



# PROGRESS REPORT

2013/2014, 2014/2015

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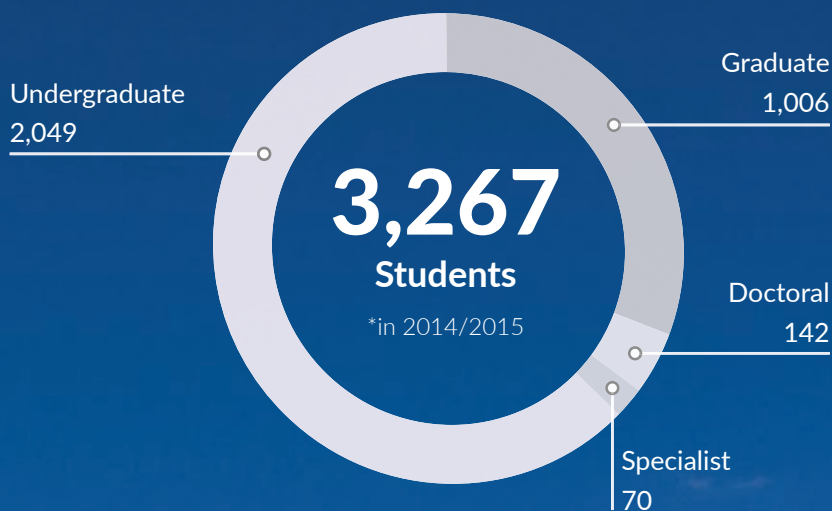
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# Facts & Figures

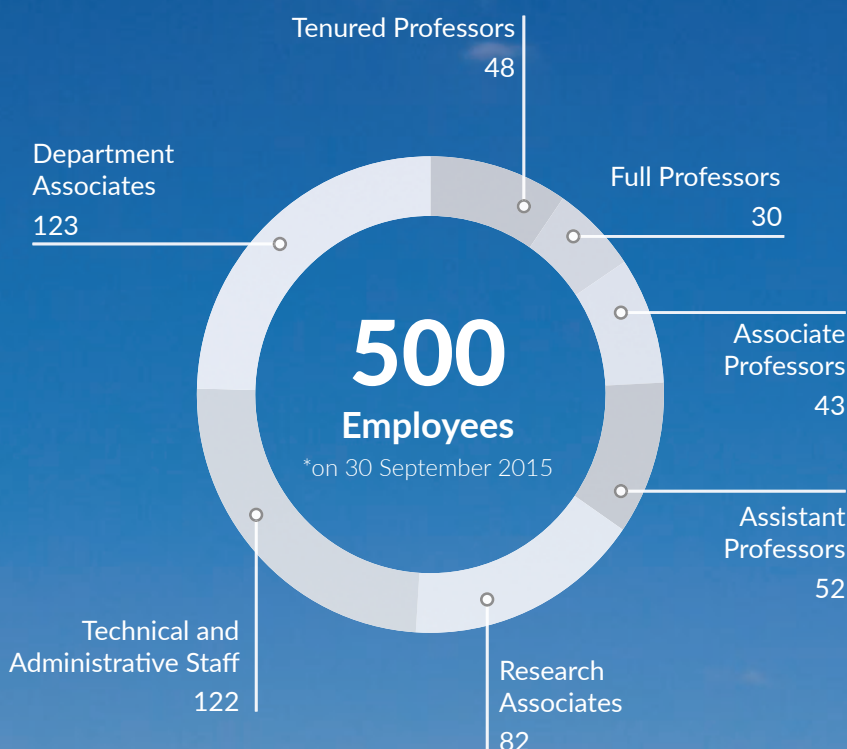


**1**  
Doctoral Programme

**2**  
Bachelor Programmes

**3**  
Master Programmes

**4**  
Specialist Programmes



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# Preface

FER strives to be an incubator for new scientific and research ideas that will be transferred to the national economy.

In the last two academic years, Faculty of Electrical Engineering and Computing of University of Zagreb has remained the leading educational and R&D institution in the fields of electrical engineering, computing, and information and communication technology in Croatia.

Scientific research is one of the basic activities of every R&D oriented faculty and, as such, FER is no exception. In that respect, we maintain the highest possible research standards, not only because of our history and position in Croatian society, but also because we are aware of our responsibility for developing high-technology products and for establishing businesses that are associated with such products as well.

FER strives to be an incubator for new scientific and research ideas that will be transferred to the national economy. Part of this transfer can be achieved through educational activities, such as masters, doctoral and specialist studies. Licensing of research results and innovations achieved directly from research projects with national and international companies proves to be equally important.

The latest period was marked by a great success of our Faculty in the European Union FP7 and Horizon 2020 frameworks: with over 25% of accepted projects in FP7 and 14% in Horizon 2020, we are high above the Croatian average, and equal to or above the EU average.

The EU projects within FP7 framework secured us funding amounting

to 16 million € from 2009 to 2014; all projects in 2015 granted funding in the amount of more than 7 million € for the next 3-4 years. We use that funding to invest in our research equipment and young researchers: a quarter of our staff – 125 people – is funded from the EU projects. We contribute to the national budget with over a million € a year in taxes.

Research excellence is pivotal to our educational activities: our students receive excellent education, as well as hands-on experience. We enroll 650 students every year; out of 1,000 best students in (higher level) Math, more than 300 of them come to FER. Furthermore, out of 1,000 best in Physics, 400 end up at FER. Our students are the best: their excellence, coupled with the quality of our research, guarantee our bright future.

This Progress Report gives an overview of all the things that happened at FER in the academic years 2013/2014 and 2014/2015: our study programmes, our students, their associations, our research, the Faculty activities and our staff. I hope you will enjoy reading it as much as I enjoyed being part of FER leadership during that time.

Finally, I would like to express my acknowledgment and gratitude to our Faculty, staff, students, graduates and friends who, all together, consolidate their efforts to continuously make FER an even more delightful place to work, teach, study and research.

Prof. Mislav Grgić  
Dean









# Teaching

*We offer study programmes at bachelor, master and postgraduate doctoral and specialist levels.*

# Bachelor Programmes

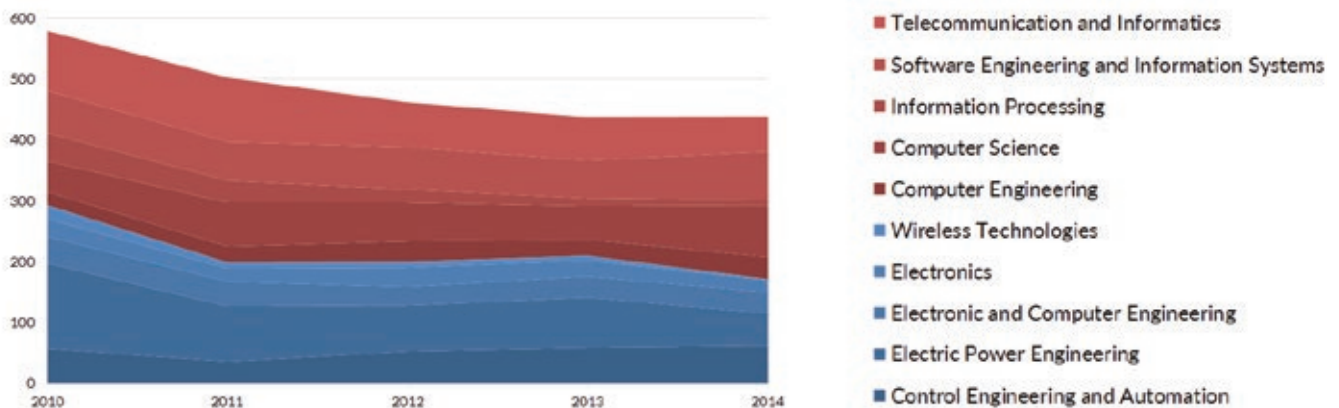
FER offers two bachelor degree study programmes. The first year of study is mutual for both study programmes. The students select a study programme while enrolling into the second year. On the third year, the study programmes are further branched down into modules as shown in the figure. The bachelor programmes nominally take 3 years and 180 ECTS credits.

	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year
<b>Bachelor Programmes</b>	<b>common year</b>	<b>Electrical Engineering and Information Technology</b>	Control Engineering and Automation
			Electric Power Engineering
			Electronic and Computer Engineering
			Electronics
			Wireless Technologies
		<b>Computing</b>	Computer Engineering
			Computer Science
			Information Processing
			Software Engineering and Information Systems
			Telecommunication and Informatics

*Bachelor graduation on 19 October 2013*



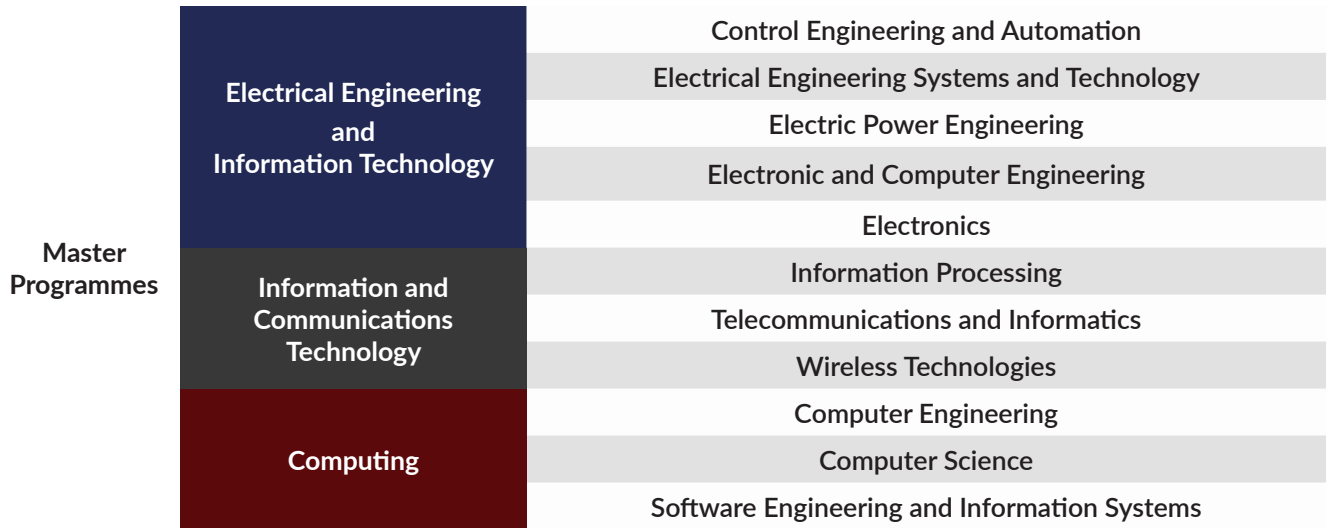
The following chart depicts the number of students who graduated with a Bachelors degree since since 2010, sorted by modules.





# Master Programmes

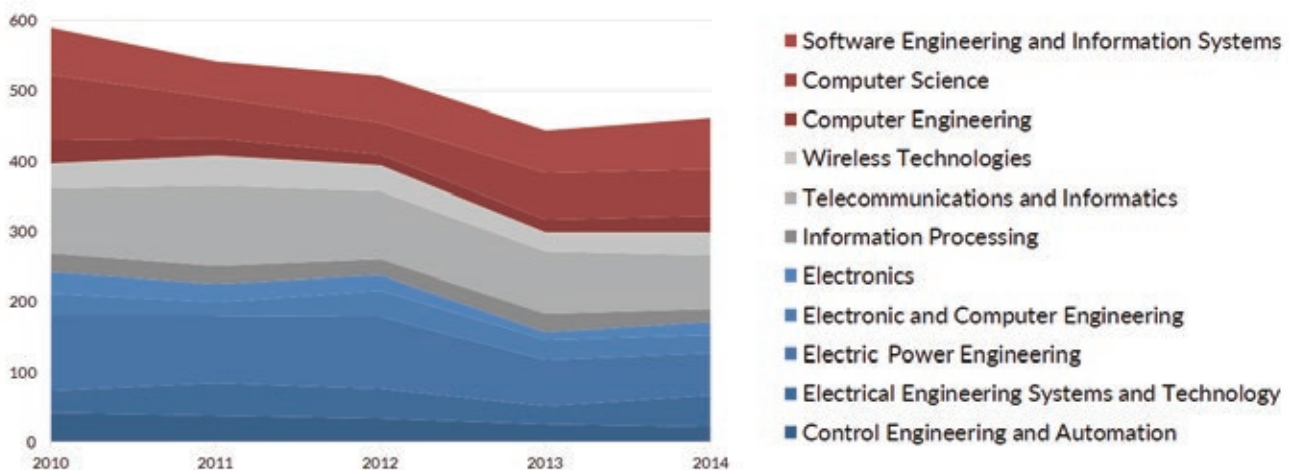
FER offers three Master degree study programmes. The study programmes are branched into profiles shown in the figure. Duration of each study programme is 2 years and 120 ECTS credits. The final semester consists of the Master Thesis, which contributes with 30 ECTS points.



Master graduation ceremony on 24 July 2014



The chart below illustrates the number of graduated students (M. Sc.) since 2010, sorted by study programmes and profiles.



2013/2014

437

Bachelors of Science

444

Masters of Science

2014/2015

440

Bachelors of Science

462

Masters of Science

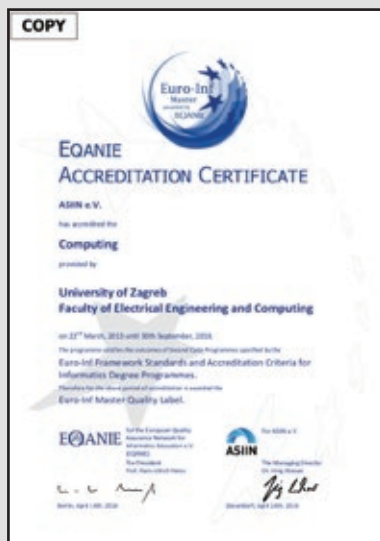


Dean Grgić presenting graduate student a diploma

## FER-2 Study Programmes Reaccredited by ASIIN

In April 2014, FER received a report of the German accreditation agency ASIIN related to Faculty's reaccreditation of undergraduate and graduate study programmes. The ASIIN agency renewed the accreditation for all our 5 study programmes until 30 September 2018.

Additionally, our study programmes received certificates of compliance with European guidelines for study programmes in Engineering and Computer Science: EUR-ACE and Euro-Inf.



## Graduation Ceremonies

Students are awarded their diplomas and diploma supplements on graduation ceremonies.

In the last 2 academic years, several graduation ceremonies were held for our undergraduates and graduates, as well as for specialists who finished one of our specialist studies:

- 18 October 2013: 13 Graduate Engineers from the FER-1 study programme, 67 graduates of the Master Study and 4 University Specialists in Transformers,
- 19 October 2013: 463 Bachelors,
- 11 April 2014: 33 graduates of Master Study,
- 25 July 2014: 368 graduates of Master Study who graduated before summer,
- 24 October 2014: 35 graduates of Master Study who graduated in September,
- 21 March 2015: 56 graduates of Master Study who graduated in the winter semester,
- 25 October 2014: 438 Bachelors.





*Dr. Ana Sović Kržić, Goran Grdenić, Prof. Marko Delimar, Dr. Anamari Nakić and Tomislav Jagušć during FER Open Door Day*

## University Fair and FER Open Door Day

Traditionally, FER takes part in the University of Zagreb Fair to engage potential future students and other interestees. In November 2013, the Fair was held at Bočarski Dom in Prisavlje and in 2014, at the University Centre in Savska street.

FER was represented by numerous interesting interactive projects prepared for the visitors by FER students and staff. Additionally, FER students and Vice Deans Petrinović (in 2013) and Delimar (in 2014) presented the study programmes and traditions of studying at FER to numerous interested high-school students through a half-hour interactive panel and a Q&A session. FER's exhibition space was visited by more than ten thousand spectators.

In parallel with the University Fair, during its last day, the Faculty opened its doors to all interested visitors. FER Open Door Day hosted various short lectures, a presentation on enrolment and life at FER, as well as guided tours of the departments and laboratories at FER.

The organization of these events was assisted by more than 100 teachers, students and non-teaching personnel as well as over 40 student volunteers from student



*FER team at the University Fair in 2015*

associations EESTEC, BEST, eSTUDENT, SSFER/KSET, SUBOS and SUPEUS. More than a thousand happy visitors offered gracious feedback about the event and took home enjoyable impressions from FER.

→ [http://www.fer.hr/otvorena\\_vrata](http://www.fer.hr/otvorena_vrata)



## Erasmus+ Student Exchange

International exchange of students at FER is accomplished through programmes such as Double-Degree programme with Politecnico di Milano, Linneaus-Palme, Swiss-European Mobility Programme, European Life-long Learning Programme (which includes the Erasmus Programme and Erasmus Mundus Programme until the end of the academic year 2013/2014), and the Erasmus+ Programme (commenced in the academic year 2014/2015).

Since the early beginnings of the institutional exchange of students in 2006, when a total of 5 students went on the exchange, the number of exchange students is constantly on the rise.

The largest student exchange takes place through the Erasmus programmes based on inter-institutional agreements. Within the framework of the Erasmus+ programme, 83 agreements have been signed with prestigious foreign universities from 20 countries, where it had been agreed about 204 available places for exchange students at all levels of study, in a total duration of 1,305 months.

In 2013/2014, incoming students came from Portugal (14 students), Spain (5), Poland (1), Argentina (1) and USA (1). In 2014/2015, we had 33 students: from Spain (9), Poland (6), Portugal (5), Greece (4), Turkey (3), Macedonia (2), France (1), Italy (1), Lithuania (1) and Slovakia (1).

→ <http://erasmus.fer.hr/>

	Outgoing			Incoming			Total
	Applied	Won	Zero-grant	Winter	Summer	W + S	
2013/2014	59	38	6	24	3	7	34
2014/2015	77	32	17	18	8	7	33

*Juraj Oršulić, outgoing Erasmus+ exchange student at the Faculty of Electrical Engineering and Information Technology, University of Vienna*



*Universities with Erasmus+ agreements with FER: the implementation of these agreed exchanges unfortunately deviates from the agreed due to insufficient funding from the European Commission, which is distributed by the Agency for Mobility and EU Programmes and finally by the University of Zagreb.*



## Summer Internship

Faculty's Summer Internship Programme started in the academic year 2011/2012 with the aim to provide our students with an opportunity to work on practical engineering problems in the realistic industrial environment, in the areas of their specific academic and professional interests.

students and domestic companies, but also for the Faculty itself, as it provides new connections and ties between the academia and industry.

After three years of successful execution of the Programme, it has been recognized by domestic companies as a very significant factor in their recruitment process.

	Companies	Positions	Students
2011/2012	44	179	85
2012/2013	83	192	103
2013/2014	143	396	118
2014/2015	98	339	104

The goal of the Programme is to bring together students and Croatian companies, by giving the students an opportunity to find their ideal internship position, and by enabling the companies to find the best matches among the population of their prospective employees.

Internship position assignment process is flexible and managed through our online internship brokerage information system. The Programme targets Master degree students, who join in on a voluntary basis, and who are awarded with 4 ECTS credits for their participation.

Students work in companies from the beginning of July till the end of September, from 3 to 6 weeks.

The participating students gave their feedback in a poll just before defending their graduate thesis, in order to assess the long-term benefits of their participation in the Programme.

The poll results show that on average 29 % of students made their diploma thesis by working with companies they spent their summer internship in; 51 % of students were offered a job in their internship company.

The long term effects of the Programme are not only beneficial for

This gives the academia an important position in a natural partnership with the industry, but it also involves the industry to improve academic processes for better alignment with modern labour marketplace expectations and requirements.

→ <http://www.fer.hr/prakse/>

## New Courses

Study programmes are constantly monitored and new courses that follow the current development in the field are introduced. The last two years, the following undergraduate (UG), graduate (G) and bridging (B) courses and skills (S) were introduced:

- Technology in Medicine (UG),
- Social Networks (G),
- Creativity laboratory (G),
- Information Technology Law (G),
- Computer Forensics (G),
- Energy storage (G),
- Introduction to the Scala programming language (S),
- Programming for the Robot Operating System (S),
- Application development using C# programming language (S),
- Elementary Mathematics (B),
- Introduction to physics (B).



## New Course: Creativity Laboratory

In the new course, organized by professors from several faculties of University of Zagreb, students gain experience in dealing with different viewpoints and methods, by joint participation in critical analysis and creative synthesis with students from other schools of the University of Zagreb.

Participation development models in the course enable students to exercise the application of critical analysis and creative synthesis in creative professional practice. The course leaders, lecturers and tutors in project development come from different schools, in order to encourage taking different perspectives on perceiving the problem and understanding the creative possibilities of innovation.

FER's Prof. Mile Šikić is one of the initiators of the course.





*Dean Grgić with members of the Working group for the preparation of the new study programme FER-3*

## FER-3: New Study Programme

The areas of electrical engineering, computer science and ICT are extremely dynamic areas that require constant changes of study programmes, since technology cycles are much shorter than in other areas. Although the current study programmes continuously update and improve, the goal is to establish new programmes, open to new areas of application and to remove deficiencies observed since Bologna process started in 2005.

New study programme, the FER-3, will keep the two-level organization of study programmes (undergraduate and graduate) to ensure better compatibility with similar programmes in Europe and the world.

In doing so, our attention in the design of the new programmes is primarily focused on 98.5 % of students who complete both levels of study, in order to avoid unnecessary repetition of course topics between levels, which was recognized as one of deficiencies of the current FER-2 study programmes.

Great emphasis on the application of modern teaching and learning methods will be given in the new programmes in order to make use of the high motivation and creativity of students in mastering the demanding studies. In addition to the in-depth mathematical, natural sciences and technical knowledge and skills, labor market requires graduates to be complemented by the so-called soft skills, and the greatest emphasis will be placed on creativity, innovation and entrepreneurship.

In the preparation of the new study programmes proposals based on learning outcomes, beside our rich previous experience gained from FER-2 programme, the international accreditation recommendations (IET, EUR-ACE, ACM/IEEE-CS and Euro-Inf), as well corresponding curricula of six chosen benchmark universities have been strongly taken into consideration (TUM, ETH, KTH, EPFL from EU, and MIT and Stanford from USA).

Given Croatian accession to the EU, programmes are prepared in accordance with the contemporary directives and recommendations of the European and national Qualifications Frameworks imposed to homogenize the European higher education area with the labour market requirements.

Selected methodology of defining study programmes is based on the knowledge units (learning outcomes), organized in knowledge areas, and was adopted from ACM/IEEE-CS recommendation.

In April 2015, first comprehensive knowledge catalogue was prepared for the FER-3 programme, and all compulsory subject syllabuses of the undergraduate study programmes have been composed using this catalogue.

Current activities are focused on preparation of graduate level core courses for all profiles of the three master level study programmes.



# Quality Management

The quality assurance system at the Faculty establishes principles, criteria and methods for quality assurance, as regulated by relevant Croatian laws and University regulations taking into account the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG).

Regulations of the Quality Assurance System at the University of Zagreb Faculty of Electrical Engineering and Computing define the activity scope of the Committee for Quality Management as an advisory and professional group of the Faculty Council and the Dean.

The Committee organizes, coordinates and implements the evaluation procedures and develops the internal mechanisms for ensuring and improving the Faculty quality.

The objective of the quality assurance is to establish mechanisms for promotion of the quality and achieving its highest level in the educational, scientific and research activities, as well as in the professional and administrative functions throughout the Faculty.

The methods of quality measurements include evaluating student feedback by questionnaires, peer-to-peer inspections, course review and self-assessment.

→ <http://www.fer.hr/kvaliteta>

## Best Teachers:

- 2013/2014: Ivan Leniček, Igor Mekterović, Jan Šnajder, Lana Horvat Dmitrović and Mario Cifrek;
- 2014/2015: Ivica Pavić, Marko Butorac, Tomislav Burić, Damir Sumina, Marko Čupić and Marko Delimar.

## Members of Quality Management Committee

- Prof. Marin Golub,
- Prof. Damir Ilić,
- Prof. Igor Lacković,
- Prof. Miljenko Mikuc,
- Prof. Mervan Pašić,
- Prof. Radovan Zentner,
- Assist. Prof. Mirjana Domazet-Lošo,
- Assist. Prof. Ana Babić,
- Damir Vuljaj, M.Sc.,
- Marijan Kuri, M.Sc. technical staff,
- Sonja Majstorović, administrative staff,
- Tomislav Car, B.Sc., external member,
- Goran Kutlača, student.

*Dr. Bojan Trkulja receiving "Roberto Giannini" Award from the Dean in 2014, awarded to the best teacher under the age of 35, according to the results of student questionnaire*



## Military Study Programme

Since 2012, FER has played an important role in the transformation process of the military education in Croatia. The basic goal was to combine the academic and basic officer education into an integrated university undergraduate study programme, as part of the mission of Croatian Defence Academy "Dr. Franjo Tuđman".

Cooperation between the University of Zagreb and Croatian Government has been established with the goal of preparing two new study programmes for the Armed Forces: Military Engineering (ME) and Military Leadership and Management (ML&M).

FER was responsible for preparation of the ME programme, while the Faculty of Political Sciences was responsible for ML&M.

Programmes were prepared according to Bologna scheme of 4-year undergraduate studies (240 ECTS), with approximately 3 years of academically oriented learning outcomes and 1 year of military oriented knowledge and skills.

Study programmes are primarily oriented towards technical (ME) and social (ML&M) fields of study, however both programs are interdisciplinary with a considerable portion of shared courses.

Senate of the University of Zagreb accepted study programmes on 11 February 2014, thus paving the way for their successful launch in the academic year 2014/2015.

Enrolment of the first class of 2014/2015 was successfully completed by mid-July by selecting the best 100 candidates out of 1,062 initial applicants. Both study programmes were fully enrolled, with 76 male and 24 female cadets.

Four students from the neighbouring countries (Bosnia and Herzegovina, Montenegro and Macedonia) enrolled the programmes the same year as well, based on bilateral agreements.

*Dr. Anamari Nakić lecturing Mathematics course to cadets*

Faculties of the University of Zagreb involved in Military Study Programme:

Faculty of Electrical Engineering and Computing  
Faculty of Political Sciences  
Faculty of Humanities and Social Sciences  
Faculty of Chemical Engineering and Technology  
Faculty of Organization and Informatics  
Faculty of Traffic Engineering  
Faculty of Mechanical Engineering and Naval Architecture  
Faculty of Geodesy  
Faculty of Civil Engineering  
Faculty of Law  
Faculty of Mining, Geology and Petroleum Engineering

After the Preparatory Boot Camp, the oath was taken in September 2014.

Our Prof. Davor Petrinović has been continuously active on this project starting from 2013. The Study Council of the Military Engineering programme elected him as the Study Board President in March 2015.

FER's Assist. Prof. Sanda Pleslić was appointed Study Board Acting President of the Military Leadership and Management Study Programme.

Both fulfilled their responsible duties in the first year of the programme's establishment.

Through this cooperation FER will employ 5 new assistant professors and 4 new teaching assistants in the four-year period from 2014 to 2018.

→ <http://vojni.unizg.hr/>





## Energy Efficiency and Renewable Energy Sources Study Programme in Šibenik

The University of Zagreb Faculty of Electrical Engineering and Computing and the University of Zagreb Faculty of Mechanical Engineering and Naval Architecture founded Energy Efficiency and Renewable Energy Sources Study Programme in Šibenik, which started in the academic year 2015/2016.

Reasons for establishment of the study programme are based on the expressed interest and requirements listed in the following documents: Energy Strategy in the Republic of Croatia, Strategy for Sustainable Development of the Republic of Croatia, Energy Act, Act of Efficient Energy Use in Direct Consumption, National Action Plan Concerning Renewable Energy Sources until 2020, National Plan of Energy Efficiency for the Period 2008-2016.

Increase of energy efficiency and increase of renewable energy sources usage is the determinant and one of the main goals of the Energy Strategy of the Republic of Croatia and of the European Union. Efficient energy use in production, transmission and direct consumption is the base of development directions for all the sectors of the energy system. Therefore, the Energy Strategy of the Republic of Croatia has defined three basic goals: security of energy supply, competitive energy system, and sustainable energy developments. Energy efficiency and increased use of renewable energy sources are the most important segments in fulfilling these three goals.

The success for the implementation of the Energy Strategy depends also on improvement of education in the area of energy, and especially in the fields of energy efficiency and renewable energy sources. Exploitation of the renewable energy sources provides favourable possibilities for the national technological development, and therefore the Government of the Republic of Croatia encourages investments in research, development and respective applications.

Likewise, the Strategy for Sustainable Development of the Republic of Croatia, adopted by the Croatian Parliament, states that incorporation of the topic of sustainability into the educational programmes on all levels is necessary. The Strategy's instruction to include the topics of sustainable development into formal and informal education on all the educational levels is particularly important.

The study programme has been established after the latest legal regulations of the Republic of Croatia accentuated the need for professionals in both public and private sector to fulfil new legal obligations in the successive period.

The goals of "Energy Efficiency and Renewable Energy Sources" study programme are:

- ensure multidisciplinary approach to technical studies in the area of energy,
- prepare the students for demanding engineering tasks in the fields of renewable energy sources usage and improvement of energy efficiency in the sectors of direct energy consumption,
- assure students to master practical knowledge, applicable in technically oriented entrepreneurship positions, but also sufficient to continue graduate study in technical disciplines,
- realise co-operation with leading professionals in business and civil service, who can transfer their practical experience to students.

The reasons for initiating "Energy Efficiency and Renewable Energy Sources" study programme are:

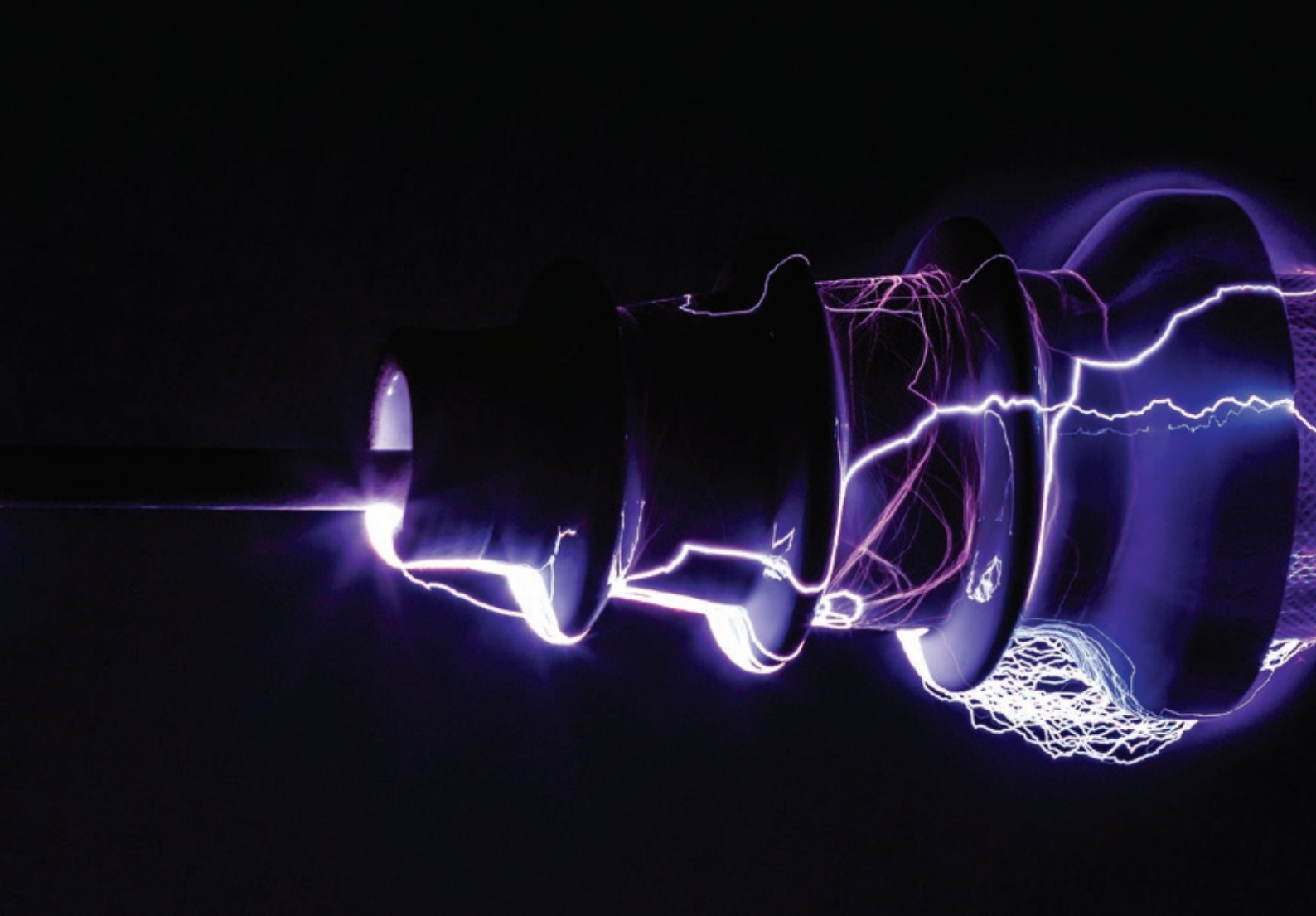
- acquisition of knowledge necessary to professionals in energy management, who are employed in industry, the building sector, the Government, regional or local administration or as consultants,
- energy management is an area important for the benefit of the society because it is indispensable for deployment of sustainable energy supply for future generations,
- further broader application of reusable energy sources,
- development of domestic potentials in the industry dedicated to manufacturing renewable energy sources equipment.

The first generation of 42 students enrolled in 2015.

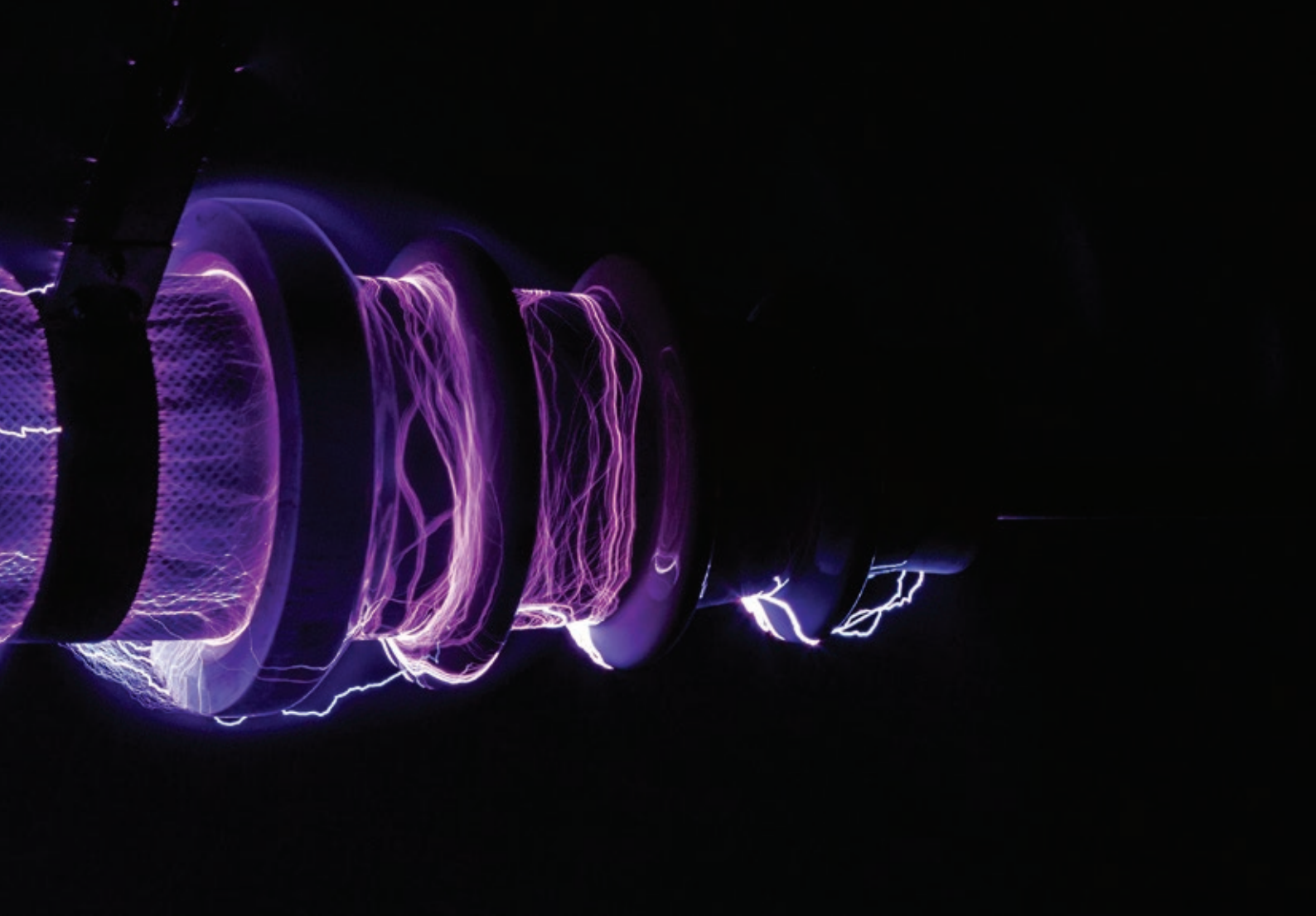
→ <http://sibenik.unizg.hr/>



*Signing of the agreement in Šibenik, 6 September 2013  
(left to right: Mayor of Šibenik Mr. Željko Burić, Rector of University of Zagreb Aleksa Bjeliš,  
and deputy Head of County Šibenik-Knin Mr. Zoran Smolić)*







# Research

*With 25 % FP7 project proposal acceptance, we are above the EU average.*

## EU Projects

Within the FP7 programme, the average success rate of new projects in Croatia is 17 % - FER's success rate is 25.23 %.

From 2009 to 2014, we received 16 million € through FP7 programmes.

Internationally, from October 2013 to September 2015:

- 10 of our FP7 project proposals were accepted;
- we were partners or coordinators on 4 Horizon 2020 projects;
- 6 COST Actions were accepted;
- 10 bilateral projects with China were approved by Chinese Ministry of Science and Technology;
- 12 other international projects were accepted.

