





**2019 42nd International Convention on
Information and Communication Technology,
Electronics and Microelectronics (MIPRO)**

**May 20 – 24, 2019
Opatija, Croatia**

Proceedings

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Publisher:

Croatian Society for Information and Communication Technology,
Electronics and Microelectronics - **MIPRO**
Office: Kruzna 8/II, P. O. Box 303, HR-51001 Rijeka, Croatia
Phone/Fax: (+385) 51 423 984

For the publisher:

Karolj Skala

IEEE Catalog Number: CFP1939K-CDR
ISSN: 2623-8764

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Introduction

The Conference Proceedings contain papers accepted for the 2019 42nd International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO) held from 20 to 24 May 2019 at the Grand Hotel Adriatic Congress Centre and Remisens Hotel Admiral in Opatija, Croatia. International convention MIPRO 2019 was organized by MIPRO Croatian Society and was technically co-sponsored by IEEE Region 8, IEEE Croatia Section, IEEE Croatia Section Computer Chapter, IEEE Croatia Section Electron Devices/Solid-State Circuits Joint Chapter, IEEE Croatia Section Education Chapter and IEEE Croatia Section Communications Chapter.

Papers are from the following fields:

- Microelectronics, Electronics and Electronic Technology /MEET
- Distributed Computing in Data Science and Biomedical Engineering /DC
- Telecommunications & Information /CTI
- Computers in Education /CE
- Computers in Technical Systems /CTS
- Intelligent Systems /CIS
- Information Systems Security /ISS
- Business Intelligence Systems /miproBIS
- Digital Economy and Digital Society /DE-DS
- Engineering Education /EE
- Software and Systems Engineering /SSE
- Composability, Comprehensibility and Correctness of Working Software /4COWS
- MIPRO Junior - Student Papers /SP

The authors are from industry, education, academia and public administration.

MIPRO 2019 Convention was held under the patronage of the President of the Republic of Croatia Kolinda Grabar-Kitarović. It was supported by many sponsors and patrons among which we single out HEP-Croatian Electricity Company Zagreb, Ericsson Nikola Tesla Zagreb, T-Croatian Telecom Zagreb, Koncar-Electrical Industries Zagreb, InfoDom Zagreb, Storm Computers Zagreb, Transmitters and Communications Company Zagreb, A1 Zagreb, Brintel Zagreb, Danieli Automation Buttrio, Mjerne tehnologije Zagreb, Selmet Zagreb, Institute SDT Ljubljana, Nomen Rijeka, University of Zagreb, University of Rijeka, Juraj Dobrila University of Pula, Rudjer Boskovic Institute Zagreb, Faculty of Electrical Engineering and Computing Zagreb, Faculty of Organization and Informatics Varazdin, Faculty of Maritime Studies Rijeka, Faculty of Engineering Rijeka, Faculty of Economics and Business Rijeka, Zagreb University of Applied Sciences, Croatian Academy of Engineering – HATZ and Croatian Regulatory Authority for Network Industries – HAKOM.

The purpose of the Proceedings is to present the state of development and work within the ICT, electronics and microelectronics field in the world, particularly in countries of Southeast Europe – we hope we have been successful in doing that.

In Opatija/Rijeka/Zagreb, June 21st 2019

Professor Karolj Skala, PhD
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Microelectronics, Electronics and Electronic Technology

Fabrication of GePb-Alloys by Means of Pulsed Laser Induced Epitaxy M.C. Weiser, D. Schwarz, H.S. Funk, D. Weißhaupt, C. Serra, J. Schulze, S. Chiusi	1
Electrical Characterization of Fabricated Pin Diodes Made from $\text{Si}_x\text{Ge}_{1-x-y}\text{Sn}_y$ with an Embedded $\text{Ge}_{1-x}\text{Sn}_x$ Quantum Well P. Povolni, D. Schwarz, C.J. Clausen, Y. Elogail, H.S. Funk, M. Oehme, D. Weißhaupt, J. Schulze	7
Electrical Characterization of Pure Boron-on-Germanium Pin Diodes L. Gebert, D. Schwarz, A. Elsayed, J. Schulze	13
Electrical Characterization of Low-Temperature Boron on Silicon Deposition Utilizing Molecular Beam Epitaxy J.F. Dick, A. Elsayed, D. Schwarz, J. Schulze	19
Impact of Ultra-Thin-Layer Material Parameters on the Suppression of Carrier Injection in Rectifying Junctions Formed by Interfacial Charge Layers T. Knezevic, T. Suligoj, L.K. Nanver	24
Reverse Breakdown and Light-Emission Patterns Studied in Si PureB SPADs M. Krakters, T. Knezevic, L.K. Nanver	30
PIN-photodiode Based Active Pixel in 0.35 μm High-Voltage CMOS for Optical Coherence Tomography M. Vlaskovic, H. Zimmermann, G. Meinhardt, J. Kraft, M. Sagmeister, J. Schoegler	36
Formation of Thin Film Ag/AgCl Reference Electrode by Electrochemical and Chemical Method D. Resnik, B. Pecar, M. Mozek, N. Lokar, D. Vrtacnik	41
Accelerating Simulation of Nanodevices Based on 2D Materials by Hybrid CPU-GPU Parallel Computing M. Poljak, M. Glavan, S. Kuzmic	47
Voltage-to-Frequency Converter for Ultra-Low-Voltage Applications D. Arbet, M. Kovác, V. Stopjaková, M. Potocný	53
Design of Sense Amplifiers for Non-Volatile Memory I.P. Tolic, J. Mikulic, G. Schatzberger, A. Baric	59

