Department of Electronic Systems and Information Processing

Faculty of Electrical Engineering and Computing

University of Zagreb, Croatia

Members of the Department, June 2010.

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Message from the Department Chair

The Department of Electronic Systems and Information Processing was founded in 1942. During the past six decades, the Department has quickly developed to become one of the strongest Departments at the Faculty of Electrical Engineering and Computing, University of Zagreb. In the last several years, we have witnessed particularly dynamic growth. Four new faculty members have recently joined the Department and we expect that this expansion will continue in the following years. The faculty members participate in undergraduate, graduate, and postgraduate programs offered by the Faculty of Electrical Engineering and Computing. The Department has initiated creation of two new master degree programs in Electronic and Computer Engineering and in Information Processing. The Department also offers graduate courses for the doctoral degree programs in Electrical Engineering and Computer Science. The students who graduate at the Department obtain advanced engineering degrees that provide them with the state-of-the-art knowledge in the fast-developing areas of electronic and computing technologies. The graduates from our Department have been extremely well received in industry due to their broad theoretical knowledge and practical engineering skills.

In addition to teaching activities, there have been many R&D projects conducted at the Department and funded by national and international research funding agencies and industry partners. The Department is internationally recognized for its research in a number of key areas including analog, digital and mixed signal processing, image processing and analysis, computer vision, biomedical engineering, electronic instrumentation, complex systems, computational biology, and embedded systems. Industry collaboration traditionally has had an important place in Department's profile. New theoretical knowledge from research projects has been applied to real-world applications through extensive collaboration with industry partners.

I invite you to visit the Department in person or via the web at http://www.zesoi.fer.hr. Please contact me or other faculty members of the Department for further information.

With my best wishes,

Sven Lončarić, Ph.D.
Professor and Chair
Department of Electronic Systems and Information Processing

Research Laboratories

Advanced Instrumentation Group (AIG)
Director: Vedran Bilas
Members: Darko Vasić, Vana Jeličić

The Advanced Instrumentation Group research covers low-frequency electromagnetic measurement methods, electronic instrumentation for harsh-environments, smart sensors and sensor networks. AIG aims to development of model-based measurement methods and their implementation from sensors and sensor interfaces to complete electronic measurement systems, including complex data analysis and inverse problems solving. Special interest is devoted to distributed and networked sensor systems. AIG uses high-end measurement equipment, has state-of-the-art simulation tools, design and development tools for digital system design and embedded design (Actel, Microchip, Atmel). Recent applied research projects are in biomedicine, agriculture, oil-well applications, home automation and traffic, while recent research topics include inductive technology for high contrast medium and multimodal wireless sensor networks.

Sample projects:

▪ Intelligent systems for measurement of difficult-to-measure variables, Ministry of Science, Education and Sport, 2007-
▪ Through-Casing Formation Conductivity Measurement, Hotwel, Austria, 2008-2010
▪ Electronic Instrumentation for Harsh Environments, Ministry of Science, Education and Sport, 2005-2007
▪ Research and development of instrumentation for oil-well measurements, Hotwell, Austria, 2004-2009

▪ MasliNET - Development of Wireless Sensor Network System for Agriculture, Siemens d.d., 2007-2010
▪ Wireless Sensor Network of an Intelligent Building, Siemens d.d., 2008
▪ General Purpose Telemetry Platform, Siemens d.d., 2007

Advanced Signal Processing Laboratory (ASPL)
Director: Damir Seršić
Member: Ana Sović

The ASP Laboratory is dedicated to research in the field of advanced digital signal processing and its various applications: denoising, compression, blind source separation, communications, control and bioinformatics. The aim of the laboratory is development of novel digital signal processing algorithms, such as adaptive wavelets, or robust adaptive systems based on the minimum of the L1 norm. Furthermore, the goal of the laboratory is to develop innovative applications that rely on advanced DSP methods. The example is use of supervised and unsupervised learning methods for solving problems in bioinformatics, in video tracking or for object recognition. Several applied research projects

deal with realization of communication systems based on sound waves, or with tracking of the position of a sound source etc.

Sample Projects:

- Development of adaptive wavelets with applications in signal and image denoising, 2010
- Novel robust adaptive systems based on the minimum of the L1 norm, 2010
- Digital communication systems based on sound waves, sound source tracking systems, 2010
- Self-balancing vehicle, 2010
- Moving object tracking systems, Digital Point, d.o.o., 2008
- DIRAC codec analysis, Little Endian, d.o.o., 2008
- Teleconferencing classrooms, CARNet & other partners, 1996-2009

Analog and Mixed Signal Processing Laboratory (AMSPL)
Director: Neven Mijat
Members: Vladimir Naglić, Dražen Jurišić, Igor Lacković, Miro Ranilović

The Analog and Mixed Signal Processing Laboratory is a research facility dedicated to basic research in analog and mixed signal processing. AMSPL aims both to develop the basic theory of analog and mixed signal processing, and to analyze and design the circuitry used in analog and mixed signal processing systems. AMSPL produces novel filter design software and uses the commercial software in the synthesis of electrical filters, amplifiers with different front-ends, precise analog circuits, analog-to-digital converters etc. Simulation software is also available for the analysis and design of electrical filter circuitry. AMSPL provides measurements on the analog and mixed signal process-

ing circuitry using sophisticated measurement equipment (network analizers, oscilloscopes, various software analyzers and simulators).

Sample Projects:

- "Systems for Analog and Mixed Signal Processing", Ministry of Science, Education and Sports, 2007-

Computational Biology Laboratory (CBL)
Director: Mile Šikić

The computational biology group is a research facility dedicated to research in protein interactions and spread of epidemic in complex networks. The first goal of our research is understanding of protein active sites and prediction of unknown active sites using information from protein structure and sequence. In research we use the following methods: protein docking using spherical harmonics, analysis of protein active sites using statistics and signal processing methods and prediction of active sites using machine learning. The second goal is understanding of epidemic spread in complex networks. Since social networks and computer networks have complex network structure, simulations on complex networks can give us a good approximation. Using mathematics and computer simulation we are trying develop models of epidemic spread and find methods for mitigation of global spread. The methods are: location and immunization of key players in networks and quarantine. In both fields we intensively use parallelization (MPI and GPUs).

Sample projects:

- Protein-protein docking using spherical harmonics, 2010

- Prediction of protein interaction sites using Random Forest algorithm, 2009
- Biomodality of epidemic spread in complex networks, 2009

Electronic and Biomedical Instrumentation Group (EBMIG)

Directors: Ratko Magjarević, Stanko Tonković
Members: Igor Lacković, Željka Lučev, Tihomir Marjanović, Saša Mrvoš, Zrinka Potočanac, Siniša Sovilj

Research of the Electronic and Biomedical Instrumentation Group is devoted to biosignal measurement and processing methods, in particular of heart (surface and esophageal ECG) and brain activity; bioimpedance measurement methods and instrumentation including characterization of bioelectrodes; computational modelling of electric and thermal effects in tissue during electroporation-based treatments, minimally invasive medical electronic instrumentation; electrical tissue stimulation in heart therapy; intelligent sensor networks for medical applications. EBMIG aims to develop new non-invasive diagnostic methods, instrumentation and networked sensor systems for physiological parameters monitoring and processing of extracted information in order to build up personalised intelligent mobile health systems for health care support. Our aim is also to develop devices for minimally invasive therapeutic procedures in cancer treatment and muscle stimulation, including pacing. EBMIG integrates electrical and computer engineering concepts and tools for modelling, simulation, development and design of instrumentation and other devices. Measurement equipment used for research and development is shared with the Electronic Measurement and Instrumentation Laboratory of the Department but comprises also equipment purchased for the purpose of carrying out the aims of numerous projects, e.g. the Precision Impedance Analyser Agilent 4294A, Precision RLC Meter HP 4284A or International Safety Analyzer Biotec ISA 601 ProXL. Recent research and applied projects of the EBMIG mainly cover biomedical signals processing, embedded systems and instrumentation.