## Croatian Projects

In Croatia, FER's share of funding received from Croatian Science Foundation accounts for 40 % of all funding allocated to all projects in technical sciences. At the University of Zagreb level, FER's share accounts for almost 60 % in the technical area.

On the following pages, we present an overview of international and domestic research projects accepted between 1 October 2013 and 30 September 2015.

→ <http://www.fer.hr/istrazivanja/>

### Horizon 2020

Wrist and Arm Sensing Technologies for Cardiac Arrhythmias Detection  
*Prof. Ratko Magjarević*

Towards the Propagation of AC Quantum Voltage Standards  
*Prof. Damir Ilić*

Submarine Cultures Perform Long-term Robotic Exploration of Unconventional Environmental Niches  
*Assist. Prof. Nikola Mišković*

CRO-EU-REKA Research for Innovation, Innovation for People  
*Prof. Gordan Gledec*

### FP7 Projects

eWall for Active Long Living  
*Prof. Dina Šimunić*

Cognitive Autonomous Diving Buddy  
*Assist. Prof. Nikola Mišković*

Multi-level Integration for Patients with Complex Needs  
*Prof. Mario Kovač*

Mitigation of Space Weather Threats to GNSS Services  
*Prof. Tomislav Kos*

Monoverse - an Inhomogeneous Model of the Universe  
*Dr. Anja Marunović*

Hybrid Silicon Photonics for Next-generation Optical Access  
*Dr. Tin Komljenović*

New Methods for Verification of Security and Privacy Mechanisms in E-commerce and E-government Systems  
*Assist. Prof. Ante Đerek*

Dynamic Management of Physically Coupled Systems of Systems  
*Prof. Mato Baotić*

Advanced Infrastructures for Electric Vehicle Charging Stations  
*Prof. Igor Kuzle*

Wind Generator Remote Inspection System  
*Prof. Ivan Petrović*

### COST Actions

Algorithms, Architectures and Platforms for Enhanced Living Environments  
*Prof. Željka Car*

Autonomous Control for a Reliable Internet of Services  
*Assist. Prof. Lea Skorin-Kapov*

Network for Sustainable Ultrascale Computing  
*Prof. Mario Kovač*

Cryptography for Secure Digital Interaction  
*Valter Vasić, M. Sc.*

Multi-paradigm Modelling for Cyber-physical Systems  
*Assist. Prof. Vedran Podobnik*





## Big Data Era in Sky and Earth Observation

*Prof. Sven Lončarić*

### Other International Projects

Financial Risk Evaluation, Using IAEA FINPLAN Tool, for Financing New Large Energy Project

*Prof. Željko Tomšić*

Autonomous Underwater Vehicles Ready for Preparedness for Oil Spills

*Prof. Zoran Vukić*

Diver Navigation Using Range-only Measurements from an Autonomous Surface Vehicle

*Assist. Prof. Nikola Mišković*

Building Green Skills

*Dr. Tomislav Capuder*

Unmanned System for Maritime Security and Environmental Monitoring

*Prof. Stjepan Bogdan*

Spatial Auditory Human-Machine Interface for UxV Teleoperation

*Assist. Prof. Nikola Mišković*

Non-Foster Source-load Networks and Metasurfaces

*Prof. Silvio Hrbar*

Analysis and Design of Curved Metamaterial Structures

*Prof. Zvonimir Šipuš*

Bio-inspired Synchronous Jumping Marine Sensor Networks

*Assist. Prof. Nikola Mišković*

Enabling Inductive Metal Characterisation in Non-cooperative Soils

*Prof. Vedran Bilas*

Innovative ICT Solutions for the Societal Challenges

*Assist. Prof. Vedran Podobnik*

Modeling and Visualization of Complex Objects System

*Prof. Željka Mihajlović*

## Bilateral Projects with PR China (2013 - 2015)

### Projects in 2014

Coordination Control of Multi-agent Systems

*Stjepan Bogdan / Ji-Feng Zhang  
Chinese Academy of Sciences*

Soundscape as a Heritage – How Important Is It? Evaluation of Soundscape in China and Croatia

*Hrvoje Domitrović / Jian Kang  
Harbin Institute of Technology*

Cardiovascular Health Informatics: Unobtrusive Sensing and Information Integration for the Tele-monitoring of Patients

*Ratko Magjarević / Yuan-Ting Zhang  
Shenzhen Advanced Institutes of Technology, Shenzhen*

Single Shoot Structured Light 3D Reconstruction

*Tomislav Pribanić / Zhan Song  
Shenzhen Institutes of Advanced Technology (SIAT), Chinese Academy of Sciences, Shenzhen*

### Projects in 2015

Rotating Remote Field Eddy Current Technique for Nondestructive Inspection of Ferrous Tubes

*Darko Vasić / Liu Ze  
Beijing Jiaotong University*

Intrabody Communication as a Key Technology for Internet of Things in Health Applications

*Mario Cifrek / Gao Yueming  
Fuzhou University*

Automatic Construction of Ontologies with Fuzzy Petri Net in the Semantic Web

*Slobodan Ribarić / Ma Zongmin  
Nanjing University of Aeronautics and Astronautics*

Acoustic Comfort Evaluation of Nonacoustic Building Space in China and Croatia

*Hrvoje Domitrović / Kang Jian  
Harbin Institute of Technology*

Investigation of Research and Innovation Partnership on Renewable Energy-based Distributed Energy System, Energy Efficiency and Sustainable Energy Solutions

*Igor Kuzle / Liu Yongqian  
North China Electric Power University*



## Projects Funded by Croatian Science Foundation



### Research Projects

Textile Antennas for Smart Environment

*Prof. Davor Bonefačić*

Autism Diagnostic Observation with Robot Evaluator

*Prof. Zdenko Kovačić*

Flexible Energy Nodes in Low Carbon Smart Grid

*Prof. Igor Kuzle*

Human-centric Communications in Smart Networks

*Prof. Maja Matijašević*

A Low-Cost Automated System to Measure the Three-dimensional Shape of Trunk Surface

*Prof. Tomislav Pribanić*

De-identification for Privacy Protection in Surveillance Systems

*Prof. Slobodan Ribarić*

High-performance Semiconductor Devices for Wireless Circuit and Optical Detection Applications

*Prof. Tomislav Suligoj*

Multi-Class Object Detection for Smart Vehicles and Safer Roads

*Prof. Siniša Šegvić*

Sustainable Optical Communication and Sensor Systems based on Extended-cavity Resonators

*Prof. Zvonimir Šipuš*

Numerical Modelling of Complex Electromagnetic Phenomena in Transformers

*Prof. Željko Štih*

Development of Advanced High Voltage Systems by Application of New Information and Communication Technologies

*Prof. Ivo Uglešić*

Advanced Electric Drives for Traction Applications

*Prof. Damir Žarko*

Advanced Design Methodology for Switching DC-DC Converters

*Prof. Adrijan Barić*

Heuristic Optimization in Cryptology

*Prof. Domagoj Jakobović*

Smart Grid Metrology Infrastructure

*Prof. Roman Malarić*

Electric Vehicle Battery Swapping Station

*Assist. Prof. Hrvoje Pandžić*

Beyond the Nyquist Limit

*Prof. Damir Seršić*

Recommender System for Service-oriented Architecture

*Prof. Siniša Srblijić*

### Starting Research Projects

Opening up Education Through Seamless and COLLABORATIVE Mobile Learning on Tablet Computers

*Assist. Prof. Ivica Botički*

De-identification Methods for Soft and Non-biometric Identifiers

*Assist. Prof. Tomislav Hrkać*

Ultrasound System for Complex Material Parameters Determination in the Nonlinear Working Conditions

*Assist. Prof. Antonio Petošić*

Managing Trust and Coordinating Interactions in Smart Networks of People, Machines and Organizations

*Assist. Prof. Vedran Podobnik*

Algorithms for Genome Sequence Analysis

*Assist. Prof. Mile Šikić*

Development of Advanced Sensorless Control of Permanent Magnet Generator for Improving Energy Efficiency

*Assist. Prof. Damir Sumina*

3CON - Control-based Hierarchical Consolidation of Large Consumers for Integration in Smart Grids

*Prof. Mario Vašak*

Development of Code Package for Advanced Gamma and Neutron Shielding Analysis

*Assist. Prof. Krešimir Trontl*

Mathematical Analysis of Multiphysics Problems Involving Thin and Composite Structures and Fluids

*Assist. Prof. Igor Velčić*

Algorithms for Systemic Risk Measurement

*Assist. Prof. Zvonko Kostanjčar*

A Software System for Parallel Analysis of Multiple Heterogeneous Time Series with Application in Biomedicine

*Dr. Alan Jović*

Leveraging Data Mining Methods and Open Technologies for Enhancement of the e-Learning Infrastructure

*Assist. Prof. Damir Pintar*

Cooperative Quality of Experience Management for Interactive Cloud-based Multimedia Applications in Mobile Networks

*Assist. Prof. Lea Skorin-Kapov*

SenseHive: Dynamic Crowdsourcing Models for Incremental Construction of Lexico-semantic Resources

*Assist. Prof. Jan Šnajder*



## European Structural Fund

Through the European Regional Development Fund, which aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions, FER has retrieved more than **2 million €** since 2014 in the call “Strengthening capacities for research, development and innovation”. Out of 19 projects financed in Croatia, FER is a partner in 4 projects, which involve Croatian industry.



### Information and Communication Technology for Generic and Energy-Efficient Communication Solutions with Application in e-/m-health

Project ICTGEN is focused on research, development and innovation in information and communication technology sector as one of the key drivers for sustainable economic development.

In partnership with **Ericsson Nikola Tesla** company, FER aims to improve its RDI capacity through industrial research and knowledge transfer aiming to create new knowledge and design of generic components for ICT solutions in the following areas: (1) complex ICT e-health and m-health services, multimedia and other services delivered over the communication network, (2) software defined networks for the delivery of ICT services, and (3) energy efficiency of network resources and quality of service. Project coordinator is Prof. Maja Matijašević.

### Wirelessly Powered Microelectronic Circuit for Distributed Sensor Networks

The project aims to develop the key building blocks of integrated circuits, which are the basis for the development of applications for wirelessly powered distributed sensor networks.

Today's sensor nodes in distributed networks use battery supply, which is problematic due to limited battery lifetime and its cost.

In this project the chip is processed as a system consisting of the circuits for the wirelessly powered supply, the 9-bit cyclic analogue-to-digital converter, the oscillator insensitive to the voltage level changes and the communication channel.

Main goal of the project is to gather new knowledge and to develop technologies which can be applied for the commercial purposes. The project is coordinated by Prof. Adrijan Barić and the SME partner is **Locus Ltd.**



### Technological Platform for the New ICT Strategy in the Treatment and Control of Diabetes

Aim of the project is to research the use of ICT solutions for solving medical and public health problems associated with diabetes and to provide solutions that are globally applicable.

Research and development will result in an innovative multi-purpose technology platform for ICT strategy in the treatment and control of diabetes. It will enable the prevention, improving the quality of life of people with diabetes, and better control and self-control of diabetes.

Research and knowledge transfer are directed towards SMEs that will ultimately produce a technical solution to the market. The project is co-financed by the European Regional Development Fund.

The project coordinator is Prof. Ratko Magjarević and the SME partner is **S.D. Informatika Ltd.**



### Advanced Technologies in Power Plants and Rail Vehicles

The project goal is to develop four advanced technologies focusing on applications in power plants and rail vehicles.

Research conducted within the “Advanced Sensors Technologies” is to establish a knowledge base and develop new sensing technologies with expected commercial applications in rotational machines monitoring systems.

Research conducted within the „Advanced estimation and control algorithms in microgrids“ aims to develop an advanced battery management system with state-of-charge and state-of-health estimation, and development of the algorithm for prediction of renewable energy systems availability using free weather forecast.

Research of the “Multilevel converters electric energy storage systems“ element of the project aims to investigate the possibilities of using multilevel converters for connecting renewable energy sources to the power grid and to explore the possibilities of efficient storage of electricity in rolling stock.

Research of the “Driver Assistance System” aims to develop new technologies in the area of vehicles and pedestrians detection and tracking.

The project is coordinated by Prof. Ivan Petrović and **Končar - Institute for Electrical Engineering** is the partner.



## BICRO - PoC Projects

The aim of the Business and Innovation Agency of the Republic of Croatia (BICRO) is to motivate the private and public sectors to invest in research and development.

BICRO offers a pre-seed capital programme known as Proof of Concept (PoC), intended for financing ideas, concepts, prototypes and intellectual property protection. The emphasis is put on the technological risk, and the main criteria are market orientation and innovativeness.

In October 2013, FER was granted ten projects, worth more than 355,000 € (total budget was around 2 million €).

**Electro-optical Detector for Measurement of Broadband Current Surges of Integrated Circuits**

*Prof. Adrijan Barić*

**Element for Tuning Acoustic Characteristic of Space**

*Prof. Kristian Jambrošić*

**Medical Imaging and Diagnostics on the Move**

*Assist. Prof. Josip Knezović*

**Identify Pathogens from a Stream of RNA Sequences**

*Prof. Mile Šikić*

**Proof of Concept for Wind Turbine Generator Fault-tolerant Control**

*Prof. Mario Vašak*

**Intrabody Communication System**

*Prof. Mario Cifrek*



**Human-powered Electronic Transmission System**

*Prof. Damir Seršić*

**System for Telemetric Temperature Measurement for Rotational Drivetrain Elements**

*Assist. Prof. Hrvoje Džapo*

**Fiber Optic Vibration Sensor for Remote Monitoring in High Power Electric Machines**

*Prof. Zvonimir Šipuš*

**Intellectual Property Protection of Inventions Related to Optical Modulation Averaging, Components and Access Network Architectures Employing Optical Modulation Averaging**

*Assist. Prof. Dubravko Babić*

## UNITY THROUGH KNOWLEDGE FUND

**Passive and Active Metamaterial Structures for Guiding, Scattering and Radiation of Electromagnetic Energy**

*Prof. Silvio Hrabar*

**Ericsson Context-aware Social Networking for Mobile Media**

*Assist. Prof. Vedran Podobnik*

## Eight IPA Projects Finalized in 2015

In March and April 2015, eight of our IPA Component IIIc (Regional Competitiveness) projects from the Science and Innovation Investment Fund ended.

Evaluation and negotiation process lasted until April 2013 and from 18 accepted projects in Croatia, FER was a partner or a coordinator in 8 of them, with the total EU funding of 1,64 million €.

FER coordinated the projects:

**Computer Vision Innovations for Safe Traffic**

*Prof. Sven Lončarić*

**ICT Competence Network for Innovative Services for Persons with Complex Communication Needs**

*Assist. Prof. Vedran Podobnik*

**Permanent Magnet Machine Technology for Boosting the Energy Efficiency in Traction and Marine Applications**

*Prof. Damir Žarko*

**Enhancement of Research, Development and Technology Transfer Capacities in Energy Management Systems for Buildings**

*Prof. Mario Vašak*

FER was the partner in projects:

**Additive Technologies for the SMEs**

*Assist. Prof. Hrvoje Džapo*

**Building Innovation Support Through Efficient Cooperation Network**

*Prof. Roman Malarić*

**Weather Intelligence for Wind Energy**

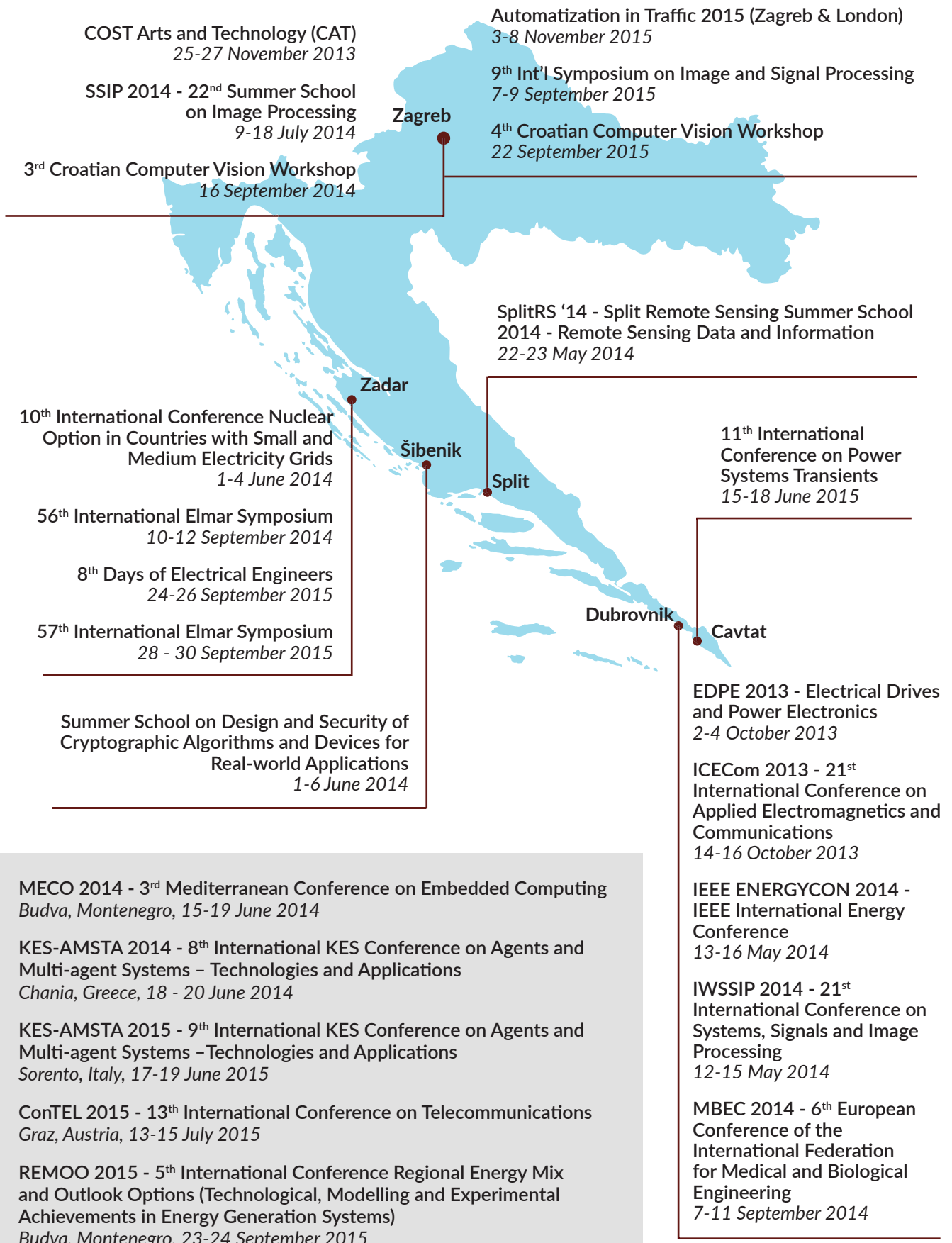
*Prof. Mario Vašak*

**Centre of Excellence for Structural Health**

*Prof. Mario Vašak*



## Conferences, Workshops and Events Organized and Co-organized by FER

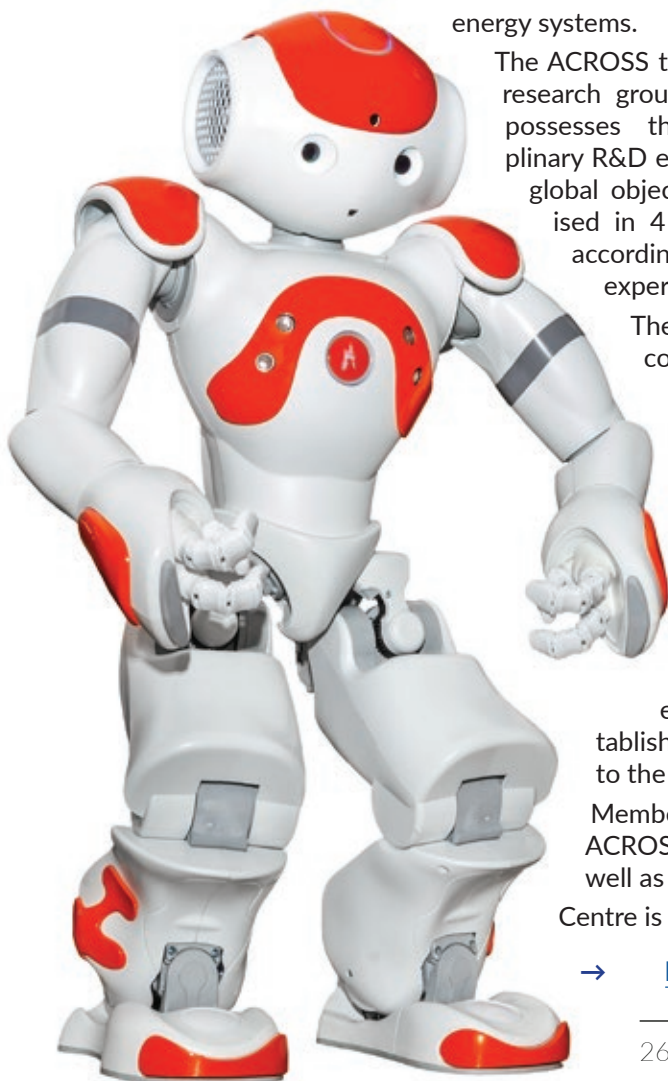


## Centre of Research Excellence for Advanced Cooperative Systems - ACROSS

Centre of Research Excellence for Advanced Cooperative Systems (ACROSS Research Centre) is an interdepartmental research centre at FER. Its establishment and operation was funded by the European FP-7 Capacities "Research Potential" programme [285939, FP7-REGPOT-2011-1].

The Centre research activities focus on the following Strategic Research Domains: Cooperative Cognitive and Robotic Systems, Cooperative Networked Embedded Systems, Cooperative Renewable Energy Systems and Cooperative Control Methods. While the first three strategic research domains are application-oriented, the fourth one is of a paramount importance for advanced cooperative systems in general, as a fundamental enabling technology. Possible applications of these advanced cooperative systems are numerous: advanced flexible manufacturing, renewable and sustainable energy, home and office automation, transport, logistics, environmental monitoring, healthcare, security and surveillance, human augmentation, etc.

Global Objective of ACROSS Centre of Research Excellence is to be at the forefront of research and development of novel methodologies and advanced engineering approaches for cooperative systems. It will also act as a point of contact between academia and industry, providing an infrastructure for scientific exchange in the area of cooperative systems related to robotics, networked embedded systems and renewable energy systems.



The ACROSS team, which comprises 14 research groups from 7 Departments, possesses the required multi-disciplinary R&D expertise for achieving the global objective. The team is organised in 4 research teams, formed according to the complementary expertise of research groups.

The ACROSS team tightly collaborates with 16 leading EU research centres and 3 Croatian partner companies. To ensure that the Centre activities remain in line with its objectives and the work plan strategy, and that the existing collective expertise of FER researchers and EU

experts is fully exploited, an external Steering Committee was established to continually assess the progress and make recommendations to the Centre managerial team.

Members of the Steering Committee are distinguished scientists in ACROSS strategic research domains, senior managers from industry, as well as representatives of public authorities and funding agencies.

Centre is coordinated by Prof. Ivan Petrović.

→ <http://across.fer.hr/>



### Access to IEEE Xplore Digital Library

The IEEE Xplore Digital Library is a powerful resource for discovery of and access to scientific and technical content published by the Institute of Electrical and Electronics Engineers (IEEE) and its publishing partners.

Every year in June, the Faculty management arranged the extension of institutional access to electronic database of scientific and professional journals in "IEEE/IET Electronic Library" (IEL, also known as IEEE Xplore - <http://ieeexplore.ieee.org>).

The content in IEEE Xplore comprises more than 170 journals, more than 5,000 technical standards, more than 1,400 conference proceeding, approximately 2,000 eBooks, and more than 400 educational courses - in total more than 3.8 million documents.

Through the IEEE Xplore more than 500 books published by MIT Press are also available.

Approximately 20,000 new documents are added to IEEE Xplore each month.





### Prof. Mario Cifrek's Paper Most Cited in the Last Five Years

The article titled "Surface EMG Based Muscle Fatigue Evaluation in Biomechanics" by Prof. Mario Cifrek, prof. Vladimir Medved, Prof. Emeritus Stanko Tonković and Saša Ostojić, M. Sc., published in journal "Clinical Biomechanics", has reached top position in the category of most cited papers in the last five years.

## 16 New Research Laboratories Established

Research laboratories are constituted at FER to foster research activities in the specific scientific field. In the last 2 academic years, sixteen new laboratories were constituted, bringing the total number of laboratories to 26.

### Green Engineering Laboratory (GEL)

*Prof. Dina Šimunić*

### Integrated Circuits and Electromagnetic Compatibility Laboratory (IC-EMC)

*Prof. Adrijan Barić*

### Micro- & Nano-Electronics Laboratory (MINEL)

*Prof. Tomislav Suligoj*

### Information Security and Privacy Laboratory (LISP)

*Assist. Prof. Stjepan Groš*

### Power System Protection Laboratory (LZEES)

*Assist. Prof. Juraj Havelka*

### Atmospheric Phenomena Laboratory (APPLY)

*Prof. Ivo Uglešić*

### Laboratory for Energy and Environmental Markets and Exchanges (LEEMaE)

*Prof. Željko Tomšić*

### Social Networking and Computing Laboratory (socialLAB)

*Assist. Prof. Vedran Podobnik*

### Laboratory for Assistive Technologies and Alternative and Augmentative Communication (ICT-AAC)

*Prof. Željka Car*

### Smart Grid Laboratory (SGLab)

*Prof. Igor Kuzle*

### Laboratory for Determination of Complex Structures Properties With Acoustics Methods (LoskSam)

*Assist. Prof. Antonio Petošić*

### Laboratory for Application of Information Technologies in Education (eduLab)

*Assist. Prof. Ivica Botički*

### Text Analysis and Knowledge Engineering Lab (TakeLab)

*Prof. Bojana Dalbelo Bašić*

### Laboratory for Bioinformatics and Computational Biology (LBCB)

*Prof. Mile Šikić*

### Laboratory for Nuclear Energy and Safety (LNES)

*Prof. Nikola Čavlina*

### Laboratory for Special Purpose Information Systems (LASPIS)

*Prof. Krešimir Fertalj*

## Stimulation of Research and Innovations

In order to stimulate research and innovations at FER, in 2011 measures were defined to help boost the quality of research activity and research productivity of our scientists:

- FER-Start programme stimulates research activities of assistant professors and preparation of project proposals and applications for financial support of research and development projects;
- FER-Co-Funding programme stimulates preparation of project proposals and applications for funding of research and development projects which require Faculty's own co-funding;
- FER-Productivity stimulates publication of scientific papers in journals with above-average impact factor and production of technically and industrially implemented inventions protected by a patent.
- FER-Project stimulates activities related to preparation of proposals for international projects;
- FER-Success rewards members of project teams who participated in successfully completed research and development projects.

# 31,000 €

Stimulation in 2013/2014

# 36,000 €

Stimulation in 2014/2015



## Open Source Cloud Solution for the Internet of Things

OpenIoT creates an open source middleware for getting information from sensor clouds, without having to worry about what exact sensors are used.

### OpenIoT Selected as Open Source Rookie Project of 2013

The Black Duck company, widely known in the open source community for awarding open source software and providing consulting services, has selected the OpenIoT project as open source rookie of the year 2013.

The Croatian team has contributed a publish/subscribe middleware component for mobile IoT environments integrating wearable sensors and smart phones with the back-end cloud services.

It explores efficient ways to use and manage cloud environments for IoT “entities” and resources (such as sensors, actuators and smart devices) and offering utility-based (i.e. pay-as-you-go) IoT services.

OpenIoT will provide instantiations of cloud and utility-based sensing services enabling the concept of “Sensing-as-a-Service”, via an adaptive middleware framework for deploying and providing services in cloud environments.

OpenIoT is perceived as a natural extension to cloud computing implementations, which will allow access to additional and increasingly important IoT based resources and capabilities.



OpenIoT team - far back: M. Matijašević, K. Pripuzić; back: V. Bilas, A. Antonić, I. Podnar Žarko, M. Marjanović, L. Skorin-Kapov; front: I. Pavelić, D. Oletić

OpenIoT is pertinent to a wide range of interrelated scientific and technological areas covering: (a) Middleware for sensors and sensor networks, (b) Ontologies, semantic models and annotations for representing internet-connected objects, along with semantic open-linked data techniques, and (c) Cloud/Utility computing, including utility based security and privacy schemes.

## FER, MIT and SMART in Joint Project of Air Monitoring in Singapore

Our Faculty, Massachusetts Institute of Technology and Singapore-MIT Alliance for Research and Technology worked jointly on Airscapes Singapore project. The primary aim of this initiative was to conduct an exposure study. Another objective was to demonstrate the collection, aggregation and storage of air quality and meteorological data from the network of moving sensors, using an appropriate architecture for this purpose. A third technical challenge was to demonstrate the display of data collected by the

monitoring network on a web application in real-time.

During the project, FER’s sensing and information system was used, in which regular people gather environment information in real-time using their smart phones. The system was developed under the EU FP7 project OpenIoT, with Prof. Vedran Bilas from the Department of Electronic Systems and Information Processing and Prof. Ivana Podnar-Žarko from the Department of Telecommunications as Principle Investigators,

and Dinko Oletić (Department of Electronic Systems and Information Processing) as Electronic Engineer, and Aleksandar Antonić (Department of Telecommunications) as Cloud and Data Infrastructure Specialist.





## Innovation Centre Nikola Tesla

In 2012, FER initiated the establishment of Innovation Centre. The principle role of the Innovation Centre is to bridge the gap between the academic and research community efforts and industrial needs by creating research-based innovative products (prototypes) for industrial applications. Thus, the Centre will benefit the Croatian economy by increasing the revenues from these original products, creating new job opportunities with high added value, and introducing new technologies into the Croatian industry. In addition, the Croatian intellectual property will increase. Accordingly, the Innovation Centre will serve as a powerful lever for knowledge and innovation transfer from academia to industry and entrepreneurship.

The Centre will be a comprehensive instrument that brings together the academic community, research institutes, Croatian industry, local and regional entities as well as the public administration. Through the interaction of these participants, a new platform for multidisciplinary research and development will be established streamlining the application and commercialisation of the results as well as the subsequent creation and improvement of the industries with high added value.

In order for the Innovation Centre to operate efficiently and serve its public role, it must be provided with appropriate developmental infrastructure located in suitable facilities occupied with highly qualified human resources in the areas of strategic importance for economic development: ICT, robotics, energetics, transportation systems, biomedical engineering and advanced component technology. In this manner, the vision and mission of the Centre are in accordance with the social challenges of both Croatia and the EU.

Owing to its structure and activities, the Innovation Centre will actively facilitate strong networking among all relevant factors of the research-innovation-incubation chain in order to establish an innovation-entrepreneurship system that commercialises innovation, thereby contributing to the creation of complementary innovation ecosystem.

According to the Centre's principal role, this independent institution will have as its primary goal the development of technologies and products for the Croatian and EU industry, as well as the knowledge transfer from the scientific and re-

search domain into prototypes that the industry can develop further into a product or production process with a minimal technological risk.

Such an institution is extremely important for the development of the Croatian economy, especially for small and medium knowledge-based enterprises. Moreover, its importance is expected to grow further in the upcoming decades in an effort to increase the competitiveness level of Croatia. Specific measures for the sustainability of the Centre are:

- development of technologies and products for specific needs of industry in a way that Croatian companies can readily get assistance from the highly qualified staff and advanced equipment of the Centre regarding the development of commercial products at affordable market prices and with a high degree of reliability and quality;
- technology transfer: development of applied ideas and innovations with research institutions in order to develop products and create new businesses. The Financing will be realized through public (development) and private funds (venture capital for spin-off companies);
- practical education of engineers and scientists to work on commercially exploitable ideas within time-limited projects based on financing through commercial and public projects. This type of professional education is crucial to meet the needs of Croatian industry;
- creation of Croatian intellectual property portfolio. Innovations and their development financed via public and state funds remain the property of the Innovation Centre, but can be licensed to the industry or newly established companies.

→ <http://www.icent.hr/>



*Prof. Nedjeljko Perić  
Interim Director of Innovation Centre Nikola Tesla*



Children helping the robot to exit the maze; European Researchers' Night, Zagreb 2014

## European Researchers' Night 2014 & 2015

European Researchers' Night is a public event dedicated to popularization of science. It takes place the last Friday of September every year all over Europe and beyond.

In 2014, these popular science events occurred on Friday, 26 September in around 300 cities located in 24 European and neighbouring countries.

The main goal of the event was to raise public awareness of the importance of research careers in interactive and engaging ways, and promote research careers to young people and their parents.

The coordinator of the events was the University of Split, with partners Znanost.org society, HAMAG-BICRO and FER. More than 30 scientists and researchers were involved in those activities.

European Researchers' Night is a Marie Skłodowska-Curie (MSCA) action, under the Horizon 2020 specific programme called "Excellent science".

→ <http://www.noc-istrzivaca.hr/>

### Projects in 2015

On 25 September 2015 another Researchers' Night was organized with the 2014 projects presented in Split, and another 3 projects presented in Zagreb:

- ACROSS centre (Autonomous Flying Vehicle and Tracking of People and Moving Objects)
- Using Robots in Autism Diagnostics,
- Six-Legged Walking Robot.

### Projects in 2014

FER was represented with 9 projects in 2014:

- Smart Diving Robot,
- RoboMaze (help the robot exit the maze),
- Computer Vision for Face Tracking,
- Smart Energy (Computers Help Us Produce More and Spend Less Energy),
- ACROSS Centre (Autonomous Space Mapping),
- Feel Zagreb Air (Measuring Air Quality in Zagreb),
- Metamaterials and Optical Communications (Electromagnetic Structures and Sensors),
- How Computers See?
- ICT-AAC (Applications for Better Social Inclusion).



## Faculty Awards Distinguished Researchers

The Faculty awards outstanding doctoral dissertations and research work with the “Josip Lončar” Silver Plaque on Faculty Day.

In 2013 four graduated doctoral students were awarded:

- Dr. Mirko Poljak (“Carrier Transport in Low-dimensional Nano-electronic Devices”; mentors Prof. Tomislav Suligoj and Prof. Kang Lung Wang, University of California Los Angeles, USA),
- Dr. Vladimir Čeperić (“Black-box Modelling of Analogue and Mixed-signal Circuits in the Time Domain”; mentor Prof. Adrijan Barić),
- Dr. Iva Bojić (“Self-organizing Synchronization in Machine-to-Machine Communication Systems Based on a Pulse-coupled Oscillators Model”; mentor Prof. Mario Kušek) and
- Dr. Marija Furdek (“Routing and Wavelength Assignment for Limiting Jamming Attack Propagation in Transparent Optical Networks”; mentor Prof. Nina Skorin-Kapov).

In 2014 the “Josip Lončar” Silver Plaque was awarded to:

- Dr. Tomislav Capuder (“Market and Environment Driven Optimization of Flexible Distributed Multi-generation”; mentor Prof. Davor Škrlec),
- Dr. Stjepan Stipetić (“Optimization of Electromagnetic Design of Synchronous Permanent Magnet Motor Series”; mentor Prof. Damir Žarko),
- Dr. Goran Delač (“Reliability Management of Composite Consumer Applications”; mentor Prof. Siniša Srblić),



*Ivan Marković receiving award in 2014 from Dean Grgić*

- Dr. Ivan Marković (“Moving Objects Detection and Tracking by Omnidirectional Sensors of Mobile Robot”; mentor Prof. Ivan Petrović) and
- Dr. Ivan Budiselić (“Component Recommendation for Development of Composite Consumer Applications”; mentor Prof. Siniša Srblić).

The “Končar” Award for outstanding doctoral dissertations with scientific achievements in technical science with application in industry was awarded to:

- Dr. Tomislav Dragičević (“Hierarchical Control of a Direct Current Microgrid With Energy Storage Systems in a Distributed Topology”; mentor Prof. Davor Škrlec) and
- Dr. Vedrana Spudić (“Coordinated Optimal Control of Wind Farm Active Power”; mentor Prof. Mato Baotić).

In 2014, it was awarded to:

- Dr. Stjepan Stipetić (“Optimization of Electromagnetic Design of Synchronous Permanent Magnet Motor Series”; mentor Prof. Damir Žarko) and
- Dr. Stjepan Sučić (“Middleware Platform for Distributed Remotely Controllable Smart Grid Subsystems”; mentor Assist. Prof. Juraj Havelka).



*Stjepan Stipetić receiving award from Darinko Bago, Končar CEO, in 2014*



## Prof. Mile Šikić in Search of Patient Zero

Prof. Mile Šikić and his team from our Faculty, along with scientists from the Ruđer Bošković Institute, Faculty of Science (PMF) of the University of Zagreb and the Croatian Catholic University (HKS), have developed a new method for detecting the “patient zero” - the first person infected by a disease, and finding them can help stop the outbreak. Mile Šikić and his colleagues focused on a scenario in which there is a network of infected and uninfected people, but it is not known when or between whom the infection has spread. The infections include sexually transmitted infections (STIs), the spread of information on a social network, or computer viruses that lay dormant before activating.

This outstanding research was published in June 2015 in *Physical Review Letters*. For his work Prof. Šikić received FER's Award for Science in 2015.

## Energy Platform Living Lab

A living lab is a research concept that is a user-centered, open-innovation ecosystem, often operating in a territorial context (e.g. city, agglomeration, region), integrating concurrent research and innovation processes within a public-private-people partnership.

The Energy Platform Living Lab (EPLL), established at FER in April 2014, is an independent, voluntary, professional and scientific association, focused on the methods of applying open innovation in the area of energy.

The aims of the EPLL is to achieve the following objectives:

- to establish a public-private-civil society partnership in the field of energy, in accordance with public interest and general development;
- to establish a system for cooperation among business and scientific community, governmental organizations, local communities and citizens in research and development (R&D) and innovation in the field of energy;

- to establish a system collaboration between producers and users of products and services, as well as all those interested in R&D and innovation in the area of energy by applying open innovation methods;
- to transfer know-how and experience and share information significant for R&D and innovation in the area of energy by applying open innovation methods.