Design Methodology of an On-Chip Inductor in 180 nm CMOS Technology I. Brezovec, J. Mikulic, G. Schatzberger, A. Baric	65
Balanced RF Power Amplifier Design in Horizontal Current Bipolar Transistor (HCBT) Technology Z. Osrecki, J. Zilak, M. Koracic, T. Suligoj	70
Constant-Resistance Filters with Diplexer Architecture for S-Band Applications A. Brizic, D. Babic	76
Design and Characterization of Bias Tee Used for S-parameter Characterization of Power Inductors V. Major, J. Bacmaga, R. Gillon, A. Baric	82
High Speed DPWM for Digital Power Converter Controller Y. Smirnov, V. Subotskaya, M. Tulupov, E. Bodano	87
Impact of Choke Selection on Performance of Current-Mode Class-D Amplifier in WPT System D. Bilandzija, I. Biondic, D. Vinko	92
Soft-Start Circuit in Wireless Power Transmission System D. Vinko, I. Biondic, D. Bilandzija	98
Survey on the Generation of Equivalent Circuit Cable Models for Transient Simulation M. Ibel, H. Hackl, B. Auinger, C. Stockreiter, B. Deutschmann	102
Time-Domain Response Simulation of Incident Field Coupling to Transmission Lines T. Mandic, S. Op't Landy, A. Baric	108
A Simple and Fast Tool for the Modelling of Inter-Symbol Interference and Equalization in High-Speed Chip-To-Chip Interfaces A. Cortiula, M. Dazzi, M. Marcon, D. Menin, M. Scapol, A. Bandiziol, A. Cristofoli, W. Grollitsch, R. Nonis, P. Palestri	112
Design of Linear Arrays Forming Pencil Beams Based on Derivatives of Chebyshev Polynomials M. Matijascic, G. Molnar	117
Noise Improvement for Different BP Filter Designs Z. Sverko, N. Stojkovic, S. Vlahinic, I. Markovinovic	122
Low-Noise and Low-Sensitivity Coupled Fourth-Order Low-Pass Filters A. Coza, D. Jurisic	128
Design of Magnetic Shielding from Space Radiation Using Numerical Methods J. Kandrata, F. Merzel, S. Arsoski	133

A Proposal for Characterizing Global Light Pollution Using a LEO Nanosatellite	138
J. Bratulic, L.-M. Golusin, J. Rendulic, D. Stipic, J. Tutavac, D. Babic, S. Grgic, T. Grubesa	
Application of the Combined Method for the Estimation of the RMS Measurement Error Caused by ADC Nonlinearity	143
A.N. Serov, N.A. Serov, V.D. Glushnev	
Sizing CMOS Operational Transconductance Amplifiers Applying NSGA-II and MOEAD	149
O. Cuate, O. Schuetze, F. Grasso, E. Tlelo-Cuautle	
A New Nonlinear Dynamical Model with Three Quadratic Nonlinear Terms and Hidden Chaos	153
S. Vaidyanathan, E. Tlelo-Cuautle, A. Sambas, F. Grasso	
Detection Threshold for TVWS Spectrum Occupancy Determination in Urban Environments in Kosovo	157
Z. Limani Fazliu, H. Maloku, A. Mekuli, M. Ibrani	
Quality Assessment of System for Automated Multi-Node Environmental Water Parameter Monitoring	163
M. Brkic, T. Keser, M. Vasiljevic Toskic, J. Radic, M. Arbanas	
Development of Voltage Source Converter Using HiL Simulation System	168
A. Peric, H. Paukovic, M. Miletic, V. Sunde	
Power Converter Circuits for Recuperation of the Regenerative Braking Energy in Rail Vehicles	174
I. Zupan, A. Lasic, D. Kruselj, V. Sunde, Z. Ban	
Analysis of the Uninterruptible Power Supply Influences to the Power Grid	180
N. Pilat, A. Peric, Z. Ban, V. Sunde	
Distributed Computing in Data Science and Biomedical Engineering	
Calculating Average Shortest Path Length Using Compute Unified Design Architecture (CUDA)	186
S. Petrushevski, M. Gusev, V. Zdraveski	
Exploiting GPUs on Distributed Infrastructures for Medical Imaging Applications with VIP and DIRAC	190
S. Camarasu-Pop, C. Lartizien, T. Grenier, A. Bonnet, P. Wassong, V. Hamar, F. Hernandez, L. Arrabito, J. Bregeon, P. Gay, A. Tsaregorodtsev	

GPU Implementation of the FastICA Algorithm G. Benko, Z. Juhasz	196
Computational Efficiency of Linear System Construction for MLPG Method on a Multicore Computer M. Depolli, R. Trobec	200
RBF-FD Solution of Electromagnetic Scattering Problem B. Stojanovic, J. Slak, G. Kosec	206
Parallel Simulation of Time-Domain Acoustic Wave Propagation J. Mocnik-Berljavac, J. Slak, G. Kosec	212
Fitting Sum of Exponentials to Experimental Data: Linearization by Numerical Integration Approximation Z. Jericevic	218
The Rainbow: Integrating Computing into the Global Ecosystem Z. Sojat, K. Skala	222
Algorithms for Procedural Generation and Display of Trees H. Nuic, Z. Mihajlovic	230
Microservice-oriented Approach to Automation of Distributed Scientific Computations G.A. Oparin, V.G. Bogdanova, A.A. Pashinin, S.A. Gorsky	236
Serverless Architecture for Workflow Scheduling with Unconstrained Execution Environment A. Mujezinovic, V. Ljubovic	242
Comparison of Data Aggregation from a Wireless Network of Sensors Using Database Sharding and Foreign Data Wrappers V. Stanisavljevic	247
CT Metal Artifacts Reduction Using Convolutional Neural Networks A. Serifovic Trbalic, A. Trbalic, D. Demirovic, E. Skejic, D. Gleich	251
Improved Nucleus Segmentation Process Based on Knowledge Based Parameter Optimization in Two Levels of Voting Structures O. Bilalovic, Z. Avdagic, M. Kafadar	256
Correspondence Analysis Applied to Large Scale Evo-Devo Data T. Siroki, S. Koska, N. Corak, M. Futo, T. Domazet-Loso, M. Domazet-Loso	262
Calculation of Topological Molecular Descriptors Based on Degrees of Vertices V. Bojovic, B. Lucic, D. Beslo, K. Skala, N. Trinajstic	266
Detection of Human Bodypart Abnormalities by Microwaves – A New Approach N. Petrovic, I. Tomasic, M. Lindén, P.O. Risman	270