Sample projects:
- Noninvasive Measurements and Procedures in Biomedicine, Ministry of Science, Education and Sport, 2007-
- Curricula Reformation and Harmonisation in the field of Biomedical Engineering, TEMPUS project
- Numerical Modelling of Electrical and Thermal Effects during Electrochemotherapy and Electrogene Therapy, Croatian – Slovenian Project
- Numerical Modelling of Electric Field Distribution in Electrochemotherapy of Esophagus Malignant Tumors, Croatian – Slovenian Project
- Intelligent Instrumentation for Home Health Monitoring, Croatian – Hungarian Project
- Enabling Technologies for Ambient Assisted Living, SD Informatika d.o.o.
- Determination of Parameters for Prediction of Atrial Fibrillation in Postsurgery Patients from Esophageal and Surface ECG
- Advanced Methods for the Estimation of Human Brain Activity and Connectivity (NEUROMATH), COST Project
- Electrophysiology of Expectatory and Learning process: Processing of Cognitive EXG potentials, Croatian – Macedonian Project
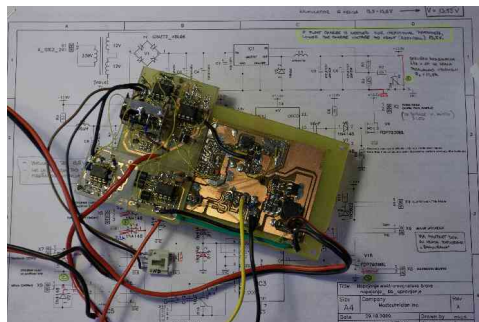
Image Processing Group (IPG)

Director: Sven Lončarić
Members: Marko Subašić, Tomislav Petković, Hrvoje Kalinić, Adam Heđi

Image Processing Group (IPG) conducts research in theory and applications of image processing, pattern recognition and computer vision methods in various areas including biometric security, biomedical imaging, and automo-

tive applications. The main research problems include image feature extraction, image segmentation, image registration, and motion analysis. In the area of biomedical image processing and analysis, we have investigated methods for real-time intravascular catheter tracking from X-ray image sequences and 3-D reconstruction of catheter tip, atlas-based image analysis of cardiac ultrasound Doppler images, nuclear medicine image analysis, CT and MR brain image analysis. In automotive multi-camera systems we developed new real-time methods for non-linear and perspective correction of fisheye lenses and image stitching. In biometric security applications we developed new methods for personal ID image analysis for quality control of passport photographs. We developed a system for tiled multi-projector visualizations on flat or cylindrical surfaces for large panoramic visualizations and simulation of virtual environments. IPG has available various research equipment including industrial GigEVision and Firewire digital video cameras and network IP cameras for multi-view scene analysis such as multi-view face recognition for security applications, intelligent surveillance applications, and complex object tracking problems. A high-performance computing cluster is used for research of complex information processing algorithms. IPG also has equipment for realization of virtual reality and augmented reality systems including active and passive 3-D stereo visualization of virtual environments using LCD shutter glasses, and Ascenscion Flock of Birds position tracking device. Computer-controlled multi-source lighting equipment is available for 3-D object analysis. Members of the group have published more than 120 scientific publications in international journals and conferences. The group has founded and organized a series of biannual international scientific symposia "Image and Signal Processing and Analysis" (www.isispa.org).

Sample projects:

▪ Intelligent methods for image processing and analysis, Ministry of Science, Education and Sports, 2007-
▪ panoVRama: System for tiled vizualization using multiple projectors, Ministry of Science, Education and Sports, 2009-2010

▪ Virtual Physiological Human NoE, EU FP7 Network of Excellence, 2009-
▪ Analysis of photographs for personal ID documents, Siemens PSE, Austria, 2005-2008
▪ Real-time tracking of objects in biomedical X-ray image sequences, Philips Medical Systems, Netherlands, 2005-2010
▪ Methods for real-time geometric correction, perspective correction and video stiching using multiple cameras, Xylon, Croatia, 2008-2010
▪ Medical imaging and image processing, CEEPUS, 1998-2010
▪ Intelligent multidimensional image processing and analysis, Ministry of Science, Education and Sports, 2005-2007
▪ Physiological Modelling of MR Image Formation, COST B21, 2003-2008

Laboratory for Systems and Signals (LSS)
Directors: Branko Jeren, Predrag Pale
Members: Hrvoje Babić, Ivan Dokmanić, Vesna Kezdorf, Zvonko Kostanjčar, Ana Sović, Vlado Torbica, Goran Ličina, Marko Martinjak, Ivica Medved, Stipo Periša, Ivica Vukoja, Goran Živković

Laboratory for Systems and Signals covers computerized measurement and control systems, computer communications, information security, and ICT in education. Over the decades LS&S developed expertise in analog and digital electronics, communications and signal processing, operating systems and software which comprise complex measurement and control systems. Today this includes ambient intelligence (smart houses, workplaces etc.). LS&S was the cradle where the idea for Croatian Internet was born in 1991. Ever since LS&S designed more than 400 LANs, 40 tele- education facilities, dozens of major data centers. LS&S

provides its clients with a range of services: design of networks, tendering documentation, analysis of tenders, technical documentation design, supervision of construction and deployment, documentation of completed or existing infrastructures as well as education for users, managers and designers of computer communication infrastructures. LS&S helped cofound CERT, Croatian national information security (IS) referral centre. LS&S supplies CERT users with daily security advisories, provides three white papers on IS topics monthly, maintains a repository of about 100 free tools for IS. In addition LS&S provides a range of services to its clients: vulnerability and penetration testing, web application testing, forensic analysis, consultancy, security design for information systems, consultancy, project management and education. LS&S actively explores multitude of ways to use ICT in education. This covers both developing tools and content as well as implementing them in University education. LS&S develops web based content (digital textbooks), web based tests, tools for test generation, and video recordings.

Sample projects:

▪ Complex system modeling, Ministry of Science, Education, and Sports, 2007-
▪ Systems and algorithms for signal and image processing, Ministry of Science, Education, and Sports, 2004-2007
▪ Minesweeper guidance system, Naval architecture institute, Zagreb, 1988-1989
▪ 200 channel data acquisition system, Naval architecture institute, Zagreb, 1989-1990
▪ Ultrasound impedance measurement system
▪ Automated Hoax Recognizer Service
▪ Digital Watermark Embedding Tool
▪ Rich content digital textbooks for several undergraduate and graduate courses
▪ Pyramida-Tool for video recording lectures

Sensors and Electronic Instrumentation Group (SEIG)

Director: Mario Cifrek
Members: Zoran Stare, Hrvoje Džapo, Željka Lučev, Tihomir Marjanović, Saša Mrvoš, Zrinka Potočanac, Tomislav Pribanić

Sensors and Electronic Instrumentation Group research aims are focused on multidisciplinary approach to development of novel measurement methods and systems in various fields of industry and biomedicine. Interests cover sensor design and interfacing, signal conditioning and data processing, data acquisition and telemetry, smart sensor networks, ultra low power systems, wireless communication and power transmission, custom electronic instrumentation design and embedded systems. In collaboration with specialists and groups from other fields, such as biomedicine, civil engineering, mechanical and naval engineering etc, we are dedicated to building complete solutions of interdisciplinary problems and proving its validity in practice. Some of our mostly recent research topics include: biomedical signal measurement and analysis (EEG, ECG, EMG etc.); measurement and analysis of earth surface potentials, touch and step voltages in large substation grounding systems; methods and algorithms for improvement of grounding system diagnostics (model-based surface potential interpolation and non-destructive grounding system structure reconstruction by means of inverse imaging); wireless monitoring of mechanical structures condition (strain, torque, vibrations etc.), with particular emphasis on near-field communication and wireless power transmission; ultra-low power radio metering networks in residential environments; precise biomechanical scale for dynamic real-time monitoring of subject's weight distribution. Image processing is also an integral research subject of SEIG. We study the mathematical models that are needed to extract 3-D content from the images and we devise methods, algorithms, and software packages that best implement these models. Our main objectives are camera (self) calibration, 3D structured light scanning, image feature extraction, marker tracking, surface registration. In this respect we research computer vision theory and methods applicable in variety of applications, and in par-

ticular for human motion analysis. For example, we have developed algorithms for 3D kinematic system, aimed for human motion analyses, which includes computation of kinetic and kinematic parameters. Additionally, we have developed several methods for 3D structured light scanning, where we have successfully applied our methods as a part of personal shoe insole design. SEIG integrates electrical and computer engineering concepts and tools for modeling, simulation, development and design of instrumentation and other devices. Measurement equipment used for research and development is shared with the Electronic Measurement and Instrumentation Laboratory of the Department but comprises also equipment purchased for the purpose of carrying out the aims of numerous projects, e.g. the Precision Impedance Analyser Agilent 4294A, Precision RLC Meter HP 4284A, International Safety Analyzer Biotec ISA 601 ProXL, two Point Grey Dragonfly2 firewire cameras and Acer X1260 projector.