It is expected that EPLL undertakes activities in the following areas:

### Energy

- energy observatory dominantly for South East Europe (SEE);
- energy sources in the future, climate change and water-energy nexus;
- strategic assessment of energy sector in SEE;
- scenario analysis: energy demand, generation mix, CO<sub>2</sub> emissions, costs benefit analysis;
- green energy and renewables;
- business intelligence projects aimed at the definition of possi-

ble scenarios in energy developments: interviews with industry experts, academic representatives and opinion leaders;

- mapping of key decision makers and stakeholders for energy developments.

### Smart Cities

- smart city projects to improve quality of life and drive growth;
- smartness and creativity as boosters of growth in cities;
- mapping of smart cities in the world and their key programmes.

### Smart Mobility

- smart mobility: move better to live better;
- intelligent management of infrastructures and transport infrastructure.

### Regional and Local Development

- competitive analysis of specific areas (County, Town), identification of their industrial and economic ecosystem and identification of strategic options for development.

## Two Accepted Horizon 2020 FET Projects

In 2014, FER's two new projects financed through the H2020-FETPRO-ACT-2014 were accepted.

### subCULTron - Croatian First H2020 FET Project

“subCULTron - Submarine Cultures Perform Long-term Robotic Exploration of Unconventional Environmental Niches” is a H2020 FET project that aims for achieving long-term autonomy in a learning, self-regulating, self-sustaining underwater society/culture of robots in a high-impact application area: Venice, Italy.

The envisioned heterogeneous system consists of 3 different agent types:

- on the seabed, artificial mussels are the collective long-term memory of the system, that monitors the natural habitat;

- on the water surface, artificial lily pads interface with the human society, delivering energy and information influx from ship traffic or satellite data; and
- between those two layers, artificial fish move/monitor/explore the environment and exchange info with the mussels and lily pads.

The four year project started in April 2015 and it is executed by two research groups, LABUST and LARICS, coordinated by Assist. Prof. Nikola Mišković.



Assist. Prof. Nikola Mišković

→ <http://www.subcultron.eu/>

### MANGO - Exploring Manycore Architectures for Next-GeneratiOn HPC Systems

High-Performance Computing is experiencing unprecedented changes, encompassing all levels, from technology to use cases. To fully harness the potential of future the HPC technology and architecture must fully match the demand of emerging application scenarios.



Prof. Mario Kovač

HPC is getting momentum in Europe to achieve world class competitive exascale computing with new H2020 EU-funded projects and with the ETP4HPC Strategic Research Agenda. Truly efficient HPC can only be achieved by perfectly matching computing resources to the applications and underlying algorithms and addressing energy efficiency.

This is best achieved with the proper selection of components (high-end processors, GPUs, accelerators, FPGAs).

MANGO, the H2020 FET HPC project, strives to address those challenges and demonstrate opportunities for exploring new heterogeneous architectures for real-time and QoS constrained HPC applications.

The project will cover all main issues in building such HPC system, starting from the ground up. Selection of the HPC components and building of the HPC core will be investigat-

ed together with research of an efficient interconnect.

Resources will be managed through the proper resource manager component, which is in charge of assignment of heterogeneous resources. Finally, matching resources to applications will be achieved by incorporating key structures and functionalities to the programming models and compiler tools. Power and thermal issues will be addressed as well.

In particular, we will review the basis of the recent innovative thermal modelling and prototyping approaches for HPC systems, which rely on neural networks and massively parallel graphics processing units (GPUs) to handle the scalability problem of transient heat flow, power and functional simulation of next-generation 2-D/3-D many-core computing servers including thousands of cores.

Contact person at FER is Prof. Mario Kovač.



## Doctoral Study

Postgraduate doctoral study programme leads to the PhD academic degree in the scientific field of Electrical Engineering or the scientific field of Computing. The duration of study is three years for full time students, and it is completed by defending the submitted thesis. The student must collect altogether at least 480 ECTS credits (including credits from the previous high education) by enrolling courses and passing examinations, doing research, and publishing research results.

The following table depicts the number of PhD degrees and the number of students enrolled in the doctoral study by academic years.

	PhD dissertations		Enrolled students	
	Electrical Engineering	Computing	Electrical Engineering	Computing
2013/2014	23	21	39	22
2014/2015	38	13	29	19

### PhD Theses Defended in 2013/2014

**Dynamic evolution of aspect oriented software**

*Marija Katić, mentor: Prof. Krešimir Fertalj*

**Control of teleoperation system based on wave variables under time-varying communication delay**

*Edin Mujčić, mentor: Prof. Nedjeljko Perić*

**Personalized synthesis of twelve channel electrocardiogram from bipolar measurements**

*Ivan Tomašić, mentors: Prof. Ratko Magjarević, Dr. Roman Trobec*

**Error handling framework as factor for risk reduction in service oriented architecture**

*Duško Vukmanović, mentor: Prof. Damir Kalpić*

**Structures for guiding and radiation of electromagnetic energy based on resonant metamaterials**

*Davor Zaluški, mentor: Prof. Silvio Hrabar*

**Context-aware recommender systems for authors of e-learning content**

*Ivana Bosnić, mentor: Prof. Mario Žagar*

**Generation of multimedia stimuli based on ontological affective and semantic annotation**

*Marko Horvat, mentors: Prof. Nikola Bogunović, Prof. Krešimir Čosić*

**Wind turbine optimal control for reduction of structural loads in strong winds**

*Vlaho Petrović, mentors: Prof. Mato Baotić, Dr. Mate Jelavić*

**Middleware platform for distributed remotely controllable smart grid subsystems**

*Stjepan Sučić, mentor: Assist. Prof. Juraj Havelka*

**Reliability prediction of consumer computing applications**

*Marin Šilić, mentor: Prof. Siniša Sribljic*

**Peer tutoring in consumer computing**

*Klemo Vladimir, mentor: Prof. Siniša Sribljic*

**Integrated framework for management of projects involving virtual teams**

*Ante Martinić, mentor: Prof. Krešimir Fertalj*

**Power system state estimation with time tags using voltage angle measurements**

*Domagoj Peharda, mentor: Prof. Ivica Pavić*

**Multilevel scheduling in complex real-time systems**

*Damir Poleš, mentor: Academician Prof. Leo Budin*

**Reliability management of composite consumer applications**

*Goran Delač, mentor: Prof. Siniša Sribljic*

**Modelling, analysis and improvement of ant colony optimization algorithms**

*Nikola Ivković, mentor: Prof. Marin Golub*

**Quality assessment model of software for managing family medicine practice**

*Damir Kralj, mentors: Prof. Emer. Stanko Tonković, Assist. Prof. Miroslav Končar*

**Component recommendation for development of composite consumer applications**

*Ivan Budiselić, mentor: Prof. Siniša Sribljic*

**Efficient high dynamic range software defined receiver**

*Marko Butorac, mentor: Prof. Mladen Vučić*

**Moving objects detection and tracking by omnidirectional sensors of mobile robot**

*Ivan Marković, mentor: Prof. Ivan Petrović*

**Communication channel model for satellite digital broadcasting with terrestrial retransmission**

*Iva Bačić, mentor: Prof. Krešimir Malarić*

**Knowledge management based method for modelling of information security policies**

*Aleksandar Klaić, mentor: Prof. Marin Golub*

**Temporal visualization of large text collections based on correspondence analysis**

*Artur Šilić, mentor: Prof. Bojana Dalbelo Bašić*

**Text information extraction and retrieval based on event graphs**

*Goran Glavaš, mentor: Assist. Prof. Jan Šnajder*

**Information system for athlete's training decision support**

*Ladislav Havaš, mentors: Prof. Zoran Skočir, Prof. Vladimir Medved*

**Model for predictive evaluation of interaction efficiency for mobile touchscreen applications**

*Sandi Ljubić, mentor: Prof. Vlado Glavinić*



*PhD Degree Awarding Ceremony*

**Optimal allocation of distributed generation in medium voltage distribution networks**

*Rene Prenc, mentor: Prof. Davor Škrlec*

**Dynamic adaptation of educational content for users of information and communication technology based augmentative and alternative communication**

*Barbara Zagajšek, mentors: Prof. Željka Car, Prof. Jasmina Frey-Škrinjar*

**Automatic creation of concept map from unstructured text in Croatian language**

*Krunoslav Žubrinić, mentor: Prof. Damir Kalpić*

**Model-based approach to real-time embedded control systems development with legacy components integration**

*Josip Babić, mentors: Prof. Ivan Petrović, Dr. Siniša Marijan*

### **PhD Theses Defended in 2014/2015**

**Secure routing protocol from denial-of-service attack in mobile ad hoc networks"**

*Ashok Mallayya Kanthe, mentor: Prof. Dina Šimunić*

**Multidimensional modelling of quality of experience for mobile web browsing**

*Sabina Baraković, mentor: Assist. Prof. Lea Skorin-Kapov*

**Solving large dense symmetric eigenproblem on hybrid architectures**

*Davor Davidović, mentors: Prof. Domagoj Jakobović, Prof. Karolj Skala*

**Recommender system for activities in computer-supported collaborative learning**

*Martina Holenko Dlab, mentors: Prof. Vedran Mornar, Prof. Nataša Hoić-Božić*

**Optimizing acoustical quality of sound control room**

*Miljenko Krhen, mentor: Prof. Siniša Fajt*

**Model for personalization of subject matter suitable for learning on mobile devices**

*Mihael Kukec, mentor: Prof. Vlado Glavinić*

**Intrabody communication based on capacitive method**

*Željka Lučev Vasić, mentor: Prof. Mario Cifrek*

**Optimization of power system operation and development under emission trading scheme**

*Robert Pašičko, mentors: Prof. Željko Tomšić, Prof. Ivar Wangensteen*

**Centralized control of variable structure multi-vehicle systems based on resource allocation**

*Tamara Petrović, mentor: Prof. Stjepan Bogdan*

**Market and environment driven optimization of flexible distributed multi-generation**

*Tomislav Capuder, mentor: Prof. Davor Škrlec*

**Holistic approach to energy saving in wireless networks of energy-hungry sensors for smart surveillance**

*Vana Jeličić, mentors: Prof. Vedran Bilas, Prof. Davide Brunelli*

**Model of multimedia textbook based on capturing of lectures and aligned with cognitive learning theories**

*Predrag Pale, mentor: Prof. Mario Žagar*

**Control of a DC-DC boost converter supplied by photovoltaic module for maximum power production**

*Tomislav Pavlović, mentor: Prof. Željko Ban*

**Optimization of electromagnetic design of synchronous permanent magnet motor series**

*Stjepan Stipetić, mentor: Prof. Damir Žarko*

**Heterogeneous computing system with field programmable gate array for decision tree learning**

*Peter Škoda, mentors: Prof. Vlado Struk, Prof. Branka Medved Rogina*

**Hybrid adaptive control system with augmented user interaction for stable aerial manipulation**

*Matko Orsag, mentors: Prof. Stjepan Bogdan, Prof. Paul Oh*

**Adaptive frequency hopping in OFDM broadband wireless networks**

*Vitomir Šeba, mentor: Prof. Borivoj Modlic*

**Modelling of electric characteristics of photovoltaic amorphous-nano-crystalline silicon cell**

*Vladimir Tudić, mentors: Prof. Sejid Tešnjak, Dr. Davor Gracin*

**Error floor prediction in transmission of orthogonal frequency division multiplex signal over time-dispersive channel**

*Adriana Lipovac, mentor: Prof. Borivoj Modlic*

**Distributed algorithm for node localization in anchor free wireless sensor network***Damir Arbula, mentor: Prof. Zdenko Kovačić***Emotional state estimation based on data mining of acoustic speech features***Branimir Dropuljić, mentors: Prof. Davor Petrinović, Prof. Krešimir Čosić***Comparative analysis of architectures and deployment scenarios of next generation optical access network***Zijad Havić, mentor: Prof. Branko Mikac***Fault-tolerant control of wind turbine subject to generator electromechanical faults***Vinko Lešić, mentor: Prof. Mario Vašak***Quantitative terrorism risk assessment and management method for energy systems***Davor Šinka, mentor: Prof. Vladimir Mikuličić***Measurement system for precise comparison of low resistance standards***Igor Štambuk, mentor: Prof. Roman Malarić***Croatian speech synthesis based on unit selection and stochastic models***Miran Pobar, mentors: Prof. Slobodan Ribarić, Prof. Ivo Ipšić***Electromagnetic influence of electric railway system on metallic structures***Boško Milešević, mentor: Prof. Ivo Uglešić***Automatic ontology matching by using parallel composition of basic methods***Marko Gulić, mentor: Prof. Boris Vrdoljak***Active suppression of low-frequency interference currents by controlled grid interface of power converters in rail vehicles***Nenad Težak, mentor: Prof. Ivan Petrović**Rector Aleksa Bjeliš awarding PhD Degree***Vehicle dynamics state estimation based on sensor fusion by adaptive Kalman filter***Mario Hrgetić, mentors: Prof. Mario Cifrek, Prof. Joško Deur***Formalism for modelling business management of public telecommunication network***Darko Markulin, mentor: Prof. Marijan Kunštić***Electromagnetic transients caused by switching small inductive and capacitive currents in high voltage switchyards***Srećko Bojić, mentor: Prof. Ivo Uglešić***Single layer memory management based on integration of memory allocation and garbage collection***Dorian Ivančić, mentor: Prof. Danko Basch***Minimisation of DC current component in galvanic isolated inverters for railway vehicles***Miroslav Macan, mentor: Prof. Željko Jakopović***Adaptive control of quadruped robot locomotion through variable compliance of revolute spiral feet***Alan Mutka, mentor: Prof. Zdenko Kovačić***Modelling coordinated operation of two independently owned hydro power plants in same basin***Ivan Rajšl, mentors: Prof. Slavko Krajcar, Prof. Ivar Wangensteen***Statistical inference algorithms for epidemic processes on complex networks***Nino Antulov-Fantulin, mentors: Prof. Mile Šikić, Dr. Tomislav Šmuc***Proactive-reactive project scheduling with flexibility and quality requirements***Mario Brčić, mentor: Prof. Damir Kalpić***Linear parameter varying control of large wind turbines***Vedran Bobanac, mentor: Prof. Mario Vašak***Network on chip many-core architectures for multimedia processing***Daniel Hofman, mentors: Prof. Mario Kovač, Prof. Jose Flich Cardo***Adaptive e-learning based on users learning styles***Jelena Nakić, mentors: Prof. Vlado Glavinić, Prof. Andrina Granić***Feasibility estimation method for implementation of information systems in small and medium enterprises***Igor Nazor, mentor: Prof. Krešimir Fertalj***Software and hardware models in component-based development of embedded systems***Luka Lednicki, mentors: Prof. Mario Žagar, Prof. Ivica Crnković***Multisensor active system for distortion reduction of low frequency loudspeaker***Milan Uskoković, mentor: Prof. Bojan Ivančević***Method for techno-economic analysis of hybrid optical wireless access networks by monte carlo simulation***Danimir Pečur, mentor: Prof. Ignac Lovrek***Electromagnetic structures based on passive and active epsilon-near-zero metamaterials***Damir Muha, mentor: Prof. Silvio Hrabar***Compensation of dead time and conduction voltage of transistors and diodes in a three level neutral point clamped inverter***Ivan Mrčela, mentor: Prof. Viktor Šunde***Blind method of reverberation time estimation based on speech signal features)***Andrea Andrijašević, mentors: Prof. Hrvoje Domitrović, Prof. Miroslav Vrankić*





*Dean Nedjeljko Perić awarding PhD Degree*

**Wind power plant control in power system primary frequency regulation based on reference model**  
*Elvisa Bećirović, mentors: Prof. Nedjeljko Perić, Prof. Mirza Kušljugić*

**Electromagnetic wave scattering on planar and cylindrical anisotropic structures**  
*Dario Bojanjac, mentor: Prof. Zvonimir Šipuš*

**System of intelligent methods for predicting failures in broadband networks**  
*Željko Deljac, mentor: Assist. Prof. Mirko Randić*

**Optimal control of a tower crane based on the polytopic linear parameter varying model**  
*Šandor Ileš, mentor: Prof. Fetah Kolonić*

**Sensorless control of wind turbine cage induction generator based on phase-locked loop**  
*Martina Kutija, mentor: Assist. Prof. Damir Sumina*

**Method for optimizing availability of optical telecommunication network in presence of correlated failures**  
*Vedran Miletić, mentor: Prof. Branko Mikac*

**Rényi entropy based complexity estimation of nonstationary signals**  
*Nicoletta Saulig, mentors: Prof. Damir Seršić, Prof. Viktor Sučić*

**Extraction of movement related oscillatory changes from electroencephalogram with application to brain-computer interface**  
*Ana Branka Jerbić, mentor: Prof. Mario Cifrek*

**Teaching of introductory programming based on semantic evaluation of programs**  
*Tonči Dadić, mentors: Prof. Vlado Glavinić, Prof. Marko Rosić*

**User interfaces adaptation for multimodal interaction in ambient assisted living**  
*Andrej Grgurić, mentor: Prof. Mario Kušek*

**Wind turbine grid side converter control under grid disturbances**  
*Tamara Hadjina, mentors: Prof. Mato Baotić, Dr. Krešimir Vrdoljak*

**Modelling non-functional properties of signalling protocols software components**  
*Lovre Hribar, mentors: Prof. Ignac Lovrek, Prof. Darko Huljenić*

**Determination of power system parameters for state estimation and protection system enhancement based on synchronized measurements**  
*Renata Rubeša, mentor: Prof. Ante Marušić*

**Integrated software system for asthma and chronic obstructive pulmonary disease classification**  
*Almir Badnjević, mentor: Prof. Mario Cifrek*

**Functional state examination of vibration sensory pathways using vibratory evoked potentials**  
*Magdalena Krbot Skorić, mentor: Prof. Mario Cifrek*

**Applications of evolutionary computation to cryptology**  
*Stjepan Picek, mentors: Prof. Domagoj Jakobović, Prof. Lejla Batina*

**Molten corium concrete interaction: investigation of heat transfer in two-phase flow**  
*Milan Amižić, mentors: Prof. Adrijan Barić, Dr. Jean-Marie Seiler*

## FER@ARCA Innovation Exhibition

FER successfully presented its projects at the 12<sup>th</sup> International Innovation Exhibition ARCA held in October 2014 in Zagreb.

Among 250 exhibits, FER won several awards:

- Golden Award and award of the jury for multiple innovation within Computer Vision Innovations for Safe Traffic (VISTA) project (Prof. Sven Lončarić);
- Golden Award for the innovation on "Bipolar transistor with horizontal current flow (HCBT) for 180 nm BiCMOS technology" (Prof. Tomislav Suligoj, Marko Koričić, Josip Žilak);
- Silver Award for innovation "Software for analysis of retina for early detection of diabetic retinopathy" (Prof. Sven Lončarić);
- Silver Award for innovation "Automatic Visual Inspection of Product Quality" (Prof. Sven Lončarić);
- Silver Plaque for innovation "Innovative ICT applications for Persons with Complex Communication Needs" (Assist. Prof. Vedran Podobnik);

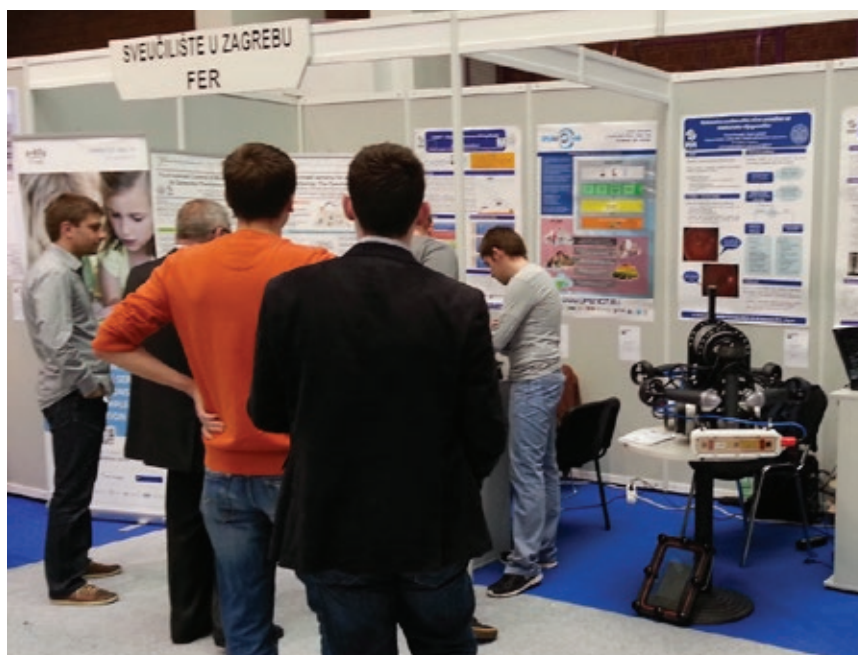


- Award to the set of innovations on the VISTA project "Best Invention", awarded by "First Institute of Innovators and Researchers" from the exhibition partner Iran, was awarded to project leader Prof. Sven Lončarić.

In 2015, more than 170 innovations were presented, including 2 from FER. Both received Silver Award:

- ENHEMS-Buildings - Cloud-based Service of Energy-efficient Building Control System Enhancement (Prof. Mario Vašak);
- First World 3D Structured Light Scanner on the Smartphone (Prof. Tomislav Pribanić).

Bronze award was given to the Faculty of Graphic Arts team for their work "MM KOD", where a co-author was Mario Osvin Pavčević from the Department of Applied Mathematics, along with Filip Cvitić and Jesenka Pibernik from the Faculty of Graphic Arts.



FER's stand on ARCA 2014

## Brain Awareness Week 2015

During the 14<sup>th</sup> Brain Awareness Week in Croatia, held 16-22 March 2015, FER organized three events.

On 18 March, workshop "Current and future applications of non-invasive and invasive BCIs" was organized by "g.tec medical engineering", Austria and FER under the endorsement of Croatian Medical and Biological Engineering Society and IEEE Croatia Section Engineering in Medicine and Biology Society Chapter. Ana Branka Jerbić, Ph.D. presented her research entitled "Detection of motor imagery from electroencephalogram with application to brain-computer interface".



On 20 March, Dr. Jelena Božek gave a talk „Research of fetal and neonatal brain development using MR image analysis – postdoctoral research at the Oxford University“. The research is part of the collaboration on the "Developing Human Connectome Project" (dHCP, [www.developingconnectome.org](http://www.developingconnectome.org)) led by King's College London, Imperial College London and Oxford University. The talk was organized under the endorsement of IEEE Croatia Section and Department of Wireless Communications.

On the same day, 2<sup>nd</sup> year graduate students Marko Medved and Krešimir Friganović, supervised by professor Mario Cifrek, Ph.D. held workshop „Brain Computer Interface“ at the Croatian Institute of Brain Research. Workshop was interactive and participants could volunteer and experience the features of the presented system.



# Postgraduate Specialist Study

The Faculty offers four postgraduate specialist study programmes. The study programme "Electronic Communications Regulation" is coordinated by FER; our partners are Faculty of Economics and Faculty of Law of the University of Zagreb. Other study programmes are managed by FER.

The table below depicts number of enrolled students in the last two academic years. Specialist these are listed below.

	Railway Electrical Systems	Information Security	Electronic Communications Regulations	Transformers
2013/2014	17	12	9	10
2014/2015	0	6	8	0

## Information Security

**Implementation of Information System Security Management in Cloud Computing**  
Gordan Daut-Kaiser, mentor: Prof. Nikola Hadjina

**Violation of User Privacy by IPTV Packet Sniffing in Home Network**  
Siniša Vukojević, mentor: Prof. Gordan Gledec

**Data Center Information Security Management**  
Dražen Koren, mentor: Prof. Nikola Hadjina

**Digital Forensics of Security Incident in a Corporate Environment**  
Oskar Križanec, mentor: Prof. Miljenko Mikuc

**Enabling High Availability of Information Services Using Backup Data Centers**  
Dubravko Sever, mentor: Prof. Nikola Hadjina

**Security Issues With Remote Configuration of Internet Service Providers' Network Equipment**  
Luka Perkov, mentor: Prof. Miljenko Mikuc

**Penetration Testing Using Social Engineering Methods**  
Nikola Pavković, mentor: Prof. Miljenko Mikuc

**New Hash Functions Implementation**  
Iva Jeličić, mentor: Prof. Marin Golub

## Electronic Communications Regulation

**Market Analysis and the Assessment of Significant Market Power in Electronic Communications**  
Iva Cibulić, mentors: Prof. Siniša Petrović, Prof. Ignac Lovrek

**Child Protection on Internet**  
Hrvoje Perica, mentor: Prof. Dražen Dragičević

**Protection of Premium Rate Service Consumers**  
Marina Ljubić Karanović, mentor: Prof. Dražen Dragičević

**Protection of Children When Using Electronic Communication Services**  
Gordana Kulišić, mentor: Prof. Dražen Dragičević

**e-Agency in the Interdisciplinary Framework of Market Regulation**  
Silvije Šeremet, mentor: Prof. Antun Carić

**Number Portability Automation in Telecommunication Network**  
Robert Vulas, mentor: Prof. Antun Carić

**Impact of Current Cost Accounting on Cost Modelling in Telecommunications Industry**  
Anita Budimir, mentor: Prof. Ivana Dražić Lutilsky

**Investment Models in Next Generation Access Networks**  
Jure Brkljačić, mentor: Prof. Branko Mikac

**Universal Services in Electronic Communications**  
Daniela Kuštović Kokot, mentor: Prof. Dražen Dragičević

**Analysis of Relevant Markets and Status of Electronic Communications in Potential Members of European Union**  
Branko Kovijanić, mentor: Prof. Ignac Lovrek

**Tool Selection for Cost Management in Telecommunication Industry**  
Marina Ivić, mentor: Prof. Ivana Dražić Lutilsky

## Transformers

**Analysis of the Influence Factors on the Quality of Transformer Core Steels**  
Dario Trbušić, mentor: Tomislav Filetin

**Losses in Open-core High Voltage Instrument Transformers**  
Igor Žiger, mentor: Prof. Željko Štih

**Electromagnetic Field of Transformation Substation TS 110/20/ kV (20 MVA) and the Connected Overhead Line**  
Mihaela Margetić, mentor: Prof. Željko Štih

## Railway Electrical Systems

**Optimization of Railway Stations Exterior Lighting**  
Silvana Luketić, mentor: Prof. Ivo Uglešić

**Assurance of Railway Traffic by Automatic Track Block**  
Darko Francuz, mentor: Prof. Zdravko Toš

**Electric Heating System for Railway Switches**  
Dražen Franjković, mentor: Prof. Zdravko Toš

**Analysis of SDH Network Synchronization Owned by Croatian Railways**  
Krunoslav Cazin, mentor: Prof. Gordan Šišul

**Disturbances and Failure Analysis for Railway Crossings in Republic of Croatia in the Purpose of Increasing Traffic Safety and Maintenance Efficiency**  
Marko Žganec, mentor: Prof. Sonja Grgić

**Analysis of Multisector Regulation in European Union**  
Ivana Bikić, mentor: Prof. Dražen Dragičević

**Benchmarking in Telecommunications**  
Tomislav Turk, mentor: Prof. Ivana Dražić Lutilsky

**Efficient Control Of Radio Frequency Spectrum**  
Ivan Pasković, mentor: Prof. Radovan Zentner

**Impact of Change in Television Transmission Technology on Radiofrequency Spectrum Usage**  
Nina Kragović, mentor: Prof. Sonja Grgić

**Techno-economic Analysis of Next Generation Access Networks Deployment in Suburban Areas**  
Siniša Pranjić, mentor: Prof. Ignac Lovrek

**Setting up of Geographic Information System of Electronic Communications Infrastructure**  
Vesna Hitrec, mentor: Prof. Željka Car

## ŠUZA - Popularization of Science Programme

“ŠUZA - From School to Science and Academic Community” is our official science popularization programme, aiming to encourage young people to pursue a career in STEM - science, technology, math and engineering.

The programme was conceived by at the time Vice Dean for Science Prof. Mislav Grgić and assistant Dr. Iva Bojić in 2012, and the first activities were held in early 2013.

Every year ŠUZA organizes workshops open for public: Arduino Day (March), Europe Code Week (September), FER Open Days (November) and Hour of Code (December).

As part of the programme, elementary and highschool visits are organized, with tours of several laboratories and a programming or robotics workshop.

In the spring, FER hosts the State Student Works Fair in Educational Sector of Electrical Engineering and Computing.

Faculty's employees often give lectures in popular science topics during the events on the Faculty as well as the events throughout Croatia.

→ <http://suza.fer.hr/>

### Workshop on STEM Popularization

In November 2013, the first workshop on popularization of STEM fields was held at FER.

The workshop was dedicated to popularization in general, studying theory, presentation skills and dramaturgy. The workshop was held by Dr. Predrag Pale and dramaturges Irena Krčelić.

After the workshop, regular monthly meetings for STEM promoters became a practice. Meetings are regularly held as an open discussion on all issues related to science popularization: tool demonstrations, activities organization and exchange ideas on access to the wider public.

## Hour of Code

The Hour of Code is a global movement reaching tens of millions of students in more than 180 countries worldwide.

The first Hour of Code at FER was held on 15 December 2013, when more than a 100 visitors aged 6 to 46 attended the workshop and got acquainted with coding, writing their first computer programmes. The initial plan of holding the workshop in two classrooms expanded to four classrooms.

The second Hour of Code was held in December 2014.



*Children programming for the first time during Hour of Code in 2014*





## Events

**FER Open Days**  
15 November 2013

**Workshop on STEM Popularization**  
18-29 November 2013

**Hour of Code**  
15 December 2013

**Student Talk: Why Geniuses Were Bad Students**  
21 February 2014

**Scientific Saturday**  
15 March 2014

**State Student Works Fair in Educational Sector of Electrical Engineering and Computing**  
5 May 2013

**Arduino Workshop**  
26 and 29 September 2014

**Europe Code Week**  
11-17 October 2014

**FER Open Days**  
15 November 2014

**European Robotics Week**  
24-30 November 2014

**Hour of Code**  
13 December 2014

**World Arduino Day**  
28 March 2015

**State Student Works Fair in Educational Sector of Electrical Engineering and Computing**  
22 April 2015

**Science Fair at Matija Gubec Elementary School**  
22 April 2015

**Science Festival**  
20-25 April 2015

## Visits from Schools

**Elementary School Pavleka Miškine, Zagreb**  
27 February 2014

**Elementary School Tin Ujević**  
10 April 2014

**Electrical Engineering School**  
29 April 2014

**Elementary School Stenjevec**  
10 June 2014

**Jelkovec Library**  
30 March 2015

**Primary Schools Zadarski otoci and Stanovi, Zadar**  
29 May 2015



*Dr. Predrag Pale delivering lecture "What Good Supervisors Do (Not)?"*

## State Student Works Fair in Educational Sector Electrical Engineering and Computing

On 5 May 2014, the State Student Works Fair in Educational Sector Electrical Engineering and Computing was held for the second time at FER. The event gathered 32 students and students groups from 24 technical and vocational schools participating at the Fair and presenting their works at FER. The Fair was organized in cooperation with the Agency of vocational education and adult education. As part of the Fair, an expert meeting for teachers titled "When science is boring, who is it boring to?" was held by Dr. Predrag Pale.

In the practical part of presentation he was joined by Dr. Ana Sović Kržić, showing the teachers how to apply robots in the education of gifted children.

A year later, on 22 April 2015, the Fair was held for the third time at FER. There were 45 student projects from 28 technical and vocational secondary schools presented. As part of the Fair, a lecture for teachers and supervisors titled "What Good Supervisors Do (Not)?" was delivered by Dr. Predrag Pale.

*Children from the Jelkovec Library visiting ACROSS centre*









# Students

*Our students are our future - they are the best of the best.*





*Luka Fuček, Antun Vukičević and Josip Vukičević receiving Rector's Award.  
On the left: Vice Rector Prof. Ivana Čuković Bagić, Rector Prof. Damir Boras and FER's Vice Dean Prof. Marko Delimar*

## Rector's Award

Rector's award for the best student achievement was awarded in the academic years 2013/2014 and 2014/2015 on ceremonies held at the Faculty in June 2014 and 2015.

FER's students who received Rector's award on 17 June 2014 were:

- Anton Grbin - v8boinc - Development of Distributed Supercomputer,
- Tin Bariša - Methods for Parameter Identification of Asynchronous Motor,
- Josip Soko - Vision Controlled Communicator,
- Marko Car, Antun Ivanović - Augmented User-Interface for Control of Flying Robot Manipulator,
- Anja Babić, Nikola Jagodin - The NAO Humanoid Robot in Social Interaction: System Elements Demonstrated on a Game of Hide and Seek.

Special Rector's award was presented to our students Branimir Čulina, Tina Zorić and Ivan Božić, who participated in the project Central Student Portal - stu-

dentski.hr, along with their colleagues from other faculties.

In 2015, the ceremony was held on 18 June and the FER students who won the Rector's award were:

- Luka Fuček, Antun Vukičević and Josip Vukičević: "Development of hexapod for research and education",
- Marko Medved, Krešimir Friganović: "Brain-computer interface based on steady - state visual evoked potentials",
- Una Pale and Goran Popović: "Voice phone book for visually impaired people",
- Damir Mirković: "Development and Implementation of a Multi-robot System for a New Robot Laboratory",
- Paolo Čerić, Miranda Kreković, Viktor Skolan and Josip Šarlija: "Multimedia project The Doors of Perception".



## Faculty Awards for Students

On the occasion of the Faculty Day, the best students at the Bachelor studies are awarded with “Josip Lončar” Special Recognition.

For study programme Electrical Engineering and Information Technology, in 2013, the awarded students were Vilim Štih, Toni Martinović and Lana Josipović. For study programme Computing, the awarded students were Marko Deak, Dorija Humski and Matija Šantl.

In 2014, students who received the award were Juraj Oršulić, Borna Vukadinović and Marsela Polić for study programme Electrical Engineering and Information Technology, and Denis Čaušević, Fran Stanić and Karlo Dumbović for study programme Computing.

The “Josip Lončar” Bronze Plaque is awarded to the best graduate students of the Master studies. In 2013, these were Branimir Novoselnik, Bruno Jurišić, Matija Varga and Saša Barić (Electrical Engineering and Information Technology), Filip Melinščak, Vedran Rafaelić and Siniša Matetić (Information and Communication Technology) and Ana Hibner, Nikolina Frid and Nikola Banić (Computing).

In 2014, awarded students were Mihovil Bartulović, Marijana Pongračić, Simon Najman, Sabina Krivec and



*Student Lana Josipović receiving award from Dean Perić*

Tin Bariša (Electrical Engineering and Information Technology), Miranda Kreković, Ivan Jakšić and Franco Grbac (Information and Communication Technology) and Marko Đurasević, Ivan Marić and Ivan Pilat (Computing).

## Special Awards by Partner Companies

Special “Josip Lončar” Bronze Plaque for an exchange student who participated in Erasmus student exchange was in 2013 awarded to Edin Kočo, and in 2014 to Jasmina Kolonić.

The “Stanko Turk Award” for an outstanding student diploma thesis from the field of Computing was awarded to Matija Korpar in 2013, and to Vedran Vukotić in 2014.

The “Werner von Siemens Award” is given for the best student work applied to industry, energy and healthcare. In 2013, it was awarded to Anja Babić and Kruno Hrvatinić. In 2014 it was received by Ivan Dražić-Šegrt.

The “Ericsson Nikola Tesla Award” for outstanding work in the field of telecommunication was awarded to:

- 1<sup>st</sup> prize: Anamarija Fofonjka and Dino Šantl;
- 2<sup>nd</sup> prize: Marko Đurasević (FER), Ante Povedulić (PMF) and Amar Mahmutbegović (ETF Tuzla, Bosnia and Herzegovina);
- 3<sup>rd</sup> prize: shared by Mladen Subotić, Goran Jelen and Gordan Glavaš (ETF Osijek) and Adnan Abdagić, Filip Babić and Adna Damadžić (ETF Sarajevo, Bosnia and Herzegovina).

In 2014, the awarded students were:

- 1<sup>st</sup> prize: Dragutin Jelić;
- 2<sup>nd</sup> prize: Vjeran Crnjak, Ivan Grce, Josipa Kovačev, Nicolette Pribanić and Edi Smoljan;
- 3<sup>rd</sup> prize: Petar Krivić, Krešimir Kuren and Antonio Zemunik.

The “INETEC Award” established to foster excellence and support young and talented students was awarded to Nikola Banić in 2013 and to Tin Bariša in 2014.

Annual “Agrokor Award” for product or service designed to wider range of electronic business users was awarded in 2013 to Edin Kočo (1<sup>st</sup> prize), Vjeran Crnjak, Filip Rudan and Petar Žuljević (2<sup>nd</sup>), and Petar Mrazović and Mario Volarević (3<sup>rd</sup>). In 2014, the student recipient was Josip Feliks.



*Adnan Abdagić and Filip Babić receiving Ericsson Nikola Tesla award from ENT President Ms. Gordana Kovačević*



## Students Win Silver Medal at ACM ICPC Programming Competition

ACM International Collegiate Programming Contest is an annual multi-tiered competitive programming competition among the universities of the world.

The 2014 World Finals were held in Ekaterinburg, Russia on 21-25 June. Final competition was held on 25 June. Among the 122 teams that participated in the competition the University of Zagreb team, formed of FER students won silver medal and 8<sup>th</sup> place in final ranking.

Team members were FER students Stjepan Glavina, Ivan Katanić and Goran Žužić. Their team was led by Luka Kalinovčić, FER's Assist. Prof Ante Đerek and Krešimir Malnar from the Croatian Informatics Association.

The 2015 World Finals were held in Marrakesh, Morocco, 16-21 May. The final competition was held on 20 May, when 128 teams competed to be the World Champion. Once again, the FER team won silver medal and 7<sup>th</sup> place in the final ranking.



Goran Žužić, Gustav Matula, Ivan Katanić, Stjepan Glavina, Krešimir Malnar and Ante Đerek, after winning silver in 2015. Photo: HSIN

Team members were Stjepan Glavina, Ivan Katanić and Gustav Matula, all FER students.

Winners were from the St. Petersburg National Research University of IT, Mechanics and Optics.

The only teams better than ours, were Moscow State University, The University of Tokyo, Tsinghua and Beijing University and University of California at Berkeley.