Comparison of Publicly Available Beat Detection Algorithms Performances on the ECGs Obtained by a Patch ECG Device	275
I. Tomasic, N. Petrovic, M. Lindén, A. Rashkovska Koceva	
Wireless Body Sensor for Electrocardiographic Monitoring in Equine Medicine	279
M. Brloznik, A. Domanjko Petric, V. Kadunc Kos, A. Rashkovska Koceva, V. Avbelj	
Interactive Home Healthcare System with Integrated Voice Assistant	284
D. Dojchinovski, A. Ilievski, M. Gusev	
New Approach of Dysgraphic Handwriting Analysis Based on the Tunable Q-Factor Wavelet Transform	289
V. Zvoncak, J. Mekyska, K. Safarova, Z. Smekal, P. Brezany	
Analysis of a Differential Noise Detection Filter in ECG Signals	295
E. Ajdaraga, M. Gusev	
Detection and Treatment of Atrial Irregular Rhythm with Body Gadgets and 35-Channel ECG	301
R. Trobec, M. Jan, M. Lindén, I. Tomasic	
Enriching Heart Monitoring with Accelerometer Data	309
I. Grubisic, D. Davidovic, B. Medved Rogina, M. Depolli, M. Mohorcic, R. Trobec	
Accurate Segmentation of Dermoscopic Images Based on Local Binary Pattern Clusterings	314
P. Pereira, R. Fonseca-Pinto, R. Paiva, L. Távora, P. Assunção, S. Faria	
Feature Extraction for Heartbeat Classification in Single-Lead ECG	320
J. Bogatinovski, D. Kocev, A. Rashkovska Koceva	
A Methodology for Laser Speckle Simulation in Controlled Dynamic Processes	326
L. Bento, F. Cunha, L. Távora, P. Assunção, S. Faria, R. Fonseca-Pinto	
Properties of the Generalized Robinson-Foulds Metric	330
L. Borozan, D. Matijevic, S. Canzar	
Evaluation of User Satisfaction with the ECGalert System	336
E. Ajdaraga, M. Gusev, L. Poposka	
Performance Evaluation of Atrial Fibrillation Detection	342
M. Gusev, M. Boshkovska	
Approaches to Metagenomic Classification and Assembly	348
J. Maric, M. Sikic	
Application of Source Localization Algorithms in Magnetoencephalography: Test on a New Generation of Magnetometers	357
U. Marhl, A. Jodko-Wladzinska, R. Brühl, T.H. Sander, V. Jazbinsek	

Detecting White Spot Lesions Caused by Teeth Alignment Treatment L. Sajn	363
EEG Based Imaging of Stroke Location, Extent and Progress of Recovery Using a GPU Architecture Z. Juhasz, M.F. Issa	369
Predicting the Effectiveness of Multi-drug Cancer Therapies D. Tomic, B. Pirkic, K. Skala, L. Kranjcevic	375
Management of Physiological Data Streams within Brain Disorder Rehabilitation P. Brezany, M. Janatova, O. Stepankova, M. Lenart, M. Edward, M. Uller, R. Burget	381

Telecommunications & Information

Targeted Multichannel Marketing Campaign in Telecommunications A. Prasljivic, A. Ramic	387
New Perspectives for People with Special Needs According the Development of New Generation ICT Technologies N. Bjelcic, D. Svelec	392
Self-learning Prioritization of End-User Services to Eliminate Overload Situations M. Kocan	398
Mapping of QoS/QoE in 5G Networks N. Banovic-Curguz, D. Ilisevic	404
Optimizing Traffic Routing in Different Network Environments Using the Concept of Software-Defined Networks S. Causevic, M. Begovic	409
An Analysis of Reconvergence Delay when Using BGP-LS/PCEP as Southbound Protocols I. Seremet, S. Causevic	415
Implementation of NETCONF Protocol D. Valencic, V. Mateljan	421
Fault Management API for SNMP Agents O. Jukic, I. Hedji, A. Sarabok	431
Enhancing REST HTTP with Random Linear Network Coding in Dynamic Edge Computing Environments C.V. Phung, J. Dizdarevic, F. Carpio, A. Jukan	435

Analysis of Cybersecurity Threats in Cloud Applications Using Deep Learning Techniques	441
S.A. Sokolov, T.B. Iliev, I.S. Stoyanov	
Phishing in Depth – Modern Methods of Detection and Risk Mitigation	447
T.D. Bikov, T.B. Iliev, G.Y. Mihaylov, I.S. Stoyanov	
Critical Infrastructure Solutions for Upcoming Developments in Telecom and Data Industries	451
A. Jakovcic, V. Barac, B. Blazevic	
Accessible Web Prototype Features from Technological Point of View	457
M. Zilak, A. Keselj, T. Besjedica	
Databases Performance Evaluation for IoT Systems: The Scrovegni Chapel Use Case	463
L. Incipini, A. Belli, L. Palma, R. Concetti, P. Pierleoni	
MIMIC: A Cybersecurity Threat Turns into a Fog Computing Agent for IoT Systems	469
L. Incipini, A. Belli, L. Palma, R. Concetti, P. Pierleoni	
Optimizing Mobile Radio Access Network Spectrum Refarming Using Community Detection Algorithms	475
D. Budic, K. Skracic, I. Bodrusic	
Path Loss Model Fitting for TV bands Based on Experimental Measurements for Urban Environments in Kosovo	480
H. Maloku, Z. Limani Fazliu, E. Sela, M. Ibrani	
Experimental Assessment of Electric Field Levels Emitted by UHF TV Broadcasters	486
M. Ibrani, A. Mekuli	
Design and Analysis of Vivaldi Antenna for Measuring Electromagnetic Compatibility	491
B. Ivsic, F. Friscic, M. Dadic, D. Muha	
Communication over Cloud Computing: A Security Survey	496
R.M. Tanash, A.F. Khalifeh, K.A. Darabkh	

Computers in Education

How Faculty from Pula, Dubrovnik, Varazdin, Koprivnica and Osijek Use Web-Based Scientific Literature: Analysis Based on their Age, Gender, Field of Science and Literature Exchange Practices	502
M. Duic	

Mapping the Hot Topics in Library and Information Science Field in Period 2015-2018 Year A. Papic, M. Buhin	508
Implementation of Blended Learning in Computer Science M. Sertic	514
Creating Student's Profile Using Blockchain Technology V. Juricic, M. Radosevic, E. Fuzul	521
Education in Science Literacy outside the Classroom: Case of Libraries R. Vrana	526
Implementation of Electronic Design Automation Software Tool in the Learning Process T. Alajbeg, M. Sokele	532
Crowdsourcing Image Descriptions Using Gamification: A Comparison between Game-Generated Labels and Professional Descriptors T. Ivanjko	537
Puzzle-like Programming Languages in Teaching Programming V. Juricic, M. Radosevic	542
Methodology for Using Games as an Educational Tool M. Filipovic Tretnjak	547
Measuring Eye Movements in Learning Research: A Useful Window to Cognition P. Pürcher, M. Höfler	552
Distinguishing the Themes Emerging from Masses of Open Student Feedback T. Hynninen, A. Knutas, M. Hujala, H. Arminen	557
Electronic Commerce Entrepreneurship Education Using Virtual Laboratory M. Vejacka	562
Engaging Students in Computer Science with Extracurricular Projects – Oracle Academy Workshops in a Box Use Case F. Urem, E. Ban, D. Jurekovic	568
Improving Plagiarism Detection Using Genetic Algorithm E. Pajic, V. Ljubovic	571
Behind the Dystopian Sentiment: A Sentiment Analysis of George Orwell's 1984 I. Dundjer, M. Pavlovski	577
Through the Limits of Newspeak: An Analysis of the Vector Representation of Words in George Orwell's 1984 I. Dundjer, M. Pavlovski	583