Sample projects:

▪ Ultra-low power consumption wireless sensor network, TI-SAN d.o.o., 2009-2010
▪ Measurement system for continuous monitoring of torque and power on rotating shafts in ships, BOBLab d.o.o., 2007-2010
▪ Software package for camera wand calibration, PEHAREC Polyclinic, 2007
▪ Software package for human motion analysis, PEHAREC Polyclinic, 2005
▪ Development of Data Logging System for Continuous Monitoring of Psychophysiological Variables, University of Zadar, 2000
▪ System for measurement and analysis of the earth surface potentials, touch and step voltages in large substation grounding systems, Croatian Measurements Society, 2000-2004
▪ Software package for force platform data acquisition and analysis, PEHAREC Polyclinic, 2003
▪ Vibration measurement on MI-8 MTV helicopter, Ministry of Defense, 2002
▪ Measurement system for wireless monitoring of dynamic strain, Naval architecture institute, Zagreb, 2003-2004
▪ Panther Safety Shoes Measurement Report, PEHAREC Polyclinic, 2001

▪ ALPINA Trekking Shoes Measurement Report, PEHAREC Polyclinic, 2000

Signal Processing and System Design Group (SPSD)
Director: Mladen Vučić
Members: Marko Butorac, Goran Molnar

Signal Processing and System Design Group (SPSD) conducts research in the field of analog and digital signal processing, digital system design and embedded system design. Many graduated students are involved in the group activities. The research covers the design of new algorithms and structures which are used in communication and measuring equipment, together with their implementation on programable logic devices and microcontoller based embedded systems. The members of the SPSD group use various software tools for signal processing and analysis such as MATLAB, Mathematica, Modelsim and PSpice. Furthermore they use development tools for the design of Xilinx programmable devices and ARM based microprocessors and microcontrollers. They have fully equipped laboratory for the development of digital systems based on Xilinx Field Programmable Gate Arrays. The members of the group have published more than 30 scientific publications in international journals and conference proceedings.

Sample projects:

▪ Implementation of Processor Cores on Programable Logic Devices, Ministry of Science, Education and Sport of Croatia and Xylon d.o.o., 2002
▪ Design and Implementation of Efficient Methods for Digital Signal Processing, Ministry of Science, Education and Sport, 2007-

▪ Analog and Digital System Design Based on Optimization Procedures, Ministry of Science, Education and Sport, 2002-2006

Speech and Signal Processing Group (SSPG)
Director: Davor Petrinović
Member: Ivan Dokmanić

The research group focuses on development and application of various signal, speech and audio processing algorithms. The group has a background in speech and audio analysis, synthesis and coding. Areas of current scientific research include: various signal interpolation and resampling algorithms that are suitable for hardware implementation, direct digital synthesis, statistical modeling of multidimensional signals, noncommutative spectral analysis and spectral analysis on manifolds, spherical and hyperspherical harmonics and nonparametric density estimation. These theoretical concepts are investigated for possible applications in efficient signal representation, quantization and coding and for emotional state estimation. The group has also developed various systems for automatic speech recognition and text-to-speech synthesis in Croatian language using popular tools like HTK, Sphinx and Festival/Festvox. The group has also a significant background in DSP processors and real time applications in embedded systems. Based on the recent donation from Analog Devices Inc., we have equipped a DSP laboratory at our Department using the Blacfin537 DSP evaluation boards (21 sets) that are used for research and for student projects. Group is also equipped with professional audio recording equipment, together with a typical home-cinema reproduction setup (4 high quality dynamic microphones, two multichannel mixing consoles, professional A/D and D/A sound cards, A/V recording and playback devices, Hi-fi 6 channel surround system, etc.) that are used for evaluation of speech and audio processing algorithms.

Sample projects:

▪ Speech based control of a two-axis robotic arm in Croatian language, Department of Control and Computer Engineering, FER, 2009
▪ ASR system for automatic entry of exam results that recognizes identification number of a student and his exam scores, FER, 2009
▪ Web-based system for automatic speech announcements of air-traffic events: arrivals and departures at the Airport Zagreb, student project, 2008-2009
▪ Very high accuracy direct digital synthesis of a sine signal using Field Programmable Gate Arrays (FPGA) with 28-bit phase resolution and 32-bit amplitude resolution, based on cubic spline model, Ministry of Science, Education and Sport, 2007-2010
▪ Digital system for adaptive data rate conversion and jitter-buffering using MOMS spline resampler implemented in FPGA, Ministry of Science, Education and Sport, 2007-2010
▪ Complete system for unlimited vocabulary text to speech synthesis for Croatian language using diphone models and Festival tool, Calyx d.o.o., Zagreb, 2010
▪ System for automatic estimation of emotional state of a person from his speech response and from psycho-physiological measurements, Ministry of Science, Education and Sport, 2007-2010

Facilities

Electronic Measurements and Instrumentation Laboratory

Electronic Measurements and Instrumentation Laboratory is equipped with state-of-the-art measurement instrumentation. It is a part of the accredited precision measurement laboratory of the Faculty of Electrical Engineering and Computing. The instrumentation is suitable for measurement, acquisition and analysis of electrical signals and electronic components and materials from DC to high frequencies. The Laboratory is supplemented on a regular basis with additional instrumentation to complement and enhance current measurement and analysis capabilities. Major instrumentation includes: the LeCroy LT 584 digital oscilloscope, Hewlett Packard HP 4195A Network/Spectrum Analyzer, Hewllet Packard HP 3457A Multimeter, Agilent 33250A Function/Arbitrary Waveform Generator, Agilent 53132A Universal Counter, Wavetek 2410 Synthesized Signal Generator, several advanced digital oscilloscopes, Weiss Umwelttechnik 125SB/+10IU/40DU Simulation Chamber and other instruments.

Electro-Mechanical Workshop

The interest of the Department of Electronic Systems and Information Processing is focused on research and development of methods and systems for solution of real-world problems relevant in various areas of human activity. Such areas include applied analog and digital electronic systems, embedded microcomputer systems, advanced measurement systems, biomedical engineering, and hardware and software for signal, image and video processing and analysis. For practical realization of such systems, an important facility available at the Department of Electronic Systems and Information Processing is Electro-mechanical workshop. The electro-mechanical workshop provides an opportunity for students, researchers and permanent stuff to carry out practical experiments related to their student projects and R&D projects. The workshop is used for building electronic and mechanical prototypes of various analog and digital electronic systems. This gives the Department an ability to practically evaluate all developed systems, which is extremely important for real-world industrial applications and collaboration with industry. The electro-mechanical workshop is also used for maintainance, repair and modifications of existing equipment. The workshop is equipped for processing of a wide range of materials including wood, aluminum, brass, iron, and different types of plastic.

Printed Circuit Board Prototyping Facility

Rapid development of various electronic devices requires a facility for in-house production of experimental printed circuit boards (PCB). The Department has at its disposal a PCB production facility, which is available for production of electronic prototypes. PCBs can be produced in a very short time, providing a quick path to experimental validation of developed electronic devices and concepts. Students and research associates regularly use this facility in everyday work.

Academic Staff

Hrvoje Babić
Professor Emeritus

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Education
dipl.ing., University of Zagreb, 1955
dr.sc., University of Zagreb, 1965

Profile
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. In the period from 1955 to 1974 dr. Babić had teaching assignments at University of Zagreb as an adjunct professor. He also had 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. Sedláček solved the problem of beam stabilization. This resulted in a new widely accepted concept for building of race track accelerators of relativistic particles. After transfer to University of Zagreb in 1974 he formed 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 has been cited by other authors (108 times). 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 a vice-rector of 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 University of California Los Angeles and Santa Barbara. Dr. Babić received Nikola Tesla award and Republic of Croatia Lifetime Achievement award. He is Life Fellow of IEEE. Since 1997, dr. Babić has been a regular member of Croatian Academy of Sciences and Arts.

Research Keywoards
analog signal processing, digital signal processing, continuous time systems, discrete time systems.

Sample Publications

Babić H.; Sedláček M. A Method for Stabilization of Particle Orbits in Race Track Microtron. Nicl. Instr. & Methods in Physics Research. 56 (1967), 1; 170-172

Babić, H.; Temes G.C. Optimum Low-Order Windows for Descrete Fourier Transform System. Transactions IEEE on Acoustic Speech and Signal Processing. 24 (1976), 6; 512-517

Mitra, Sanjit K.; Babić, Hrvoje. A note on the partial fraction expansion of rational Z-transform. Electronics letters. 34 (1998), 18; 1726-1726

Vučić, Mladen; Babić, Hrvoje; Čosić, Vladimir; Mijat, Neven. Optimization and Realization of the Digitally Controlled Antialiasing Filter Set. Automatika 33 (1992), 3-6; 135-140

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Associate Professor

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Education
dipl.ing., University of Zagreb, 1991
mr.sc., University of Zagreb, 1995
dr.sc., University of Zagreb, 1999

Profile
Prof. Bilas teaches undergraduate, graduate and post graduate courses in the area of electronic measurement systems and electronic instrumentation, sensor networks, engineering management and entrepreneurship. His research interests are in the field of continuous physiological monitoring, electronic instrumentation, intelligent and networked sensors, applied electromagnetism and signal processing. His recent project and publications are in the induction methods, design of harsh environment electronic systems, intelligent sensors and interfaces, and wireless sensor networks. He has experiences on interdisciplinary and multidisciplinary projects in biomedicine, agriculture, hydrocarbon exploration, home automation and traffic.