→ <http://www.hsin.hr/>

## Students Win EMC 2015 Student Design Competition

Students Mislav Mikić and Rebecca Grancarić, under the supervision of PhD student Raul Blečić and Prof. Adrijan Barić, won the Student Design Competition organized as a part of EMC 2015, Joint IEEE International Symposium on Electromagnetic Compatibility and EMC EUROPE.

The symposium was held 16-22 August 2015 in Dresden, Germany.

Our team demonstrated mastery of EMC principles in meeting predetermined design requirements for a typical application in the electronic design world.

Their design of a step-down switch-mode power supply (DC/DC converter)

was ranked first in each of the three categories: EMI measurements, report quality, and mechanical and aesthetic quality of the design.

The team shared their design techniques and experience with the greater EMC community by publishing an article in IEEE EMC Magazine.



Left to right: Raul Blečić, Rebecca Grancarić, Mislav Mikić and Prof. Adrijan Barić





## Students Present Self-sustaining House Membrain Project in Versailles

FER students participated as members of the University of Zagreb team in Solar Decathlon Europe, an international university competition which promotes research in the development of efficient houses, held in Versailles in June 2014. The project was started in 2012, by members of student organization SUPEUS.

Several Faculty professors mentored the students, helping them solve current problems. The primary goal of the Membrain project was to build a self-sustainable prefabricated house which would satisfy its needs for energy out of renewable energy sources, primarily the Sun.

The Membrain home consists of multiple layers – some of them provide structural stability, some gather solar energy, while some protect the interior from inappropriate weather conditions. All systems within Membrain house are managed by a central computer system that allows simultaneous monitoring and control. The main objective of this system is to increase the energy efficiency of the house, keeping the ideal housing conditions.

→ <http://www.membrain.com.hr/>

## FER Projects Among the Top 20 in Analog Design Contest in 2013 and 2014

The Texas Instruments Innovation Challenge (TIIC) – Europe Design Contest (Analog Design Contest) is a design competition for European undergraduate and postgraduate students. Project designs must display innovative concepts in the field of analog electronics, using TI components.

In 2013, project “Authentication System Based on Intra Body Communication” was selected. Students Josip Lončar, Vladimir Bachler, Nikola Luburić, Saša Tepić and Toni Šarić worked under the supervision of team leader prof. Hrvoje Džapo and with the help of Željka Lučev Vasić and prof. Igor Krois. The presented prototype uses the concept of signal transmission through human body.

The second project selected in Top 20 was “Temperature & EM Radiation Device Characterization - TEMPERA”, carried out by Ivan Debelec and David Vrtarić under the supervision of team leader Dr. Tvrtko Mandić

and supervisor Prof. Adrijan Barić. The project is a computer numerical control (CNC) system for contactless measurement of the temperature and radiated electromagnetic compatibility (EMC) of electronic devices.

In 2014 project “Mushroom in Classroom” was also selected. Marko Magerl and Jurica Rešetar together with the team leader Dr. Tvrtko Mandić and under the supervision of Prof. Adrijan Barić developed the system for active learning process. Mushroom is a battery-powered hand-held gadget that enables students to actively participate in lectures by giving instant feedback on the questions, quizzes or assignments.





## Sport

At FER, sporting activities are recognised as a relevant part of student life. FER actively supports student sporting activities by providing facilities for sport and physical recreation, as well as financial resources for both recreation classes and competition teams.

Whether they are elite athletes or amateur enthusiasts, students have a wide range of sporting activities at their disposal. There are teams, tournaments and competitions at different skill levels, from student clubs to inter-university teams, and the best athletes get the chance to represent the University of Zagreb in the international tournaments.

In the 2013/2014 season, our best rowing athlete (m8+) Luka Pap represented the University of Zagreb at the 2<sup>nd</sup> European Universities Games which were held in Rotterdam, Netherlands.

The same season our student Domagoj Pelegrin won the gold medal at the Croatian National Crossbow Championship and our student Zvonimir Hölbling won silver medal in men's doubles and bronze medal in men's singles at the Croatian National Badminton Championship.

In the 2014/2015 season, our student Domagoj Pelegrin won the gold medal at the Croatian National Crossbow Championship and the gold medal at the European Crossbow Championship (Innsbruck, Austria). The same season he competed at the World Crossbow Championship (Frankfurt, Germany) and won 4<sup>th</sup> place.

## EuroZagreb



EuroZagreb is an international student sports tournament organised by students and employees of The University of Zagreb and held in Zagreb. In the last two years, our athletes represented FER at two EuroZagreb tournaments.

In 2013/2014, our athletes won gold medals in table tennis (m) and volleyball (m), and silver medals in volleyball (w).

In the 2014/2015 season, FER students won gold medals in futsal (m) and volleyball (w).



## Zagreb University Championship

FER participates in Zagreb University Championship where students from 33 faculties and academies of the University of Zagreb compete in 19 sports.

In 2013/2014 FER won:

- 1<sup>st</sup> place in basketball (m), table tennis (m), rowing (m) and beach volleyball (w);
- 2<sup>nd</sup> place in badminton (m) and beach volleyball (m);
- 3<sup>rd</sup> place in futsal (m) and handball (m) and overall men's ranking.

In 2014/2015 FER won:

- 1<sup>st</sup> place in cross country running (m), bridge, volleyball (m), handball (m), chess and table tennis (m) and overall men's ranking;
- 2<sup>nd</sup> place in judo (m), volleyball (w) and beach volleyball (m);
- 3<sup>rd</sup> place in squash (m).





Elektrijada - International Electrical Engineering Students' Gathering has been taking place traditionally since 1960. Founded in former Yugoslavia, it now represents the largest annual meeting of electrical engineering students in Europe. Through its programmes, Elektrijada promotes a wider sphere of all active student life – scientific research, knowledge competitions, sports competitions, educational programmes, fun and fellowship. FER success was noted in the media: numerous news portals published the news, including leading daily newspapers and weekly business magazine. Croatian Radio presented Elektrijada results in two shows and before the event, Croatian Television filmed the story about it.

## Elektrijada 2014

Elektrijada 2014 was held in Siófok, Hungary from 7 to 12 May 2014. In the strong competition of 1300 students from 17 regional faculties:

- in overall faculty competition, FER won 1<sup>st</sup> place (ETF Belgrade came 2<sup>nd</sup>, EF Niš came 3<sup>rd</sup>);
- in knowledge competition, FER teams won 2<sup>nd</sup> place (ETF Belgrade came 1<sup>st</sup>, ETF Sarajevo came 3<sup>rd</sup>);
- in sports competition, FER teams won 1<sup>st</sup> place (ETF Belgrade came 2<sup>nd</sup>, FESB Split came 3<sup>rd</sup>),

In all sport disciplines, FER teams reached at least semi-finals, and won 1<sup>st</sup> place in eight disciplines - the achieved result was beyond every expectation.



## Elektrijada 2015

The following year, 19-24 May 2015, Elektrijada 2015 was held in Bečići, Montenegro, with more than 1,400 students from 20 faculties of electrical engineering from the region:

- FER won the 1<sup>st</sup> place in overall competition for the third year in a row (2<sup>nd</sup> place: ETF Belgrade, 3<sup>rd</sup> place: ETF Sarajevo);
- in knowledge competition, FER teams won 3<sup>rd</sup> place (ETF Belgrade came 1<sup>st</sup>, ETF Sarajevo came 2<sup>nd</sup>);
- in sports competition, FER teams won 1<sup>st</sup> place (ETF Belgrade came 2<sup>nd</sup>, ETF Osijek came 3<sup>rd</sup>).





## Electrical Engineering Students' Association - EESTEC

EESTEC is a non-political, non-profit organization of and for Electrical Engineering and Computer Science (EECS) students at European universities, institutes and technical schools awarding an engineering degree. It is present in 28 countries and 53 universities across Europe with over 4,000 members.

It aims to promote and develop international contacts and exchange of ideas among the students of EECS through improving technical knowledge of EECS students, introducing them to the industry and the educational system of other countries.

EESTEC Local Committee Zagreb ([www.eestec-zg.hr](http://www.eestec-zg.hr)) was founded in 2007. Since then, it has organised 9 international workshops, Android Competition "it's APP to you!" and other events on the local level.

CroApps, held in June 2014, was an international workshop where the participants were taught about the basics of mobile and web app development – from an idea to a product. In the academic part of the workshop, representatives of Croatian successful companies educated the participants about development techniques, types, trends and the latest technologies in the field of mobile and web applications.

Due to the great interest in CroApps 2014 workshop, another international project was organized with the same subject matter in 2015. In CroApps 2015, the main field of interest were mobile apps. Participants attended Java crash course, upgraded their knowledge about object-oriented programming and designed their own mobile app.



Soft Skills Academy, SSA, held in March 2014 and January 2015 was a three-day workshop for students of the University of Zagreb. Students participated in training given by certified EESTEC trainers and representatives of partner companies.

The main goal of the interactive trainings was development of soft skills - eg. public relations and marketing, strategic planning, handover and sustainability, leadership, project and time management, which, although very important in private



and professional life, unfortunately, often cannot be learned at university.

DIALUX, held in May 2014 was organized for students of the University of Zagreb. Through lectures and exercises, professors from FER educated the participants about basics of DIALUX software for professional light planning.



PLC+ (March, 2015) was the workshop on industrial automation and programmable logic controllers. This workshop provided future engineers with a detailed insight into issues facing automation engineers in practice.



EESTEC LC Zagreb also organized motivational team building weekends for our members (eco-village Gradunje, 2012-2015) and a humanitarian fundraising event "Sweeten your day and fulfil someone's Christmas dream" (December, 2011-2015).

→ <http://eestec-zg.hr/>





## IEEE Student Branch Zagreb

The Institute of Electrical and Electronics Engineers (IEEE) is the world's leading professional association for the advancement of technology. IEEE also serves student members in colleges and universities around the world.

IEEE Student Branch Zagreb started its activities in 1994 at FER and is the oldest student branch in Croatia Section.

It currently has 201 members in four chapters: Computer Chapter, Communication Chapter, Industrial Applications Chapter, and Power and Energy Chapter. Our activities include technical and soft skills lectures, workshops, job fairs, company visits, IEEE Day celebration and annual Croatian student branch congress. Technical lectures and workshops are usually organized with help of professors and research assistants at FER.



In the last two academic years, we were involved with:

- LabVIEW 30-hour training course;
- technically focused English-language training;
- trip to Nuclear Power Plant Krško;
- organisation of scientific nights and annual IEEE Day;
- connecting students with their first job by exchanging contacts and information about job offers and by organising the Styrian Job-Recruiting Day Croatia;
- helping IEEE Croatia Section in many activities;
- organisation of Student Transition and Elevation Partnership workshops and IEEE Elevate lectures.

→ <http://www.ieee.hr/ieee>

*Members of the IEEE Student Branch in front of FER*

## IEEE Central European Student and Young Professionals Congress

Central European Student and Young Professionals Congress (CEuSYP) was held in Croatia, on 8-10 May 2015, at FER. The congress was attended by 72 participants – student members and Young Professionals, as well as sections' and Region 8 representatives - from twelve IEEE Sections.



During the opening session the audience was addressed by dean Grgic, also Croatia Section Chair, Margaretha Eriksson, Region 8 Director-Elect, and Christian Schmid, Region 8 Secretary.

The programme consisted of sessions related to student activities, young professionals, educational and professional activities. Participants could also choose among 11 workshops improving their soft skills, increasing their technical knowledge, or informing them about IEEE topics. Participating student branches and affinity groups presented their recent activities and upcoming events during poster session, enabling exchange of ideas with other Congress participants. Volunteers had a chance to get to know each other during the gala dinner and multicultural evening. New contacts and friendships were made, and students gained insight into new trends in science and technology, and most certainly – became better IEEE volunteers.





## Student Union

Student Union is an association of students elected by all students on the Faculty, which protects student interests, participates in Faculty bodies and represents students in higher education system. It is an umbrella organization that coordinates all other student organizations. The Union has 31 student members on bachelor, master and postgraduate levels.

The Student Union organizes tribunes, discussion groups and other events which help students with important administrative information. Furthermore, it guides freshmen in their education and helps students



*Members of Student Union*

(especially those who come from other places) in many things they would otherwise need to learn the hard way, and eases transition from high school.

The Student Union Science and Sport Competitions Committee (SSCC), founded in 2011, organizes

FER student's attendance at Elektrijska competitions, where our students achieve outstanding results.

President of the Student Union in 2013/2014 was Marko Gulin and in 2014/2015 Domagoj Kenda.

→ <http://szzg.hr/>

## Student Union Representatives in the Office of the President of Croatia

Croatian President Prof. Ivo Josipović received the members of the Science and Sport Competitions Committee of the Student Union on 2 May 2014.

Delegation was led by Chairman of the Committee Martina Kutija and Vice Chairman Luka Humski, members Željko Martinović, Josip Gregov, Dalibor Lukić, Karmen Papić, Tomislav Hlupić, Tanja Kojić and student Mirko Kokot.

They were accompanied by advisers Assist. Prof. Saša Ilijić and Assist. Prof. Boris Milašinović.

In a relaxed conversation, members of the Committee informed the President about the organization and the history of Elektrijska and described activities performed before the event.

President Josipović expressed great interest in the competition and wished them success in the forthcoming event.





SUPEUS members during “The future of comfortable living” conference held at FER in March 2014

## Student Association for Promoting Energy Efficient and Sustainable Systems

Student Association for Promoting Energy Efficiency and Consulting, (SUPEUS) was founded in 2011. Since then, it has attracted mostly students from technical and science faculties.

Every year SUPEUS organises and holds educational projects:

- SUPEUS Case Study, held in December at 3 faculties; it provides 3 interdisciplinary lectures delivered by professors or experts from the industry;
- the biggest project is the annual conference „The future of comfortable living”, which is comprised of lectures and seminars brought by professors or leaders in business;
- SUPEUS publishes „SUMA”, annual magazine with the mission to make members explore and enrich their knowledge by writing the article to publish in the magazine.

In November 2015, in cooperation with the Faculty of Civil Engineering and Faculty of Architecture of the University of Zagreb, SUPEUS organised ECO-SANDWICH® Case Study; the winner was presented at the “9<sup>th</sup> Croatian forum on green building” organised by Holcim Croatia. The idea of the Case Study was to present energy efficient, recycled concrete sandwich facade panel,

awarded at the international trade fair “Bau Messe 2015” in Munich, Germany as one of the most innovative products presented. The importance of the product and projects is also recognised by CIP-Eco-innovation initiative by European Commission.

The effort and progress that SUPEUS has made through its first five

years earned us the „Croatian Energy Award 2014” awarded by „Croatian Energy Alliance” for our work on the development of sustainable energy system and industry, significant public impact and clear vision for long-term future of national energetics and industry related to it.

→ <http://supeus.hr/>

### X.FER

Student Informatics Club of FER, founded in 2001, is a student organization of former and current Mathematics, Electrical Engineering and Computing students at universities, institutes and companies.

The aim is to promote and develop algorithmic knowledge and core computer science concepts among students. The club attracts around 20 regular members every year who are responsible for the Competitive Programming course, which was launched in 2009. Each year, about 30 students from all years of study are accepted to take this course. Other members, about 40 of them, are students who have completed their studies but wanted to stay in touch with younger generations and help them with their knowledge and experience.

Besides the Competitive Programming course, which is a one semester long course covering twelve algorithmic topics with two exams, we are constantly working on something new. We have created ourselves an infrastructure to make the whole course organization a lot easier (<http://dev.xfer.hr/>), we have designed tools to make writing editorials and lectures unified (<http://mp.xfer.hr/home/>) and available online (<http://wiki.xfer.hr/>). We have two ongoing projects and we are glad to accept new forces willing to learn and create new things.

→ <http://www.xfer.hr/>



## eSTUDENT

eSTUDENT is one of the most active student associations in Croatia and the region with more than 300 active student members and more than 8,000 students that participate in its projects. eSTUDENT members are bright and ambitious students of the University of Zagreb.

eSTUDENT's mission is to gather and network best students and offer them theoretical knowledge and practical skills through various projects, lectures and workshops in order to develop students' leadership abilities and encourage them to take a significant role in modern society.

The goal of eSTUDENT is to persistently link students and prospective employers in order to help students find internships or jobs in their specific field of interest and help the employers find capable and prospective new employees.

Every academic year eSTUDENT organises more than 30 projects, lectures, workshops and our own parties, team buildings and events.

Additionally, eSTUDENT collaborates with 60 companies and organizations, and its strategic partners include Zagrebačka banka and Nestlé.

→ <http://www.estudent.hr/>

## Elektroboj

Elektroboj is an educational student competition intended primarily for students of electrical engineering. Students compete in teams of 2 to 4 members, and during the contest build hardware solutions. Lectures and workshops that offer additional education are also organised during the competition.



In the academic year 2014/2015 two lectures and one workshop were held in collaboration with IT companies that are partners of the competition. The theme of the workshop was to create an electronic dice and the participants had a chance to solder SMD components.

Additionally, a visit to the partner company Končar - Institut za elektrotehniku d.d. was organised. The tour started off with a lecture on certification held by the department in charge of it. After the lecture, students had the chance to visit several laboratories in the company.

## Case Study Competition

Case Study Competition is a student competition that provides students with a chance to solve real-life business challenges of some of the biggest Croatian companies across industries.

The competition has a 12-year long tradition and is organized by eSTUDENT in partnership with leading Croatian companies, that provide challenges and problems to get fresh, out-of-the-box solutions from the most talented students of all Croatian and regional universities.

In 2013/2014 students were solving cases (4 out of 16) from some of the most popular Croatian IT companies such as Omega Software, Infobip, Ericsson Nikola Tesla and Hrvatski Telekom. Many of the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup>-placed contestants were students of FER.

In 2014/2015 more than 2.000 students competed in solving 13 business cases, while the combined prize pool for all cases was 234,000 kn (31,120 €). This makes Case Study Competition the biggest student competition in Croatia and the region.

For 2016, the Case Study Competition organising team leader is a student from the Faculty of Electrical Engineering and Computing.

## Starter

Starter is a platform that connects prolific young students and their potential employers, the best companies in Croatia. Starter includes the system for job advertisement forwarding and visits to the future workplace.

- Golden index award - an annual award ceremony in which students award companies for their contribution to additional student education, as well as their offered scholarships and employment opportunities;
- Starter conference - conference held at various faculties across the University in which HR experts from companies explain their hiring process as well as give advice on job interviews and writing CVs and cover letters. The lecturers also present their companies and their field of work, a typical workday and in general how it is like to work there;
- Graduate's guidebook - a guidebook for all final year students which offers great advice on writing the CV and cover letter, performing well on job interviews, business etiquette, and similar.

## Mozgalo

Mozgalo is a student competition in developing predictive models using statistical and machine learning methods.

As the only competition of that kind in Croatia, it was first held in 2014, with 100 applied competitors and 3 educational lectures held.

In 2015 there were 155 applied competitors and 4 educational lectures held with the topics of:

- cleaning and data analysis in R,
- the most common machine learning algorithms,
- predictive modelling with a focus on logistic regression,
- validation and calibration of predictive models.



In 2014/2015 a half of the workshops were held at FER, as well as the big finale of the competition in May.

The competition includes student participants from different universities in Croatia, but most are from FER, often in mixed teams, which best utilise their skills and knowledge.

## Popularization of Science

The Team for the popularization of science at FER focuses on FER's programme "ŠUZA - from School to Science and Academic Community".

The main goal of the programme is to encourage young people to pursue a career in science.

eSTUDENT actively participates in the programme implementation helping our professors and assistants organize school visits and various events (eg. Hour of Code, EU Code Week and similar).

## App Start Contest

App Start Contest is an educational student competition in which student teams develop entrepreneurial projects based on mobile applications.

Contest evolved from Web Start Contest, founded in 2007 at FER, shifting focus on emerging mobile platforms.

Main goals of App Start Contest are to encourage students to learn about mobile app development, design and business planning and to connect the most talented students with the most exciting IT companies.

It is organized by eSTUDENT, partnered with top IT companies, startup incubators and university professors.

Top 10 teams get to pitch their projects to professors, students, representatives of the top Croatian IT companies and potential investors. The best solutions are awarded.

From 2013 to 2015, more than 300 students in 97 teams have competed in ASC. Most finalists get job offers from some of the competition's partner companies, and some of the best solutions started their own companies to further develop their projects.

*Finals of the ASC contest in 2015*





## Board of European Students of Technology - BEST

BEST is a student organisation present in over 30 countries in Europe, in almost 100 universities, and consists of over 4.000 members who form an innovative, growing and powerful student network.

Local BEST group Zagreb was founded in 1999 and has evolved into a recognized and well respected student organisation with a solid base of 50 members, from various technical faculties and an alumnae network consisting of 200 engineers.

In the last 2 years, BEST Zagreb organised several projects and hosted many foreign students in Zagreb.

We have enabled over 100 Croatian students to attend BEST engineering courses all over Europe, and over 80 programming students to attend our programming competition.

**BEST Engineering Days** is a four-day event that gathers top companies in Croatia and local students with technical background. Students can learn necessary information about the companies through promotional materials or through direct contact with company employees. Through workshops and trainings, students learn how to write quality CVs for job applications, scholarships and competitions or gain knowledge such as how to properly behave on a job interview. Knowing the importance of proper etiquette in a business environment, we also train on communication with employers, professors and colleagues.

There are two categories of competition during the Engineering days, in

which we want to motivate students to utilise their skills and knowledge:

- Case Study, where they have to find a solution to a real technical problem, and
- Team Design, where they have to design a physical prototype of a given device.

Students are divided into four member teams, and given one day for each task. Through these competitions, we both promote and develop teamwork in students which they will benefit from later, in a working environment. The winners of the competition go on to compete in regional and European BEST competitions. Best Zagreb hosted the 2015 Regional BEST Engineering Competition, hosting around 40 engineering students.

**BEST Engineering Course** is an academic one or two week course with 20-30 participants from all over Europe, and 20-30 participants from Croatia.

The academic part covers a hot topic in engineering and is taught by local professors, for which all attendees are granted 1 ECTS credits at their respective universities. In the past two years we have organised two courses, one on materials technology and the other on oil and petrochemicals. Apart from the academic part, participants were introduced to Croatian culture and natural heritage. Our courses are mostly held at FER.

→ <http://www.best.hr/>

## Cultural Exchanges

Cultural Exchanges are events where two local BEST groups from Europe meet and experience each other's cultures and traditions. In the last 15 years we had exchanges with BEST groups from Russia, Italy, France, Spain and others.

Regional Meetings are organised between all local BEST groups from one region, in order to learn from each other. BEST Zagreb organised a Regional Meeting in autumn 2014, where we hosted over 60 BEST members from 4 regional and several members from outside of the region.

## Best Code Challenge

Best Code Challenge is a computing competition in most popular programming languages. Participants solve a given task in a two-week period.

Main objective is to connect students with universities and companies. This project gathers all the best student programmers and companies, and it also promotes computer science among students. In 2013 we held the last edition of this competition and this year we are preparing AI Battleground competition which will be held in 2015/2016.



## Student Association - SS FER

SS FER is a voluntary student organization with the main goal of organizing students free time in a creative and educational way. One of SS FER main projects is Electrical Engineering Students Club (KSET).



Club members work intensively on promoting underground and urban culture by hosting musicians and performers from around the world as well as local artists. The club is regionally famous for its concert programme with around 100 concerts and 50 music listening sessions per year. Except for music programmes. Over the last two years there have been around 15 theatre plays (some produced by the club's volunteers), 10 poetry reading nights, 8 quiz nights and more than 20 documentary and movie nights.



Each year SS FER members organize "Job Fair", an event at which companies offer students internships and jobs, hold presentations on newest technologies and discuss latest topics in the industry. The last two years the event was held in May and hosted over 20 participating companies, start-ups and organizations. A lot of students got information on job opportunities and possibilities of starting their own business. Since both companies and students were enthusiastic and asked about more

presentations, in the fall 2014 a series of presentations about new technologies, called "Tech Talk", was started and held through the academic year.

For years now members of the photo section have been organizing photo courses and digital photography workshops. At the end of the course attendees prepare their own photo exhibition exposed in KSET gallery. Members of Technical section organized several courses about proper use of power tools with emphasis on safety at work, as well as a workshop for programming microcontrollers which was very successful and will be transformed in short course in the following semester. Hiking section organized five-week hiking schools focusing on first aid, orientation, map reading and everything else about nature and being outdoors. In the past two years they also organized multiple expeditions and hiking competitions. Music section organized two audio production courses each year.



Computing section is actively working on popularizing open source technologies through biannual Linux Installfest and through two university courses on Linux OS. Members also maintain and actively upgrade club's network, gathering valuable hardware and software skills and providing other students with free and fast WiFi connectivity. Video section members are engaged in video production, from documenting KSET live music programme to filming creative and original videos and short movies. Video section also filmed and documented Elekrijada, an international university competition among electrical engineering students in science and sport. Much attention is given to amateur creativity and constant education of section members. As a result, each year they participate in some of the Croatian film festivals.

We try hard to provide an entertaining, as well as an educational environment, and all students interested in helping our cause are more than welcome to join us.

→ <http://www.ssfer.hr/>



## Croatian Academic Sport Association - SUBOS

Croatian Academic Sport Association SUBOS is a voluntary student organization with a mission to promote sport in academic society. It gathers students from all faculties of the University of Zagreb. It was established in 2004 by three FER students and it undisputedly became the most popular student sport organization in Croatia.

In ten years more than 4,000 students have been active in this association. SUBOS organizes practices in 12 different sports, team buildings, student parties, charity projects, summer and winter extreme sport weekends in the nature, and other social and sporting events focused on students.

In the academic year 2013/2014 and 2014/2015 some of the major achievements in SUBOS included:

- 50 training classes each week, for 10 months in a year,
- around 50,000 student/hour/trainings per year,

- 2 summer extreme sport events were organized - 3 days of kayaking in Adriatic sea for 100 students,
- International Roger Gracie BJJ seminar with more than 100 participants from 10 European countries,
- conjoint project with students from Academy of Fine Arts - SUBOS Gym wall paintings,
- two charity projects were successfully achieved (financial donations and blood donations),
- one winter extreme sport event was organized - a three-day mountaineering on Velebit for 100 students,
- ten SUBOS parties were organized,
- cooperation with professional rugby club Lokomotiva was established,
- conditional strength and Brazilian jiu-jitsu year-long tournaments,
- participation in organizing official championship of the University of Zagreb.

→ <http://www.subos.hr/>

### SUBOS Volunteers Clean Martinovka Sports Hall

In May 2015, SUBOS volunteers helped clean and repaint our Faculty gym.

The action took **1** sanding machine, **2** aluminium scaffolds, **3** days, **4** compressors, **5** WD-40 spray bottles, **6** meters of chain, **7** vacuum cleaners, **8** bricks, **9** extension cords, **10** litres of paint, **20** brooms, **30** paint rollers, **35** carabiners, **40** steel L-profiles, **50** kilos of meat, **55** brushes, **60** litres of interior walls paint, **65** nitro solvent bottles, **70** steel wire spiral scourer, **75** kilos of construction glue, **80** kitchen sponges, **90** rags, **100** pizzas, **150** litres of facade paint, **251** T-shirts, **251** volunteers, **500** beer bottles and **2,285** work hours.

Many thanks to SUBOS!



## Our Alumni

FER awards alumni at the ceremonial part of the Faculty Council held just before the Faculty Day in November. During the ceremony, commemorative Golden Diplomas are awarded to alumni who graduated 50 years earlier.

On 13 November 2013, the Faculty Council held a ceremonial session where alumni from the academic year 1962/1963 were awarded to 67 former students.

The following year, the Golden Diplomas were awarded on 12 November to 63 former students who graduated in the academic year 1963/1964; among them were our Prof. Gorislav Erceg and Branimir Makanec, a pioneer of computer popularization in Croatia and the main designer of the first Croatian personal computer, Ivel Ultra, developed in 1980s.

→ <http://amac.fer.hr/>



*Alumni Aleksandar Szabo addressing the audience during his thank-you speech in 2013*



*Dean Grgić awarding Golden Diploma to 1963/1964 alumni Josip Grgić - his father*



*Alumni Branimir Makanec, designer of first Croatian personal computer Ivel Ultra*



### PhotoMath App by Alumni Jurica Cerovec

Jurica Cerovec, former FER student, former laboratory student assistant at the Department of Applied Mathematics and winner of the Josip Lončar Award, is one of the authors of the PhotoMath smartphone app.

Along with his colleagues from the MicroBlink company, he developed an app that caused enormous interest by users all around the world in 2014.







# The Faculty

*We are Croatia's leading academic and research institution in the fields of electrical engineering, computing, and ICT.*



## New Dean and Vice Deans Elected

On its session held on 25 April 2014, the Faculty Council elected new Dean for the academic years 2014/2015 and 2015/2016.

The two candidates confirmed earlier by the Senate of the University of Zagreb were Prof. Mislav Grgić, Vice Dean for Science from 2010 to 2014, during Dean Nedjeljko Perić's term, and Prof. Željko Štih, Head of Department of Electrical Engineering Fundamentals and Measurements and Vice Dean for Science from 2002 to 2006, during Dean Mladen Kos' term.

In the first secret ballot, Prof. Grgić received 118 votes from the members of the Faculty Council and Prof. Štih received 66 votes. Eight ballots were invalid. Thus, Prof. Grgić became the new dean, the youngest in the history of the Faculty.

Dean Elect Grgić presented his choice for Vice Deans and immediate vote was cast on his proposal.

After a secret ballot, all three Vice Deans were approved by majority of votes of the Faculty Council for the next two academic years:

- Prof. Marko Delimar as Vice Dean for Education,
- Prof. Gordan Gledec as Vice Dean for Science, and
- Prof. Mario Vražić as Vice Dean for Finances and Organization.



Back: G. Gledec and M. Delimar  
Front: M. Vražić and M. Grgić



**Prof. Mario Vražić**  
Vice Dean for Finances and Organization

Prof. Vražić is an associate professor at the Department of Electric Machines, Drives and Automation. Until 2014 he was the Head of the Department.

**Prof. Marko Delimar**  
Vice Dean for Education

Prof. Delimar is an associate professor at the Department of Energy and Power Systems. From 2011 to 2014 he served on the IEEE Board of Directors.

**Prof. Gordan Gledec**  
Vice Dean for Science

Prof. Gledec is an associate professor at the Department of Applied Computing. He served as Chairman of the Faculty's Quality Management Committee from 2010 to 2014.

## Heads of Departments

**Assist. Prof. Sanda Pleslić**  
*Department of Applied Physics*

**Prof. Ilko Brnetić**  
*Department of Applied Mathematics*

**Prof. Krešimir Fertalj**  
*Department of Applied Computing*

**Prof. Željko Štih**  
*Department of Electrical Engineering  
Fundamentals and Measurements*

**Assist. Prof. Damir Sumina**  
*Department of Electric Machines,  
Drives and Automation*

**Prof. Marin Golub**  
*Department of Electronics,  
Microelectronics, Computer and  
Intelligent Systems*

**Prof. Igor Kuzle**  
*Department of Energy and Power  
Systems*

**Prof. Igor S. Pandžić**  
*Department of Telecommunications*

**Prof. Mario Cifrek**  
*Department of Electronic Systems  
and Information Processing*

**Prof. Hrvoje Mlinarić**  
*Department of Control and Computer  
Engineering*

**Prof. Ivan Đurek**  
*Department of Electroacoustics*

**Prof. Zvonimir Šipuš**  
*Department of Wireless Communica-  
tions*

## New Faculty Advisory Board

Members of the Board are proposed by the Dean and approved by the Faculty Council. Four members of the Advisory Board are full professors of the Faculty, and other members come from institutions and companies that are of interest concerning the Faculty's field of operation. The constituent session of the new Advisory Board was held on 15 January 2015. New members of the FER Advisory Board are:

- Darinko Bago, Končar-Elektroindustrija;
- Mladen Fogec, Siemens Hrvatska;
- Ljubo Jurčić, University of Zagreb, Faculty of Economy;
- Branko Jeren, FER;
- Ignac Lovrek, FER;
- Zoran Bohaček, Croatian Banking Association;
- Ivo Špigel, Perpetuum Mobile;
- Ante Mandić, IN2;
- Gordana Kovačević, Ericsson Nikola Tesla;
- Mladen Pejković, Telekom Austria Group;
- Slavko Krajcar, FER;
- Nedjeljko Perić, FER;
- Davor Tomašković, Hrvatski Telekom;
- Hrvoje Somun, APIS IT;
- Slavko Vidović, InfoDom;
- Damir Vandelić, Adris grupa.

The Chairman of the Board is Zlatko Bohaček, Ph.D., the chairman of the Croatian Banking Association and his deputy is Prof. Nedjeljko Perić, the former Faculty Dean.

**Mr. Zoran Bohaček**  
*Chairman of FER Advisory Board*



## Working Bodies

The Faculty Council voted members and chairmen of the Faculty permanent working bodies:

**Committee for Undergraduate and Graduate Studies**  
*Prof. Marko Delimar, Vice Dean*

**Committee for Doctoral Studies**  
*Prof. Maja Matijašević*

**Committee for Elections into Status**  
*Prof. Borivoj Modlic*

**Committee for Research and International Cooperation**  
*Prof. Sven Lončarić*

**Committee for Cooperation with Industry and Business and for Innovation**  
*Prof. Ivan Petrović*

**Committee for Infrastructure and Conduct**  
*Prof. Igor Kuzle*

**Committee for Life-long Education and e-Learning**  
*Prof. Krešimir Fertalj*

**Commission for Quality Management**  
*Prof. Marin Golub*

**Library Commission**  
*Prof. Goran Gledec, Vice Dean*

**Commission for Awarding Employees and Students**  
*Assist. Prof. Sanda Pleslić*

**Commission for Admission to Undergraduate and Graduate Studies**  
*Prof. Mario Osvin Pavčević*

**Disciplinary Commission for Students**  
*Prof. Damir Ilić*

**Ethical Commission**  
*Prof. Lahorija Bistričić*



## FER Graduates at the University of Zagreb Head Positions

The graduates of our Faculty, who later established their academic careers outside of FER (except Prof. Modlic), were elected to head duties at University of Zagreb:



**Prof. Damir Boras**  
Rector of University of Zagreb  
Graduated in 1974



**Prof. Klaudio Pap**  
Dean of Faculty of Graphic Arts  
Graduated in 1987



**Prof. Vjeran Strahonja**  
Dean of Faculty of Organization and Informatics, Varaždin, until 9/2014  
Graduated in 1980



**Prof. Hrvoje Gold**  
Dean of Faculty of Transport  
Graduated in 1974



**Prof. Borivoj Modlic (FER)**  
Acting Dean of Faculty of Graphic Arts (2012-2014)  
Graduated in 1972



**Prof. Neven Vrček**  
Dean of Faculty of Organization and Informatics, Varaždin, since 10/2014  
Graduated in 1990

## Acoustical Design of a New Concert Hall and Other Music Facilities

The Academy of Music of the University of Zagreb is an institution with 90 years of history and tradition in education. However, a building suitable for their needs was finished and opened only in 2015.

The 12,000 m<sup>2</sup> of available space hosts many music facilities, such as rehearsal rooms, teaching cabinets, two small recital concert halls and a larger multifunctional concert hall with a variable number of seats for up to 300 visitors.

Due to space constraints, it was not possible to build more than one hall of this size in the building. Therefore, it had to be designed to serve several purposes: as a concert hall for chamber music orchestras, organ music and full symphony orchestra performances, operas, but also as a drama theatre, cinema, and a space for speech-based events.

Thanks to the expertise and experience in such projects of Prof. Hrvoje Domitrović, Prof. Kristian Jambrošić and Dr. Marko Horvat, from the Department of Electroacoustics, more than 100 acoustically sensitive

rooms, including the multifunctional concert hall, were successfully designed and finished.

Many musicians from the Academy of Music already confirmed the excellent acoustic quality of the new rooms and the concert hall.



*Music Hall at the Academy of Music*

## Cooperation with srce

In May 2015, the management of the Faculty met with director of University Computer Centre and his assistants at Srce premises. The meeting included topics related to current projects at the two institutions and the possibility of extending our long-lasting cooperation in the area of development of e-infrastructure in Croatia, as well as the greater involvement of FER students in Srce activities.

Excellent ties between FER and Srce date back to the time when Srce was established in 1971 with the efforts of group of FER professors, who envisioned Srce as the central national institution for development and application of information technologies.



From the left: Prof. Delimar, Director Dr. Bekić, M. Milinović, Dean Grgić, I. Marić, Prof. Gledec, S. Softić Kučina and Mr. D. Dobrenić.

## FER and Ruđer Bošković Institute Sign a Letter of Intent

Dean Prof. Mislav Grgić and Director of Ruđer Bošković Institute Dr. Tome Antičić signed a Letter of intent about cooperation on mutual research projects with special accent on structural strategic projects between FER and IRB, worth close to a 100 million €.

The cooperation is tied to two strategic projects: O-ZIP, a structural project of the IRB which is on the EU priority list since the accession to the Operative programme for the period 2014-2020, and a strategic project of FER's Innovation centre, which is on the indicative list of the Croatian Ministry of Science, Education of Sports.

O-ZIP is valued at 50 million € and will provide development platform for start-up labs, SMEs and innovation incubators.

We expect that by strengthening the cooperation between FER and IRB on strategic structural projects the EU funding of the development of the much needed innovative and competitive projects and services will additionally increase.

Along with Director Antičić and Dean Grgić, the signing ceremony was held in the presence of Dr. Tomislav Šmuc, assistant director of IRB for international cooperation and projects, Dr. Neven Soić, assistant director of IRB for science and education and FER's Vice-Deans Profs. Vražić, Delimar and Gledec, as well as Prof. Nedjeljko Perić as the coordinator of the Innovation Centre project.



Left to right: N. Soić, M. Vražić, T. Šmuc, T. Antičić, M. Grgić, N. Perić, G. Gledec

## Cooperation with Faculty of Mechanical Engineering and Naval Architecture

A meeting between previous and current managements of FER and Faculty of Mechanical Engineering and Naval Architecture (FSB) of the University of Zagreb was held on 30 January 2015.

The meeting venue was the newly renovated alumni club of FSB. Topics discussed included means of the so far excellent cooperation between the two faculties in all fields of activities:

- education - already several joint study programmes are active,
- research - several research projects are under way where FER or FSB are coordinators and partners,
- innovations and professional work.