Using Robots to Master Simple Mathematical Assignments A. Lovic, A. Sovic Krzic	589
Towards a Justified Choice of Gamification Framework when Building an Educational Application S. Ivanova, G. Georgiev	594
Flipped Classroom Model for Advanced Networking Courses D. Bjelobrk Knezevic, V. Tadic, Z. Siranovic	600
An Educational Tool for Visualising Actor Programs A. Colak, M. Aglic Cuvic	605
Students' Viewpoint about Using MIT App Inventor in Education T.S. Georgiev	611
Implementation of LMS Activities in the Adoption of ESP in Higher Education T. Ivanjko, I. Grubjesic	617
ICT Competences Assessment through ICT Escape Room B. Musil, S. Gartner, I. Pesek, M. Krasna	622
Experiences from Digital Learning Analytics in Finland and Sweden: A Collaborative Approach M.-V. Apiola, T. Karunaratne, E. Kaila, M.-J. Laakso	627
Project Teaching in Computer Subjects V. Zuppa Baksa, A. Bednjanec	633
Dynamic Machine Translation of Croatian Academic Web Sites D. Radosevic, A. Bernik, J. Dobsa, M. Kaniski, N. Mrvac	637
Teachers' Perceptions of Digital Learning Path in Mathematics, Languages and Programming E. Kurvinen, E. Kaila, H. Kajasilta, M.-J. Laakso	643
A Framework for Measurement of Interactivity of Digital Learning Resources V.T. Atanasov, A.S. Ivanova	649
Decision Support in a Telecommunications Engineering e-Learning Platform B. Rodic	655
Enhancement of Students' Skills via Project-Based Learning L. Kakalejcík, D. Pařová	661
Modernizing Laboratories for New Courses in Automotive Software Engineering I. Kastelan, B. Pavkovic, M. Vranjes, M. Popovic, G. Velikic	667
Using Raspberry Pi Computers in Education B. Balon, M. Simic	671

A Model of an Online Evaluation System for STEM Education G. Djurovic, M. Holenko Dlab, N. Hoic-Bozic	677
Development of Human Capital via Modern Informatics Education L. Révészová	681
The Uniqueness of Computational Thinking P. Larsson, M.-V. Apiola, M.-J. Laakso	687
Methods for Double-Blind Peer Review and Grade Prediction of Student Software Projects I. Prazina, V. Okanovic	693
Problem Based Learning for Primary School Junior Grade Students Using Digital Tools J. Mezak, P. Pejic Papak	697
Assistive Technologies for Children with Cognitive and/or Motor Disabilities: a Diagnosis of the Training Needs of Informal Caregivers I. Almeida, J. Ribeiro, A. Moreira	703
The Opinions and Attitudes of Students - Future IT Teachers - on the Use of VR and AR in Teaching M. Homen Pavlin, M. Suznjevic	709
Teaching the Physics behind a 3D Cinema through Experiments Supported by ICT P. Bernad, N. Vaupotic, R. Repnik	715
Teaching of Computer Programming in Bulgarian Primary School – Challenges and Solutions D. Tuparova	722
About Some Barriers in Usage of Educational Computer Games by Teachers in STEM D. Tuparova, V. Veleva, G. Tuparov	727
Intuitive Communication versus Rational Communication among Students of Computing at the Algebra University College T. Babic, S. Papic, M. Babic	731
Investigating Gender Gap in Computer Science Research Community L. Abazi-Bexheti, A. Kadriu, M. Apostolova-Trpkovska	737
GitHub as Backbone in Software Engineering Course: Technology Acceptance Analysis A. Cizmesija, Z. Stapic	742
Analyses of Possibilities of Flipped Classroom in Teaching Computer Science Courses M. Fetaji, B. Fetaji, M. Ebibi	747

User Evaluation of an Adaptive Language Learning System Prototype V. Slavuj, B. Kovacic, I. Jugo	753
Analysis of Clustering Algorithms for Group Discovery in a Web-based Intelligent Tutoring System D. Bunic, I. Jugo, B. Kovacic	759
Influence of Gamification Reward System on Student Motivation P. Vranesic, K. Aleksic-Maslac, B. Sinkovic	766
A Web-Based System for Personalized Learning Path Tracking of Doctoral Students P. Zlatarov, G.I. Ivanova, D. Baeva	773
Open Educational Resources as a Trend of Modern Education O.V. Semenikhina, M.G. Drushlyak, Y.A. Bondarenko, S.M. Kondratiuk, I.M. Ionova	779
Benefits of Experimental Supported Teaching M. Wagner, C. Ungermanns, W. Werth	783
Regional Computer Graphics Competition as a Tool of Influence on the Profession Choice: Experience of Sumy Region of Ukraine A.O. Yurchenko, O.M. Udovychenko, A.M. Rozumenko, Y.O. Chkana, M.M. Ostroha	789
Use of the Software BIOMECHANICS in Physical Culture and Sports Specialists' Preparation Y.I. Petrenko, V.M. Zigunov, D.I. Balashov, D.V. Bermudes, I.V. Shishenko	795
Information Literacy and Critical Thinking Freshman Course Experience V. Buselic	800
Developing Leadership in a Simulation-Games Environment J. Zoroja, M. Pejic Bach, I. Miloloza	806
Learning Analytics and Academic Libraries in Croatia - Are We Ready for It? D. Vrkic	812
Teaching for Virtual Work J. Henno, H. Jaakkola, J. Mäkelä	818
A "Fingerbeeper" School Monitoring Device A. Spornjak, T. Bastasic, J. Dolensek	827
Use of the System for Authenticity Verification at the Tourism and Communication Sciences of the University of Zadar V. Kalajzic, M. Raznjevic Zdrilic	831
Automated Analysis of e-Learning Web Applications F. Skopljanac-Macina, B. Blaskovic, I. Zakarija	837