Research Keywoards
harsh environment electronics, low-frequency electromagnetic measurements, multimodal wireless sensor networks, low power electronics, energy harvesting

Sample Publications
Vasić, Darko; Bilas, Vedran; Šnajder, Boris. Analytical modelling in low-frequency electromagnetic measurements of steel casing properties. NDT & E International. 40 (2007), 2; 103-111

Vasić, Darko; Bilas, Vedran; Ambruš, Davorin. Validation of a Coil Impedance Model for Simultaneous Measurement of Electromagnetic Properties and Inner Diameter of a Conductive Tube. IEEE transactions on instrumentation and measurement. 55 (2006), 1; 337-342

Ambruš, Davorin; Bilas, Vedran; Vasić, Darko. A digital tachometer for high-temperature telemetry utilizing thermally uprated commercial electronic components. IEEE transactions on instrumentation and measurement. 54 (2005), 4; 1361-1365

Dadić, Martin; Vasić, Darko; Bilas, Vedran. A system identification approach to the modeling of pulsed eddy-current systems. NDT & E international. 38 (2005), 2; 107-111

Vasić, Darko; Bilas, Vedran; Ambruš, Davorin. Pulsed Eddy-Current Nondestructive Testing of Ferromagnetic Tubes. IEEE transactions on instrumentation and measurement. 53 (2004), 4; 1289-1294

Mario Cifrek
Professor and Vice-Dean

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Education
dipl.ing., University of Zagreb, 1987
mr.sc., University of Zagreb, 1992
dr.sc., University of Zagreb, 1997

Profile
Dr. Mario Cifrek joined the Department of Electronic Systems and Information Processing in 1987. At the University of Zagreb, Faculty of Electrical Engineering and Computing he teaches courses Computer Aided Design of Electronic Systems (undergraduate study), Biomedical Signals and Systems, Sensor Technology, Biomedical Informatics, Electronic Equipment Power Supplies, Programming Industrial Embedded Systems (graduate study), and Multisensor Biomonitoring Systems (postgraduate study). He participates in course Measurement and Analysis of Human Locomotion at the Faculty of Medicine with lecture Surface electromyography: measurement technique and signal interpretation. His research interests are electronic measurements, instrumentation and biomedical engineering. His work is focused on

design of biomedical instrumentation and biomedical signal analysis, especially detection and analysis of the myoelectric signals for research and clinical applications. He is a member of IEEE (EMBS, SPS and IMS), CROMBES (Croatian Medical and Biological Engineering Society, affiliated with IFMBE), KoREMA (Croatian Society for Communications, Computing, Electronics, Measurement & Control), HMD (Croatian Metrology Society), and member of the Croatian Academy of Engineering. He was chairman of Technical Committee No 66 (Safety of Measuring, Control and Laboratory Equipment) at the State Office for Standardisation and Metrology from 2000 – 2005.

Research Keywoards

electronic measurement, electronic instrumentation, sensors, biomedical engineering, biomedical signal processing, surface electromyography, evoked potentials, 3D reconstruction

Sample Publications

Cifrek, Mario; Medved, Vladimir; Tonković, Stanko; Ostojić, Saša. Surface EMG based muscle fatigue evaluation in biomechanics. Clinical Biomechanics. 24 (2009), 4; 327-340

Pribanić, Tomislav; Sturm, Peter; Cifrek, Mario. Calibration of 3D kinematic systems using orthogonality constraints. Machine Vision and Applications. 18 (2007), 6; 367-381

Alajbeg, Ž. Iva; Valentić-Peruzović, Melita; Alajbeg, Ivan; Cifrek, Mario. The influence of age and dental status on elevator and depressor muscle activity. Journal of oral rehabilitation. 33 (2006), 94-101

Čelebić, Asja; Valentić Peruzović, Melita; Cifrek, Mario; Vojvodić, Denis; Magjarević, Ratko; Kern, Josipa; Katunarić, Marina. Latency of the inhibitory reflex (silent period) in individuals without input from periodontal receptors. Collegium Antropologicum. suppl. 20 (1996), 2; 67-72

Cifrek, Mario; Tonković, Stanko; Medved, Vladimir. Measurement and analysis of surface myoelectric signals during fatigued cyclic dynamic contractions. Measurement. 27 (2000), 2; 85-92

Hrvoje Džapo
Assistant Professor

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Education

dipl.ing., University of Zagreb, 1999
dr.sc., University of Zagreb, 2007

Profile

He is currently an Assistant Professor with the Department of Electronic Systems and Information Processing, Faculty of Electrical Engineering and Computing, University of Zagreb. He has been lecturing subjects Computer aided design of electronic systems, Electronic equipment design, Transducers in measurement systems, Electronics, and Algorithms and data structures. He was involved in auditory and laboratory exercises for subjects Design and manufacturing of electronic equipment, Electronics I, Fundamentals of electrical engineering I, Digital logic and Signals and systems. He co-mentored 15 students during their final and diploma theses. He has been actively involved in MZOS scientific projects (036026, 0036007, 036-0362979-1554) as a research assistant since 1999. He designed hardware and software for few complex commercial devices and systems (earth surface potentials, touch and step voltage measuring system for large grounding systems with accompanying analysis and visualization software, software for computer spectrography of human voice, portable wireless torsional vibration measurement system with accompanying monitoring and analysis software, standalone measuring instrument for long-term monitoring of torque, power and fuel consumption on large shafts in ships, ultra-low power wireless data collection system for consumption metering etc.). He is a member of IEEE, IFMBE, and IEEE Instrumentation and Measurement Society Croatia Chapter chair since 2009. He received silver plaque "Josip Lončar" for out-

standing doctoral dissertation "Model-Based Measurement with Application to Grounding System Testing" for academic year 2006/2007.

Research Keywoards

electronic instrumentation, embedded systems, smart sensors, sensor networks, computational electromagnetics, inverse problems, nondestructive test and evaluation, grounding systems

Sample Publications

Džapo, Hrvoje; Giannini, Roberto; Tonković, Stanko. Model-Based Reconstruction of the Grounding System Surface Potential Distribution by Means of Monte Carlo Markov Chain Simulation. Electromagnetics. 29 (2009), 8; 586-604

Džapo, Hrvoje; Stare, Zoran; Bobanac, Nenad. Digital Measuring System for Monitoring Motor Shaft Parameters on Ships 2008 IEEE International Instrumentation and Measurement Technology Conference Proceedings, Piscataway : IEEE, 2008. 2079-2084

Džapo, Hrvoje; Giannini, Roberto; Tonković, Stanko. Reconstruction of the Earth Surface Potential Distribution using Radial Basis Functions, Proceedings of the 15th IMEKO TC4 International Symposium on Novelties in Electrical Measurements and Instrumentations, Iasi, Rumunjska: CERMI Publishing House, 2007. 11-16

Džapo, Hrvoje; Giannini, Roberto. Program Support for Earth Surface Potentials Measuring System MEASUREMENT 2003, Proceedings of 4th International Conference on Measurement, Bratislava : Institute of Measurement Science of the Slovak Academy od Sciences, 2003. 364-367

Giannini, Roberto; Džapo, Hrvoje. Embedded Device Concept for Earth Surface Potentials Measurements of a Grounding System, 12th IMEKO TC4 International Symposium, Electrical Measurements and Instrumentation, Zagreb, Croatia: Croatian Metrology Society, 25-27 September 2002, 122-126

Dražen Jurišić
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Education

dipl.ing., University of Zagreb, 1990
mr.sc., University of Zagreb, 1995
dr.sc., University of Zagreb, 2002

Profile

Dražen Jurišić finished mathematics and informatics as a secondary education. He earned the Bachelor's degree in Electrical Engineering at the University of Zagreb in Croatia in May 1990; the thesis was "Active RC-filter with band-pass characteristic". At the Department of Electronic Systems and Information Processing he earned the Master's degree in October 1995, the thesis was "Fault analysis of analog networks using fault dictionary". He earned the PhD degree in April 2002, the thesis was "Active-RC filter design using impedance tapering". He was rewarded with the Silver plaque "Josip Lončar" for a very successful doctoral thesis. From July 1997 until March 1999 he was with Swiss Federal Institute of Technology (ETH) Zürich, Switzerland, as holder of Swiss Federal Scholarship for Foreign Students (ESKAS). He is participating at the research project "Systems for Analog and Mixed Signal Processing" no. 036-0362214-2316, supported by Ministry of Science, Technology and Sports, Republic of Croatia with principal investigator Prof. dr. sc. Neven Mijat. In 2006 he was elected as Assistant Professor. His teaching duties included participation in undergraduate courses on Electrical Circuits, Signals and Systems and graduate course Analog and Mixed Signal processing. He is also teaching the postgraduate course Electrical Filters in Power Systems. He was co-author of the script Laboratory exercises in the courses of Electrical circuits and Analog and Mixed Signal processing. His current research interests in the field of analog signal processing and filter design includes research of low-sensitivity, low-

noise, and low-power active-RC filters. He is a member of KoREMA and IEEE-CAS society. He speaks English and German.