Organization of joint study Energy Efficiency and Renewable Energy Sources Study Programme in Šibenik was discussed in more detail.



Managements of FSB and FER





Top images: students working at the Central Library

Bottom image: Zora Žitnik working at the Library desk

Central Library desk

## Central Library

With the mission of supporting implementation of teaching, scientific research and professional work, FER Central Library offers high-quality support to research and scientific process, and acts as an active partner in improving learning outcomes.

The Library offers students, teaching and non-teaching staff, as well as high-school students, access to relevant information, scientific and professional papers, and also suggests literature (by online database searching and information retrieval, interlibrary loan and Ask a Librarian service).

Additionally, the Library is involved in the preparation of bibliometric indicators for the purposes of evaluation and quality measurements of scientific publications (as an essential part of the process of awarding prizes, electing to scientific title, etc...).

Faculty of Humanities and Social Sciences Council in Zagreb appointed the Head of the Central Library as mentor to students of Library and Information science as a part of student practice programme.

Within publishing activities of the Faculty, the Central Library assigned 29 ISBN numbers and participated in the process of print and online publishing.

With the aim of better service delivery and increasing the quality of work, the Library employees constantly undergo further training in seminars, lectures, doctoral study, and also conduct research, as well as publish research papers and articles. In addition, the Head of the Library was an active participant in the international project titled "Once upon a time... in Europe".

With the purpose of enhancing its availability and communication with its users, the Central Library is also present on Twitter and Facebook.

→ <http://www.fer.hr/knjiznica/>



### Full Time Staff

Jadranka Lisek, M.S. library adviser, Head of the Central Library

Branka Marijanović, graduate teacher, Master of Library Science

Stjepan Šimara, graduate teacher, Master of Library Science

Zora Žitnik, library assistant

### Part-Time Staff

Ana Mari Čajsa, graduate teacher; librarian (serial holdings revision associate)

Nina Jelača, Master of Library Science; Master of museology (Croatian Employment Service programme for professional training for work without employment)

Dina Vrkić, Master of Library Science (until 30 June 2014)



## FER Wins “Bike to Work” Campaign

In June and September 2015, FER participated in two “Bike to work” campaigns. The goal of the campaigns, organized by the non-governmental organization “Sindikata biciklista” (Biker’s Union) is to promote a healthy and sustainable lifestyle for employees of companies and institutions in Zagreb.

The campaigns were organized as competitions, where the goal was to encourage as many employees as possible to use their bicycle for commuting to work.

A total of 277 companies and institutions participated in the June campaign, which took place 1-28 June 2015.

FER won first place in the “over 500 employees” category, with 11 % of employees commuting by bike to work. The 58 bikers racked up a total of 7,190 kilometres during the campaign.

In a week-long September campaign (14-18 September 2015), FER defended the title among 148 companies and institutions, winning first place, with 5% of its employees commuting by bike.

Among the departments, Department of Control and Computer Engineering repeated a strong showing with 15%, falling just 1% short of first place in its category. Fourth place in the same category was claimed by Department of Telecommunications with 9.4%.

In addition to the prizes awarded by the organizers, FER organized a get-together for its current and prospective bike commuters at the KSET Student’s club. The event featured a bike repair clinic, a screening of the “Flying Scotsman” movie, prizes for the top individuals and departments and free pizza for everybody.



*Student parking his bike on the new parking lot in front of building C*

## New Bicycle Parking Facility

With many students and staff using their bikes as a means of transport, FER management set up a plan to build a bicycle parking facility to be used by students and staff.

The parking was built on two locations in 2015.

The first location, with the capacity of 70 bikes is located between buildings B and C - on site of the existing bike parking lot; the second parking lot with the capacity of 140 bikes was built between buildings A and D. Bicycle parking is possible by putting the bike on a specially designed column with space for the pedal and chain.

Video surveillance was installed which monitors the parking lot 24/7.

In the near future, the fence door will be equipped with locks that can be opened using student smart cards.



## Improvement of Faculty Infrastructure

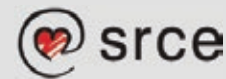
Faculty is the place that is supposed to encourage creativity and make students and staff feel comfortable. In the last two years, a lot has been done to improve the quality of work at FER:

- wireless network was improved and it now covers most of the Faculty premises,
- extensive plumbing work was done in the basement of building D,
- all parking spots at the Faculty parking lot have been redrawn and repainted,
- air-conditioning was installed at the Department of Applied Mathematics,
- blinds were installed on the south facade of the building D (towards Vukovarska Avenue).

With the start of the term of office of the new management, the work was intensified in 2014/2015:

- Martinovka Sports Hall was cleaned with the help of SUBOS student organization,
- the floor in the small Martinovka halls was sanded and varnished,
- two bike parking lots were built,
- Student Administration service desk was refurbished,
- all buildings were connected with optical network,
- Gray and White Hall in the Congress Centre were remodelled and rebuilt,
- information support on the web was updated with new applications to help every-day business activities,
- a wheelchair for the disabled was acquired and stored at the reception office,
- the work on the energy renovation of buildings A, B, C, D and the Martinovka Sports Hall has started.

*Remodelled Grey Hall in the Faculty Congress Centre*



## ECDL Education

In an effort to increase the efficiency of computer use in every-day business, administrative staff and department secretaries attended the European Computer Driving Licence (ECDL) certification programme provided by Srce. In 2015, the education included word processing and spreadsheets (basic and advanced levels) modules.

Total of 51 employees attended the certification. In the quality questionnaire, they expressed content with the quality of teachers and the certification process itself (average grade for teachers was 4.94, with 104 responses for all modules).





## In the Media...

### **Tportal.hr**

*Croatian students turn building process upside-down*

### **Jutarnji list**

*Interview with Prof. Davor Grgić about Nuclear Power Plant Krško*

### **Slobodna Dalmacija**

*Dean of FER at Science Festival in Sinj*

### **Slobodna Dalmacija**

*Round table discussion at Science Festival*

### **Business Daily**

*FER buys the first Croatian electric car*

### **RTL, Radio Sljeme, TV**

*Jabuka  
FER Open Days 2013*

### **Croatian Radio Television**

*Cooperation between FER and Croatian Radio Television*

### **Dnevnik.hr**

*FER Day*

### **Jutarnji list**

*Robots with Souls: Herr Flick Helps Autistic Children*

### **Nova TV**

*Prof. Sonja Grgić about Marin Soljačić's new invention*

### **Croatian Radio Television**

*About movement of bees*

### **HAK review**

*When Robots Help Sick Children*

### **Auto klub**

*VISTA: Croatian Project for Safer Traffic*

### **Croatian Radio Television**

*Assist. Prof. Mile Šikić*

### **Jutarnji list**

*Who is Head of the Best Faculty in Croatia*

### **Srednja.hr**

*Interview with newly elected dean of FER*

### **Novi list**

*FER partner in a 2.8 billion € project*

### **Znano.st**

*What Are Our Brain's Electric Signals Hiding*

### **Croatian Radio Television**

*About the project "Feel Zagreb Air"*

### **Croatian Radio Television**

*About Internet of Things*

### **Croatian Radio Television**

*About FER*

### **Business Daily**

*Computer Vision Systems Help Car Drivers*

### **Croatian Radio Television**

*Interview with Assist. Prof. Hrvoje Pandžić*

### **Croatian Radio Television**

*About VISTA project*

### **Croatian Radio Television**

*About VISTA project*

### **Croatian Radio Television**

*Interview with Prof. Ivana Podnar Žarko*

### **EGE**

*Interview with Dean Grgić*

### **Globus**

*My Doctor is a Robot*

### **Jutarnji list**

*FER is Currently the Most Popular Faculty*

### **Croatian Radio Television**

*Prof. Sonja Grgić about the history of television*

### **Večernji list**

*FER and IRB joint projects*

### **Business Daily**

*FER students design the application for bee business*

### **HINA agency**

*EU Code Week at FER*

### **Srednja.hr**

*About Competitive Programming course*

→ <http://www.fer.hr/oferu/mediji>



## Lider's Exporters' Club Conference Opened by the President of Croatia

On 3 July 2015 FER hosted the 2<sup>nd</sup> Conference on Export, organized by business weekly magazine "Lider". The Conference motto was "Smart People Know What Export Is For". By using this motto, the organizer's intention was to point out the fact that growth of export in 2014 and start of 2015 was the biggest factor that pulled Croatia out of recession after 6 years.

The Conference was opened by President of Croatia Ms. Kolinda Grabar-Kitarović, who in her speech stressed the importance of the support for companies which invest in knowledge, research and development, but also warned the brain drain problem. The President noted that until now economic development was mostly based on wrong assumptions which increased import, diminished competitiveness of our productive companies and entered into a huge debt at the state and individual level.

FER joined Club of Exporters in April 2015 during the 19<sup>th</sup> meeting which was held in Podravka, in Koprivnica. The meeting was attended by Croatian Prime Minister Mr. Zoran Milanović.

FER's Dean Prof. Mislav Grgić drew the audience's attention to the fact that from 2009 to 2014 FER received over 16 million € from EU funds and carried out 40 % of all projects in technical sciences in Croatia. This



*Dean Grgić speaking at the conference*

helped FER acquire research equipment, but also using that funding, FER employs 130 of its own employees - total of almost a quarter of all the staff, thus giving a million Euros back to the national budget in taxes.

In the course of the Conference, economists and businessmen held a round table about the problems facing the economy in Croatia. FER was represented by Prof. Vedran Bilas.

## "Smart City: Zagreb" Workshop

On 1 October 2013 workshop "Smart City: Zagreb" was held at FER. The workshop was attended by the presence of Mayor of Zagreb Milan Bandić, his deputy Sandra Švaljek, Vice Rector of the University of Zagreb Bojan Baletić, deans and vice deans of technical and



*Mayor Milan Bandić speaking at "Smart City: Zagreb"*

biotechnical faculties of the University of Zagreb, their colleagues from Skopje, distinguished businessmen - members of FER Advisory Board and representatives of the Government,

The focus of the workshop was the presentation of infrastructural project "Smart City: Zagreb" - a project that brings together public and private sector, institutions, citizens and other interested parties, in accordance with EU regulatory framework on smart cities. The workshop was organized by the City of Zagreb and FER.

Dean Perić welcomed the audience and introduced the plans of FER to establish the Living Lab.

Mayor Bandić talked about the ambition of the City to climb up from the current 35<sup>th</sup> place in the list of European smart cities. The presentation on the Living Lab and smart city concept and opportunities it brings to cities was given by Giorgio Tonelli, President of European House Ambrosetti, from Milan, Italy.

Legal counsel Ivan Tilošanec presented the legal framework of the Living Lab.

## Open Croatia Conference Held at FER

On 26 March 2014, FER hosted the Open Croatia conference, dedicated to the topic of openness and transparency of the Croatian government as well as to how these values are being implemented through the Open Government Partnership. The Conference was attended by President Ivo Josipović, Minister of Science, Education and Sports Željko Jovanović, Deputy Minister of Foreign and European Affairs and chairman of the Government's OGP Council Joško Klisović, Deputy Finance Minister Boris Lalovac, and Assistant Minister of Administration Jagoda Botički. The OGP is an international initiative which through cooperation between governments and civil society promotes reforms aimed at achieving a more open and more responsible government. It was launched by US President Barack Obama in 2011. Croatia is one of the 63 member states.

Before the conference, President Josipović and Minister Jovanović were welcomed by Dean Perić and Vice Dean Petrinović in Dean's Office.

**Right top:** Conference Participants in Dean's office. **Right bottom:** Ministers Jovanović, President Josipović and Deputy Mayor of Zagreb Višnja Kusin



*Dean Perić speaking during introductory speech at the Conference*



## Round Table on National Cyber Security Strategy

As part of consultations with the interested public, FER hosted the round table "National Cyber Security Strategy and Action Plan for its Implementation" on 17 June 2015.

Welcome speech was given by Prof. Gordan Gledec, Vice Dean for Science, and Mr. Ivica Panenić, Head of The Office of the National Security Council. Introduc-

tory talks were given by Mr. Aleksandar Klaić, Ph.D., Assistant to the Head of The Office of the National Security Council, Mr. Vinko Kuculo, senior advisor and Ms. Marija Portner Marinković, senior advisor.

Discussion was opened by FER's Predrag Pale, Ph.D. and Assist. Prof. Stjepan Groš, Head of Faculty's Laboratory for Information Security and Privacy.



## Round Table “Informatics in the Croatian Education System”

A round table on “Informatics in the Croatian Education System” was held at the Faculty’s Auditorium Maximum (D1) Hall on 14 April 2015.

Guests were welcomed by the Minister of Science, Education and Sports Prof. Vedran Mornar; President of the Croatian Academy of Sciences and Arts Zvonko Kusić; and Rector of the University of Zagreb Prof. Damir Boras.

An introductory presentation given by FER’s Dean Prof. Mislav Grgić was followed by a lively discussion with Assist. Prof. Dejan Škvorc (FER), Zlatka Markučić (XV Highschool, Zagreb), Assist. Prof. Saša Mladenović (University of Split), Dr. Jasminka Mezak (University of Rijeka) and Dr. Boris Jokić (Chairman of the Expert Working Group for implementation of Comprehensive Curricular Reform).

The discussion was moderated by FER’s Vice Dean for Education Prof. Marko Delimar. Members of the Coordination Team from FER are Academician Prof. Leo Budin and Assist. Prof. Dejan Škvorc.



Assist. Prof. Dejan Škvorc during round table presentation

The round table resulted in a report recommending two courses of action: one immediate to the current educational programme in primary schools; and the other, long-term strategic one, within the framework of the Comprehensive Curricular Reform that were under development nation-wide.

## International Girls in ICT Day Celebrated at FER



Prof. M. Baranović (middle) during round table discussion



Audience during round table discussion

At the initiative of the International Telecommunication Union (ITU), 23 April 2015 was marked as the “International Girls in ICT Day”. To celebrate the day, Croatian Regulatory Authority for Network Industries (HAKOM) organized the “International Girls in ICT Day” in partnership with Ericsson Nikola Tesla company and FER. The celebration was held at FER.

The event brought together prominent women at the leading positions in the ICT sector, as well as prominent experts and scientists. Discussions involved ICT sector generally, the role and position of women in the ICT sector in Croatia and the need for an increased women participation in the ICT sector.

Faculty representative was Prof. Mirta Baranović from the Department of Applied Computing, who delivered an introductory presentation “Female vs. Male Students at FER Before & Today”, presenting statistics regarding the number of female students out of the total number of students at FER.

Prof. Baranović also participated in the round table discussion along with Gordana Kovačević (Ericsson Nikola Tesla), Vedrana Miholić (CROZ, Programerko), Ivana Matic (Women in Adria) and Tanja Pušelj Ostroški (IN2). The panel discussed about advantages and disadvantages of pursuing a career in ICT as a woman.

## Croatian Internet Governance Forum

The first Croatian Forum on Internet Governance (CRO-IGF) was held on 6 May 2015 at our Faculty. The organizers of the event were Croatian Regulatory Authority for Network Industries (HAKOM) and FER.

Guests were welcomed by Zdravko Jukić, member of HAKOM Council and FER's Vice Dean Prof. Gordan Gledec.

The first forum topic was devoted to the Internet domain management - introductory presentation about Croatian .hr top-level domain was given by Nataša Glavor, Assistant Director of CARNet.

Later on, along with the Chairman of the Committee for the management of the domain .hr, Prof. Gordan Gledec, responded to audience questions about the forthcoming new rules of the .hr domain organisation and management.

The second forum topic focused on Internet Governance - introductory presentations were given by Mislav Hebel from HAKOM and Andrea Beccalli from The Internet Corporation for Assigned Names and Numbers (ICANN).

The panel discussion on the need of an open forum on Internet governance followed.



*Vice Dean Prof. Gordan Gledec welcoming participants of the first Croatian Internet Governance Forum*

Panellists were Krešo Antonović, Chief of Postal and Electronic Communications Sector in the Ministry of Maritime Affairs, Transport and Infrastructure, Dr. Marko Jurić, from the Faculty of Law, Hrvoje Hadžić, from Ericsson Nikola Tesla and Zdravko Jukić from HAKOM.

## Meeting of Regional Electrical Engineering and Computing Faculties

Deans, vice deans and representatives of faculties of electrical and computer engineering from former Yugoslavia met on 22 September 2014 in Portorož, Slovenia, during the annual Electrotechnical and Computer Science Conference - ERK 2014. The event gathered representatives from Belgrade, Novi Sad, Skopje, Tuzla, Osijek, Podgorica, Ljubljana, Maribor and Zagreb.

FER was represented by Prof. Gledec as newly elected Vice Dean for science who took office soon after the event. The meeting resulted in the Memorandum of Understanding which was distributed to all the participating faculties and is currently being finalized.

By signing of the Memorandum, all faculties agreed to cooperate in order to expand opportunities for further development of academic research and other academic activities. The cooperation entails the following activities:

- exchange of academic and administrative personnel,
- exchange of students,

- exchange of academic information and knowledge,
- cooperation in the implementation of doctoral study programmes,
- coordinated participation in international projects,
- coordinated participation in regional conferences and other events,
- other activities to which all faculties agree.

The Second meeting was held on 24-25 September 2015 in Ohrid, Macedonia. FER was represented by Prof. Sven Lončarić, Chairman of Committee for Research and International Cooperation.



*Participants of the meeting of deans in Ohrid*





## FER in Croatian-Korean Business Club

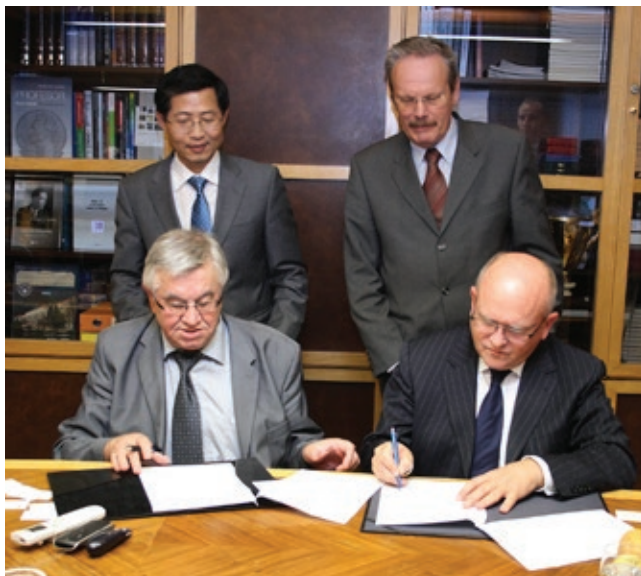
On 27 September 2014, Dean Prof. Nedjeljko Perić and President of the Croatian-Korean Business Club Mr. Zoran Horvat, signed the Memorandum of Understanding making FER an official member of the Croatian-Korean Business Club.

The ceremony was attended by the Ambassador of the Republic of Korea in Croatia H. E. Suh Hyung-Won and his associates, Prof. Krešimir Ćosić Ph.D., Adviser to the Dean, Mr. Igor Zgrabljčić, Secretary General of the Club and Mr. Luka Novosel, Deputy Secretary General.

The Club was established with the aim of promoting and enhancing the economic cooperation between Republic of Croatia and the Republic of Korea with an emphasis on entrepreneurship development and business initiatives, as well as trade between the two countries.



*Dean Perić and Mr. Horvat with associates and Ambassador H. E. Suh Hyung Won*



*Dean Perić and Mr. Horvat signing a Memorandum of Understanding*

“FER wants to develop mutual research project with partner institutions in Korea, which is a highly developed and technologically advanced country. The membership in the Croatian-Korean Business Club is our opportunity to deepen our relationship with the academic community in Korea with the aim of increasing the application of applied science in the real sector”, said Prof. Perić.

Mr. Horvat emphasized long-term friendly relations between Croatia and Korea, which was one of the first

Asian countries that recognized Croatia’s independence in 1992 and at that time acknowledged Croatia as a country with high research and academic potential in the fields of electrical engineering and computing.

H. E. Suh Hyung-Won expressed satisfaction with FER joining the Croatian-Korean Business Club and his visit to prestigious institution, where he was impressed with achievements of FER’s researchers.



## Membership in euRobotics AISBL

euRobotics AISBL (Association Internationale Sans But Lucratif) is a Brussels based international non-profit association for all stakeholders in European robotics.

One of the association’s main missions is to collaborate with the European Commission (EC) to develop and implement a strategy and a roadmap for research, technological development and innovation in robotics, in view of the launch of the next framework programme Horizon 2020.

On the euRobotics General Assembly, held on 15 October 2013, our Faculty became a full member of the association.

## Cooperation Agreement with Faculty of Electrical Engineering and Information Technologies from Skopje, Macedonia

Prof. Mislav Grgić, Dean of FER and Prof. Mile Stankovski, Dean of Faculty of Electrical Engineering and Information Technologies, Ss. Cyril and Methodius University in Skopje, Macedonia signed Memorandum of Agreement between the two Faculties on 7 November 2014 in Skopje.

The objective of the Agreement is the promotion of scientific, academic and cultural cooperation in education and research - faculty members and students exchange, design of collaborative research projects, joint academic programmes and inter-institutional internship programmes.

The signing ceremony was held at Faculty of Electrical Engineering and Information Technologies in the presence of Vice Deans Prof. Hristina Spasevska and Prof. Dimitar Taškovski from FEIT and Prof. Gordan Gledec from FER.

Dean Grgić and Vice Dean Gledec, accompanied by hosts from FEIT, visited the third exhibition *Science for Youth*, featuring projects developed by young researchers. The exhibition was organized by the Union of young researchers of Macedonia and the Faculty of Electrical Engineering and Information Technologies and held at the People's Office of the President of the Republic of Macedonia in Skopje. The exhibition was organized on the occasion of 10 November, World Science Day for Peace and Development.

Dean M. Stankovski and Vice Dean H. Spasevska, also the President of the Assembly of the Associations of Technical Culture of the Republic of Macedonia, the organizer of the exhibition, introduced Dean Grgić and Vice Dean Gledec to Mr. Gjorgje Ivanov, President of Macedonia, who attended the event. During the brief conversation, President Ivanov expressed satisfaction with FER and FEIT cooperation.



*Deans Stankovski and Grgić signing the Agreement.*



*Macedonian President Ivanov with Dean Grgić; Vice Dean Spasevska and Dean Stankovski standing behind*

## FER Becomes an Associate Member of Informatics Europe

In February 2014, the Faculty became an associate member of Informatics Europe, the association of computer science departments and research laboratories in Europe and neighbouring areas. The Association's mission is to foster the development of research and education in information and computer sciences, also known as Informatics.

Members of the association are prestigious European universities: KU Leuven, DTU, INRIA, Technion, EPFL, ETHZ, Oxford University, Imperial College London and others.

FER's membership in the association will foster networking, access to information, access to working groups focused on curriculum development, research evaluations and strategy developments.

The traditional Workshop for Deans, Department Chairs and Research Directors was held during the 10<sup>th</sup> European Computer Science Summit in Krakow, Poland in October 2014. The participants shared their experiences, learned from colleagues, exchanged best practices and built relationships among different European Informatics research and education institutions. At the Workshop, FER was represented by Prof. Siniša Srblijić from the Department of Electronics, Microelectronics, Computer and Intelligent Systems.





## President of University of Houston at FER



*Mr. and Ms. Khator with their hosts at the Department of Electronic Systems and Information Processing*

On 18 July 2014 President of University of Houston and Rector of University of Houston System Ms. Renu Khator and Dr. Suresh Khator, Associate Dean for Graduate Programmes, Cullen College of Engineering, visited our Faculty. The University of Zagreb was represented by Dr. Branka Roščić, head of International Relations Office.

Our guests were welcomed by Dean Prof. Perić, Vice Dean for Science Prof. Grgić and Chairman of Quality

Management Committee, Prof. Gledec.

Dean Perić briefly introduced the University of Zagreb and the teaching, research and innovation activities at our Faculty. Later on, our guests visited Laboratory for Renewable Energy Systems (LARES), research centre ACROSS and Department of Electronic Systems and Information Processing.

## Visit of NATO Command

Delegation of NATO Allied Command Transformation from Norfolk, Virginia, USA visited the Faculty on 22 September 2014 and discussed the initiative to establish NATO centre of excellence in Croatia.

NATO was represented by Mr. Tony Wedge and Mr. Andreas Kraft, while FER was represented by Dean Nedjeljko Perić and Prof. Krešimir Ćosić.

With FER as the initiator of cooperation, several other research institutions from University of Zagreb are involved in cooperation: Faculty of Medicine, Croatian Brain Research Institute, Clinical Medical Centre Zagreb, Psychiatric Clinic Vrapče and Ruđer Bošković Institute.

The cooperation also includes Croatian Ministry of Defence and General Staff of the Armed Forces of Croatia.



*NATO delegation with Dean Perić and general Ćosić*

## Penn State Delegation visits FER and University of Zagreb

As part of the ongoing cooperation with the University of Zagreb, delegation of Penn State University visited FER on 28 October 2014. Members of the PSU delegation were Prof. Dr. David Baker, co-chair of the Penn State Task Force for comprehensive partnership with the University of Zagreb; Renata Horvatek, Ph.D. candidate, member of the Penn State Task Force and Prof.

Dr. Igor Jovanović, Associate Professor of Nuclear Engineering.

After the short welcoming presentation given by Dean Grgić and Vice Dean Gledec, the delegation visited Laboratory for Renewable Energy Systems (LARES), research centre ACROSS and Department of Electronic Systems and Information Processing.



*Penn State delegation at the University of Zagreb*

## Latvian Delegation at the Faculty

Delegation of Riga Technical University (Rīgas Tehniskā universitāte) from Riga, Latvia visited the Faculty on February 4, 2015. Latvian delegation included Prof. Jurijs Merkurjevs from Faculty of Computer Science and Information Technology, Assoc. Prof. Pēteris Apse-Apsītis from Institute of Industrial Electronics and Electrical Engineering, and lect. Edgars Bondars from Faculty of Architecture and Urban Planning, and project manager Renāte Roga from International Relations Office.

The guests from Latvia were welcomed by Vice Dean Prof. Gordan Gledec, Prof. Nedjeljko Perić, head of Innovation Centre, Prof. Ivan Petrović, head of ACROSS project and Prof. Sven Lončarić, Chairman of Research and International Cooperation Committee.

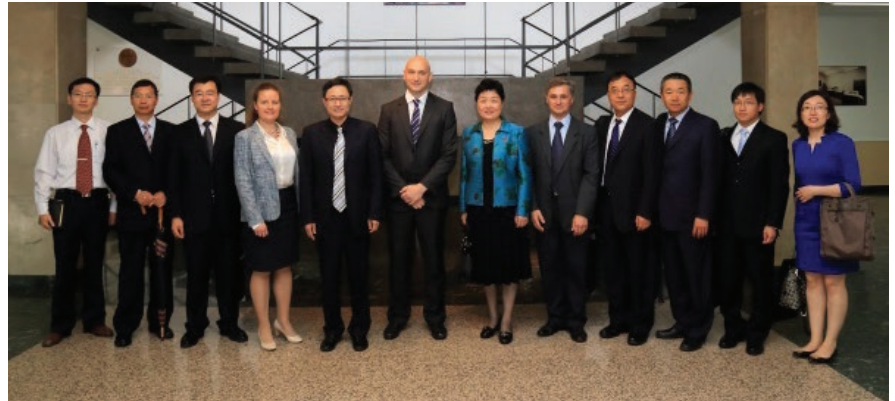
Vice Dean Gledec presented the University of Zagreb and FER and Prof. Perić presented activities regarding the Innovation Centre.

Professors Merkurjevs and Apse-Apsītis presented their research and institutions.

*FER and Riga University delegations during the presentation*



## Chinese Ministry of Science and Technology Delegation visits FER



*Chinese Delegation with hosts Vice Dean Gledec, Prof. Cifrek and Ž. Lučev*

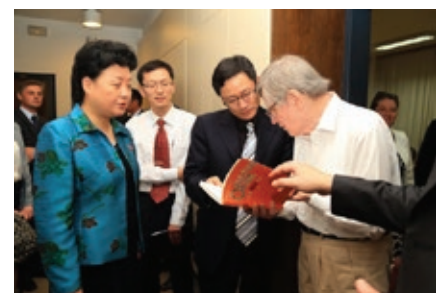
In June 2015 the Faculty hosted the delegation of six representatives of Ministry of Science and Technology of People's Republic of China, led by Deputy Minister Mr. Li Meng. The delegation included representatives of Embassy of P. R. of China in Croatia H. E. Ambassador Ms. Deng Ying, first secretary Mr. Feng Shaolin and attaché Mr. Peng Yu and representatives of Croatian Ministry of Science, Education and Sports Ms. Silvana Siebert and Mr. Andrej Sušić.

Vice Dean Gledec acquainted the guests with the University and the Faculty and with finished and ongoing bilateral research projects with Chinese partners, presented by project leaders.

The delegation visited the Department of Electronic Systems and Information Processing, where they were welcomed by Prof. Mario Cifrek and Prof. Ratko Magjarević, as well as the Department's project

partner Yueming Gao, from College of Physics and Information Engineering, Fuzhou University, China.

*Top: delegation from China; middle: all meeting participants; bottom: Prof. Čepulić with H. E. Ambassador Ms. Deng Ying and Mr. Li Meng*









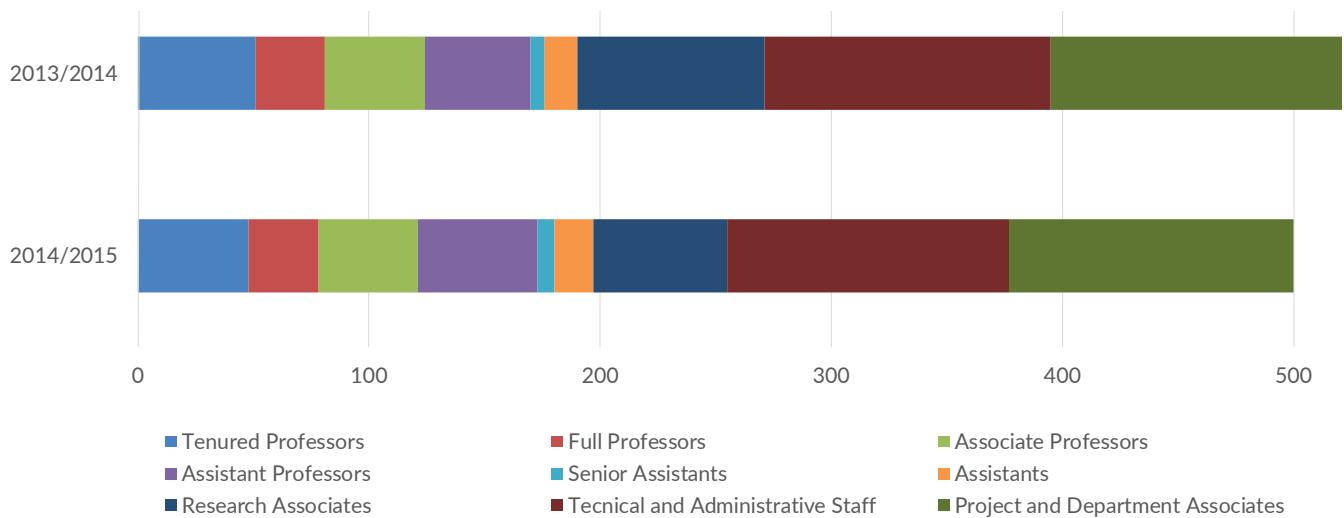


# Our Staff

*More than 500 people work daily to keep FER top research and educational institution in Croatia.*



## Faculty Staff



## Academic Promotions

### Tenured Professors

**Bojana Dalbelo Bašić**  
*Department of Electronics, Microelectronics, Computer and Intelligent Systems*

**Mervan Pašić**  
*Department of Applied Mathematics*

**Ivan Petrović**  
*Department of Control and Computer Engineering*

### Full Professors

**Željko Ban**  
*Department of Control and Computer Engineering*

**Gordan Ježić**  
*Department of Telecommunications*

**Igor Kuzle**  
*Department of Energy and Power Systems*

**Viktor Šunde**  
*Department of Electric Machines, Drives and Automation*

### Associate Professors

**Igor Krois**  
*Department of Electronics, Microelectronics, Computer and Intelligent Systems*

**Josipa Pina Milišić**  
*Department of Applied Mathematics*

**Tomislav Pribanić**  
*Department of Electronic Systems and Information Processing*

**Mile Šikić**  
*Department of Electronic Systems and Information Processing*

**Tomislav Šikić**  
*Department of Applied Mathematics*

**Mario Vašak**  
*Department of Control and Computer Engineering*

### Assistant Professors

**Ana Babić**  
*Department of Applied Physics*

**Tomislav Burić**  
*Department of Applied Mathematics*

**Vladimir Čeperić**  
*Department of Electronics, Microelectronics, Computer and Intelligent Systems*

**Marko Čupić**  
*Department of Electronics, Microelectronics, Computer and Intelligent Systems*

**Ognjen Dobrijević**  
*Department of Telecommunications*

**Mirjana Domazet-Lošo**  
*Department of Applied Computing*

**Lana Horvat Dmitrović**  
*Department of Applied Mathematics*

**Zvonko Kostanjčar**  
*Department of Electronic Systems and Information Processing*

**Boris Milašinović**  
*Department of Applied Computing*

**Hrvoje Pandžić**  
*Department of Energy and Power Systems*

**Siniša Popović**  
*Department of Electric Machines, Drives and Automation*

**Marin Vuković**  
*Department of Telecommunications*

## Appointments to Non-Faculty Duties

The expertise of our Faculty professors and staff is recognized far beyond FER. In the last two academic years, many were appointed to various duties in Croatia and abroad.

### Prof. Nikola Čavlina

*Representative of Croatia in The Euratom Research and Training Programme for period 2014-2018 in the "Fusion" area*

### Prof. Gordan Gledec

*Re-elected as Chairman of Committee for domain .hr in 2014*

### Prof. Damir Kalpić

*President of Management Board of Polytechnic of Zagreb in 2014  
President of Management Board of University Computing Centre Srce in 2014*



**Prof. Marko Delimar**  
*Re-elected as IEEE Secretary*

**Prof. Igor Kuzle**  
*Elected IEEE Region 8 Vice-Chair Technical Activities in 2014*

### Prof. Mario Kovač

*Representative of Croatia in "Information and Communication Technologies" configuration of the Committee for the Specific Programme Implementing Horizon 2020*

### Prof. Ignac Lovrek

*Appointed by European Research Area Steering Group on Human Resources and Mobility (ERA SGHRM) as member of Working Group on Professional Development of Researchers*

*Appointed as Member of a Special Expert Committee for the implementation of Strategy for Education, Science and Technology and the coordination of the strategies in the field of education and science.*

### Prof. Ratko Magjarević

*Honorary Member of the University of Ljubljana Senate*

### Prof. Željko Tomšić

*Representative of Croatia in "Secure, Clean and Efficient Energy" configuration of the Committee for the Specific Programme Implementing Horizon 2020*



## University of Zagreb Appointments

### Prof. Adrijan Barić

*Elected as Chairman of Technical Area Council in 2013 and 2015*

### Prof. Borivoj Modlic

*Appointed as Acting Dean of Faculty of Graphic Arts on 3 October 2013*

### Prof. Maja Matijašević

*Member of Doctoral Programmes Board in 2014*

### Prof. Gordan Ježić

*Member of Postgraduate Specialist Programmes Board in 2014*

### Kristijan Zimmer, M. SC.

*Member of e-Learning and Internet Services Board in 2014*

### Luka Humski

*Student Assistant to the Vice Rector*

## Former Faculty Dean Prof. Vedran Mornar Appointed Minister of Science, Education and Sports

Croatian Parliament gave a vote of confidence to Faculty's former Dean Prof. Vedran Mornar on 18 June 2014 appointing him Minister of Science, Education and Sports.

Prof. Mornar is a tenured professor at the Department of Applied Computing. He served two terms as Faculty's Vice Dean for Education from 2002 to 2006 and two terms as the Dean from 2006 to 2010. He was the chairman of National Council for Higher Education and a member of the University of Zagreb Senate.



### Prof. Davor Škrlec Member of EU Parliament

After the election of members of the European Parliament in 2014, Prof. Davor Škrlec became a Croatian representative in the European Parliament, serving as a member of ORaH - the "green party" - and promoting renewable energy and sustainable development.

Prof. Škrlec is a full time professor at the Department of Energy and Power Systems and the chairman of the Croatian national Smart Grid platform. He also served as a Deputy of Minister in the Ministry of Environment and Nature Protection in 2012.