Critical Thinking and Creative Thinking - the Self-Assessment of Algebra University College Students	843
T. Babic, A. Lackovic, M. Matejic	
Metamodeling SNAP, a Multi-Criteria Method for Effective Strategic Decision Making on e-Learning Issues	849
M. Dzeko, N. Kadoic, Z. Dobrovic	
Teaching Business Mathematics Using Computers	854
K. Soric	
Artificial Intelligence Yesterday, Today and Tomorrow	860
H. Jaakkola, J. Henno, J. Mäkelä, B. Thalheim	
How Much Has Technology Dehumanized Us in School	868
D. Radolovic	
Teaching Computer-Assisted Translation: A Proposal for Course Content	871
M. Brkic Bakaric	
Young Entrepreneurs in Action	877
I. Ruzic, L. Zima Krnelic, N. Mota, M.D. Forte, F. Diramali Dildar	
Perceived Hedonic and Content Quality of Social Networking Sites	882
S. Babic, T. Orehovacki	
The Exhaustive Search Algorithm in the Transport Network Optimization on the Example of Urban Agglomeration Rijeka	888
S. Vukmirovic, Z. Capko, A. Babic	
Learning of Color in Croatian Primary Schools	896
Z. Prohaska, Z. Prohaska, I. Uroda	

Computers in Technical Systems

Highlighting the Key Factors of an IoT Platform	901
M. Ullah, K. Smolander	
Cloud Connected Smart Birdhouse for Environmental Parameter Monitoring	907
J. Raychev, G. Hristov, D. Kinaneva, P. Zahariev, E. Kyostebekov	
Assessing Compression Algorithms on IoT Sensor Nodes	913
E. Guberovic, F. Kristo, P. Krivic, I. Cavrak	
Analysis and Comparison of Exact and Approximate Bin Packing Algorithms	919
L. Tadic, P. Afric, L. Sikic, A.S. Kurdija, K. Vladimir, G. Delac, M. Silic	
Performance of Common Classifiers on Node2vec Network Representations	925
M. Pozek, L. Sikic, P. Afric, A.S. Kurdija, K. Vladimir, G. Delac, M. Silic	

Analysis and Synthesis of Fountain Sound D. Miljkovic	931
Detecting Aircraft Piston Engine Problems by Analysis of Engine Parameters D. Miljkovic	937
Development of the Complex Modelling System for Intelligent Control Algorithms Testing D. Kostylev, A. Tolstikhin, S. Ul'yanov	943
Unity Based Urban Environment Simulation for Autonomous Vehicle Stereo Vision Evaluation M. Vukic, B. Grgic, D. Dincir, L. Kostelac, I. Markovic	949
Remote Control System Concept in Electric and Hybrid Marine Propulsion Objects K. Blaskovic, D. Milovan	955
Predictive Torque Vectoring Vehicle Control Based on a Linear Time Varying Model M. Svec, K. Hrvatinic, S. Iles, J. Matusko	960
Bolt65 – Performance-optimized HEVC HW/SW Suite for Just-in-Time Video Processing I. Piljic, L. Dragic, A. Duspara, M. Cobrnic, H. Mlinaric, M. Kovac	966
A New Low-Complexity Cipher Class for Clone-Resistant Identities S. Mulhem, M. Mohammad, W. Adi	971

Intelligent Systems

An Overview and Comparison of Free Python Libraries for Data Mining and Big Data Analysis I. Stancin, A. Jovic	977
Web Tool for Graph Embeddings Representation Techniques Evaluation I. Ivanoska, M. Milenkovski, S. Kalajdziski, K. Trivodaliev	983
Distillation of a CNN for a High Accuracy Mobile Face Recognition System F. Guzzi, L. De Bortoli, S. Marsi, S. Carrato, G. Ramponi	989
Deep Image Captioning: An Overview I. Hrga, M. Ivasic-Kos	995
Using High Performance Computing in Vehicles to Create Image Datasets for Deep Learning B. Malnar, A. Unnervik, N. Köse Cihangir	1001

Emotion Classification Based on Convolutional Neural Network Using Speech Data	1007
N. Vrebcevic, I. Mijic, D. Petrinovic	
Feature Selection for Improved Classification of Protein Structures	1013
G. Mirceva, I. Ivanoska, A. Naumoski, A. Kulakov	
Analysing the Influence of Two Similarity Metrics on the Ant Colony Optimisation Based Fuzzy-Rough Feature Selection Algorithm	1019
A. Naumoski, I. Ivanoska, G. Mirceva	
A Novel NLP-FUZZY System Prototype for Information Extraction from Medical Guidelines	1025
L. Begic Fazlic, A. Hallawa, A. Schmeink, A. Peine, L. Martin, G. Dartmann	
Improving Case-Based Reasoning with the Aid of Multi-Criteria and Group Decision-Making Methods	1031
G.S. Maltugueva, A.Y. Yurin	
Digital Archives Supporting Document Content Inference	1037
E. Cherkashin, A. Shigarov, V. Paramonov, A. Mikhailov	
Multiagent Technology for Parallel Implementation of Boolean Constraint Method for Qualitative Analysis of Binary Dynamic Systems	1043
V.G. Bogdanova, S.A. Gorsky	
Exploring Keystroke Dynamics and Stylometry Features for Gender Prediction on Chatting Data	1049
G. Li, P. Rezaee Borj, L. Bergeron, P. Bours	
People Counting in a Public Event - Use Case: Free-to-Ride Bus	1055
J. Grönman, P. Sillberg, P. Rantanen, M. Saari	
Early Forest Fire Detection Using Drones and Artificial Intelligence	1060
D. Kinaneva, G. Hristov, J. Raychev, P. Zahariev	
Fuzzy Models for Managing a Micro Grid PV System	1066
P.V. Georgieva, R. Dolchinkov	
Intelligent Data Service for Farmers	1072
P. Linna, N. Narra, J. Grönman	
Short-Term Forecasting of Electricity Consumption Using Artificial Neural Networks - an Overview	1076
I. Baric, R. Grbic, E.K. Nyarko	
Semantic Approach in Encoding of the Meanings in Bulgarian Folklore Embroidery in Digital Libraries	1082
D. Baeva, B. Baev	