Research Keywoards

analog electrical circuits, active-RC filters, sensitivity analysis, fault analysis, noise analysis, approximation theory, control and system theory

Sample Publications

Jurišić, Dražen; Moschytz, George S.; Mijat, Neven. Tuning Elliptic Filters with a 'Tuning Biquad' Proceedings of 2009 IEEE International Symposium on Circuits and Systems, ISCAS 2009 Taipei, Taiwan : IEEE, 2009. 45-48

Jurišić, Dražen; Mijat, Neven; Moschytz, George S. Low-Sensitivity, Single-Amplifier, Active-RC Allpole Filters Using Tables. Automatika. 49 (2008), 3-4; 159-173

Jurišić, Dražen; Mijat, Neven; Moschytz, George S. Optimal Design of Low-Sensitivity, Low-Power 2nd-Order BP Filter Proceedings of the IEEE International Conference on Signals and Electronics Systems ICSES 2008 Krakow : AGH University of Science and Technology, 2008. 375-378

Jurišić, Dražen; Mijat, Neven; Mihalić, Ivica. General Purpose Biquads Optimized for Dynamic Range and Low Noise Proceedings of The 13th IEEE Mediterranean Electrotechnical Conference, Melecon 2006 Málaga : IEEE, 2006. 31-34

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Education

dipl.ing., University of Zagreb, 1973
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dr.sc., University of Zagreb, 1984

Profile

Dr. Branko Jeren, Full Professor of the University of Zagreb, tenure position. He served as: Assistant post-graduate - Ruđer Bošković Institute, Zagreb (1973-75); Expert associate - Institute for Research and Development in Electrical Generation and Supply (1975-76); Lecturer and Professor - University of Zagreb, Faculty of Electrical Engineering and Computing (since 1976); Vice Minister of Science (1991-93) and Minister of Science and Technology in the government of Republic of Croatia (1993-95); Science and Technology Adviser to the President of Croatia (1995-98); Elected Rector of the University of Zagreb (1998-2002). He was DAAD scholar, University of Erlangen, W. Germany, scholarship in academic year 1980/81; Senior Visiting Researcher, University of California, Santa Barbara, USA 1987-89; Visiting Researcher, University of Sheffield, England, 1990 (two months). He was recipient of Federal Award "Dr. Vratislav Bedjanič" for Masters Thesis, Ljubljana 1978; Silver plaque "Josip Lončar" for Dr. Sc. Thesis, Zagreb 1986; Fulbright scholarship for five months at University of California Santa Barbara (1987); Annual State Award for Science (1997); Honorary Doctorate Award (Honoris Causa) – University of Mostar 2007.

Research Keywoards

analog signal processing, digital signal processing, digital system design, digital filtering algorithms, multiprocessor systems, information security, e-learning.

Sample Publications

Pižeta, Ivanka; Jeren, Branko; Aleksić-Maslać, Karmela. Straight-Lines, Windows and Background Current Synthesis in Deconvolution Procedure. Journal of Electroanalytical Chemistry. 375 (1994), 169-174

Sung, Wonyong; Mitra, Sanjit K.; Jeren, Branko. Multiprocessor Implementation of Digital Filtering Algorithms Using a Parallel Block Processing Method. IEEE Transactions on Parallel and Distributed Systems. 3 (1992), 1; 110-120

Kostanjčar, Zvonko : Jeren, Branko : Cerovec, Jurica. Particle Filters in Decision Making Problems under Uncertainty. Automatika : časopis za automatiku, mjerenje, elektroniku, računarstvo i komunikacije. 50 (2009), 3-4; 245-251

Mihel, Josip; Šikić, Mile; Tomić, Sanja; Jeren Branko; Vlahoviček, Kristian. PSAIA - Protein Structure and Interaction Analyzer. Bmc structural biology. 8 (2008)

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Education
dipl.ing., University of Zagreb, 1996
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dr.sc., University of Zagreb, 2004

Profile
Dr. Lacković's main research interests are in the field of biomedical engineering with a special focus on electric field interaction with biological tissue including numerical modeling of electric and thermal field distribution for electroporation-based drug and gene delivery, bioimpedance and related instrumentation development. Dr Lacković is author of more than 35 scientific papers published in journals and conference proceedings. He participated in four scientific projects financed by the Ministry of Science, Education and Sports of the Republic of Croatia and in a number of bilateral international project and international projects of the European Commission. He serves as a reviewer for international journals (IEEE Transactions on Biomedical Engineering, Medical & Biological Engineering & Computing, Journal of Neuro-Engineering and Rehabilitation, etc.). He also acted as evaluator and reviewer of research project proposals for Croatian and international research agencies, and also for the European Commission's FP7. He is a member of the IEEE, IEEE Engineering in Medicine and Biology Society, IFMBE and Croatian Society for Medical and Biological Engineering. Dr Lacković received silver medals "Josip Lončar" from the Faculty of Electrical Engineering and Computing, University of Zagreb for outstanding master and doctoral theses, and "Vera Johanides" award from the Croatian Academy of Engineering for scientific achievements in 1999, 2004 and 2005, respectively. He also received an individual research grant from the Government of the Republic of Slovenia in 2003. He teaches four courses at the University of Zagreb: Electric Circuits, Analog and Mixed Signal Processing, Biomedical Signals and Systems and Medical Instrumentation for 2-D Imaging. He served as adjunct professor at the University of Ljubljana for the post-graduate course Electroporation-based technologies and treatments (2003-2005).

Research Keywoards
biomedical engineering, biomedical instrumentation, biosignal processing, computational modelling, finite-element method, bioimpedance, bioimpedance spectroscopy, dielectric properties of biological materials, bioelectromagnetics, electroporation, electropermeabilization

Sample Publications
Lacković, Igor; Magjarević, Ratko; Miklavčič, Damijan. Three-dimensional Finite-element Analysis of Joule Heating in Electrochemotherapy and in vivo Gene Electrotransfer. IEEE Transactions on Dielectrics and Electrical Insulation. 16 (2009), 5; 1338-1347

Lacković, Igor; Magjarević, Ratko; Miklavčič, Damijan. Influence of anisotropic tissue electrical conductivity on electric field and temperature distribution during electroporation-based therapy IFMBE Proceeding vol. 25/XIII, Berlin : Springer, 2009. 210-213

Lacković, Igor; Stare, Zoran. Low-frequency dielectric properties of the oral mucosa 13th International Conference on Electrical Bioimpedance and 8th Conference on Electrical Impedance Tomography 2007 : ICEBI 2007 ; IFMBE Proceedings ; Vol. 17, Berlin ; Heidelberg ; New York : Springer, 2007. 154-157

Lacković, Igor; Magjarević, Ratko. Analysis of Current Density Distribution during Trans-esophageal Pacing Using the Finite-Element Model. World Congress on Medical Physics and Biomedical Engineering 2006 : Imaging the Future Medicine ; Book Series IFMBE Proceedings ; Vol. 14, Heidelberg : Springer, 2007. 2673-2676

Lacković, Igor; Bilas, Vedran; Šantić, Ante; Nikolić, Vasilije. Measurement of gait parameters from free moving subjects. Measurement. 27 (2000), 2; 121-131

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Education
dipl.ing., University of Zagreb, 1985
mr.sc., University of Zagreb, 1989
Ph.D., University of Cincinnati, USA, 1994

Profile
Dr. Lončarić is the Chair of the Department of Electronic Systems and Information Processing. He has been involved in active research in the area of image processing and computer vision since 1990. Dr. Lončarić is the Head of the Image Processing Group, which is active in research in theory and applications of image processing and computer vision in various areas including biomedicine, biometric security, industrial, and automotive applications. He was a Fulbright scholar and earned his doctoral degree from University of Cincinnati, USA in 1994. He was an Assistant Professor of Electrical and Computer Engineering at New Jersey Institute of Technology, Newark, NJ, USA from 2001-2003, where he was Director of Visual Image Processing Laboratory. Dr. Lončarić has published more than 130 papers in scientific peer-reviewed journals and at international conferences. He has taught courses at the University of Zagreb, Faculty of Electrical Engineering and Computing, where he introduced new undergraduate and graduate courses on Digital Image Processing, Digital Image Analysis, and Artificial Neural Networks. He teaches courses on image understanding and neural networks for interdisciplinary doctoral programs "Language and Cognitive Neurosciences" and for the doctoral program "Neuroscience" at the Faculty of Medicine. At New Jersey Institute of Technology, he taught Microprocessor Laboratory course and created a new course in Digital Image Processing. Dr. Lončarić is Editor-in-Chief of the Journal of Computing and Information Technology and as an Associate Editor of EURASIP Journal of Image and Video Processing. He was the IEEE Croatia Section Chair from 2005-2008. He is a senior member of IEEE and a member of the Croatian Academy of Engineering. Dr. Lončarić founded the series of international research symposia "Int'l Symposium on Image and Signal Processing and Analysis".

