma spectroscopy, physics of rare nuclear events and radioecology.
References:

- I. Bikit, D. Mrdja, J. Nikolov, K. Bikit, S. Forkapic, Methods of low level gamma spectroscopy, Gamma Rays: Technology, Applications and Health Implications, Editor: I.Bikit, ISBN: 978-1-62257-697-5, (2013), Nova Science publishers Inc., pp. 41-73.
- D. Mrdja, I. Bikit, M. Veskovic, J. Slivka, N. Todorovic, J. Nikolov, S. Forkapic, K. Bikit, Time resolved spectroscopy of cosmic-ray muons induced background, Astroparticle Physics, vol. 42, pp. 103-111, 2013.
- T. Nemes, D. Mrdja, I. Bikit, Absolute activity measurement of 152Eu sources with a single detector, Nuclear Instruments and Methods in Physics Research A, 2011., vol. 648, pp. 114-123.
- N. Todorovic, J. Nikolov, S. Forkapic, I. Bikit, D. Mrdja, M. Krmar, M. Veskovic, Public exposure to radon in drinking water in Serbia, Applied Radiation and Isotopes, 2012. ,Vol. 70, str. 543–549
- I. Bikit, D. Mrdja, N. Todorovic, J. Ninkov, M. Krmar, M. Vesković, J. Slivka, J. Hansman, S. Forkapić, N. Jovančević, Airborne radioiodine in northern Serbia from Fukushima, Journal of Environmental Radioactivity, vol. 114, pp. 89–93, 2012.



Reproductive Endocrinology and Signaling research group - RES group

Research field – classification code:
FOS106 - Biological sciences

The main objectives and activities

Research activities of our group are investigation and definition of some mechanisms and signaling pathways involved in molecular adaptations of Leydig cells (the exclusive producers of male sexual hormone, testosterone). In that respect, the main research activities are as follows:

- The role of NO-cGMP signaling in Leydig cell steroidogenesis.
- Some aspects of mechanisms and signaling pathways involved in adaptation of impaired Leydig cell steroidogenesis on repeated immobilization stress.
- The role of cAMP/cGMP cross-talk in regulation of Leydig cell steroidogenesis during stress.
- Effect of acute and hronic in vivo Viagra treatment on steroidogenesis and cAMP/cGMP signaling in Leydig cells.
- Regulation of the Leydig cells homeostasis and decreased androgenesis during aging.
- Peripheral biological clock in Leydig cells - possible autonomy in relation to the central biological clock, the relationship and feedback.
- The role of Leydig cell androgen receptor in molecular adaptations during disturbed homeostasis.
- The role of IGF1R/INSR in regulation of testosterone biosynthesis in Leydig cells.
- The role of Leydig cell adrenergic receptors in molecular adaptation during disturbed homeostasis.
- Regulatory mechanisms of mitochondrial biogenesis in Leydig cells.
- Molecular markers of mitochondrial biogenesis in different organs (pineal, hypothalamus, whole brain, pituitary, neurohypophysis, heart, liver, brown adipose tissue, adrenals, testes, prostates) under the conditions of normal and disturbed homeostasis.

The most important innovative results

- Several new molecular mechanisms involved in “fight/adaptation” of Leydig cells during disturbed homeostasis of whole organism.
- Beneficial effects of Viagra on androgenesis in Leydig cells of old male rats.
- First animal facility in Serbia with “knock-out” mice with specific deletion in steroidogenic cells.

List of the international projects

- “Investigating the role of the insulin receptor family in regulating testicular steroidogenesis” (Swiss National Fondation SCOPES).
- “GnRH deficiency: Elucidation of the neuroendocrine control of human reproduction” (COST Action BM1105)
- “Evaluation of Leydig-cell-specific knockout of Cyp51 gene function on spermatogenesis and steroidogenesis” (Bilateral cooperation Serbia-Slovenia).

Resources, equipment, software and test facilities which can be shared with other SMEs or research teams

All equipment located in the Department of Biology and Environmental Science UNS: Animal facility; Equipment for research in cell signaling, cell biology & basic molecular biology research.

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Short CVs of key persons of the entity including 5 references (published papers) in peer-reviewed journals

Silvana A Andric, PhD, full professor FSUNS; silvana.andric@dbe.uns.ac.rs 1999 - PhD in Biology (Reproductive Endocrinology) – FS UNS (http://www.pmf.uns.ac.rs/en) 2000 - 2004 Post-doctoral studies in Cell Signaling (http://neuroscience.nih.gov/Lab.asp?Org_ID=362)