Deep Learning Advancements: Closing the Gap A. Stipic, T. Bronzin, B. Prole, K. Pap	1087
Crowd Motion Pattern Detection at the Microscopic Level D. Marcetic, L. Males, S. Ribaric	1093
Reverse Engineering of the MMORPG Client Protocol I. Tomicic, P. Grd, M. Schatten	1099
A Clustering Model for Time-Series Forecasting R. Coric, M. Djumic, S. Jelic	1105
Towards Reusable Process-Based Models of Dynamical Systems: A Case Study in the Domain of Aquatic Ecosystems I. Tolovski, A. Kostovska, N. Simidjievski, L. Todorovski, S. Dzeroski, P. Panov	1110
A Parallel Heuristic for a k-Medoids Clustering Problem with Unfixed Number of Clusters A.V. Ushakov, I. Vasilyev	1116
Computational Study of Time Constrained Influence Maximization Problem under Deterministic Linear Threshold Model for Networks with Nonuniform Thresholds S. Kochemazov, A. Semenov	1121
Thermal Imaging Dataset for Person Detection M. Kristo, M. Ivasic-Kos	1126
Software Development for Rule-Based Spreadsheet Data Extraction and Transformation A. Shigarov, V. Khristyuk, A. Mikhailov, V. Paramonov	1132
Event Trees Transformation for Rule Bases Engineering A.F. Berman, N.O. Dorodnykh, O.A. Nikolaychuk, A.Y. Yurin	1138
Parallel Framework for Evolutionary Black-box Optimization with Application to Algebraic Cryptanalysis A. Pavlenko, A. Semenov, V. Ulyantsev, O. Zaikin	1144
 Information Systems Security	
Privacy-Preserving Encryption-Domain Video Retrieval over the Cloud via Block Transformations of Key Frames C.-K. Yang, C.-H. Kao, Y.-C. Lai, N.-W. Lo	1150
Flow-based Anomaly Detection Using Multilayer Perceptron in Software Defined Networks Y.-C. Lai, K.-Z. Zhou, S.-R. Lin, N.-W. Lo	1154

Investigating Modern Cars D. Sladovic, D. Topolcic, K. Hausknecht, G. Sirovatka	1159
A Security Model for Wireless Sensor Networks A. Aliti, K. Sevrani	1165
Utilizing a Vulnerable Software Package to Teach Software Security Design Analysis N. Luburic, G. Sladic, B. Milosavljevic	1169
Implementation of Virtual Digital Forensic Class and Laboratory for Training, Education and Investigation D. Delija, G. Sirovatka, D. Tulicic, M. Zagar, K. Hausknecht, D. Topolcic, S. Gruicic	1175
Examining Security and Usability Aspects of Knowledge-Based Authentication Methods L. Bosnjak, B. Brumen	1181
Survey on Astroturfing Awareness B. Vukelic, B. Polonijo, M. Kaluza	1187
Neural Networks for File Fragment Classification K. Vulinovic, L. Ivkovic, J. Petrovic, K. Skracic, P. Pale	1194
UnProVET: Using Explicit Constraint Propagation to Construct Attack Graphs D. Gorbatenko, A. Semenov, S. Kochemazov	1199
The Importance of Integration of Information Security Management Systems (ISMS) to the Organization's Enterprise Information Systems (EIS) A. Luma, B. Abazi	1205
Development of a New International Behavioral-Cognitive Internet Security Questionnaire: Preliminary Results from Croatian and German Samples T. Velki, A. Mayer, J. Norget	1209
Investigating File Use and Knowledge with Windows 10 Artifacts A. Djuranec, D. Topolcic, K. Hausknecht, D. Delija	1213
Information Security in Principles and Provisions of EU Data Protection Law T. Katulic, N. Protrka	1219
Fair Exchange and Anonymous E-Commerce by Deploying Clone-Resistant Tokens A. Mars, W. Adi	1226

Business Intelligence Systems

Conceptual Framework for Entity Integration from Multiple Data Sources D. Orescanin, R. Tan, J. Ao	1232
Map-Matching on Big Data: A Distributed and Efficient Algorithm with a Hidden Markov Model M. Francia, E. Gallinucci, F. Vitali	1238
Structuring the Information Resources for Intelligent Ecosystem Monitoring System Based on Camera Traps V.V. Nicheporchuk, T.G. Penkova, I.V. Gryazin	1244
Detecting Credit Card Fraud Using Selected Machine Learning Algorithms M. Puh, L. Brkic	1250
An Empirical Study on the Impact of New Participants on Final Price Savings and Process of Electronic Reverse Auctions R. Delina, L. Senderáková, R. Olejárová, M. Macik	1256
Big Data for Smart Factories: A Bibliometric Analysis T. Bertoncel, M. Mesko, M. Pejic Bach	1261
Game-to-Game Prediction of NBA Players' Points in Relation to Their Season Average T. Zovak, A. Sarcevic, M. Vranic, D. Pintar	1266
Analysis of the Simulation-based Procurer Behavior Determinants R. Delina, R. Olejárová, M. Macik, L. Senderáková	1271
Automation of Data Lake Ingestion Process from Various Sources A. Tunjic	1276
Mining Learning Management System Data Using Interpretable Neural Networks M. Matetic	1282
General Solution Framework for Management and Monitoring of Cross-Platform Data Processes V. Banovic, I. Soric	1288
Digital Transformation Case Studies across Industries – Literature Review A. Kutnjak, I. Pihir, M. Tomicic Furjan	1293
A Project Management System for Time Planning and Resources Allocation T. Mladenova	1299
Influence of Digital Transformation Drivers on Business Model Creation L. Hrustek, M. Tomicic Furjan, I. Pihir	1304

Automated Decision-Making with DMN: from Decision Trees to Decision Tables	1309
D. Etinger, S.D. Simic, L. Buljubasic	
Hidden Costs of ERP Implementation	1314
M. Nikitovic, A. Mahmutovic	
 Digital Economy and Digital Society	
Workflow for Development and Integration of Digital Content for Holographic Displays	1319
J. Raychev, G. Hristov, D. Kinaneva, P. Zahariev, E. Kyostebekov	
Use of Hierarchical Clusters Analysis in Identification of Obstacles to Introduction of e-Commerce in European Countries	1325
M. Pejic Bach, K. Dumcic, B. Zmuk, A. Bartolic, J. Zoroja	
Cost-Effective Transition to Wi-Fi 5 Standard in Small Office / Home Office (SOHO) Environment	1331
A. Skendzic, B. Kovacic, L. Ljubcic	
Dedicated Wireless Personal Area Network Specification for Retail Shop Management	1337
N. Vlahovic, Z. Bace	
Electronic Auction in European and Croatian Public Procurement Law	1343
M. Rasic, M. Milenkovic, G. Vojkovic	
An Overview of Security Challenges of Seaport IoT Systems	1349
M. Jovic, E. Tijan, S. Aksentijevic, D. Cisc	
ICTs for Education: An Inclusive Approach to Addressing Challenges Faced by Roma Communities in Europe	1355
N.M. Novak, M. Rabiee, A M. Tjoa	
Information Systems in Sports Organizations: Case Study of the Sports Association of the City of Zadar	1362
J. Miocic, L. Zekanovic-Korona, B. Bosancic	
Developing a Communication Application System for Chamwino Small-Scale Farmers in Tanzania: A Participatory Design Research	1368
E. Misaki, M.-V. Apiola, S. Gaiani	
Smart Specialization within Industry 4.0 Network Strategies	1374
O. Kudrina, V. Omelyanenko, O. Saenko, Y. Hurbyk, V. Petrenko	
Digital Transformation Scoreboard – Case of Slovenia and Croatia	1380
M. Marolt, A. Pucihar, G. Lenart, D. Vidmar	