Research Keywoards
image processing, video processing, image analysis, medical imaging, biomedical image analysis, pattern recognition, computer vision, visual inspection, motion analysis, neural networks, virtual reality, 3D visualization

Sample Publications
Orlić, Nikša; Lončarić, Sven. Earthquake—explosion discrimination using genetic algorithm-based boosting approach. Computers & geosciences. 36 (2010), 2; 179-185

Subašić, Marko; Lončarić, Sven; Birchbauer, Josef. Expert System Segmentation of Face Images. Expert Systems With Applications. 36 (2009), 3 (Part 1); 4497-4507

Salamunićcar, Goran; Lončarić, Sven. Open framework for objective evaluation of crater detection algorithms with first test-field subsystem based on MOLA data. Advances in Space Research. 42 (2008), 1; 6-19

Bolanča, Tomislav; Cerjan-Stefanović, Štefica; Regelja, Melita; Regelja, Hrvoje; Lončarić, Sven. Development of an inorganic cations retention model in ion chromatography by means of artificial neural networks with different two phase training algorithms. Journal of chromatography. 1085 (2005.), 74-85

Subašić, Marko; Lončarić, Sven; Sorantin, Erich. Model-based quantitative AAA image analysis using a priori knowledge. Computer Methods and Programs in Biomedicine. 80 (2005), 2; 103-114

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Education
dipl.ing., University of Zagreb, 1982
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dr.sc., University of Zagreb, 1994

Profile
Dr. Magjarević is a professor of Electronic Instrumentation and Biomedical Engineering at the Department for Electronic Systems and Information Processing, Faculty of Electrical Engineering and Computing, University of Zagreb. He has lectured at several universities in Croatia and in Europe. Dr. Magjarević successfully led national and international bilateral scientific projects. He is currently leading projects in electronic measurement and instrumentation as well as in bioimpedance measurements, therapeutic applications, pacing and electrical stimulation. He is currently project leader of the Croatian partner of the project: TEMPUS IV CRH-BME "Curricula Reformation and Harmonisation in the field of Biomedical Engineering". Dr. Magjarević served two terms as Secretary General of the International Federation for Medical and Biological Engineering, 2003-2006 and 2006-2009. In 2009 he was elected IFMBE President Elect and in 2012 he will take over the presidency. He organized several international conferences in the field of electrical engineering and biomedical engineering in Croatia and actively cooperated on the organization of major IFMBE scientific conferences, as well as served in scientific and awards committees. Dr. Magjarević has been keynote and invited speaker at a number of international conferences. He has published a number of papers in journals and conference proceedings, book chapters, text books and other publications. Since 2003 he has been editor of the Federation's electronic newsletter-IFMBE News and since 2006 co-editor of the IFMBE Proceedings Series. Dr. Magjarević received Silver Plaque Josip Lončar for his master thesis and dissertation, respectively.

Research Keywoards
biomedical engineering, m-health networks, biomedical instrumentation, biomedical signal processing

Sample Publications
Pavlin, Mojca; Kandušer, Maša; Reberšek, Matej; Pucihar, Gorazd; Hart, X. Francis; Magjarević, Ratko; Miklavčič, Damijan. Effect of cell electroporation on the conductivity of a cell suspension. Biophysical Journal. 88 (2005), 6; 4378-4390.

Magjarević, Ratko; Ferek-Petrić, Božidar. Implantable Cardiac Pacemakers – 50 Years from the First Implantation. Zdravniški Vestnik. 79 (2010), 55-67.

Lacković, Igor; Magjarević, Ratko; Miklavčič, Damijan. Three-dimensional Finite-element Analysis of Joule Heating in Electrochemotherapy and in vivo Gene Electrotransfer. IEEE Transactions on Dielectrics and Electrical Insulation. 16 (2009), 5; 1338-1347.

Sovilj, Siniša; Van Oosterom, Adriaan; Rajsman, Gordana; Magjarević, Ratko. ECG Based Prediction of Atrial Fibrillation Development Following Coronary Artery Bypass Grafting. Physiological measurement. 31 (2010), 663-677

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Education

dipl.ing., University of Zagreb, 1970
mr.sc., University of Zagreb, 1974
dr.sc., University of Zagreb, 1984

Profile

Dr. Mijat is a full professor in the Networks, Systems and Signals group at the Department of Electronic Systems and Information Processing, Faculty of Electrical Engineering and Computing He teaches the undergraduate courses: "Electrical Circuits" and "Analog and Mixed Signal Processing", and the postgraduate courses: " Electrical filters - selected topics", and " Electrical filters in Power systems". Dr. Mijat is mainly active in the fields of system and network theory and signal processing. His current research interests include data acquisition systems, filter theory and realization methods. He is an author or co-author of nearly 90 papers, or conference papers, and 51 professional and development projects. Dr. Mijat was also leading an important number of R&D projects. He was a principal investigator for several scientific projects and development projects for companies. He is member of IEEE, CROMBES, Ko-REMA and other professional societies. He received the "Josip Lončar" silver plaques for his M. Sc. thesis and for Ph. D. thesis in 1974 and 1984 respectively.

Research Keywoards

system theory, network theory, analog signal processing, mixed signal processing, data acquisition systems, filter theory, filter realization methods.

Sample Publications

Mijat, Neven; Moschytz, George. Sensitivity Limitations of some FLF-Type Active Filters. International Journal of Circuit Theory and Applications. 14 (1986), 2; 153-161

Mijat, Neven; Moschytz, George. Multiple-Critical-Pole Coupled Active Filters. International Journal of Circuit Theory and Applications. 12 (1984), 3; 240-268

Jurišić, Dražen; Mijat, Neven; Moschytz, George S., Low-Sensitivity, Single-Amplifier, Active-RC Allpole Filters Using Tables. Automatika, 49 (2008), 3-4; 159-173

Jurišić, Dražen; Moschytz, George S.; Mijat, Neven. Tuning Elliptic Filters with a 'Tuning Biquad' Proceedings of 2009 IEEE International Symposium on Circuits and Systems, ISCAS 2009, Taipei, Taiwan : IEEE, 2009. 45-48

Jurišić, Dražen; Mijat, Neven; Moschytz, George S. Optimal Design of Low-Sensitivity, Low-Power 2nd-Order BP Filter Proceedings of the IEEE International Conference on Signals and Electronics Systems ICSES 2008, AGH University of Science and Technology, 2008. 375-378

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Professor

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Education

dipl.ing., University of Zagreb, 1957
dr.sc., University of Zagreb, 1968

Profile

Dr. Naglić joined the Faculty of Electrical Engineering in Zagreb in 1959. His career as full-time lecturer and scientist was permanently tied up with the Faculty until retirement, but he remains active in specific segments of education. In the scientific qualifications he got a title of scientific adviser. His general scientific interest is analysis and synthesis of electric circuits, with a particular accent on research of response

properties, systematization and normalization in high order linear circuits. Dr. Naglić's doctoral thesis subject and certain needs in educational process, led him to the area of signal processing for multimedia communication systems. His long-time work on the research program of the national communication network system development, resulted in a number of scientific reports on telephone traffic management. Dr. Naglić introduced to university curriculum graduate and postgraduate courses, like Network Theory and Lines, Transmission and Telemetry Systems, Nonlinear Network Analysis. He was visiting lecturer in several other universities, and supervisor in three doctoral and several master theses. He wrote a few lecture books or notes. In a long-lasting Croatian editorial project "Technical Encyclopaedia", he is the author of all entries about main concepts in electric circuit theory. He authored ninety scientific and professional papers. In addition, he produced a fairly great number of industrial designs. He wrote a book about the Faculty history. In a couple of election periods he was Department Chair, Vice dean in (1984-1986), and Dean of the Faculty between (1988-1990). His intensive work on the new campus building expansion and a general contribution to the Faculty was awarded with the supreme "Josip Lončar Golden Plaque". He has got University of Zagreb award entitled "To Deserving Professor and Distinguished Scientist". Dr. Vladimir Naglić also got the honorific title "Distinguished Professor" for his contribution to development and progress of Faculty of Electrical Engineering and Computing.

Research Keywoards

system theory, network theory, analog signal processing, filter theory, filter realization methods, electrical circuits analysis, electrical circuits synthesis.