## Awards and Recognitions

**Prof. Vladimir Knapp**

*Order of the Croatian Wattle for his work on research of humanitarian demining*

**Prof. Mario Cifrek**

*Award of the City of Zagreb for outstanding contribution in science and higher education in 2014*  
*Annual Award "Rikard Podhorsky" for 2013 awarded by Academy of Technical Sciences*

**Prof. Branka Zovko-Cihlar**

*Gold Medal of the Dean of Faculty of Electrical Engineering and Information Technology, Slovak University of Technology in Bratislava, for long-lasting cooperation in research and education*

**Assist. Prof. Ante Đerek**

*Annual National Award for Technical Culture "Faust Vrančić" in 2013*  
*Assist. Prof. Nikola Mišković*  
*Award for young scientist "Vera Johanides" for 2013 by Academy of Technical Sciences*

**Dr. Mirko Poljak**

*Award for young scientist "Vera Johanides" for 2013 by Academy of Technical Sciences*

**Prof. Sven Lončarić**

*Annual Award "Rikard Podhorsky" for 2014 awarded by Academy of Technical Sciences*

**Dr. Maja Resman**

*International Award "Bernd Aulbach Prize for Students 2014" awarded by International Society of Difference Equations for outstanding contribution in the field of differential equations and discrete dynamic*

**Assist. Prof. Hrvoje Pandžić**

*Award for young scientist "Vera Johanides" for 2014 by Academy of Technical Sciences*

**Project Team ICT-AAC:**

*Assist. Prof. Vedran Podobnik, Prof. Željka Car, Prof. Ignac Lovrek, Prof. Maja Matijašević, Prof. Igor S. Pandžić, Assist. Prof. Lea Skorin-Kapov, Assist. Prof. Marin Vuković, Jurica Babić, Ivan Slivar, Ivan Šemanjski, Ivana Rašan Sladoljev, Marina Ivić*  
*Ivan Filipović Award in the field of scientific and professional work*



### National Science Awards

**Dr. Stjepan Stipetić**

*National Science Award - "Annual Award for Junior Researchers" in 2012*

**Assist. Prof. Hrvoje Pandžić**

*National Science Award - "Annual Award for Junior Researchers" in 2013*

**Prof. Tomislav Kelemen**

*Former Honorary Professor*  
*National Science Award - "Lifetime Achievement Award" in 2013 in recognition of scientific and research activities and contribution to broadening scientific knowledge and implementing the results of scientific research in technical sciences*

**Prof. Vjekoslav Sinković**  
*Retired Professor*

*National Science Awards - "Lifetime Achievement Award" in 2014 in recognition of scientific and research activities and contribution to broadening scientific knowledge and implementing the results of scientific research in technical science*

**Prof. Tomislav Suligoj**

*National Science Award - "Annual Science Award" in 2014 in recognition of outstanding scientific discovery, scientific discovery and implementation of the results of scientific research in technical science*

### University of Zagreb Awards

**Prof. Zdenko Kovačić**

*University Award "Fran Bošnjaković" for 2013*

**Prof. Ignac Lovrek**

*Special recognition for outstanding contribution in encouraging research activities and technology transfer at the University of Zagreb on the occasion of University Day (Dies Academicus) in 2013*

**Prof. Darko Huljenić**

*Ericsson Nikola Tesla*  
*Special recognition for encouragement of cooperation of University of Zagreb with Croatian industry and for support to quality management system of the University on the occasion of University Day (Dies Academicus) in 2013*



## IEEE Awards

**Prof. Nedjeljko Perić**  
Award "Nikola Tesla" from IEEE  
Croatia Section in 2013

**Prof. Ivana Podnar Žarko**  
IEEE Croatian Section  
Award for substantial  
engineering achievement in  
2013

**Prof. Igor Kuzle**  
IEEE Croatian Section Award  
for contribution to Croatia  
Section in 2013

**Prof. Ignac Lovrek**  
IEEE Croatian Section Award  
for outstanding scientific,  
professional and educational  
contribution in the fields of  
electrical engineering and  
computing in 2014

**Prof. Vladimir Mikuličić**  
IEEE Croatian Section Award  
outstanding educational  
activities in the field of energy  
systems in 2014

**Prof. Šandor Dembitz**  
IEEE Croatian Section Award  
for development of Hascheck,  
the Croatian Academic Spelling  
Checker in 2014



Above: Prof. Šandor Dembitz receiving IEEE Croatia Section Outstanding Engineer Award from President of IEEE Croatia Section Prof. Mislav Grgić, for his work on Croatian Academic Spelling Checker - Hascheck

Below: Prof. Vladimir Mikuličić (middle) receiving IEEE Croatian Section Award for the outstanding educational activities in the field of energy systems in 2014; left: Prof. Sven Lončarić, right: Section Chair Prof. Mislav Grgić





## Retirements

In the last 2 academic years, 11 of our employees reached the retirement age. They were traditionally awarded at the Faculty Christmas party and given a small token of appreciation for their fruitful work at the Faculty. Their names, positions and time spent at FER is listed below.

**Snježana Božić**  
Department Administrator  
26 January 1981 - 23 December 2013

**Radoslav Zelić, M. Sc.**  
Head of Laboratory  
4 May 1971 - 30 September 2015

**Vladimir Malarić, LL. B.**  
General Secretary  
1 September 1975 - 30 December 2013

**Marija Kovačević, LL. B.**  
Head of General Office  
16 February 1979 - 28 February 2015

**Josip Leskovec**  
Delivery Service  
1 September 2000 - 16 April 2014

**Davor Klarin, Eng.**  
Senior Technician  
1 March 1976 - 3 July 2015

**Liljana Mišerić**  
Maintenance  
22 March 1995 - 6 June 2014

**Prof. Ivan Gašparac**  
Tenured Professor  
1 January 1973 - 30 September 2015

**Prof. Vladimir Mikuličić**  
Tenured Professor  
1 December 1969 - 30 September 2014

**Prof. Dubravko Horvat**  
Full Professor  
1 July 1990 - 30 September 2015

**Prof. Nikola Bogunović**  
Tenured Professor  
1 April 1997 - 30 September 2014



Dean Grgić giving a present to Ms. Kovačević, thanking her for her long service to the Faculty, during Christmas 2015 celebration

## The Last Goodbye

**Zvonimir Sirotić**  
Professor  
17 October 2013

**Zvonko Halužan**  
Senior Technician  
20 September 2014

**Vesna Kos**  
Research Assistant  
14 March 2015

**Marijan Đurek**  
Professor  
26 April 2014

**Vilim Gumbas**  
Senior Technician  
29 January 2015

**Hrvoje Babić**  
Professor  
6 June 2015

**Ervin Zentner**  
Professor  
28 May 2014



Goran Ranogajec

## Changes in Secretary's Office

After 38 years of his devoted work as General Secretary of the Faculty, Vladimir Malarić retired with the last days of 2013.

His duties were taken in January 2014 by Goran Ranogajec, who was selected as the best candidate among almost 30 applicants for the position. He previously worked at the Croatian Pension Insurance Institute.

Another change in the Secretary's Office took place in March 2014, when Marija Kovačević, the Head of the General Office, retired after 34 years spent at the Faculty.

She was succeeded by Iva Piški, Master of Law, who previously worked as a project assistant on the University of Zagreb IPA 2008 project titled "Improving the Capacity of the University System to Create a Framework for Battling Discrimination and Corruption Aimed at Improving Academic Integrity" (2011 - 2013) and as an expert associate for Legal Affairs at the Rectorate of the University of Zagreb (2013 - 2015).



*Prof. Ratko Magjarević receiving his Honorary Senator plaque at the University of Ljubljana*

## Prof. Stanko Tonković Receives Honorary Title Professor Emeritus

At the proposal of the Faculty Council of the University of Zagreb Faculty of Electrical Engineering and Computing, the Senate of the University of Zagreb granted on 11 November 2013 Prof. Stanko Tonković, Ph.D., the honorary title of Professor Emeritus of the University of Zagreb.

Prof. Stanko Tonković made a noticeable impact on the development and progress of the University of Zagreb, especially in modernization and transformation of the Faculty of Electrical Engineering into the Faculty of Electrical Engineering and Computing. He was the lead researcher in a large number of research projects and a mentor to a number of research assistants, master and doctoral students and, as such, he contributed to development of a scientific atmosphere at the University. He is a globally recognized scientist in the field of biomedical engineering and measurement techniques, as well as one of the founders of the field of biomedical informatics in Croatia. He published a large number of scientific papers in journals and conference proceedings and a university handbook. He has experience in organizing scientific and professional meetings and he was the president of the organizing or scientific committees of several international conferences. He has been awarded major medals and awards in Croatia.

Prof. Tonković was the Dean of the Faculty of Electrical Engineering and Computing in two mandates, the President of the Croatian Academy of Engineering and the President of Croatian Medical and Biological Engineering Society.



*Rector Aleksa Bjeliš awarding Professor Emeritus Stanko Tonković*

## Prof. Ratko Magjarević Becomes Honorary Senator of the University of Ljubljana

Prof. Ratko Magjarević was promoted to the Honorary Senator of the University of Ljubljana on 3 December 2013, thus gaining recognition for the long and fruitful cooperation with the University of Ljubljana in the area of research and teaching and for his important work in biomedical technology.

Ratko Magjarević received his Ph.D. in Electrical Engineering in 1994 from the University of Zagreb Faculty of Electrical Engineering. After his appointment in industry, he joined the Electronic Measurement and Biomedical Engineering Group at the University of Zagreb Faculty of Electrical Engineering and Computing.

He is full professor teaching several courses in Electronic Instrumentation and Biomedical Engineering at undergraduate, graduate and postgraduate studies. His scientific and professional interest lies in fields of electronic and biomedical instrumentation, in particular in cardiac potentials analysis and pacing, in research of new methods for drug delivery based on electroporation, and recently in research of personalised intelligent mobile health systems.

Prof. Magjarević is author or co-author of numerous journal and conference papers, several textbooks and book chapters. Ratko Magjarević is currently Vice-President of the International Union for Physical and Engineering Sciences in Medicine (IUPESM) and the Immediate Past-President of International Federation for Medical and Biological Engineering (IFMBE).



## Faculty Day

Faculty Day is celebrated every year on Friday closest to 21 November.

In 2013 the celebration was held on 22 November, and on that occasion “Josip Lončar”, “Stanko Turk”, “Werner von Siemens” and “Roberto Giannini” awards for academic year 2012/2013 were presented to the best students and distinguished professors.

Furthermore, the Award for Science and awards given by Končar, Ericsson Nikola Tesla, Agrokor and INETEC companies were presented.

In 2014, the celebration was held on the Faculty Day, and awards for the academic year 2013/2014 were presented.

Two days before the Faculty Day celebration, Special session of the Faculty Council is held, where commemorative diplomas are awarded to FER alumni who graduated 50 years ago. Awards for best students are handed out as well.



Rector Prof. Aleksa Bjeliš addressing the audience in 2013



Minister Prof. Vedran Mornar delivering address in 2014

## Faculty Awards

The highest academic achievement award at FER is the “Josip Lončar” award, named after professor Josip Lončar, founder of FER. Silver Plaque is given to doctoral students in recognition of an outstanding doctoral dissertation.

Gold Plaque award is presented to the most distinguished professors of the Faculty.

The winners of the Gold Plaque award for 2013 were Prof. Slobodan Ribarić and Prof. Ivan Petrović.

A year later, the Gold Plaque was awarded to Prof. Sven Lončarić and Prof. Mirta Baranović.

The Silver Plaque is awarded to most successful PhD dissertations and research.

In 2013, it was awarded to Dr. Mirko Poljak, Dr. Vladimir Čeperić, Dr. Iva Bojić and Dr. Marija Furdek.

In 2014, the Silver Plaque was given to Dr. Tomislav Capuder, Dr. Stjepan Stipetić, Dr. Goran Delač, Dr. Ivan Marković and Dr. Ivan Budiselić.

“Roberto Giannini” Award is given for excellence in teaching and work with students to teachers under 35. In 2013, it was presented to Dr. Zvonko Kostanjčar; in 2014, it was given to Dr. Bojan Trkulja.

The “Award for Science” is given for outstanding achievements in research and innovations at the Faculty.

In 2013, it was awarded to Prof. Stjepan Bogdan and Dr. Mirko Poljak. A year later, Prof. Sven Lončarić and Dr. Ana Sović Kržić were the awardees.

## FER Contributes to National Strategies

### National Cyber Security Strategy

Dr. Predrag Pale (as the representative of the Ministry of Science, Education and Sports) and Prof. Miljenko Mikuc were members of the commission responsible for making the draft proposal of the National Cyber Security Strategy.

The Faculty was included in the working group dealing with education in cybersecurity.

### Croatian Strategy of Education, Science and Technology

In October 2014, the Croatian Parliament adopted Strategy of Education, Science and Technology, which is planned to come into force in 2018.

Among more than 130 experts from all fields of science, two distinguished FER professors held leading roles during its development:

- **Prof. Leo Budin**, member of the Croatian Academy of Sciences and Arts, was a member of the National Operative Body for Strategy development and

member of the Working Group for early, preschool, elementary school and highschool education, and

- **Prof. Ignac Lovrek**, head of Working group for Science and Technology.

### Smart Specialization Strategy

Croatian Smart Specialization Strategy was developed during 2014 and 2015 and is pending adoption by the Parliament in 2016. The strategy will serve as a basis for investment in research and development from the EU structural funds.

Several FER professors were involved in its development: Prof. Zdenko Šimić in the Energy and Sustainable Environment thematic area, Prof. Stjepan Groš and Dr. Predrag Pale in the Security area, and Assist. Prof. Sumina and Prof. Lončarić in the Transport and Mobility area.

During the public debate, suggestions and comments were given by Prof. Nedjeljko Perić, Prof. Mario Kovač, Prof. Mario Vašak and Assist. Prof. Nikola Mišković. Out of 80 suggestions, 53 were accepted.

## St. Nicholas Day Celebration

St. Nicholas Day Celebration was held in D1+D2 Hall at the Faculty on 6 December 2014. Children of our students and staff were entertained by characters from the play they enjoyed later in the day, as well as by the magician and Balonko the Clown. Children also got their face painted, and after the show, they took photos with St. Nicholas, who gave them presents.

Over 150 kids were present and enjoyed the entertainment (including cookies and refreshments) from 9.30 to 12.30. Kids came with parents who enjoyed their own programme during children's play that included refreshments and quiet discussion.





## Prof. Zvonimir Sirotić (1921 - 2013)



Prof. Zvonimir Sirotić was born in Slumbuzet, on 30 April 1921. He graduated in 1947 at the Faculty of Engineering University of Zagreb and earned his PhD in 1976 at the Faculty of Electrical Engineering in Ljubljana.

He started his engineering career at "Rade Končar" factory in 1947 as a power generator designer, in a team that started the Croatian electrical industry.

Within the group and with other industry experts he developed a permanent and comprehensive cooperation between the Faculty and the industry. From 1961 until his retirement in 1990 he worked at FER, where he was head of the Department of Electrical Machines from 1986 till 1990, vice dean from 1972 to 1974 and dean from 1974 to 1976.

In addition to teaching and scientific research activities, he had a lasting collaboration with the industry on solving complex tasks of developing and designing large generators. His talent and technical knowledge in designing large power generators proved indispensable while designing and constructing the hydrogenerator for HE Split (Zakučac near Split), at the time the largest power generator of that kind in the world, produced in Rade Končar factory in 1961.

Prof. Sirotić, along with late Prof. Tomo Bosanac, was awarded the Nikola Tesla scientific award in 1960 for the HE Split generators. He received the same award for the second time in 1974 along with 7 experts from Končar for the 190 MVA hydrogenerators manufactured at Končar and installed in HE Đerdap.

He holds numerous medals and awards for scientific and professional work as well as his contribution for the development of FER. Prof. Sirotić left a deep imprint as a good man, of unusually refined manners. He will remain in memory for all of us who knew him or had the privilege of working with him and learning from him.

Prof. Sirotić passed away on 17 October 2013.

## Prof. Marijan Đurek (1948 - 2014)



Marijan Đurek was born on 6 February 1948 in Gornji Raić, Croatian region of Slavonia. He graduated at FER in the field Electronics – Automation as one of the best students in his generation in 1970 and achieved his MS degree in Electronics.

For his PhD thesis he programmed numerical calculations of electromagnetic fields, for the "Rade Končar" factory, that was renowned for

producing generators, motors and transformers. From mid 1970s to mid 1980s he was leading the Computer Science group, hiring the best students to be engaged in applied computing projects. Most of them turned university professors or well-established professionals.

Later on, his professional interest was in computing ergonomics and finally computer forensics, becoming also a court expert in that field and one of the founders of the specialist study Information security. He had educated thousands of students at FER. He also helped in educational activities in newly established studies in Split, Dubrovnik, Šibenik, as well as in the neighbouring Bosnia and Herzegovina - in Banja Luka, Tuzla and Bihać.

He had a gift for painting and established a Gallery at FER where he organized painting exhibitions of renowned artists, as well as of faculty and students.

He was a highly intelligent, industrious, but also candid person. He was a joyful, emotional and warm person, devoted friend one could always rely on, eager to socialise and organise social gatherings - indoors, like playing bridge or exhibiting art; and outdoors, like mushroom harvesting, which usually ended with memorable dinners where Marijan was the master chef in preparing mushroom dishes. He left us half a year after his retirement, while having abundant ideas how to creatively use the finally gained free time. Unfortunately, he has not lived to that.

Our dear colleague passed away on 27 April 2014 and is sorely missed. We who had the privilege of working with him, of having him as our friend, shall always remember and miss his remarkable personality.

## Prof. Ervin Zentner (1931 - 2014)



Prof. Ervin Zentner was born on 28 May 1931. He was active with the Department of Wireless Communications for 42 years, since 1959 until his retirement in 2001, but he continued to contribute to the research and teaching almost until his last breath. He obtained Ph.D. in 1964, and became Assistant Professor, Associate Professor and Full Professor in 1968, 1972 and 1978, respectively.

He will be remembered for his inspiring work with students, both undergraduate and graduate, and for initiating courses and research about antennas and propagation, microwave semiconductor circuits, radar technologies, mobile communications, electromagnetic compatibility, etc. He founded many courses, established several laboratories and created many experiments that fascinated his students and helped them develop physical intuition. He supervised over 250 graduate and 6 Ph.D. students, many of which later became successful industry leaders, managers or deans. He served as a Head of Department from 1982 to 1984 and from 1988 to 1992.

Along with Prof. Boris Kviz, in 1966 he received recognition from TV broadcasters for calculating optimal network of TV transmitters for Slovenia, Croatia and Bosnia and Herzegovina. He contributed significantly to the development of the first digital microwave wireless link in this part of Europe, a 24-channel PCM link that was developed jointly by FER and RIZ company in early 1970s. The final product enabled connection of major Croatian islands to the public telephone network.

He authored two university textbooks: "Radio Communications" (1980) and "Antennas and Radio Systems" (2001) and many scientific and professional papers. He co-authored the first paper from the Department of Wireless Communications that was published in a CC journal. He helped organise and chair many scientific conferences and served as a reviewer for numerous scientific journals.

He died on 28 May 2014, on his 83<sup>rd</sup> birthday.

## Prof. Hrvoje Babić (1929 - 2015)



Prof. Hrvoje Babić was born on 17 September 1929 in Bugojno. After graduation in 1955, Dr. Babić was employed at the Institute Ruđer Bošković in Zagreb. His main occupation there was development of electronic instrumentation for research in physics. From 1955 to 1974 Dr. Babić had teaching assignments at the University of Zagreb as an Adjunct Professor.

He also held a post-doctoral position at Royal Institute of Technology, Stockholm, Sweden from 1965 to 1968, where he was a member of the team that developed the classic and the race track microtron. He and dr. Sedlaček solved the problem of beam stabilization. This resulted in a new widely accepted concept for building race track accelerators of relativistic particles.

After transfer to the University of Zagreb in 1974, he formed a laboratory and developed research in analog and digital signal processing. He published more than 80 papers on international conferences and journals indexed in Current Contents and INSPEC databases.

Dr. Babić became full professor in 1977. He introduced and taught a number of undergraduate and graduate level courses and prepared course materials. Dr. Babić advised 114 final diploma of engineering theses, 34 master theses and 16 doctoral theses.

Dr. Babić served as vice-rector of the University of Zagreb from 1991 to 1994. From 1974 to 1976 and in a number of shorter visits, he worked in signal processing area at the University of California Los Angeles and Santa Barbara. Dr. Babić received the Nikola Tesla award and the Republic of Croatia Lifetime Achievement award. He was Life Fellow of IEEE. Since 1997, dr. Babić was a regular member of the Croatian Academy of Sciences and Arts.

He passed away on 6 June 2015.







# Departments

*in order of establishment*

*The Faculty is organised in 12 departments which represent focal points of education, research and development in various fields.*

*The list of employees includes all personnel who worked at the Faculty between 1 October 2013 and 30 September 2015.*



# Department of Applied Mathematics

Founded in 1919

**Prof. Ilko Brnetić**  
Head of Department

☎ + 385 1 6129 958

☎ + 385 1 6129 946

✉ [zpm@fer.hr](mailto:zpm@fer.hr)

→ <http://www.fer.unizg.hr/zpm>



**Professors**

Neven Elezović – mathematical analysis  
 Mervan Pašić – differential equations  
 Mario Osvin Pavčević – combinatorial and discrete mathematics  
 Darko Žubrinić – nonlinear elliptic PDEs, fractal analysis  
 Vesna Županović – dynamical systems

**Associate Professors**

Andrea Aglič Aljinović – mathematical analysis  
 Ilko Brnetić – mathematical analysis  
 Mario Krnić – mathematical analysis  
 Josipa Pina Milišić – mathematical modelling, nonlinear PDEs

**Assistant Professors**

Tomislav Burić - mathematical analysis, complex analysis, special function  
 Lana Horvat Dmitrović – dynamical systems  
 Domagoj Kovačević – representation theory of Lie groups  
 Tomislav Šikić – representation theory of affine Lie algebras  
 Igor Velčić – theory of elasticity, nonlinear analysis  
 Ana Žgaljić Keko - numerical mathematics and modelling

**Retired Professors**

Davor Butković – mathematical analysis  
 Vladimir Čepulić – finite groups, finite mathematics  
 Ivan Ivanšić – topology  
 Petar Javor – algebra  
 Luka Korkut – partial differential equations  
 Ljubo Marangunić – finite mathematics, mathematical analysis

**Senior Assistants**

Mario Bukal  
 Marijana Greblički  
 Siniša Miličić  
 Anamari Nakić  
 Goran Radunović  
 Maja Resman  
 Domagoj Vlah

**Assistants**

Ana Anušić  
 Lenka Mihoković  
 Stjepan Šebek

**Administrative Staff**

Ljiljana Frigelj



1 - Stjepan Šebek, 2 - Domagoj Vlah, 3 - Tomislav Šikić, 4 - Mario Osvin Pavčević, 5 - Neven Elezović, 6 - Igor Velčić, 7 - Domagoj Kovačević, 8 - Ana Žgaljić Keko, 9 - Vesna Županović, 10 - Mario Krnić, 11 - Ana Anušić, 12 - Ilko Brnetić, 13 - Andrea Aglič Aljinović, 14 - Darko Žubrinić, 15 - Goran Radunović, 16 - Maja Resman, 17 - Lana Horvat Dmitrović, 18 - Lenka Mihoković, 19 - Mervan Pašić



## Department Day Celebration

Department of Applied Mathematics was founded in 1919, thus being the oldest department at FER.

During the annual celebration of the Department Day on 10 October 2013, eight young researchers from the Department presented their ongoing scientific research in 20 minutes short lectures.



*Dr. Lenka Vukšić delivering lecture*

### Prof. Pavčević Active Vice-chair of COST Action Random Network Coding and Designs over GF(q)

International COST project titled “Random Network Coding and Designs over GF(q)” is running (2012-2016) in the ICT area under the label IC1104, and its vice-chair is Prof. Mario Osvin Pavčević.

More than 100 scientists from different branches coming from 27 countries are involved. Random network coding is one of the key research fields in communication technologies with many applications. Grassmannian codes, having a direct connection to designs over finite fields, showed to be of particular interest

Within the project Prof. Pavčević received renowned collaborators (Dr. Michael Kiermaier, University of Bayreuth, Germany (2013); Dr. Marcus Greferath, University of Dublin, Ireland (2014)), and took part in organizing several distinguished conferences and schools.

FER accepted sponsorship of an international scientific Network Coding and Designs conference to be held in April 2016 in Dubrovnik. This interdisciplinary scientific meeting will be the final conference of this COST action.

→ <http://www.network-coding.eu>

### Prof. Vesna Županović Vice-president of Croatian Mathematical Society

In 2015, Prof. Vesna Županović was elected vice-president of Croatian Mathematical Society (HMD), professional society of mathematicians in Croatia, aiming to promote Mathematical sciences, the teaching of Mathematics on all levels, its applications in other disciplines, as well as improving the social recognition of mathematicians.

### Conference “Mathematical Inequalities and Applications 2014”



The Conference titled “Mathematical Inequalities and Applications 2014” (MIA 2014) One Thousand Papers Conference, organized on 22-26 June 2014 in Trogir, Croatia, was organized in honour of Academician Prof. Josip Pečarić, on the occasion of Prof. Pečarić publishing more than 1000 scientific mathematical papers.

Prof. Mario Krnić and Prof. Neven Elezović delivered their plenary lectures. The conference gathered around a 100 lecturers from 18 countries.

The first MIA conference was held in 2008 in Trogir, and the second one was held in November 2015 in Mostar, Bosnia and Herzegovina.



### Prof. Mervan Pašić Editor-in-chief of Differential Equations and Applications (DEA) Journal

Our department publishes an international scientific journal titled “Differential Equations and Applications” (DEA) jointly with Element Publishing Co. in Zagreb.

Four issues appear each year, and in 2015 the Journal celebrated its 7<sup>th</sup> anniversary. The Editors-in-Chief of DEA are professors Matts Gyullenberg from Finland, FER’s Mervan Pašić and Jean-Michel Rakotoson from France.

The Editorial Board consists of 45 experts from around the globe.

→ <http://dea.ele-math.com/>



### Prof. Tomislav Šikić Editor-in-chief of Professional Math Methodics Journal Poučak

Prof. Tomislav Šikić is the Editor-in-Chief of Poučak, a Mathematics education and didactics journal, published quarterly. The Journal is a publication of the Croatian Mathematical Society.

### RADDAR Project for Gifted Children Founded by Prof. Vesna Županović

FER, "XV gimnazija" highschool and Association for Young Gifted Mathematicians "Marin Getaldić" co-organized the RADDAR ("Inquisitive and gifted") event on 5 May 2015 at FER. As part of the event, mathematical workshops for primary school children were also organized.

Prof. Vesna Županović initiated the project in 2013, which now also includes computer programming workshops. So far, about 200 children have participated. At final ceremony, children were awarded diplomas and acknowledgments for their participation.



*Prof. Vesna Županović during RADDAR lecture*

### International Cooperation at "Mathematical Analysis of Multi-physics Problems Involving Thin and Composite Structures and Fluids" Project

Installation research project "Mathematical Analysis of Multi-physics Problems Involving Thin and Composite Structures and Fluids", funded by the Croatian Science Foundation, boosted international research collaborations and scientific recognisability of the project members.

Prof. Igor Velčić, the principal investigator of the project, fortified a research collaboration with Prof.

Peter Hornung from TU Dresden in the area of rigorous derivation of homogenized lower-dimensional models from three-dimensional nonlinear elasticity. He also established a novel scientific link to Prof. Andro Mikelić from Université Lyon 1 in the area of poroelasticity.

Dr. Mario Bukal renewed his research collaboration with Prof. Ansgar Jüngel from TU Wien in the area

of entropy methods for nonlinear partial differential equations. Assist. Prof. Boris Muha, the project member from the Faculty of Science, continued through this project his very successful collaboration with Prof. Sunčica Čanić (University of Houston), one of the project's consultant and a former employee of this institution.

### Visit by Prof. M. L. Lapidus, from University of California, Riverside

Prof. Michel L. Lapidus from the University of California, Riverside, visited our Department on the occasion of PhD thesis defence of Goran Radunović, as one of the supervisors.

On 27 March 2015, Prof. Gordan Gledec, the Vice Dean for Science, hosted Prof. Michel L. Lapidus, who was accompanied by Prof. Darko Žubrinić, Prof. Ilko Brnetić and Dr. Goran Radunović, acquainting the distinguished guest with FER and the University.



*From left: Prof. D. Žubrinić, Vice Dean G. Gledec, Prof. M. L. Lapidus, Prof. I. Brnetić, Dr. G. Radunović*

### FER Hosts Summer School for Young Mathematicians

FER hosted 27 of the best Croatian young mathematicians 4-21 June 2015. The Croatian Mathematical Society organized the School for frontrunners of the National Mathematics Competition.

Prof. Ilko Brnetić and Prof. Mario Krnić participated jointly with colleagues from the Faculty of Science.

FER has been organizing and hosting the School for Young Mathematicians continuously since 1992. Furthermore, Prof. Neven Elezović and Prof. Andrea Aglič-Aljinović participate in the National Committee for Mathematical Competitions.



# Department of Electrical Engineering Fundamentals and Measurements

*Founded in 1924*

**Prof. Željko Štih**

*Head of Department*

☎ + 385 1 6129 753

☎ + 385 1 6129 571

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→ <http://www.fer.unizg.hr/zoem>



**Professors**

- Sead Berberović - numerical field calculations, CAD  
 Damir Ilić - precise EM measurements, standards calibration, virtual instruments, measurement technique  
 Petar Knežević - telematic services, performance of computer systems  
 Roman Malarić - automated data acquisition systems, electromagnetic measurements, calibration of standards  
 Armin Pavić - EM fields measurement and protection, computer-aided learning  
 Zoran Skočir - database design, information system development, networked economy, electronic business  
 Željko Štih - computational electromagnetics, engineering management

**Associate Professors**

- Bruno Blašković - model checking, formal description methods, protocol synthesis  
 Martin Dadić - computational and applied electromagnetics  
 Šandor Dembitz - natural language processing, expert systems  
 Ivan Leniček - precise electromagnetic measurements, calibration of standards

**Assistant Professors**

- Marko Banek - database design, e-business, ontology engineering, natural language processing  
 Luka Ferković - precise measurement of high AC and DC current, non-conventional measuring transducers

- Marko Jurčević - automated data acquisition, EM measurements, remote calibration of standards, graphical programming languages  
 Damir Pintar - service-oriented computing, data mining, predictive and descriptive data analysis  
 Mirko Randić - distributed object-oriented software design, network and system management  
 Bojan Trkulja - computational electromagnetics, boundary element methods

**Retired Professors**

- Božidar Ferković - precise measurements of electromagnetic quantities  
 Zijad Haznadar - electromagnetic fields, numerical analysis  
 Dušan Vujević - precise measurement of voltage and magnetic quantities

**Senior Assistants**

- Hrvoje Hegeduš  
 Petar Mostarac  
 Mihaela Vranić

**Assistants**

- Kristina Ferković  
 Luka Humski  
 Tomislav Župan

**Associates**

- Ana Drandić  
 Ivica Kunšt  
 Frano Škopljanač-Mačina

**Technical Staff**

- Dražen Franolić  
 Davor Kotur

**Administrative Staff**

- Sanja Ferković-Živković  
 Jasenka Haladin

**90<sup>th</sup> Anniversary**

The Department celebrated the 90<sup>th</sup> Anniversary on 4 April 2014. The Department's activities started in 1923, when Dr. Josip Lončar established the Laboratory for Electrical Engineering Fundamentals and Measurements at the Royal Technical Polytechnic in Zagreb. On 4 April 1924 it was established as the Laboratory for Electrical Measurements and a month later Josip Lončar was appointed its Head.

In 1949, the name was changed to its current name - Department of Electrical Engineering Fundamentals and Measurements.

Department professors Prof. Josip Lončar, Prof. Vojislav Bego and Prof. Tomo Bosanac became members of the Croatian Academy of Sciences and Arts; Prof. Zijad Haznadar became a member of the Academy of Sciences and Arts of Bosnia and Herzegovina.

The Department takes pride in educating all graduates of electrical engineering and computing during their 1<sup>st</sup> year of study and many others during later years, as well as with more than 60 defended PhD and more than 150 M.Sc. theses, several thousand studies, reports and surveys.

The Department is proud of being a pioneer in introducing modern technologies in Croatian industry (CAD/CAM), and contributing in electrical measurements and telecommunications, as well as cooperation with many Croatian companies.

*Department on a field trip, organized on the occasion of the 90<sup>th</sup> anniversary*



- 1 – Željko Štih, 2 – Zijad Haznadar, 3 – Sead Berberović, 4 – Roman Malarić, 5 – Damir Ilić, 6 – Zoran Skočir, 7 – Ivica Kunšt, 8 – Davor Kotur, 9 – Marko Jurčević, 10 – Bojan Trkulja, 11 – Sanja Ferković Živković, 12 – Ruža Vukelić, 13 – Jasenka Haladin, 14 – Ana Drandić, 15 – Marija Čukelj, 16 – Mirko Randić, 17 – Dražen Franović, 18 – Hrvoje Hegeduš, 19 – Petar Mostarac, 20 – Luka Humski, 21 – Damir Pintar





# Department of Electric Machines, Drives and Automation

Founded in 1925

**Assist. Prof. Damir Sumina**  
Head of Department

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☎ + 385 1 6129 705

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→ <http://www.fer.unizg.hr/esa>



### Professors

Fetah Kolonić - control of drives, mechatronic systems  
 Viktor Šunde - power electronics, semiconductor power devices  
 Ivan Gašparac - electrical machines, industrial plants  
 Željko Jakopović - power electronics, semiconductor power devices  
 Zlatko Maljković - electrical machines systems

### Associate Professors

Jadranko Matuško - control of mechatronic systems  
 Mario Vražić - electrical machines, industrial plants  
 Damir Žarko - electrical machines and drives

### Assistant Professors

Igor Erceg - control of electrical machines, industrial automation  
 Siniša Popović - interactive simulation systems, affective computing  
 Nikola Švigir - technical mechanics  
 Damir Sumina - control of electrical machines, industrial automation

### Retired Professors

Zvonko Benčić - power electronics, semiconductor power devices  
 Krešimir Čosić - interactive simulation systems, strategic planning  
 Ivan Ilić - electrical machines and drives  
 Drago Ban - electrical machines and drives

### Senior Assistants

Branimir Dropuljić  
 Marko Horvat  
 Šandor Ileš  
 Davor Kukulja  
 Martina Kutija  
 Ivan Mrčela  
 Stjepan Stipetić

### Assistants

Boris Fažo  
 Zlatko Hanić  
 Marinko Kovačić  
 Tanja Poljugan  
 Goran Rovišan  
 Igor Sirotić  
 Damir Vuljaj

### Associates

Tin Bariša  
 Tino Jerčić  
 Josip Jurić  
 Bernard Kovač  
 Matija Kurešić  
 Marijan Martinović  
 Mateja Novak  
 Danko Sirotić

### Affiliates

Vitomir Blagojević

### Technical Staff

Marinko Miletić  
 Zdenko Štifter

### Administrative Staff

Snježana Krleža  
 Spomenka Perkušić



1 – Damir Žarko, 2 – Mario Vražić, 3 – Ivan Ilić, 4 – Igor Erceg,  
 5 – Jadranko Matuško, 6 – Ivan Mrčela, 7 – Marinko Kovačić,  
 8 – Tino Jerčić, 9 – Davor Kukulja, 10 – Drago Ban, 11 – Siniša  
 Popović, 12 – Nikola Švigir, 13 – Zlatko Hanić, 14 – Spomenka  
 Perkušić, 15 – Željko Jakopović, 16 – Marinko Miletić, 17 –  
 Viktor Šunde, 18 – Vitomir Blagojević, 19 – Damir Vuljaj, 20  
 – Zvonko Benčić, 21 – Martina Kutija, 22 – Zlatko Maljković,  
 23 – Fetah Kolonić, 24 – Šandor Ileš, 25 – Damir Sumina, 26  
 – Zdenko Štifter, 27 – Mateja Novak, 28 – Igor Sirotić, 29 –  
 Snježana Krleža

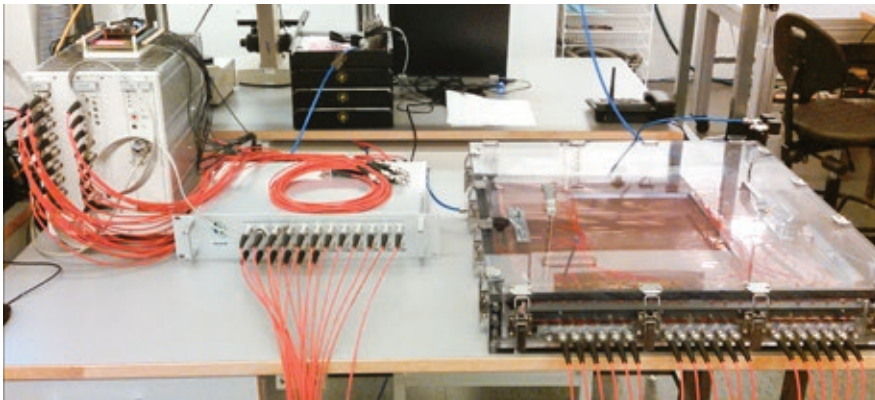


## Marinko Kovačić Participated in the Development of Measurement Devices for Testing at CERN

Marinko Kovačić, an assistant at the Department of Electric Machines, Drives and Automation, in collaboration with a group of researchers led by Prof. Mirko Planinić from the Department of Physics of the University of Zagreb Faculty of Science developed a device for measuring electric current in picoampere range at a voltage up to 5 kV.

The device is primarily developed for the purpose of conducting tests on GEM (Gaseous Electron Multiplier) detector, which is part of the research conducted within the UKF project titled "Study of the momentum correlations in high energy collisions using event structure criteria and ALICE detector at the LHC" at the Faculty of Science.

A spin off company PicoLogic has been founded as a result of the development of this measuring device which has a significant potential for commercialization.



Picoammeter for GEM foil leakage current measurement

## Multidisciplinary Metrics for Soldier Resilience Prediction and Training



Prof. Krešimir Čosić

Research on the understanding of soldiers' stress resilience resulted in the NATO Science for Peace and Security project "Multidisciplinary Metrics for Soldier Resilience Prediction and Training", led by Prof. Krešimir Čosić.

The project combines broad clusters of multidisciplinary markers, which include genomic, biological, physiological, acoustic, facial and EEG features, as well as self-report information, expert evaluations, and brain imaging data.

Distinction between stress resilient and stress vulnerable individuals is based on machine learning and big data analytics on these heterogeneous multidisciplinary datasets. State-of-the-art wearable devices and validated machine learning methods and models can provide valuable predictive information, important for preventive cognitive behavioural resilience building training interventions.

This 3-year project worth 378,000 € starts on 1 October 2015 and will be conducted in partnership with prominent research institutions from Israel, United States and Croatia: Hadassah Hebrew University Hospital, Jerusalem, Emory University School of Medicine, Atlanta, GA, Ruđer Bošković Institute, Zagreb, and several top Croatian medical institutions.

## 17<sup>th</sup> International Conference on Electrical Drives and Power Electronics

The 17<sup>th</sup> International Conference on Electrical Drives and Power Electronics (EDPE2013) was held in Dubrovnik, Croatia from 2-4 October 2013, which was also the sixth joint Croatian-Slovak organization of this Conference.

The organizer of the Conference is KoREMA - Croatian Society for Communication, Computing, Electronics, Measurement and Control. The co-organizers are the University of Zagreb Faculty of Electrical Engineering and Computing (FER), University of Kosice Faculty of Electrical Engineering and Informatics (FEI), Slovak Electrotechnical Society (SES) as well as the Centre of Research Excellence for Advanced Cooperative Systems (ACROSS).