The Transition of Croatian Seaports into Smart Ports M. Jovic, N. Kavran, S. Aksentijevic, E. Tijan	1386
Students' Perception of Studying in Digital Environment and Preparedness for Workplaces in Digital Economy - Current State and Perspectives J. Glavas, I. Uroda, B. Mandic	1391
The Potential of ICT-Enabled Social Innovation I. Kedmenec, K. Detelj, N. Kadoic	1396
Ontology Literature Review as Guidelines for Improving Croatian Qualification Framework K. Klarin, I. Nazor, S. Celar	1402
E-Government Ecosystem: A New View to Explain Complex Phenomenon M.M. Rantanen, J. Koskinen, S. Hyrynsalmi	1408
Assessment of High Performance Computing Services Potential of SMEs M. Kljajic Borstnar, T. Ilijas	1414
The Role of University Technology Transfer Process in Digital Economy P. Karanikic, M. Matulja, E. Tijan	1419

Engineering Education

Comparison of Graduate Specialist Study of Computing and Specialist Study of Information Security and Digital Forensics at the Zagreb University of Applied Sciences D. Delija, G. Sirovatka, D. Tulicic, M. Zagar	1423
Introducing Cornerstone Courses into Electrical and Computer Engineering Curriculum B. Pejcinovic	1427
Education for Technology Transfer to Small and Medium Entrepreneurship - Results of the T4 Project Implementation F. Urem, C. Vlad, I. Voncila	1433
A System for Managing Classes with a Large Number of Participants V. Paunovic, S. Tomic, I. Bosnic, M. Zagar	1439
Gamification in Software Engineering Education G.I. Ivanova, V. Kozov, P. Zlatarov	1445
Enhancing Communication Competences through Mathematics in Engineering Curriculum P.V. Georgieva, E.P. Nikolova	1451

Computer-based Methods for Assessing Information Security Competencies Z. Deljkic, P. Pale, J. Petrovic	1457
3D Virtual Learning and Measuring Environment for Mechanical Engineering Education G.I. Ivanova, A. Ivanov, M. Radkov	1463
Laboratory Module for Training in the Subject “Specialized Communication Networks in the Vehicles” I.I. Stoev, V.A. Mutkov, A.N. Borodzhieva	1469
Modeling of Cryptosystems Based on Linear Feedback Shift Registers Using Spreadsheets A.N. Borodzhieva	1473
Assessment of Mental Fatigue during Examination Period with P300 Oddball Paradigm M. Zelenika Zeba, K. Friganovic, M. Palmovic, V. Isgum, M. Cifrek	1479

Software and Systems Engineering

Using Modern Web Frameworks when Developing an Education Application: A Practical Approach S. Ivanova, G. Georgiev	1485
Development of an Autonomous, Intelligent and Adaptive e-Learning System B. Sumak, V. Podgorelec, S. Karakatic, K. Dolenc, A. Sorgo	1492
Comparative Analysis of Faculties’ Websites Accessibility Based on an Automatic Evaluation K. Kous, S. Kuhar, M. Pusnik, B. Sumak	1498
Development of a New Improved Model of ISO 20000 Standard Based on Recommendations from ISO 27001 Standard A. Tanovic, I. Serna Marjanovic	1503
Smart Tools in Software Engineering: A Systematic Mapping Study D. Savchenko, J. Kasurinen, O. Taipale	1509
PRINCE2 vs Scrum in Digital Business Transformation A. Cerimagic Hasibovic, A. Tanovic	1514
Bridging the Gap between Software Architecture and Business Model Development: A Literature Study S. Hyrynsalmi, S. Rauti, E. Kaila	1519
Ontology as a Modeling Tool within Model Driven Architecture Abstraction B. Bucko, K. Záborská, M. Záborský	1525

Continuous Integration in Distributed Applied Software Packages A.G. Feoktistov, S.A. Gorsky, I.A. Sidorov, A. Tchernykh	1531
Adapting God Class Thresholds for Software Defect Prediction: A Case Study M. Gradisnik, T. Beranic, S. Karakatic, G. Mause	1537
Parametric versus Direct Modeling in Manufacturing Process Management M. Fandáková, B. Bucko, K. Záborská	1543
Graph Database Approach for Data Storing, Presentation and Manipulation I. Folic, K. Solic	1548
Design and Development of an Automated Web Crawler Used for Building Image Databases Y. Kalmukov, I. Valova	1553
Spatial Data Integration in Heterogeneous Information Systems' Environment M. Ponjavic, A. Karabegovic, E. Ferhatbegovic, I. Besic	1559
Design and Implementation of Smart Contract: A Use Case for Geo-Spatial Data Sharing E. Leka, L. Lamani, B. Selimi, E. Deçolli	1565
 Composability, Comprehensibility and Correctness of Working Software	
Knowledge Engineering Paradigms for Smart Education and Learning Systems – <i>Invited Paper</i> A.-B. Salem, A.Y. Nikitaeva	1571
Comparing Software Complexity of Monadic Error Handling and Using Exceptions G. Nagy	1575
Delivering Comprehension Features into Source Code Editors through LSP M. Mészáros, M. Cserép, A. Fekete	1581
Multitasking on Microcontrollers Using Task Oriented Programming M. Lubbers, P. Koopman, R. Plasmeijer	1587
Designing Early Testing Course Curricula with Activities Matching the V-Model Phases T. Hynninen, A. Knutas, J. Kasurinen	1593
Software Evolution and Profiling in a Competitive Environment C. Szabó	1599