Sample Publications

Čosić, Vladimir; Mijat, Neven; Mrković, Boško; Naglić, Vladimir. Distributed Measuring System for Monitoring and Control, 37. KoREMA, Zagreb 1992. 452-455

Davor Petrinović
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Education

dipl.ing., University of Zagreb, 1988
mr.sc., University of Zagreb, 1996
dr.sc., University of Zagreb, 1999

Profile

Dr. Petrinović was a Fulbright scholar in 2000/01 at SCL Laboratory, UC Santa Barbara, USA and visiting researcher at Sound and Image Processing Lab, School of EE, KTH, Sweden in 2005/06. Dr. Petrinović has taught several undergraduate and graduate courses: System and Signal Theory, Digital Signal Processing, Digital Speech Processing, Design of Embedded Systems, Advanced Tools for Digital Design. He teaches Embedded Systems, Multimedia Technologies and Digital Signal Processing Software Design. His research activities in speech coding include development of the algorithms for analysis and synthesis of the voiced speech, based on the sinusoidal representation and a new speech analysis technique based on the Generalized Fourier Transform. He worked on development of the improved speech coders, design of the codebooks for quantization of the speech spectral envelope, and improved LPC analysis techniques for higher signal compression. He developed distributed multi-channel signal acquisition system for vibration and stress analysis; highly secure voice-band communication system; remote control systems with very high reliability; automated measurement and diagnostic system for electro-optical missile guidance systems; various speech enabled systems for Croatian language (ASR, TTS). Dr. Petrinović was appointed by the Croatian Ministry of Science and Technology to serve as a National coordinator for Eureka ITEA umbrella project. He received a Fulbright postdoctoral research grant in 2000/01 at Signal Compression Lab, ECE Department, UCSB, Santa Barbara

and Silver Plaque "Josip Lončar" in 1997 for the outstanding Master's thesis, Faculty of EE&C, University of Zagreb. He received Award for contribution to research and development in 1997 by the Ministry of Science and Technology and Ministry of Defense of Croatia. Dr. Petrinović is a member of the IEEE, IEEE Signal Processing Society and Croatian engineering society KOREMA, IFAC's Technical Committee on Real-Time Software Engineering. Currently he is the chair of the Signal Processing chapter of the IEEE Croatia Section.

Research Keywoards

digital speech processing, digital signal processing, interpolation techniques, spectral analysis on manifolds, ASR, TTS, direct digital synthesis, speech coding, speech modeling, speech analysis

Sample Publications

Petrinović, Davor. Causal Cubic Splines: Formulations, Interpolation Properties and Implementations. IEEE Transactions on Signal Processing. 56 (2008), 11; 5442-5453

Petrinović, Davor. Continuous time domain properties of causal cubic splines. Signal Processing. 89 (2009), 10; 1941-1958

Dokmanić, Ivan; Petrinović, Davor. Convolution on the n-sphere with application to pdf modeling. IEEE transactions on signal processing. 58 (2010), 3; 1157-1170

Dropuljić, Branimir; Petrinović, Davor. Development of Acoustic Model for Croatian Language Using HTK. Automatika : časopis za automatiku, mjerenje, elektroniku, računarstvo i komunikacije. 51 (2010), 1; 79-88

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Education

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mr.sc., University of Zagreb, 2001
dr.sc., University of Zagreb, 2005

Profile

Dr. Pribanić teaches the following courses: Digital logic, Algorithms and data structures in C, Biomedical electronics, Transducers in measurement systems, Biomedical informatics. He has following visiting research experience: February 2006 – August 2006, Fraunhofer Institute for Computer Graphics (IGD), Darmstadt, Germany, September 2004 – December 2004, INRIA Rhône-Alpes, France. Dr. Pribanić won several honors and awards: 2001 Silver medal "Josip Lončar" award for an outstanding master thesis, 2004 French government scholarship for a visiting research at INRIA Rhône-Alpes, France, 2006 Croatian Ministry of Science, Education and Sports scholarship for a visiting research at Fraunhofer Institute (IGD), Darmstadt, Germany, 2006 "Vera Johanides" the award of the Croatian Academy of Engineering to the Young Scientists for an outstanding research performance (an emphasis on the applicability) in the last five years. He is a member of following professional organizations: IEEE (Institute of Electrical and Electronics Engineers), societies EMBS (Engineering in Medicine and Biology Society), IFMBE (International Federation for Medical and Biological Engineering), CROMBES (Croatian Medical and Biological Engineering Society). Dr. Pribanić actively participates in the research project "Noninvasive Measurements And Technologies In Biomedicine" sponsored by Croatian Ministry of Science, Education and Sport. He is married, has two daughters and one son. His hobbies are skiing, biking, handball, hiking, swimming.

Research Keywoards

computer vision, image processing, camera calibration, 3D reconstruction, 3D scanners, structured light, biomechanics, electromyography, motion capture, body modeling.

Sample Publications

Pribanić, Tomislav; Sturm, Peter; Cifrek, Mario. Calibration of 3D kinematic systems using orthogonality constraints. Machine Vision and Applications. 18 (2007), 6; 367-381

Pribanić, Tomislav; Sturm, Peter; Stanislav, Peharec. Wand-based calibration of 3D kinematic system. IET Computer Vision. 3 (2009), 3; 124-129.

Pribanić, Tomislav; Peharec, Stanislav; Medved, Vladimir. A comparison between 2D plate calibration and wand calibration for 3D kinematic systems. Kinesiology: International Journal of Fundamental and Applied Kinesiology. 41 (2009), 2; 147-155

Pribanić, Tomislav; Džapo, Hrvoje; Salvi, Joaquim. Efficient and Low-Cost 3D Structured Light System Based on a Modified Number-Theoretic Approach. EURASIP Journal on Advances in Signal Processing. 2010 (2010), Article ID 474389; 1-11

Pribanić, Tomislav; Mrvoš, Saša; Salvi, Joaquim. Efficient multiple phase shift patterns for dense 3D acquisition in structured light scanning. Image and vision computing. 28 (2010), 8; 1255-1266

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Education

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mr.sc., University of Zagreb, 1993
dr.sc., University of Zagreb, 1999

Profile

Dr. Seršić's research interests are in the theory and applications of wavelets, adaptive systems, estimation techniques and applications of DSP algorithms in video & audio processing and bioinformatics. He was a guest researcher at the Institute of Communications and Radio-Frequency Engineering of the Technical University of Vienna, and a guest lecturer at the Malta College of Arts and Sciences. He has taught courses at three Croatian universities at the undergraduate level (Signals and Systems, Information Processing), graduate level (Random Processes in Systems, Advanced DSP Methods) and postgraduate level (Signal Theory). His current work is focused on adaptive systems based on the minimum of L1 norm, adaptive multi-resolution analysis and its applications. Dr. Seršić was researcher on five scientific projects; principal investigator or coordinator on three information technology projects of the Ministry of Science, Education and Sport of the Republic of Croatia. He participated in one European Social Fund project. He is a member of the IEEE (SP and COM), EURASIP and KoREMA. Dr. Seršić served as the chair of the Signal Processing Society chapter of the IEEE Croatia Section, and as a reviewer for several scientific journals and conferences.

Research Keywoards

digital signal processing, wavelets, multi-resolution, non-linear filter banks, adaptive systems, audio processing, video processing, bioinformatics

Sample Publications

Vrankić, Miroslav; Seršić, Damir; Sučić, Viktor. Adaptive 2-D Wavelet Transform Based on the Lifting Scheme with Preserved Vanishing Moments. Ieee transactions on image processing. (2010)

Kopriva, Ivica; Seršić, Damir. Wavelet packets approach to blind separation of statistically dependent sources. Neurocomputing. 71 (2008), 7-9; 1642-1655

Tomić, Mladen; Seršić, Damir; Vrankić, Miroslav. Edge-preserving Adaptive Wavelet Denoising Using ICI Rule. IET Electronics Letters. 44 (2008), 11; 698-699

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Education

dipl.ing., University of Zagreb, 1999
mr.sc., University of Zagreb, 2003
dr.sc., University of Zagreb, 2007

Profile

Dr. Subašić teaches the following courses: Signals and Systems, Sustainable Development and Environment, and Neural Networks. His research interests are in image processing and analysis with special interest in image segmentation and detection techniques. The most recent research is in automatic segmentation of ID photographs used for electronic passports. Results of this research have been incorporated into a commercial security system. He is a member of the Image Processing Group. During his research in medical image segmentation he visited Radiological Department of University hospital in Graz, Austria on several occasions throughout 1999 till 2003. He is a member of the following professional organizations: IEEE (Institute of Electrical and Electronics Engineers), IEEE Computer Society and Croatian Nuclear Society. Dr. Subašić actively participated in organization of several international conferences (International Symposium on Image and Signal Processing and Analysis 2000, 2001, 2003, 2005, 2007 and 2009). He participated in three scientific projects sponsored by the Croatian Ministry of Science and in several research projects with industry.

Research Keywoards

computer vision, image processing, image analysis, image segmentation, object detection, face detection.