General chairs were Prof. Fetah Kolonić (Croatia) and Prof. Viliam Fedak (Slovakia). The Conference was traditionally held in Dubrovnik, at the Centre for Graduate Studies (CAAS).

The total of 62 papers were presented by scientists in the field of electric drives and power electronics from 17 countries.





*The Laboratory for Industrial Automation*

## Laboratory for Industrial Automation Equipped in Cooperation with Siemens

A modern Laboratory for Industrial Automation has been equipped in cooperation with Siemens. The most up-to-date equipment in the field of automation and drive technology has been installed, which includes programmable logic controllers (Siemens S7-300, S7-1200, S7-1500), Sinamics converters, SCADA systems and industrial communication networks.

The laboratory is used for student seminars, projects and graduation theses. In addition, the laboratory is used by Siemens Inc. to test specific solutions in industrial automation and drive technology, and to hold various technical workshops and seminars intended for experts from industry.



### Stjepan Stipetić Receives Silver Plaque for PhD Thesis, Takes up Postdoc Research Appointment in France

Dr. Stjepan Stipetić received the "Josip Lončar" Silver Plaque for particularly successful doctoral thesis and scientific research and the Annual "KONČAR" Award for prominent scientific achievements in the technical sciences with applications in industry.

Dr. Stjepan Stipetić is currently undergoing scientific and professional specialist training as a postdoctoral researcher on the FP7 Marie Curie project titled "Advanced Electric Powertrain Technology" (ADEPT) in the partner company Motor Engineer, Meylan In-ovalee, France. He is engaged in research in the field of advanced simulation for components and systems of battery powered electric vehicles.

### Šandor Ileš a Visiting Researcher at TU/e



Šandor Ileš has actively participated in the European FP7 project ACROSS - "Centre of Research Excellence for Advanced Cooperative Systems". During the project, he was a visiting researcher at the Technische Universiteit Eindhoven (TU/e), Eindhoven, Netherlands from 28 February 2014 until 1 August 2014.

He worked under the guidance of assistant professor Mircea Lazar on the topic of model predictive control of linear parameter varying systems.

### Damir Žarko Received an IEEE Award



Prof. Damir Žarko received the Annual Award of the Croatian Section of IEEE for Exceptional Engineering Contribution as a distinguished member for outstanding contributions to the design and prototyping of modern high efficiency motors.

Damir Žarko has been with the Department since February 1996.



# Department of Energy and Power Systems

Founded in 1934

**Prof. Igor Kuzle**  
Head of Department

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**Professors**

Nikola Čavlina - nuclear power plant safety and control  
 Nenad Debrecin - nuclear power plants, renewable energy sources, energy efficiency  
 Slavko Krajcar - electrical facility design, distribution networks, energy market design  
 Igor Kuzle - power system dynamics and control, equipment maintenance, electricity markets, smart cities  
 Ante Marušić - power system protection and local control  
 Vladimir Mikuličić - energy conversion, electrical power system reliability  
 Ivica Pavić - transmission networks, power system analysis and control  
 Davor Škrlec - electric distribution systems, geographical information systems  
 Sejid Tešnjak - electric power system, electric power system regulation and dynamics  
 Tomislav Tomiša - power system automation and control  
 Ivo Uglešić - high voltage engineering

**Associate Professors**

Marko Delimar - smart grid, power system analysis, operation and control  
 Davor Grgić - nuclear power plants, reactor safety  
 Viktor Milardić - high voltage engineering  
 Zdenko Šimić - renewable energy sources, programming  
 Željko Tomšić - energy sustainable development, energy markets generation system planning, energy management

**Assistant Professors**

Juraj Havelka - relay protection for power systems, SCADA system design for power facilities  
 Hrvoje Pandžić - power system economics, smart grid

**Retired**

Danilo Feretić - nuclear power plants, reactor safety, energy and environment  
 Zdravko Hebel - transmission networks, power system analysis

**Senior Assistant**

Tomislav Capuder  
 Boško Milešević  
 Anamari Nakić  
 Ivan Rajšl

**Assistants**

Goran Grdenić  
 Perica Ilak  
 Frano Tomašević  
 Matija Zidar

**Associates**

Kristina Baranašić  
 Vesna Benčik  
 Tomislav Fancev  
 Bojan Franc  
 Ninoslav Holjevac  
 Bruno Jurišić  
 Kristina Jurković  
 Ivan Pavić  
 Davor Rašeta  
 Siniša Šadek  
 Miroslav Šturlan

**Technical Staff**

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 Božidar Filipović-Grčić  
 Davor Klarin  
 Radoslav Želić

**Administrative Staff**

Jasna Hemen  
 Neda Šimara



1 – Boško Milešević, 2 – Frano Tomašević, 3 – Perica Ilak, 4 – Goran Grdenić, 5 – Nikola Čavlina, 6 – Siniša Šadek, 7 – Viktor Milardić, 8 – Matija Zidar, 9 – Tomislav Fancev, 10 – Ivan Rajšl, 11 – Bojan Franc, 12 – Slavko Krajcar, 13 – Kristina Jurković, 14 – Marko Delimar, 15 – Davor Grgić, 16 – Nenad Debrecin, 17 – Juraj Havelka, 18 – Ivo Uglešić, 19 – Ninoslav Holjevac, 20 – Matea Filipović, 21 – Ante Marušić, 22 – Jasna Hemen, 23 – Vesna Benčik, 24 – Neda Šimara, 25 – Igor Kuzle, 26 – Sejid Tešnjak, 27 – Željko Tomšić



### IPST 2015 Conference

11<sup>th</sup> IPST conference was hosted 15-18 June 2015 in collaboration with local utility industry.



The biannual event offers a platform for the exchange of scientific and technical information related to electromagnetic transients in electric power systems. In 4 days of conference, 144 papers were presented in 29 sessions. Local Organizing Committee Chairperson was our Prof. Ivo Uglešić.



### PACWORLD 2014

5<sup>th</sup> Protection, Automation and Control (PAC) World Conference was held in Zagreb 23-26 June 2014. The Chair of local organizing committee was Prof. Igor Kuzle, and several members of the Department were members of scientific committee.

The Conference was highly attended with over 150 participants from 25 different countries, and with 72 scientific and technical papers and 3 keynote speeches delivered.



### CAMP Spring Meeting

Regular spring CAMP users meeting was organized by our Department in Zagreb on 14-16 May 2014, in cooperation with US NRC.

The total of 26 papers in the field of nuclear safety and RELAP5, TRACE, and PARCS code development were presented by 48 participants from 15 countries.

### Students and Professors from University of Tampere Visit in April 2015

Students and professors from the University of Tampere visited the Department in April 2015. During the visit, our professors presented their laboratories and some crucial laboratory exercises were demonstrated.

Croatian and Finnish students exchanged their professional experiences and discussed various themes in a casual atmosphere.

The guests visited the Croatian National Dispatch Centre at HOPS (Croatian Transmission System Operator) where dispatchers presented their daily activities and equipment used. The visiting students were shown the sights of Zagreb and were given a warm welcome at the Department.

### IEEE Energycon 2014 Conference

IEEE Energycon 2014 conference was hosted by IEEE members of the Croatian Section in collaboration with industry partners.

Prof. Igor Kuzle was the Conference chairperson, Prof. Pandžić was the chair of the Organizing Committee, while several other members of the Department participated in the organization as well.



Energycon is one of the flagship conferences in the IEEE Region 8. Main topics included future and low carbon power systems, sustainable transportation systems, energy conversion advancements and ICT in energy sector.

The Conference was held in Cavtat, Croatia from 13 to 16 May 2014. The total of 223 papers were presented with 253 participants coming from over 50 different countries. The organizing team was awarded the certificate of appreciation for exemplary service as the host of the Energycon 2014.

### 10<sup>th</sup> International Conference of Croatian Nuclear Society

The 10<sup>th</sup> International Conference on Nuclear Option in Countries with Small and Medium Electricity Grids of Croatian Nuclear Society, took place in Zadar 3-6 June 2014. Chair of the Programme Committee was Prof. Nikola Čavlina, while many other members took part in organizing the Conference.

The Conference proved successful as it gathered 102 scientists and specialists from 16 countries. The total of 72 technical and scientific papers were presented and 11 invited lecturers delivered talks.

As part of the Conference, a round table titled "Fulfilments of the EUROATOM Directive 2011/70 Requirements in a Country with Small Nuclear Programme" was organized.



## Baltazar System Shown at Zagreb Energy Week

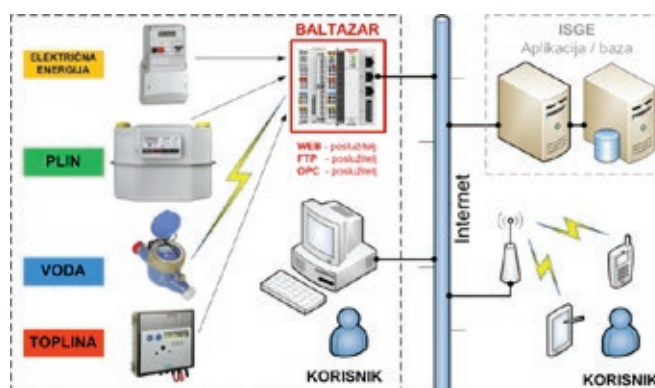
Baltazar system was shown as part of the sixth Zagreb Energy Week, held 11-16 May 2015. The system was developed by Prof. Tomislav Tomiša and Prof. Juraj Havelka.

In accordance with the energy-climate package "EU 20-20-20", the Ministry of Construction and Planning has adopted the "Program of energy reconstruction of public buildings for 2012-2013".

The goal of the programme is to implement advanced measurement of energy consumption that should continuously monitor energy consumption and provide real-time centralized cost analysis; EMIS (Energy Management Information System). A successful implementation is possible with inexpensive subsystem for remote data measurement that is compatible with the existing local measurements.

A prototype system was designed in the form of a demo panel called Baltazar and equipped with standard meters for measuring electrical and thermal energy consumption and gas and water consumption that were connected through various sensors with PAC modular system.

The Baltazar system is a modern low cost solution to the so-called front-end systems for the collection of energy consumption data in commercial and industrial buildings.



### Department in the Media

Press often asks our Department staff to take part in radio and TV shows.

Prof. Slavko Krajcar talked on national TV about the privatization of national power utility HEP, planned thermal power plant in Tuzla, energy saving lamps, Internet and education.

Prof. Željko Tomšić discussed new research labs at our Department, European electricity market and climate changes in Croatia.

Prof. Ivo Uglešić and Dr. Boško Milešević presented our High Voltage Laboratory in a TV show.

Assist. Prof. Hrvoje Pandžić discussed the needs for electric vehicle charging infrastructure in Croatia.

After the Fukushima incident in 2013, our Prof. Zdenko Šimić and Prof. Davor Grgić often commented on the issues related to nuclear energy safety.

## AREVA Fuel Cycle Back End Forum

The workshop was organized by HND, AREVA, and members of our Department on 20 November 2014 in Zagreb. Four AREVA experts presented 10 topics in 3 sessions related to back end fuel cycle, fuel reprocessing and spent fuel dry storage.

In total, 47 people from 11 organizations from Croatia participated. Apart from info on state-of-the-art fuel cycle back end technologies.

Forum provided an opportunity for establishing business relationships and cooperation.



## PES Central European Student and Young Professionals Congress 2015

IEEE Power and Energy Society members, mostly from the Department of Power and Energy of the Faculty of Electrical Engineering and Computing in collaboration with local industry partners, organized the Congress for more than 70 participants. The Congress was a great opportunity to expand the technical knowledge and meet peers from other European countries.

In three days a series of plenary talks and workshops regarding both technical aspects and soft skills aspects was held.

Prof. Igor Kuzle, Prof. Hrvoje Pandžić and Dr. Tomislav Capuder presented their research and helped the local organizing committee.





# Department of Electronic Systems and Information Processing

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## Professors

Mario Cifrek - electronic instrumentation and measurements, biomedical engineering  
 Vedran Bilas - electronic instrumentation and measurements, biomedical engineering  
 Davor Petrinović - digital signal and speech analysis and processing  
 Damir Seršić - electronic instrumentation and measurements, signal processing  
 Mladen Vučić - analogue and digital signal processing, digital system design  
 Branko Jeren - network and system theory, signal processing  
 Sven Lončarić - signal and image processing, computer vision, intelligent systems  
 Ratko Magjarević - computerised instrumentation, biomedical engineering, minimally invasive methods  
 Neven Mijat - electrical network, system theory and signal processing

## Associate Professors

Dražen Jurišić - analog signal processing and filtering  
 Igor Lacković - electronic instrumentation and measurements, biomedical engineering  
 Tomislav Pribanić - computer vision, image processing & analysis, motion analysis  
 Mile Šikić - bioinformatics and computational biology

## Assistant Professors

Hrvoje Džapo - electronic instrumentation and measurements, embedded systems  
 Zvonko Kostanjčar - complex systems, computational finance  
 Marko Subašić - computer vision and neural networks  
 Darko Vasić - electronic instrumentation and measurements, signal processing

## Retired Professors

Vladimir Naglič - electrical network, system theory and signal processing  
 Stanko Tonković - electronic instrumentation and measurements, biomedical engineering

## Senior Assistants

Marko Butorac  
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 Krešimir Križanović  
 Željka Lučev Vasić  
 Tihomir Marjanović  
 Tomislav Petković  
 Ana Sović Kržić

Pavle Prentašić

Goran Šeketa  
 Sara Žulj

Ita Modun  
 Goran Molnar  
 Andrej Novak  
 Dinko Oletić  
 Predrag Pale  
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 Tomo Stjepović  
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 Tihomir Šmit  
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 Marijana Jurić Fraculj  
 Ivan Matec  
 Domagoj Materni  
 Ivica Medved  
 Hrvoje Mihaldinec

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## Croatian Computer Vision Workshops

4<sup>th</sup> Croatian Computer Vision Workshop was held on 22 September 2015 in Zagreb. General Chair was Prof. Sven Lončarić, Dr. Josip Krapac was Program Committee Chair, Vedrana Baličević was the Local Organizing Committee Chair, and Dr. Tomislav Petković was the Publications Chair.

The aim of the Workshop was to foster exchange of ideas between researchers and to promote research and development collaboration between academic sector and industry. The workshop had 40 participants. The programme included oral presentations, poster presentations, and a plenary speech.

3<sup>rd</sup> Croatian Computer Vision Workshop was held on 16 September 2014 in Zagreb. General Chair was Prof. Lončarić, Prof. Marko Subašić was Program Committee Chair, Dr. Tomislav Petković was the Local Organizing Committee Chair and Pavle Prentašić was the Publications Chair. The workshop had 35 participants. The programme included oral presentations, poster presentations, and a plenary speech.

### International Symposium on Image and Signal Processing and Analysis

9<sup>th</sup> International Symposium on Image and Signal Processing and Analysis was held from 7-9 September 2015 in Zagreb. The symposium was technically co-sponsored by IEEE Signal Processing Society, IEEE Croatia Section, and IEEE Croatia Section Signal Processing Society Chapter. General Chair was professor Sven Lončarić, while professor Marko Subašić was the Local Organizing Committee Chair. The symposium had 60 participants. The programme included one plenary speech.

### MBEC2014 Conference Held in Dubrovnik

6<sup>th</sup> European Conference of the International Federation for Medical and Biological Engineering - MBEC2014 was held in Dubrovnik 7-11 September 2014.

The conference was organized by Croatian Medical and Biological Engineering Society, sponsored by IFMBE and endorsed by European Alliance for Medical and Biological Engineering & Science (EAMBES) and by the University of Zagreb the Faculty of Electrical Engineering and Computing.

More than 350 papers were presented and an excellent group of plenary speakers gave insight to newest research and achievements in the field.

The Chair of the Conference was Prof. Igor Lacković.

### Launching IFMBE Into the 21<sup>st</sup> Century: 50 Years and Counting

Springer published the monography "Launching IFMBE into the 21<sup>st</sup> Century: 50 Years and Counting", edited by Herbert Voigt and Ratko Magjarević.

The monograph refreshes memories of ten years of activity of the International Federation for Medical and Biological Engineering - IFMBE, shortly before its 50<sup>th</sup> anniversary, as well as the achievements of scientific and professional societies that are affiliated to the Federation.



### Science Popularization Programme

Members of the Department were active in popularization of STEM. In July 2014, several workshops were held for elementary school students in building and programming Lego Mindstorms robots and for high school students in using Arduino. Lego and Arduino workshops were led by Ana Sović Kržić, PhD and Tomislav Jaguš, BSc.

They participated in Science Festivals 2014 and 2015 with workshops "Valery and Vivaldi: Lego robots that bring a new wave of fun in everyday learning", where Lego robots were used to explain basics of waves, and "Lego and solar energy", where robots were used to explain principle of operation of solar cells.

Several research groups from the Department participated in the European Researchers' Night 2014 financed through Marie Skłodowska-Curie Actions under the Horizon 2020 Framework.

### Students from Faculty of Electrical Engineering in Ljubljana visited Biomedical Electronics Laboratory

A successful long-term cooperation between the Faculty of Electrical Engineering, University of Ljubljana and the Faculty of Electrical Engineering and Computing resulted in regular bidirectional exchange visits of students from both Universities. The students and teachers from Ljubljana visit their colleagues early in December and have "hands on" laboratory exercises within the course "Biomedical Instrumentation".



### VISTA Project Completed, Wins Innovation Awards

A two-year infrastructure-building project funded by IPA Illc mechanism under title "VISTA - Computer vision applications for safe traffic" was completed in March 2015. The project leader was Prof. Sven Lončarić.

The main goal of the project was to strengthen research capacity of two partner institutions: FER and the Faculty of Transport and Traffic Sciences. The second goal was transfer of technology towards industry. The third goal was R&D of new computer vision-based advanced driver assistance systems. The project was valued at 685.265,45 € and the EU contributed with 573.841,29 €.



The VISTA project team received two awards at international innovation fair iENA 2014 in Nürnberg, Germany:

- Silver medal for university inventions created within the project VISTA, and
- Gold medal for innovations created within VISTA project from "Russian House for International Scientific and Technological Cooperation".

Furthermore, two awards were received at ARCA 2014 innovation fair in Zagreb:

- Golden Award for inventions created within the project VISTA, and
- FIRI diploma for the best invention from First Institute Inventors and Researchers in Iran.

### Dr. Ana Sović Kržić Received Faculty Award, Presented Her Work on TV

At a celebration of the Faculty anniversary held on 21 November 2014, Dr. Ana Sović Kržić received the Faculty award for exceptional achievement in research and innovation in the previous two years, for the extraordinary results of her scientific work in the field of adaptive wavelet transform with applications in image processing.



Dr. Ana Sović Kržić was interviewed on Croatian national television during the European Researchers' Night and for the central daily news about women in ICT. She was also interviewed for the Al Jazeera television for the show "Context: The young professionals are leaving the region."

### EP4Bio2Med - European Network for Development of Electroporation-Based Technologies and Treatments

Exposure of biological cells to a sufficiently strong external electric field results in increased permeability of cell membranes, referred to as electroporation. Since all types of cells (animal, plant and microorganisms) can be effectively electroporated, electroporation is considered to be a universal method and a platform technology. Electroporation has become a widely used technology applicable to e.g. cancer treatment, gene transfection, food and biomass processing, and microbial inactivation.

The COST Action aims at providing necessary steps towards EU cooperation of science and technology to

foster basic understanding of electroporation, improving communication between EU research groups.

This results in streamlining European R&D activities, and enabling further development of new and existing electroporation-based applications by integrating multidisciplinary research teams, as well as comprehensive training for Early-Stage Researchers (ESRs).

Results will provide multiple societal, scientific, and technological benefits in the field of medicine, biotechnology and environment preservation.

Prof. Ratko Magjarević and Prof. Igor Lacković were involved in the Management Committee of the Action.

### Software Replaces Mechanical Bike Transmission

Original bicycle with mechanical transmission replaced by software was an outcome of a project led by Prof. Damir Seršić, and brought to life by Igor Brkić, M. Sc.

Mapping of physical to virtual world was conducted by means of digital signal processing. Hence, everything is possible: hills and valleys, even friction may disappear! Or, they may appear even if they do not exist in reality. People of different physical condition can drive in parallel with different load, adjusted to their abilities. In the new bicycle, the connection between the left and right pedal is also realized by the software.

After a successful confirmation of the concept, developed system components were adapted and reused for a novel wheelchair that is now electrical, steered by a joystick and self-stabilized.





# Department of Electronics, Microelectronics, Computer and Intelligent Systems

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**Professors**

Adrijan Barić - modelling of electronic devices, design and modelling of integrated circuits, passive components and interconnect, electromagnetic compatibility design, model based design, model based reasoning, knowledge based systems, knowledge discovery

Nikola Bogunović - formal methods in the design of computing systems, automated knowledge discovery and extraction from signal and data sets

Željko Butković - electronic devices and circuits, microelectronic analog and digital circuits, CAD in microelectronics

Bojana Dalbelo Bašić - artificial intelligence, machine learning, data and text mining, natural language processing, information retrieval

Vlado Glavinić - e-learning and m-learning systems, human-computer interaction, mobile applications and interfaces, semantic web

Željka Mihajlović - computer graphics, visualization, animation, virtual reality

Slobodan Ribarić - computer architecture, digital system design, pattern recognition, biometrics, computer vision, artificial intelligence, intelligent systems, autonomy oriented computing

Siniša Srblić - consumerization of innovation, programming language translation, theory of computing, experimental computer architectures

**Associate Professors**

Marin Golub - operating systems, security, evolutionary computation

Domagoj Jakobović - evolutionary computation, parallel computation

Zoran Kalafatić - computer vision, pattern recognition

Igor Krois - analog design

Vlado Sruk - software and hardware reliability, design methodologies, embedded systems and information technology, storage systems

Tomislav Suligoj - advanced electron devices, semiconductor fabrication technology, simulation modeling and characterization, solid state circuit design

Siniša Šegvić - computer vision, autonomous navigation, software design, computer architecture

**Assistant Professors**

Vladimir Čeperić - microelectronics, electromagnetic compatibility, neurocomputing

Marko Čupić - soft computing, artificial intelligence, optimization, computer graphics, programming languages

Ante Đerek - computer network security and privacy, cryptography

Stjepan Groš - computer networks and internet, operating systems, security

Tomislav Hrkać - computer architecture, computer vision, intelligent systems

Leonardo Jelenković - operating systems, embedded operating systems

Marko Koričić - advanced semiconductor devices and structures, integration of bipolar and CMOS technologies

Dejan Škvorc - web architecture and protocols, service-oriented computing, mobile and cloud computing, computer networks for geolocation-targeted communication

Jan Šnajder - natural language processing, text mining, information retrieval

**Retired Professors**

Uroš Peruško - memory structures, computer systems reliability

Petar Biljanović - electronic devices, solid state circuits, microelectronics

Leo Budin - computational methods in science and engineering

Julijana Divković-Pukšec - solid state circuits, VLSI physical design

Joško Radej - digital systems, computational engineering

**Senior Assistants**

Ivan Budiselić

Goran Delač

Goran Glavaš

Danko Ivošević

Alan Jović

Josip Krapac

Tvrtko Mandić

Darijan Marčetić

Mirko Poljak

Miroslav Popović

Marin Šilić

Klemo Vladimir

Sanja Žonja

**Assistants**

Domagoj Alagić

Josip Bačmaga

Niko Bako

Raul Blečić

Marko Đurasević

Nikolina Frid

Mladen Karan

Tihomir Knežević

Jurica Kundrača

Marko Magerl

Marija Marčetić

Zvonimir Pavlič

Branko Samaržija

Artur Šilić

Hrvoje Štimac

Josip Žilak

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Markan Lopar

Dino Pačandi

Martin Soldić

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Zvonimir Jakopović

**Administrative Staff**

Biljana Geratović Reich

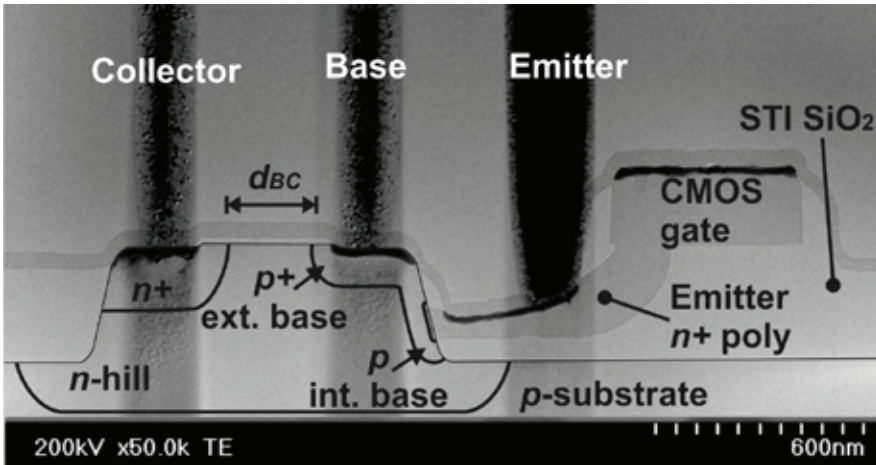
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Jasminka Mustić



1 – Branko Filipčić, 2 – Biljana Geratović Reich, 3 – Zvonimir Jakopović, 4 – Siniša Šegvić, 5 – Marko Čupić, 6 – Tvrtko Mandić, 7 – Aleksandar Szabo, 8 – Goran Delač, 9 – Zvonimir Pavlič, 10 – Leonardo Jelenković, 11 – Darijan Marčetić, 12 – Raul Blečić, 13 – Martin Soldić, 14 – Danko Ivošević, 15 – Klemo Vladimir, 16 – Marin Šilić, 17 – Tomislav Hrkać, 18 – Alan Jović, 19 – Dejan Škvorc, 20 – Vlado Sruk, 21 – Nikola Bogunović, 22 – Zoran Kalafatić, 23 – Sabina Krivec, 24 – Marko Magerl, 25 – Mirko Poljak, 26 – Bojana Dalbelo Bašić, 27 – Željko Butković, 28 – Siniša Srblić, 29 – Stjepan Groš, 30 – Nikolina Frid, 31 – Ante Đerek, 32 – Karla Brkić, 33 – Željka Mihajlović, 34 – Vlado Glavinić, 35 – Slobodan Ribarić, 36 – Dubravka Bernat, 37 – Sanja Žonja, 38 – Marin Golub, 39 – Hrvoje Štimac, 40 – Marko Đurasević, 41 – Mladen Karan, 42 – Jan Šnajder, 43 – Domagoj Alagić, 44 – Tihomir Knežević, 45 – Josip Žilak





### Fastest Published Pure-silicon Bipolar Transistor Invented

Members of Micro and Nano-electronics Laboratory have invented the Horizontal Current Bipolar Transistor (HCBT), which is currently the fastest published pure-silicon bipolar transistor. They have been conducting research on the improvements of HCBT technology and the design of radio-frequency circuits using HCBTs over the past 20 years, and the developed transistors have been awarded with 2 patents in years 2013 and 2014 adding to the total of 12 issued or pending patents on HCBT technology.

The exhibit "Horizontal Current Bipolar Transistor Integrated into 180 nm BiCMOS Technology" won Golden Award at the International Exhibition of Inventions ARCA 2014, authored by T. Suligoj, M. Koričić and J. Žilak. Prof. Tomislav Suligoj, Head of Micro and Nano-electronics Laboratory was awarded by the National Science Award for the invention of HCBT technology.

Dr. M. Poljak and Prof. T. Suligoj have pioneered the theoretical work and modelling of transport properties of ultra-thin InGaAs MOS transistors, which resulted in the invited lecture titled "Electron Transport in Thin-Body InGaAs-OI MOSFETs: A Theoretical Viewpoint" presented at the Workshop on Carrier Transport in Nano-Transistors as a part of International Conference on Simulation of Semiconductor Processes and Devices (SISPAD) in Yokohama, Japan, in September 2014.



### Prof. Siniša Šegvić Chaired Session at 11<sup>th</sup> International Conference on Computer Vision Theory and Applications

The 11<sup>th</sup> International Conference on Computer Vision Theory and Applications was held on 11-14 March 2015 in Berlin, Germany.

The Conference included 10 technical sessions organized in 5 tracks: Image Formation and Preprocessing; Image and Video Analysis and Understanding; Motion, Tracking and Stereo Vision; and Applications and Services.

The session Surveillance 2 was chaired by Prof. Siniša Šegvić from the Department.

### Prof. Siniša Srblijić Becomes Technical Advisory Board Member in Altera Corporation's Virtualization Lab



Prof. Siniša Srblijić at Altera, in San Jose

Altera has recently formed the Virtualization Lab to research and develop technology that will enable FPGA acceleration within cloud and data centre environments. The Virtualization Lab is seeking the help of prominent academic researchers to help them with this effort.

Professor Srblijić's long history of work in the area of multiprocessor systems and cloud computing made him an ideal candidate for this role, and therefore, he was invited to conduct his research at San Jose campus, California, USA, from December 2015.

In this capacity, he will work closely with engineering teams to architect state-of-the-art solutions for FPGAs in the cloud. This role will also serve to foster future industrial and academic collaboration on joint research projects in the future. After Intel acquisition of Altera, he continues his research as Technical Advisor at Intel's Programmable Solutions Group.

### Training School of the COST Action "De-identification for Privacy Protection in Multimedia Documents"

Organized by COST Action IC1206 "De-identification for Privacy Protection in Multimedia Documents", chaired by Department Prof. Slobodan Ribarić, which includes 28 EU COST countries as well as China, USA, Argentina and Belarus, the First Training School was organized 7-11 October 2015 in Limassol, Cyprus.

Topics included De-identification in Multimedia Contents, Aspects of Facial Aging in Face Image De-identification, Text Mining of Patient Records Preserving Patient Anonymity, Speaker De-identification, Smart cameras and privacy and others.

School attendance included 23 trainees (early stage researchers, PhD students) and 15 experts from USA, UK, Croatia, Hungary, Serbia, Switzerland, Slovenia, Sweden, Portugal, Belgium and Malta.



*Trainers and trainees - participants of The First Training School*

### Marin Šilić Member of Programme Committee at ESEC and FSE

Marin Šilić has served on the Programme Committee of the 10<sup>th</sup> joint meeting of the European Software Engineering Conference (ESEC) and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE).

The event was held from 31 August till 4 September 2015 in the stunningly beautiful and historic city of Bergamo, Italy.

### Summer Schools on Cryptography

Two summer schools on cryptography were jointly organized by the Digital Security group, Radboud University Nijmegen, The Netherlands, DTU, Denmark, KU Leuven, Belgium and Faculty of Electrical Engineering and Computing, Zagreb, Croatia. The school aims at bringing together PhD students, postdoc researchers and security experts from industry.

The Summer School on Design and security of cryptographic algorithms and devices for real-world applications took place in Šibenik in June 2014, and the Summer school on real-world crypto and privacy in June 2015.

*Lectures during summer school on cryptography*





# Department of Applied Physics

Founded in 1945

**Assist. Prof. Sanda Pleslić**

Head of Department

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### Professors

Tomislav Petković - experimental particle and hypernuclear physics, philosophy and history of science  
 Dubravko Pevec - reactor physics, nuclear engineering  
 Dubravko Horvat - gravitation, cosmology and elementary particle structures and symmetries

### Associate Professors

Lahorija Bistričić - molecular and laser physics, spectroscopy of nanohybrid polymers  
 Vesna Borjanović - experimental solid state physics, investigations of nanostructured materials (quantum dots, nanorods, hybrid materials)

### Assistant Professors

Sanda Pleslić - atomic and plasma physics, knowledge management  
 Ana Babić - experimental high energy astrophysics  
 Saša Ilijić - high energy physics: gravitation and cosmology, stochastic dynamics of complex systems  
 Zoran Narančić - elementary particle structures and symmetries  
 Krešimir Trontl - nuclear engineering, renewable energy sources, programming

### Retired

Vladimir Knapp - nuclear physics and engineering  
 Višnja Henč-Bartolić - atomic physics, lasers  
 Mile Baće - nuclear engineering and non-conventional energy sources

### Senior Assistants

Mario Matijević  
 Anja Marunović

### Associates

Nikola Dragić  
 Paulina Dučković  
 Vjeran Gomzi  
 Danijela Grozdanić  
 Radomir Ječmenica

### Administrative Staff

Ana Holjak  
 Snježana Božić



1 – Krešimir Trontl, 2 – Vesna Borjanović, 3 – Mario Matijević,  
 4 – Ana Holjak, 5 – Vesna Popović, 6 – Sanda Pleslić, 7 –  
 Vjeran Gomzi, 8 – Saša Ilijić, 9 – Dubravko Horvat, 10 – Zoran  
 Narančić, 11 – Tomislav Petković, 12 – Lahorija Bistričić, 13  
 – Paulina Dučković, 14 – Radomir Ječmenica, 15 – Danijela  
 Grozdanić, 16 – Nikola Dragić



## Collaboration Between Faculty and Georgia Institute of Technology (FHR)

The Faculty has become a formal collaborator on a new NEUP project, titled "Integrated Approach to Fluoride High Temperature Reactor (FHR) Technology and Licensing Challenges" in August 2014. This multi-institutional project, led by Georgia Institute of Technology, USA, aims to address critical technology challenges that have been barriers to the development of a commercially viable Fluoride High Temperature Reactor (FHR).

Fluoride salt-cooled high-temperature reactors (FHRs) are an emerging reactor class that has the potential to economically and reliably produce large quantities of electricity and high-temperature industrial process heat while maintaining full passive safety. One of the Faculty's representative in the project is a member of the Department, Prof. Dubravko Pevec.

### FER Becomes Team Member of I2S-LWR Working Group

Following the U.S. Department of Energy (DOE) approval, the I2S-LWR Working group has been formally augmented in the mid 2014 by two new team members: Florida Institute of Technology and University of Zagreb Faculty of Electrical Engineering and Computing.

The Faculty thus became collaborator in a multi-institutional project "I2S-LWR" led by Georgia Institute of Technology, USA.

Over a period of three years this project will engage about ten USA organizations in seven states and three international organizations from UK, Italy and Croatia to develop a novel concept of a high-power (on the order of 1,000 MWe) LWR with inherent safety features.

The new reactor is referred to as the Integral Inherently Safe Light Water Reactor, or I2S-LWR. The inherent safety features will advance its safety level beyond that of advanced passive Gen-III+ LWRs.

The I2S-LWR design will incorporate lessons learned from the recent events induced by the natural disaster in Japan. At the same time, economic competitiveness will be maintained and other Gen-IV requirements will be considered and accommodated to the possible extent.

The project coordinator from the Croatian side is Prof. Dubravko Pevec and several other Department's employees are participating in this project as well.



*Prof. Bojan Petrović during the lecture*

## Scientific Guest Lecture

The lecture entitled "Review of advanced methodologies for effective analysis of radiation shields" was held by Prof. Bojan Petrović from Georgia Institute of Technology, USA, on 15 December 2014 in the Faculty Gray Hall. Prof. B. Petrović was a guest lecturer in the framework of the Croatian Science Foundation Project No. 3522 "DOCPAGANSA - Development of Code Package for Advanced Gamma and Neutron Shielding Analysis", led by scientists from the Department.

The scientific work of Prof. B. Petrović is focused on design of advanced reactors, nuclear fuel cycle, radioactive waste management and appropriate methods of modeling and simulation. Special interest of Prof. Petrović is focused on developing ways of applying the Monte Carlo method and hybrid deterministic-stochastic methods in radiological issues that will provide practical and relevant analysis of complex nuclear systems.

### The Computer Assisted Exercise "CAX 15"

The Computer Assisted Exercise (CAX 15), was conducted in the Croatian Defence Academy in Zagreb 8-12 June 2015.

The Exercise participants included the teaching staff and the students of the War School, Advanced Officer School, the Senior NCO School and other Defence Academy personnel.

The goal was to increase the students' operation planning and preparing competence at command and staff posts at various levels (strategic to tactical) in national and multi-national settings.

Professors and assistants from the Faculty of Electrical Engineering and Computing also visited CAX 15 with Colonel Čolić as a host.



Participants of the Workshop; Assist Prof. S. Pleslić (4<sup>th</sup> from right), Maja Resman (3<sup>rd</sup> right) and Ana Babić (1<sup>st</sup> right)

## NATO Defence Education Enhancement Programme (DEEP) Workshop

The mission of the Defence Education Enhancement Programme (DEEP) is to contribute to international security through the professionalization of the officer corps, NCO corps and civilian defence officials of partner countries, making their defence education institutions compatible with Western defence education standards and values. The DEEP programme works closely with the Partnership for Peace Consortium's Education and Development Working Group (EDWG). DEEP addresses the professional military education component of Defense Institution Building. To accomplish its mission, DEEP possesses the following features:

- supports defence education institutions (war college, staff college, military academy, NCO) on a matter of faculty development (how to teach) and curriculum development (what to teach);

- it is tailored to meet individual Partner education requirements – each defence education institution is different and treated accordingly;
- it is managed by the Partnership for Peace Consortium and NATO through multi-year programs of cooperation designed to assist the host nation government education system to support effective modernization.

In collaboration with the Croatian Defence Academy “Dr. Franjo Tuđman”, NATO DEEP Team in Zagreb organized workshop on modern methods of teaching 13-14 July 2015.

Assist. Prof. Sanda Pleslić and Ana Babić and assistant Maja Resman, as active teachers at university military studies, participated in the workshop.

### Prof. Petković Contributes to Special Issue of Almagest Journal and to the Hypernuclear Spectroscopy

Selected papers from the 24<sup>th</sup> International Congress of History of Science, Technology and Medicine (held in Manchester, UK in 2013) were published as the special issue of Almagest journal, Vol. 6, Issue 1, 2015.

The Conference session title was comprehensive: “The achievements of R J Bosovich in the philosophy of nature, astronomy, technique and culture: historical resources and contemporary epistemic reflections”.

One of the initial organisers of the Symposium and one of the co-editors of the thematic issue of the journal was Prof. Tomislav Petković.

In the field of precise hypernuclear spectroscopy, a paper in Phys. Rev. C 90, 034320 (2014) based on two experiments performed at the Hall C of JLab (E01-011 and E05-115) were evaluated and published. The paper provides the clearest level structure to date of the 12B-Lambda hypernucleus.