- Andric SA, Gonzalez-Iglesias AE, Van-Goor F, Tomic M & Stojilkovic SS (2003): Nitric oxide inhibits prolactin secretion in pituitary cells downstream of voltage-gated calcium influx. Endocrinology 144 (7): 12912-12921.
- Andric SA, Kostic TS & Stojilkovic SS (2006): Contribution of multidrug resistance protein - MRP5 in control of cGMP intracellular signaling in anterior pituitary cells. Endocrinology 147 (7): 3435-3445.
- Andric SA, Janjic MM, Stojkov NJ & Kostic TS (2007): Protein kinase G – mediated stimulation of basal Leydig cell steroidogenesis. Am J Physiol Endocrinol Metab 293 (5): E1399-1408.
- Stojkov NJ, Janjic MM, Bjelic MM, Mihajlovic AI, Kostic TS & Andric SA (2012): Repeated immobilization stress disturbed steroidogenic machinery & stimulated the expression of cAMP signaling elements & adrenergic receptors in Leydig cells. Am J Physiol Endocrinol Metab 302(10): E1239-E1251.
- Stojkov NJ, Baburski AZ, Bjelic MM, Sokanovic SJ, Mihajlovic AI, Drljaca DM, Janjic MM, Kostic TS & Andric SA (2013): In vivo blockade of alpha1-adrenergic receptors mitigates stress-disturbed cAMP & cGMP signaling in Leydig cells. Mole Hum Reprod doi.10.1093/molehr/gat052. [Epub ahead of print July 26, 2013]
- PI of 2 international projects (SCOPES "Investigating the role of the insulin receptor family in regulating testicular steroidogenesis"; Bilateral cooperation Serbia-Slovenia "Evaluation of Leydig-cell-specific knockout of Cyp51 gene function on spermatogenesis & steroidogenesis" & 1 national APV project ("Signaling pathways and molecular mechanisms involved in maintenance of sex steroids homeostasis").

Tatjana S Kostic, PhD, full professor FSUNS; tatjana.kostic@dbe.uns.ac.rs 1997 - PhD in Biology (Reproductive Endocrinology) at FS UNS (http://www.pmf.uns.ac.rs/en) 1999 – 2002 Post-doctoral studies in Cell Signaling (http://neuroscience.nih.gov/Lab.asp?Org_ID=362)

- Kostic TS, Andric SA, Kovacevic R, Maric D (1998): The involvement of nitric oxide in immobilization stress impaired testicular steroidogenesis. Eur J Pharmacol 346: 267-273.
- Kostic T.S., Andric S.A., Stojilkovic SS (2004): Receptor-controlled phosphorylation of alpha-1 soluble guanlylyl cyclase enhances nitric oxide-dependent cGMP production in pituitary cells. Mol Endocrinol 18 (2): 458-470.
- Andric SA, Janjic MM, Stojkov NJ & Kostic TS (2010): Testosterone-induced modulation of Nitric Oxide-cGMP signaling pathway and androgenesis in the rat Leydig cells. Biol Reprod 83(3): 434-442.
- Andric SA, Janjic MM, Stojkov NJ & Kostic TS (2010): "Sildenafil treatment in vivo stimulates Leydig cell steroidogenesis via cAMP and cGMP signaling pathway" Am J Physiol Endocrinol Metab 299(4): E544-E450.
- Janjic MM, Stojkov NJ, Bjelic MM, Mihajlovic AI, Andric SA, Kostic TS (2012): Transient rise of serum testosterone level after single sildenafil treatment of adult male rats J Sex Med 10 (9): 2534-2543.
- PI of national project 173057 "Molecular mechanisms & signal transduction pathways involved in regulation of steroidogenesis and adaptation of Leydig cells to disturbed homeostasis".



4. Appendix - 1
Research field classification

Field of science and technology classification (FOS 2007)

FOS1 Natural sciences

- FOS101 Mathematics
- FOS102 Computer and information sciences
- FOS103 Physical sciences
- FOS104 Chemical sciences
- FOS105 Earth and related environmental sciences
- FOS106 Biological sciences
- FOS107 Other natural sciences

FOS2 Engineering and technology

- FOS201 Civil engineering
- FOS202 Electrical engineering, electronic engineering, information engineering
- FOS203 Mechanical engineering
- FOS204 Chemical engineering
- FOS205 Materials engineering
- FOS206 Medical engineering
- FOS207 Environmental engineering
- FOS208 Environmental biotechnology
- FOS209 Industrial Biotechnology
- FOS210 Nano-technology
- FOS211 Other engineering and technologies

FOS3 Medical and health sciences

- FOS301 Basic medicine
- FOS302 Clinical medicine
- FOS303 Health sciences
- FOS304 Health biotechnology
- FOS305 Other medical sciences

FOS4 Agricultural sciences

- FOS401 Agriculture, forestry, and fisheries
- FOS402 Animal and dairy science
- FOS403 Veterinary science
- FOS404 Agricultural biotechnology
- FOS405 Other agricultural sciences

FOS5 Social sciences

- FOS501 Psychology
- FOS502 Economics and business
- FOS503 Educational sciences
- FOS504 Sociology
- FOS505 Law
- FOS506 Political Science
- FOS507 Social and economic geography
- FOS508 Media and communications
- FOS509 Other social sciences

FOS6 Humanities

- FOS601 History and archaeology
- FOS602 Languages and literature
- FOS603 Philosophy, ethics and religion
- FOS604 Art (arts, history of arts, performing arts, music)
- FOS605 Other humanities

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Tempus

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