Sample Publications

Subašić, Marko; Lončarić, Sven; Sorantin, Erich. Model-based quantitative AAA image analysis using a priori knowledge. Computer Methods and Programs in Biomedicine. 80 (2005), 2; 103-114

Sorantin, Erich; Balogh, E.; Bartol, Vilanova; Palgyi, Kalman; Nyl, Laszlo; Lončarić, Sven; Subašić, Marko; Kovačević, Domagoj. Virtual Dissection of the Colon. 3D Image Processing: Techniques and Clinical Applications. Medical Radiology : Diagnostic Imaging and Radiation Oncology. (2002) ; 197-209

M. Subasic, S. Loncaric, J. Birchbauer, Expert system segmentation of face images, Expert Systems with Applications 2008, doi:10.1016/j.eswa.2008.05.010

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Education

dipl.ing., University of Zagreb, 1967
mr.sc., University of Zagreb, 1978
dr.sc., University of Zagreb, 1997

Profile

After graduation dr. Stare joined the Institute "Ruđer Bošković", Laboratory for ionized gases on construction of electronic instrumentation for special measurements. He has worked at the Faculty of Electrical Engineering and Computing, Department of Electronic Systems and Information Processing, University of Zagreb in Electronic instrumentation and biomedical electronics group, since 1972 as a teaching assistant, since 1998 as assistant professor, and since 2003 as associate professor. Dr. Stare was the Chair of the Department from 2004-2006. Dr. Stare taught undergraduate courses on "Electronic Instrumentation", "Electronic Measurements and Components", "Industry Measuring Systems", "Electronic Measurements and Instrumentation", and the graduate courses "Measuring Amplifiers" and "Systems for Measurement Nonelectrical Values". He was supervisor of 126 undergraduate and four doctoral students. His scientific and professional interests are in the fields of electronic instrumentation and biomedical electronics. Dr. Stare has conducted research and development of instrumentation for industrial measurements and medical instrumentation. He has published more than 50 scientific papers in journals and conference proceedings. Dr. Stare is a member of IEEE, CROMBES (Croatian Medical and Biological Engineering Society, affiliated with IFMBE), KoREMA (Croatian Society for Communications, Computing, Electronics, Measurement & Control), Technical Committee TO-08, TO-72 and TO-95 at the State Office for Standardization and Metrology.

Research Keywoards

electronic instrumentation, smart sensors, sensor networks, nondestructive test and evaluation, grounding systems

Sample Publications

Džapo, Hrvoje; Stare, Zoran; Bobanac, Nenad. Digital Measuring System for Monitoring Motor Shaft Parameters on Ships. IEEE Transactions on Instrumentation and Measurement. 58 (2009), 10; 3702-3712

Jukić Krmek, Silvana; Ljubičić, Ana; Prpić Mehičić, Goranka; Simeon, Paris; Švegar, Domagoj; Stare, Zoran. Accuracy of three different apex locators considering different meter readings: an ex vivo study International endodontic journal / Dummer, PMH (ur.). Edinburgh : European Society of Endodontics, 2009. 1147-1147

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Education

dipl.ing., University of Zagreb, 1996
mr.sc., University of Zagreb, 2002
dr.sc.,University of Zagreb, 2008

Profile

Dr. Šikić teaches the following courses: Programming and Software Engineering, Algorithms and Data Structure, Systems and signals. He leads a group of graduate students with the main fields of research in bioinformatics and computational biology, epidemics spread in complex networks and GPU CUDA programming. In the field of bioinformatics and computational biology the group is particularly interested in protein-protein interactions. The researched methods predict interaction sites from sequence-only information and protein-protein docking. For protein-protein docking spherical harmonic representation of protein properties (shape, electricity…) has been used. Since complex networks can be good representations of social networks and human-built networks (as

Internet), in cooperation with physicists and mathematicians we investigate epidemic spreading in them and methods for mitigation of risks. We are also interested in methods for epidemic spreading prevention. Protein-protein docking and simulation of epidemics in large networks are time consuming. Hence, we use GPU programming to accelerate our software. In the past I was a member of a group of experts and consultants in the field of wired and mobile networks.

Research Keywoards

protein-protein interactions, data mining, signal processing, GPU, CUDA, complex networks, epidemic, docking

Sample Publications

Dokmanić, Ivan; Šikić, Mile; Tomić, Sanja.Metals in proteins: correlation between the metal-ion type, coordination number and the amino-acid residues involved in the coordination. Acta Crystallographica Section D - Biological Crystallography. 64 (2008), 3; 257-263

Mihel, Josip; Šikić, Mile; Tomić, Sanja; Jeren Branko; Vlahoviček, Kristian. PSAIA - Protein Structure and Interaction Analyzer. Bmc structural biology. 8 (2008);

Šikić, Mile; Tomić, Sanja; Vlahoviček, Kristian. Prediction of Protein-Protein Interaction Sites in Sequences and 3D Structures by Random Forests. Plos computational biology. (2009)

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Education

dipl.ing., University of Zagreb, 1964
mr.sc., University of Zagreb, 1971
dr.sc., University of Zagreb, 1975

Profile

Dr. Tonković has more than forty years of teaching experience in the fields of electronic measurements and instrumentation and biomedical engineering. With educational, scientific and professional activities he has excelled at most in biomedical engineering and technology (bioelectric signal analysis, bioimpedance measurements, biomedical informatics, Health Technology Assessment), electronic measurements and instrumentation. He has been the principal investigator on a number of scientific and technological projects, as well as projects for industry. He is an author or co-author of more than 150 scientific papers in journals or conference proceedings. He is IEEE Senior Member and a member of various professional societies both at home and abroad. He has received Croatian Award for Achievements in Education and Science "Order of Danica Hrvatska with the Face of Ruđer Bošković" 1996; Faculty Award Golden Plaque "Josip Lončar", 1998. Dean of the Faculty of Electrical Engineering and Computing, 1994-1998. Dr. Tonković currently holds the position of the President of Croatian Academy of Engineering. He is the President of the Croatian Medical and Biological Engineering Society, 2000-2009. President of HL7 Croatia Affiliate from 2008.

Research Keywoards

biomedical electronics, biomedical instrumentation, biomedical signal processing, electronic measurements, electronic instrumentation.

Sample Publications

Cifrek, Mario; Medved, Vladimir; Tonković, Stanko; Ostojić, Saša. Surface EMG based muscle fatigue evaluation in biomechanics. Clinical Biomechanics. 24 (2009), 4; 327-340

Džapo, Hrvoje; Giannini, Roberto; Tonković, Stanko. Model-Based Reconstruction of the Grounding System Surface Potential Distribution by Means of Monte Carlo Markov Chain Simulation. Electromagnetics. 29 (2009), 8; 586-604

Tonković, Stanko; Tonković, Ivana; Kovačić, Dubravko. Bioelectric Impedance Analysis of Lower Leg Ischaemic Muscles Proceedings of the 22nd Annual International Conference of the IEEE Engineering in Med. and Biol. Soc. (CD-ROM) / Fullerton, Garry D. (ur.). Chicago, 2000

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Medved, V., Tonković, S.: Locomotion Diagnostics: Some Neuromuscular and Robotic Aspects, IEEE Eng. in Medicine and Biology Magazine., 10 (1991) 2, 23-29

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Education
dipl.ing., University of Zagreb, 1989
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dr.sc., University of Zagreb, 1999

Profile
Mladen Vučić is with the Department of Electronic Systems and Information Processing of the Faculty of Electrical Engineering and Computing since 1999. He teaches the undergraduate course on Embedded Systems, graduate courses on Embedded System Design, Signal Processing in Communications and Tool for Digital System Design, and postgraduate course on Nonlinear Systems. He also supervises the students working on their projects and final theses. He is an author of three textbooks and various teaching materials. Mladen Vučić has 21 years of professional experience in signal processing, embedded systems, DSP hardware and software, system design, and military electronics. He was the principal investigator of four scientific projects and one technological project, all supported by the Ministry of Science, Education and Sport of Republic of Croatia. He also participated as a collaborator in five scientific projects of the Ministry of Science, Education and Sport of Republic of Croatia. He published 33 papers in journals and conference proceedings. He served as a reviewer for several scientific journals and conferences. He was a coordinator or collaborator on many research and development projects. In 1997 he was awarded by Ministry of Science and Technology and Ministry of Defense for scientific contribution to the development of military forces of Republic Croatia. Dr. Vučić is a member of Croatian Society for Communications, Computing, Electronics, Measurement and Control (KoREMA) and a member of the Institute of Electrical and Electronics Engineers (IEEE).

Research Keywoards
circuit theory, analog signal processing, digital signal processing, communication systems, optimization theory and applications, digital system design.

Sample Publications
Vučić, Mladen; Molnar, Goran; Butorac, Marko. FPGA Implementation of High-Frequency Software Radio Receiver Proceedings of 2009 IEEE International Symposium on Circuits and Systems. Taipei, 2009. 1040-1043

Vučić, Mladen; Molnar, Goran. Time-Domain Synthesis of Continuous-Time Systems Based on Second-Order Cone Programming. IEEE transactions on circuits and systems. I, Regular papers. 55 (2008), 10; 3110-3118

Vučić, Mladen; Molnar, Goran. Equaliser design based on maximum of response to sinc pulse. Electronics letters. 41 (2005), 19; 1089-1090

Molnar, Goran; Vučić, Mladen. IIR Hilbert transformers based on symmetry of time-domain response. Electronics letters. 40 (2004), 20; 1309-1310

Vučić, Mladen; Molnar, Goran. Measure for phase linearity based on symmetry of time-domain response. IEE Electronics Letters. 39 (2003), 19; 1425-1426

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