Co-author of the paper is Prof. Petković who has recently successfully completed all trainings and exams to get current status of the Jefferson Lab user, thus making the “User Agreement” between JLab and FER possible.





# Department of Telecommunications

Founded in 1951

**Prof. Igor Sunday Pandžić**  
Head of Department

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**Professors**

Alen Bažant - data communications, local area networks, broadband access networks and technologies  
 Dragan Jevtić - computer telephony, Petri and neural nets, knowledge based systems and services, intelligent agents  
 Gordan Ježić - agent technology, mobile networks and services, mobile computation  
 Mladen Kos - network optimisation, performance analysis  
 Ignac Lovrek - telecommunication system architecture, call/service modelling and processing, mobile agents and multi-agent systems  
 Maja Matijašević - converged IP-based networks, multimedia communication, quality of service  
 Branko Mikac - reliability, transmission systems  
 Igor Sunday Pandžić - face tracking and analysis, virtual environments

**Associate Professors**

Željka Car - software engineering, software process modelling and simulation, project management  
 Mario Kušek - mobile service programming, mobile software agents, software development, machine to machine (M2M) communication, self-organizing systems  
 Miljenko Mikuc - logical design, application of formal methods in telecommunication system design, network simulation systems  
 Ivana Podnar Žarko - large-scale distributed systems, real-time data stream processing, information retrieval and recommender systems

**Assistant Professors**

Ognjen Dobrijević - software-defined communication networks, network functions virtualization  
 Željko Ilić - high-performance digital transmission, medium access control protocols for broadband access networks, information theory  
 Vedran Podobnik - social networks, multi-agent systems, electronic markets  
 Krešimir Pripuzić - distributed information systems, information retrieval and filtering, data stream processing  
 Lea Skorin-Kapov - quality of experience of multimedia services, signaling and resource allocation in next generation networks  
 Marin Vuković - Internet security, contactless technologies and applications, machine learning

**Retired Professors**

Vjekoslav Sinković - information theory, information networks  
 Mladen Tkalić - automata theory, logical design  
 Marijan Kunštić - information, logic and languages, switching systems

**Senior Assistants**

Marina Bagić Babac  
 Iva Bojić  
 Aleksandra Čereković  
 Marija Furdek  
 Tomislav Grgić

**Assistants**

Aleksandar Antonić  
 Matija Džanko  
 Vedran Hrgetić  
 Krunoslav Ivešić  
 Damjan Katušić  
 Nenad Markuš  
 Marko Pavelić  
 Marina Ptiček  
 Pavle Skočir  
 Mirko Sužnjević  
 Darko Štriga  
 Matija Šulc  
 Valter Vasić

**Associates**

Jurica Babić  
 Krešimir Bešenić  
 Šimo Brtan  
 Miroslav Frljak  
 Ivan Gogić  
 Marina Ivić  
 Marko Kolarek  
 Martina Manhart  
 Hrvoje Maračić  
 Martina Marjanović  
 Dino Paić  
 Vjekoslav Ranogajec  
 Ivana Rašan Sladoljev  
 Ivan Renić  
 Kristijan Rožanković  
 Denis Salopek  
 Ivan Slivar  
 Petar Stojanac  
 Ivan Šemanjski

**Technical Staff**

Marko Zec

**Administrative Staff**

Jasna Slavinić



1 - Matija Džanko, 2 - Krešimir Pripuzić, 3 - Marina Ivić, 4 - Marko Zec, 5 - Miljenko Mikuc, 6 - Tomislav Grgić, 7 - Ivan Gogić, 8 - Igor Sunday Pandžić, 9 - Ivan Slivar, 10 - Mirko Sužnjević, 11 - Ognjen Dobrijević, 12 - Gordan Ježić, 13 - Mladen Kos, 14 - Krunoslav Ivešić, 15 - Alen Bažant, 16 - Mario Kušek, 17 - Hrvoje Maračić, 18 - Damjan Katušić, 19 - Ivana Rašan Sladoljev, 20 - Darko Štriga, 21 - Pavle Skočir, 22 - Matija Šulc, 23 - Jurica Babić, 24 - Marko Pavelić, 25 - Ignac Lovrek, 26 - Maja Matijašević, 27 - Valter Vasić, 28 - Aleksandar Antonić, 29 - Martina Marjanović, 30 - Nenad Markuš, 31 - Ivana Podnar Žarko, 32 - Marina Ptiček, 33 - Jasna Slavinić, 34 - Lea Skorin-Kapov, 35 - Marina Bagić Babac, 36 - Branko Mikac, 37 - Dragan Jevtić



# 13<sup>th</sup> International Conference on Telecommunications

The 13<sup>th</sup> International Conference on Telecommunications – ConTEL 2015 took place in Graz, Austria, from 13 to 15 July 2015.

ConTEL was jointly organized by the University of Zagreb and Graz University of Technology (TUG), and was technically co-sponsored by the IEEE Austria Section and IEEE Communications Society.

Professors Maja Matijašević and Mario Kušek were involved as the General Co-Chair, and the TPC Co-Chair, respectively.

The well-attended Conference programme comprised 47 peer-reviewed research paper presentations and 4 keynote talks, with speakers from Austria, Portugal, and USA. It also included 2 special sessions, on interactive multimedia services and applications, and smart cities, crowdsourcing and M2M communication.

The 5<sup>th</sup> Workshop on Regulatory Challenges in the Electronic Communications Market, chaired by Professor Gordan Ježić, was organized within the scope of the Conference.

The workshop programme included a peer-reviewed paper session, two round tables related to EU Digital Agenda, entitled “Digital Single Market” and “Broadband Networks, Services and Users”, and a keynote talk presented by Fatima Barros, the 2015 Chair of the Body of European Regulators for Electronic Communications (BEREC) and Professor at the Lisbon School of Business and Economics.



*General Chair Prof. Erich Leitgeb (Graz University of Technology, Institute of Microwave and Photonic Engineering) with Programme Chair Prof. Mario Kušek (FER, Department of Telecommunications)*

→ <http://www.contel.hr/>

*ConTEL 2015 opening ceremony*



## Erasmus Energy Science Award 2013 for CrocodileAgent team

CrocodileAgent team representing the University of Zagreb in the Trading Agent Competition and consisting of students Jurica Babić, Ivo Buljević, Siniša Matetić and Tomislav Briševac and led by Assist. Prof. V. Podobnik, was awarded the Erasmus Energy Science Award 2013 as recognition for their research which pairs practical relevance to future energy business and presents new findings with scientific rigor.



The CrocodileAgent team was active in developing solutions for trading and visualization in future energy markets and significantly contributed to the development of the Power TAC, the world-leading simulation platform for future energy markets.

## 9<sup>th</sup> KES-AMSTA Conference

The 9<sup>th</sup> KES Conference on Agent and Multi-Agent Systems - Technologies and Applications took place in Sorrento, Italy, 17-19 June 2015. KES-AMSTA 2015 was organized by the KES International, with Prof. Ignac Lovrek as Honorary Chair, Prof. Gordan Ježić as General Chair and Prof. Mario Kušek as the Programme Co-Chair.

The programme comprised 38 paper presentations from 22 countries, a keynote talk and invited sessions. The presented papers highlighted new trends and challenges in agent and multi-agent research.

## Prof. Vjekoslav Sinković Receives National Science Award for Lifetime Achievement

Retired Prof. Vjekoslav Sinković from our Department received the 2014 National Science Award in the Lifetime Achievement category in recognition of his outstanding scientific and research contribution to technical sciences.

Professor Sinković is recognized for his work in the area of information theory and information networks which includes new concepts of digital communications and complex models of mobile communication entities. The results of his work were applied in research and development of communication systems produced by Croatian industry for local and global market.



Prof. Sinković's research has also impacted the implementation of telecommunication networks in Croatia, especially in the planning of digital networks of the cities of Zagreb, Osijek, Rijeka and Split.



## ICT-AAC Competence Network

The main achievement of EU-IPA IIIc project "ICT Competence Network for Innovative Services for Persons with Complex Communication Needs" (ICT-AAC)" (3/2013 - 3/2015) is a formal establishment of the ICT-AAC Competence network involving project partners and other stakeholders interested in the domain of Alternative and Augmentative Communication. The goal of the Competence network is to promote multidisciplinary cooperation and to collaborate closely with all the partners who can contribute in finding ICT based solutions for people with complex communication needs and carrying out application-oriented research.

The members of the ICT-AAC Competence network cooperate in education, research, development and innovation, and by jointly applying for projects, as well as by establishing a dialogue with European and national government bodies and agencies responsible for the development of an inclusive society.

Along with FER, members of the ICT-Competence network are: Faculty of Education and Rehabilitation Sciences, Faculty of Graphic Arts and Faculty of Humanities and Social Sciences Department of Psychology; Croatia Down Syndrome Association, Parental association OKO, Croatian Association on Early Childhood Intervention, Polyclinic SUVAG Osijek, HSM Informatika and Josip Juraj Strossmayer University of Osijek Faculty of Electrical Engineering.

→ <http://www.ict-aac.hr/>



# Department of Wireless Communications

Founded in 1954

**Prof. Zvonimir Šipuš**

Head of Department

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**Professors**

Juraj Bartolić - electromagnetic wave theory, microwave engineering, antennas and propagation, remote sensing, EMC, EMI  
 Davor Bonefačić - microwave engineering, small, active and wearable antennas, radar systems, EMI  
 Mislav Grgić - digital mammography, computer-aided detection and diagnosis (CAD) for breast cancer, face recognition, biometrics, image and video compression, multimedia communications  
 Sonja Grgić - video signal processing and communications, picture quality assessment, digital video broadcasting  
 Silvio Hrabar - electromagnetic wave theory, application of microwaves, antennas, optoelectronic circuits  
 Tomislav Kos - radio positioning and navigation, television, cable television systems, broadband networks  
 Krešimir Malarić - electromagnetic wave theory, microwave communications, satellite communications, EMC, biomedical effects of electromagnetic fields  
 Borivoj Modlic - broadcasting, wireless access networks, EMC  
 Robert Nađ - mobile and wireless communications, RF and microwave small signal amplifiers, circuits and communication system weak nonlinearities problems  
 Dina Šimunić - wireless communications, biomedical effects of electromagnetic fields, green communications, intelligent transport systems  
 Zvonimir Šipuš - optical communication systems, computational electromagnetics, antennas

**Associate Professors**

Gordan Šišul - wireless access networks, mobile communications, digital communications, propagation  
 Radovan Zentner - radio channel modelling, wireless communication, MIMO systems, antennas, propagation

**Assistant Professors**

Dubravko Babić - optoelectronics, microwave engineering, optical communication systems

**Retired Professors**

Boris Kviz - optical communication systems, radio telemetry, radiolocation and navigation  
 Branka Zovko-Cihlar - digital television, multimedia communications, television broadcasting, broadband network mobile communication

**Senior Assistants**

Iva Bačić  
 Dario Bojanjac  
 Marko Bosiljevac  
 Jelena Božek Mouthuy  
 Tomislav Debogović  
 Emil Dumić  
 Branimir Ivšić  
 Tin Komljenović  
 Damir Muha  
 Mario Muštra  
 Davor Zaluški

**Assistants**

Pavel Najman  
 Leonard Novosel  
 Dijana Tralić  
 Josip Vuković

**Associates**

Vedran Ciganović  
 Goran Dimić  
 Jožef Ferčec  
 Andrej Galoić  
 Antun Kerner  
 Ana Koren  
 Josip Lončar  
 Antonija Marinčić  
 Željko Martinović  
 Josip Seljan  
 Marko Šprem  
 Igor Vitas  
 Mladen Vukomanović

**Technical Staff**

Damir Petričević

**Administrative Staff**

Ljerka Nuić



1 – Davor Zaluški, 2 – Dario Bojanjac, 3 – Robert Nađ, 4 – Branimir Ivšić, 5 – Krešimir Malarić, 6 – Damir Muha, 7 – Josip Vuković, 8 – Goran Dimić, 9 – Gordan Šišul, 10 – Antonija Marinčić, 11 – Dina Šimunić, 12 – Borivoj Modlic, 13 – Davor Bonefačić, 14 – Juraj Bartolić, 15 – Tomislav Kos, 16 – Jelena Božek, 17 – Mislav Grgić, 18 – Silvio Hrabar, 19 – Boris Kviz, 20 – Ljerka Nuić, 21 – Josipa Baček, 22 – Branka Zovko-Cihlar, 23 – Sonja Grgić, 24 – Ana Koren, 25 – Damir Petričević, 26 – Josip Seljan, 27 – Marko Bosiljevac, 28 – Mladen Vukomanović, 29 – Andrej Galoić, 30 – Zvonimir Šipuš, 31 – Marko Šprem, 32 – Leonard Novosel



## 60 Years of the Department

On 4 December 2014 a celebration was held on the occasion of the 60<sup>th</sup> Anniversary of the establishment of the Department, which was founded in 1954 as the Department for the Emission Devices. Additionally, at the celebration we also marked:

- 100<sup>th</sup> birthday of Dr. Roman Galić,
- 90<sup>th</sup> birthday of Prof. Zlatko Smrkić and Prof. Ivan Modlic, the renowned Department professors and
- 50<sup>th</sup> anniversary of the PhD defense of our distinguished professor Prof. Branka Zovko-Cihlar.

The celebration was addressed by the Rector of the University of Zagreb, Prof. Damir Boras, who was also a Department alumni, and the Faculty Dean Prof. Mislav Grgić, a professor at the Department.

The talk about late professors was given by Prof. Boris Kviz, and Prof. Sonja Grgić talked about Prof. Zovko-Cihlar and her accomplishments.

Informal gathering was held after the celebration in the Faculty Gallery Hall.

## ELMAR Symposiums

The 56<sup>th</sup> and 57<sup>th</sup> International ELMAR Symposiums were organized by Croatian Society Electronics in Marine (ELMAR) and our Department. The General Chair was Prof. Branka Zovko Cihlar, and the Program Chair was Prof. Mislav Grgić. Several research assistants from the Department participated in the organization.

Main topics were multimedia communications, image and video processing, navigation systems, speech and audio processing, telecommunications, wireless communications, and electronics in marine.

ELMAR 2014 was held on 10-12 September 2014, included 73 papers and 2 invited talks; ELMAR 2015 was held on 28-30 September 2015, included 63 papers and 3 invited talks. The symposium is traditionally held in Zadar.

→ <http://www.elmar.hr/>



Top to bottom: (1) Prof. Boris Kviz talking about professors Galić and Smrkić, (2) Audience, with Dean Mislav Grgić, Rector Damir Boras and Prof. Juraj Bartolić in the front row, (3) Prof. Branka Zovko-Cihlar with Prof. Sonja Grgić

## European School of Antennas

As a part of ESoA, a course entitled „Advanced Mathematics for Antennas“ was held in Hotel Uvala, Dubrovnik, Croatia 12-17 May 2014. This is a biennial course jointly organized by Department of Wireless Communications, FER, and Laboratory of Applied Electromagnetism, University of Siena. In its fifth edition the course attracted 15 PhD students and experts from academia and industry from 8 countries. During the six day course the participants had the opportunity to learn advanced ideas and methods used in electromagnetic analysis from some of the leading experts in the field.



Participants of the „Advanced Mathematics for Antennas“ course



Students visiting flight simulator at Croatia Airlines

## Cooperation with Companies in Education

The cooperation of the Department with industry and government bodies who are the users of RF wireless equipment is very important in the fields of professional activities, as well as in education.

Visits to companies and RF installations of government bodies are organized on a regular basis for students enrolled in graduate courses at the Department.

Visits are organized to Vipnet (mobile operator), Croatia Airlines, Croatian Air Force, Croatia Control (Croatian air traffic management authority), broadcasting companies: Croatian Radio and Television, RTL, 24sata, etc.

By the experience obtained during the technical, our students gain a new perspective on wireless engineering. Usually, this is only the first step, continued by summer internship, and after graduating, by first employment in these companies.

### Optics Info Day

First Optics Info Day was held in Zagreb on 2 June 2015, in the organization of Department of Wireless Communications and Applied Optics Laboratory, and sponsored by Croatian Science Foundation (HRZZ). The aim of this Workshop was to familiarize students with current activities in the field of optical networks and with trends in development of new technology and measurements methods in Croatia. Presentations and lectures was given by the Croatian leading companies in optical technologies. The workshop provided an opportunity for students to establish relationship and cooperation with Croatian Companies.

## Patents

Members of our department had two international patents related to new types of optical sources for future optical access networks approved:

- "Modulation averaging reflectors", Tin Komljenović, Dubravko Babić, US pat # 8,970,945 (2015);
- "Temperature-stable incoherent light source", Dubravko Babić US pat # 8,902,425 (2014).

### IWSSIP 2014

The 21<sup>st</sup> International Conference on Systems, Signals and Image Processing was held in Dubrovnik, 12-15 May 2014.

In 2014, the staff of Department of Wireless Communications organized the Conference and prepared the proceedings. The programme included three keynote talks presented by eminent experts in the field and presentations of 65 peer reviewed contributed papers, written by authors from 34 countries. Several special sessions were organized during the Conference.

## Postdoc Research

### Dr. Tin Komljenović at University of California, Santa Barbara

Our researcher Dr. Tin Komljenović received the NEWFELPRO two-year grant for postdoctoral research at the University of California, Santa Barbara.

He works on a project Hybrid Silicon Photonics for Next-generation Optical Access with Prof. John E. Bowers, Fred Kavli Chair in Nanotechnology and Professor in the Department of Electrical and Computer Engineering and Materials at UCSB. Tin's research is in heterogeneous silicon photonics integration.

### Dr. Davor Zaluški and Dr. Dario Bojanjac at University of Michigan

As a part of the UKF-funded project "Passive and Active Metamaterial Structures for Guiding, Scattering and Radiation of Electromagnetic Energy", Dr. Davor Zaluški and Dr. Dario Bojanjac spent the winter semester 2014/2015 as visiting researchers at University of Michigan, Ann Arbor, USA.

During their stay in Ann Arbor, they worked on experimental demonstration of recently proposed DB metasurface and on analysis method of curved metasurfaces. Apart from usual and expected house-working-working routine, Ann Arbor proved to be an excellent place to live and have fun, except during the winter, when it is unbelievably cold.

### Dr. Jelena Božek at University of Oxford

Dr. Jelena Božek worked as a postdoctoral researcher from 2013 to 2015 on the project "Developing Human Connectome Project" (dHCP) at the Centre for Functional Magnetic Resonance Imaging of the Brain (FMRIB), University of Oxford, Nuffield Department of Clinical Neurosciences, John Radcliffe Hospital, Oxford, UK.



# Department of Electroacoustics

Founded in 1954

**Prof. Ivan Đurek**  
Head of Department

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**Professors**

Hrvoje Domitrović - audio technique, sound reinforcement, acoustical designing, sound recording and editing, broadcasting systems, audio in multimedia

Bojan Ivančević - electroacoustics, psychoacoustics, digital audiotechnology, hydroacoustics, architectural acoustics

**Associate Professors**

Ivan Đurek - audio signal processing  
Siniša Fajt - electroacoustics, digital sound processing, speech and hearing, acoustical measurements, architectural acoustics, professional audio technique

Kristijan Jambrošić - architectural acoustics, psychoacoustics

**Assistant Professors**

Antonio Petošić - electromechanical characterization of ultrasound systems used in medicine and industry, nonlinear time series analysis, numerical modelling in acoustics

**Retired Professors**

Ivan Jelenčić - electroacoustics, radio-communications-receivers

Mladen Maletić

Branko Somek - acoustics, electroacoustics, audiotechnics

Momir Vujnović

**Senior Assistants**

Sanja Grubeša

Marko Horvat

Miljenko Krhen

Mia Suhanek

**Assistants**

Karlo Filipan

**Associate**

Ivan Vican

**Technical Staff**

Darko Gašparović

**Administrative Staff**

Ljubica Konjević



1 - Ivan Đurek, 2 - Antonio Petošić, 3 - Marko Horvat, 4 - Hrvoje Domitrović, 5 - Miljenko Krhen, 6 - Kristijan Jambrošić, 7 - Darko Gašparović, 8 - Ljubica Konjević, 9 - Bojan Ivančević

**Department's 60<sup>th</sup> Anniversary**

60<sup>th</sup> Anniversary of the Department was celebrated on 1 October 2014, together with the 100<sup>th</sup> birthday of Prof. Tihomil Jelaković, founder of the Department. Celebration was attended by numerous dignitaries, among others, Rector of the University of Zagreb Prof. Damir Boras, Dean of FER Prof. Mislav Grgić with his Vice Deans (all of them on their first working day in the new capacity), former Dean of FER Prof. Nedjeljko Perić, Vice Rector of newly established University North Prof. d. h. c. Vladimir Šimović, Member of Croatian Academy of Arts and Science, Prof. Emer. Leo Budin, Mr. Duško Zimonja, director of technology at Croatian Radio and Television with his associates and many others.



*Prof. Siniša Fajt, Prof. Ivan Đurek, Head of Department, Prof. Kristijan Jambrošić and Prof. Branko Somek (sitting) during the ceremony*

During the celebration, speeches were held by Prof. Branko Somek and Prof. Ivan Jelenčić, and guests were greeted by Rector Boras and Dean Grgić.

**Prof. Domitrović and Prof. Jambrošić in Erasmus Staff Mobility Programme**

Prof. Kristijan Jambrošić and Prof. Hrvoje Domitrović participated in the Erasmus Programme for Staff Mobility. They held a course in acoustics with 40 teaching hours focusing on psychoacoustics at the Hochschule für Musik Detmold, Germany, at the Erich-Thienhaus-Institute led by Prof. Malte Kob.

The course was offered to bachelor students in German, and additionally for master students in English. The visit was also aimed at strengthening the contacts between this institution and FER, as both institutions have similar curriculum in the field of acoustics and audio engineering as part of their teaching programmes.

**6<sup>th</sup> Congress of the Alps Adria Acoustics Association**

The 6<sup>th</sup> Congress of the Alps Adria Acoustics Association was held in Graz, Austria on 16-17 October 2014.

The Congress was aiming at bringing together scientists from Austria, Slovenia and Croatia, as well as from other south-eastern European countries, so that mutual cooperation among the national societies could be improved for the benefit of the whole region.

In the course of three days, national and international experts presented a number of papers on the activities that they have undertaken in all fields of acoustics related to the Alpine-Adriatic Regional Cooperation Community. Several members of the Department of Electroacoustics took part in the Scientific Committee and actively participated in this major congress.





# Department of Control and Computer Engineering

Founded in 1954

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**Professors**

- Željko Ban - modelling and simulation, intelligent and model reference adaptive control, optimization of control algorithm parameters, control of the fuel cell and photo voltaic based energy sources, alarm systems
- Danko Basch - programming language design, modelling and simulation of computer architectures, hardware description languages
- Stjepan Bogdan - discrete event systems, flexible manufacturing automation, intelligent control, supervisory control, multi-agent formation control, Unmanned Aerial Vehicles
- Mario Kovač - computer architectures, multimedia algorithms and architectures, large scale information systems, medical information systems, smart card applications
- Zdenko Kovačić - intelligent and adaptive control, industrial and mobile robotics, artificial intelligence based control, electrical drives and servo systems, virtual reality-based systems
- Nedjeljko Perić - estimation and system identification, advanced control strategies, plant and process automation, servo drives and servo systems, control of renewable energy sources, smart cities
- Ivan Petrović - advanced control, optimal estimation, autonomous mobile robots, networked robotic systems, intelligent space
- Zoran Vukić - adaptive and robust control, fault tolerant and intelligent control, non-linear and stochastic control, guidance and control of marine vehicles
- Mario Žagar - microcomputer architectures, real-time microcomputer systems, distributed computing (ubiquitous, pervasive) and distributed measurements/control, design automation, open computing, e-learning

**Associate Professors**

- Mato Baotić - mathematical programming, hybrid systems, optimal control, model predictive control, smart cities
- Hrvoje Mlinarić - computer architectures, embedded system design, programmable logic, system on chip
- Mario Vašak - predictive control, renewable energy systems control, energy-efficient buildings control, energy management systems

**Assistant Professors**

- Igor Čavrak - distributed intelligent systems, pervasive computing, software engineering
- Josip Knezović - computer architecture, high-level compilation for embedded systems, multimedia processing, homo- and heterogeneous parallel computers
- Nikola Mišković - nonlinear control systems, guidance, navigation and control of marine vehicles, marine systems and technologies

**Retired Professors**

- Ljubomir Kuljača - Nonlinear control, ship automation, application of control theory to marine vessels
- Gabro Smiljanić - computer architectures, real-time microcomputer systems, modelling and simulation

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## 60 Years of Department of Control and Computer Engineering

In 2014 Department of Control and Computer Engineering celebrated its 60<sup>th</sup> anniversary.

It was founded in 1954 at the University of Zagreb, College of Engineering. The first head of the department was distinguished and renowned Prof. Vladimir Muljević (1913-2007), who is also recognized as the Department founder.

Since then, the Department has been the place of study and research for numerous undergraduate and doctoral students, researchers, industrial partners and academics, growing to be one of the largest departments at today's Faculty of Electrical Engineering and Computing.

It has also been recognized worldwide as the partner to the renowned and most prestigious education and research institution worldwide.

## Our Department has the Most Research Projects at FER

Currently there are 20 ongoing research projects at the Department of Control and Computer Engineering, which makes more than 20 % of all research projects at FER.

The list of ongoing projects includes:

- two H2020 projects
- six FP7 projects
- one ERDF project
- two projects by the Croatian Science Foundation
- two COST projects
- two bilateral projects
- and 5 projects from other international funding programmes.

There are also numerous R&D projects carried out with industry partners from Croatia and abroad.

Project leaders at FER are Prof. Zoran Vukić, Prof. Zdenko Kovačić, Prof. Ivan Petrović, Prof. Mario Kovač, Prof. Stjepan Bogdan, Assoc. Prof. Mato Baotić, Prof. Mario Vašak, and Assist. Prof. Nikola Mišković.

## Awards at the Department

Prof. Nedjeljko Perić was awarded with the "Nikola Tesla" award by IEEE Croatia Section for his contributions in the area of control engineering and advanced control methods for renewable energy sources.

Prof. Ivan Petrović was awarded by the Faculty of Electrical Engineering and Computing in 2013 with "Josip Lončar" Golden Plaque for scientific achievements and international cooperation.

The University of Zagreb awarded Prof. Zdenko Kovačić with "Fran Bošnjaković" award in 2013 for scientific and educational excellence.

Assoc. Prof. Mario Vašak has been awarded with the "Nikola Tesla" international award in 2015 for young scientists under 35 years of age from the area of Western Balkans by the Petrović Njegoš Foundation and the MED 21 programme.

Croatian Academy of Technical Sciences awarded Assist. Prof. Nikola Mišković in 2014 with the "Vera Johanides" award for young scientist in 2013 for an extremely successful scientific activities in the last five years in the area of technical sciences and a specially significant achievement in competing for European and national research projects in the area of robotics.

Dr. Ivan Marković was awarded by Faculty of Electrical Engineering and Computing with "Josip Lončar" Silver Plaque for an especially successful doctoral dissertation and research activities.

Students Marko Car and Antun Ivanović, mentored by Prof. Stjepan Bogdan, with their work titled "Augmented User-Interface for Control of Flying Robot Manipulator", and Anja Babić and Nikola Jagodin, mentored by Prof. Zdenko Kovačić, with their work "The NAO humanoid robot in social interaction: system elements demonstrated on a game of hide and seek" received the Rector's Award for the best student work in 2013/2014.

Students Luka Fuček, Antun Vukičević and Josip Vukičević, mentored by Prof. Stjepan Bogdan, with their work "Development of hexapod for research and education", and Damir Mirković, mentored by Prof. Zdenko Kovačić, with his work "Development and Implementation of a Multi-robot System for a New Robot Laboratory" received the Rector's Award for the best student work in 2014/2015.

In the last 15 years 32 students from the Department of Control and Computer Engineering received Rector's Award, which is a remarkable and admirable achievement.



### “Distributed Software Development” Course Wins e-Learning Award

European University Information Systems organisation (EUNIS) awarded “EUNIS Dorup e-Learning Award 2014” to the “Distributed Software Development” course, for the outstanding and innovative application of information technology (IT) in an educational setting.

The course is a joint software engineering course held among FER, Mälardalen University (Västerås, Sweden) and Politecnico di Milano (Milano, Italy).

The winner announcement was held during EUNIS 2014 conference, in the city of Umea, in northern Sweden.



*Dr. Ivana Bosnić at the EUNIS 2014 Dørup e-Learning Award ceremony*



### “Breaking the Surface” Workshop

“Breaking the Surface” workshop was organized by Laboratory for Underwater Systems and Technologies (LABUST) 7<sup>th</sup> year in a row.

It serves as a meeting place of experts and students of marine control engineering and signal processing and the marine robotics application areas in various types of ocean science. It is the world’s first successful, multi-year field training programme

that combines academic topics in marine robotics and robotics application areas and hands-on working experience in the sea, doing remote sensing and sampling for various ocean sciences.

The General Chair of the workshop was Prof. Zoran Vukić, while the Programme Chair is Assist. Prof. Nikola Mišković.

### LABUST Successful in Attracting New Projects

Laboratory for underwater systems and technologies (LABUST) was established with the goals of research and development of of underwater systems and technologies, education in the domain of navigation, guidance and control of unmanned marine vessels (surface and underwater) and interdisciplinary and multidisciplinary cooperation for the purpose of underwater systems and technologies promotion of high technology in sustainable development and exploitation of the sea, sub-sea, rivers, lakes, technical waters, water reservoirs as well as in maritime security.

In the last 2 academic years, Office of Naval Research Global funded 3 research projects, executed by LABUST researchers, headed by Assist. Prof. Nikola Mišković:

- “DINARO - Diver navigation using range-only measurements from an autonomous surface vehicle” deals with an exciting research problem of using single range measurements for underwater navigation;
- “SPATEL - Spatial Auditory Human-Machine Interface for UxV Teleoperation” investigates innovative uses of auditory interfaces in remote control of marine vehicles. Both projects are coordinated by FER;
- “SeaJumper - Bio-inspired Synchronous Jumping Marine Sensor Networks” is a joint effort with Imperial College London, with the main goal to develop novel distributed, low-energy, marine sensors inspired by jumping aquatic animals such as the flying squid.





# Department of Applied Computing

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 Krešimir Fertalj - information systems, software engineering, project management  
 Damir Kalpić - information systems, operational research  
 Vedran Mornar - information systems, programming paradigms, e-learning

**Associate Professors**

Gordan Gledec - internet and web technologies, natural language processing, human factors in computing  
 Nikica Hlupić - system identification and optimization, algorithm design  
 Boris Vrdoljak - database systems, e-business technology

**Assistant Professors**

Ivica Botički - technology enhanced learning, mobile learning, information systems  
 Ljiljana Brkić - databases, information systems, business intelligence  
 Mirjana Domazet-Lošo - bioinformatics and computational biology  
 Igor Mekterović - databases, information systems, business intelligence  
 Boris Milašinović - information systems, software engineering  
 Slaven Zakošek - database systems

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## The Department that Emerged from Projects

The Department was formed in 2005 from the Computer science group, initially established at the Department of Applied Mathematics. This group was started in late 1960s, at the time when the first general purpose computer was acquired and an introductory course of programming established.

From its beginning the group, which grew from 2 to 4 members in 2 years, was open to cooperation with all kinds of users with computing requirements. By financing the additional staff from projects, the group gradually grew, approaching 30 members. In parallel, the requirements for education in programming languages, techniques and methods were also augmenting.

Consequently, the number of group members who turned educators was increasing, and all the members were encouraged to participate in educational activities, regardless of their formal status. It was useful to level the teaching load, which resulted in the knowledge being improved by lecturing and real-world experience being interesting to students.

### Research Activities

Scientific and research activities at the department are primarily triggered by real-world needs for development of non-standard, new or challenging software solutions. In this way, and by following the market requirements, we were educating students who have been in high demand not only abroad, what may prevail when the so called scientific excellence is overstressed, but also at the domestic labour market.

In spite of the seemingly too broad spectre of interests and lack of focus, we found our approach to be appropriate for our environment.

Unlike in some orthodox scientific circles, our holistic and multidisciplinary non-standard approach was accepted as support to industry and state administration.

We prefer a paid contract for successfully accomplished research and development project to a positive review of a speculative paper.

We believe that the primary goal of professionals in the technical field is to create added value for their environment, which our country sometimes lacks. Therefore, we are happy by the fact that our alumni are well accepted and in high demand on the labour market.

### Assist. Prof. Botički's Cooperation with Nanyang Technological University and Nan Chiau Primary School in Singapore

Assist. Prof. Ivica Botički has participated in a number of research and development projects in technology enhanced learning and teaching in cooperation with the Nanyang Technological University and Nan Chiau Primary School in Singapore. As part of the SamEx project a platform for mobile learning for use in Singapore schools was developed.

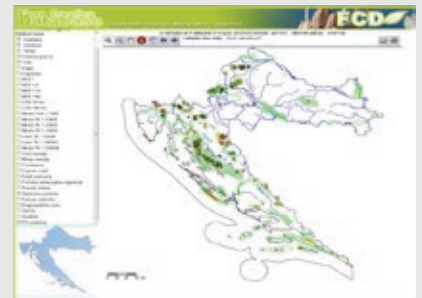


*Assist. Prof. Botički engaging with students as part of the digital lesson design*

Throughout experiments, as well as through cooperation with teachers and researchers, the system design was verified, and several scientific papers in the area of technology enhanced learning were published respectively.

### Areas of Expertise

Our projects have encompassed development of software for numerical and statistical calculations, optimisation of production planning and transportation, support to technical maintenance, to printing houses, medical data processing, civil engineering, natural language processing, exchange of multimedia information, support to university administration and student standard, development of applications for organisational support to state administration and education, data warehousing and decision-making in banking, preservation of plants, animals and endangered species, biomedicine, etc.



In parallel to that we have been offering courses and consulting services like computerisation strategies, ranging from users like land registry, railways, health authorities, forestry, and water management to insurance, banking and yachting. Information security is important and omnipresent nowadays together with other computing activities.



The related postgraduate specialist study programme was established on our initiative.

A part of experience gained through projects is reflecting in the graduate study module Software Engineering and Information Systems.

## National Information System of Applications to Higher Education Institutions

Members of the Department of Applied Computing actively participate in development of the National Information System of Applications to Higher Education Institutions (Croatian acronym NISpVU), National Information System for Online Application and Enrolment in Secondary Schools (Croatian acronym NISpuSŠ), as well as the National Information System of Application to Graduate Studies (Croatian acronym NISpDS).

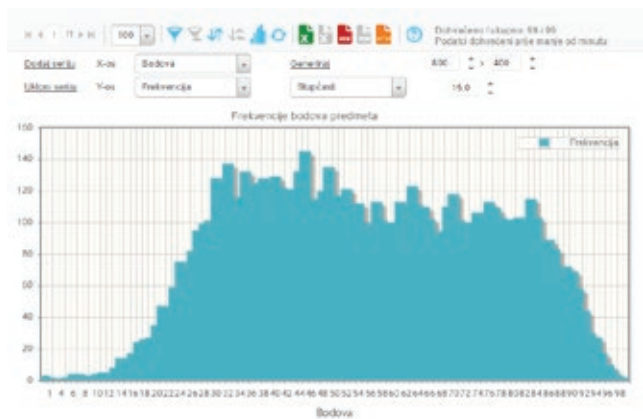
NISpVU was established within the scope of the State graduation exam (In Croatian "Matura") project. This state graduation exam has been performed since 2010, encompassing all the secondary schools and higher education institutions in the Republic of Croatia.

Every year, more than 40,000 candidates from Croatia and abroad take the examinations in 28 different courses, competing for enrolment in some of the higher education institutions in Croatia. In co-operation with the National Centre for External Evaluation of Education, each year more than 200,000 examinations are performed and processed.

NISpuSŠ was established in 2013 and it covers all the elementary and secondary schools in Croatia. Each year more than 50,000 pupils from Croatia and abroad enrol in secondary schools in Croatia through the NISpuSŠ system.

In co-operation with the Agency for Science and Higher Education, a pilot project for NISpDS was successfully completed at the University of Rijeka in 2015. Inclusion of all the higher education institutions in Croatia can be expected in the future.

The image shows two screenshots of the NISpVU application system. The top screenshot is a table listing various courses (Predmet) with columns for 'Zadanih' (Assigned), 'Ostalih' (Others), 'Sveukupno' (Total), and 'Broj bodova' (Number of points). The bottom screenshot shows a detailed view of a course, including the course name, level, and a list of candidates with their scores.



## Using Tablet Computers for Collaborative Learning in Primary Schools

One of the research interests at the Department deals with the use of tablet computers in Croatian primary schools. The research started in September 2014 when researchers, led by the principal investigator Assist. Prof. Ivica Botički started collaboration with the teachers from the Trnjanska Primary School on the innovative digital lessons design primarily aimed at tablet computers.

Since the lessons will be deployed onto tablet computers, the project team uses the term "mobilizing the curriculum" to describe this approach. Examples of such usage include recognizing plants during field trips, learning parts of the world using digital cartography and virtual and augmented reality, etc.

The research was officially approved by the Croatian Science Foundation, as the new project titled SCOLLAM.

The scientific research undertaken within the SCOLLAM project aims to affect the current teaching model used in Croatian primary schools, where the teachers serve as the centre of knowledge, and learners are expected to follow them exclusively.

In today's world of fast digital technology development and wide availability of web, children tend to use a diverse set of devices such as tablets, smartphones and other portable devices, and already possess the skills for exploring a wide array of information. This project leverages students' motivation when using novel technologies and proposes new ways of learning and teaching which are also close to children.

For Croatian scientists this kind of projects presents a possibility of conducting research potentially pro-



ducing results recognizable on the regional, European and international level.

This is especially the case when doctoral students at FER are concerned, but it also affects the students of undergraduate and graduate levels who will be included in various project phases.

The project team also aims at commercializing the research results via cooperation with IT companies and other schools.



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Ankica Turkalj  
Robert Veljković  
Ruža Vukelić  
Miljenko Vukmanić



Aleksandar Petrović

Ivan Čajsa

Marijan Kundih

Kristijan Škuljević

Božo Armelin

Vera Čukelj

Marija Čukelj

Branka Rihtarić

Željko Stojin

Dušan Bušljeta