Project-Based Approach to Teaching Event-Driven Simulation S. Korecko	1604
Influence of Student Computer Literacy on Qualification for Creating Virtual Learning Environments D. Karuovic, I. Tasic, C. Szabó, V. Vidacek Hains, Z. Namestovski, M. Kocaleva, D. Glusac, D. Milanov	1609

Mipro Junior – Student Papers

Using Convolutional Neural Networks for Emoticon Classification K. Burnik, D. Bjelobrk Knezevic	1614
Visualizations of the Training Process of Neural Networks K. Babic, A. Mestrovic	1619
Mask R-CNN for Ear Detection M. Bizjak, P. Peer, Z. Emersic	1624
Utilizing Apple's ARKit 2.0 for Augmented Reality Application Development I. Permozer, T. Orehovacki	1629
Development of Android Application for Gender, Age and Face Recognition Using OpenCV A. Salihbasic, T. Orehovacki	1635
Overview and Comparison of Several Relational Database Modelling Metodologies and Notations I. Puja, P. Poscic, D. Jaksic	1641
Development of 2D Game with Construct 2 A. Sag, T. Orehovacki	1647
Network and Service Performance Case Study in a High School Equipped in the Scope of the Pilot Project e-Schools K. Pavlinic, L. Skorin-Kapov	1653
An Overview of Clustering Models with an Application to Document Clustering I. Pauletic, L. Nacinovic Prskalo, M. Brkic Bakaric	1659
New Frontiers in Document Classification with Applications to Medical Context L. Amelio, A. Amelio	1665
Exploring Aspects of Polyglot High-Performance Virtual Machine GraalVM M. Sipek, B. Mihaljevic, A. Radovan	1671
Analysis of Garbage Collection Algorithms and Memory Management in Java P. Pufek, H. Grgic, B. Mihaljevic	1677

Author index

Abazi, B.	1205	Begic Fazlic, L.	1025
Abazi-Bexheti, L.	737	Begovic, M.	409
Adi, W.	971, 1226	Belli, A.	463, 469
Afric, P.	919, 925	Benko, G.	196
Aglic Cuvic, M.	605	Bento, L.	326
Ajdaraga, E.	295, 336	Beranic, T.	1537
Aksentijevic, S.	1349, 1386	Bergeron, L.	1049
Alajbeg, T.	532	Berman, A.F.	1138
Aleksic-Maslac, K.	766	Bermudes, D.V.	795
Aliti, A.	1165	Bernad, P.	715
Almeida, I.	703	Bernik, A.	637
Amelio, A.	1665	Bertoncel, T.	1261
Amelio, L.	1665	Besic, I.	1559
Ao, J.	1232	Besjedica, T.	457
Apiola, M.-V.	627, 687, 1368	Beslo, D.	266
Apostolova-Trpkovska, M.	737	Bikov, T.D.	447
Arbanas, M.	163	Bilalovic, O.	256
Arbet, D.	53	Bilandzija, D.	92, 98
Arminen, H.	557	Biondic, I.	92, 98
Arrabito, L.	190	Bizjak, M.	1624
Arsoski, S.	133	Bjelcic, N.	392
Assunção, P.	314, 326	Bjelobrk Knezevic, D.	600, 1614
Atanasov, V.T.	649	Blaskovic, B.	837
Auinger, B.	102	Blaskovic, K.	955
Avbelj, V.	279	Blazevic B.	451
Avdagic, Z.	256	Bodano, E.	87
Babic, A.	888	Bodrusic, I.	475
Babic, D.	76, 138	Bogatinovski, J.	320
Babic, K.	1619	Bogdanova, V.G.	236, 1043
Babic, M.	731	Bojovic, V.	266
Babic, S.	882	Bondarenko, Y.A.	779
Babic, T.	731, 843	Bonnet, A.	190
Bace, Z.	1337	Borodzhieva, A.N.	1469, 1473
Bacmaga, J.	82	Borozan, L.	330
Baev, B.	1082	Bosancic, B.	1362
Baeva, D.	773, 1082	Boshkovska, M.	342
Balashov, D.I.	795	Bosnic, I.	1439
Balon, B.	671	Bosnjak, L.	1181
Ban, E.	568	Bours, P.	1049
Ban, Z.	174, 180	Bratulic, J.	138
Bandiziol, A.	112	Bregeon, J.	190
Banovic, V.	1288	Brezany, P.	289, 381
Banovic-Curguz, N.	404	Brezovec, I.	65
Barac, V.	451	Brizic, A.	76
Baric, A.	59, 65, 82, 108	Brkic Bakaric, M.	871, 1659
Baric, I.	1076	Brkic, L.	1250
Bartolic, A.	1325	Brkic, M.	163
Bastasic, T.	827	Brloznik, M.	279
Bednjanec, A.	633	Bronzin, T.	1087

Brühl, R.	357	Dick, J.F.	19
Brumen, B.	1181	Dincir, D.	949
Bucko, B.	1525, 1543	Diramali Dildar, F.	877
Budic, D.	475	Dizdarevic, J.	435
Buhin, M.	508	Djunic, M.	1105
Buljbasic, L.	1309	Djuranec, A.	1213
Bunic, D.	759	Djurovic, G.	677
Burget, R.	381	Dobrovic, Z.	849
Burnik, K.	1614	Dobsa, J.	637
Buselic, V.	800	Dojchinovski, D.	284
Camarasu-Pop, S.	190	Dolchinkov, R.	1066
Canzar, S.	330	Dolenc, K.	1492
Capko, Z.	888	Dolensek, J.	827
Carpio, F.	435	Domanjko Petric, A.	279
Carrato, S.	989	Domazet-Loso, M.	262
Causevic, S.	409, 415	Domazet-Loso, T.	262
Cavrak, I.	913	Dorodnykh, N.O.	1138
Celar, S.	1402	Dragic, L.	966
Cerimagic Hasibovic, A.	1514	Drushlyak, M.G.	779
Cherkashin, E.	1037	Duic, M.	502
Chiussi, S.	1	Dumicic, K.	1325
Chkana, Y.O.	789	Dundjer, I.	577, 583
Cifrek, M.	1479	Duspara, A.	966
Cisic, D.	1349	Dzeko, M.	849
Cizmesija, A.	742	Dzeroski, S.	1110
Clausen, C.J.	7	Ebibi, M.	747
Cobrnica, M.	966	Edward, M.	381
Colak, A.	605	Elogail, Y.	7
Concetti, R.	463, 469	Elsayed, A.	13, 19
Corak, N.	262	Emersic, Z.	1624
Coric, R.	1105	Etinger, D.	1309
Cortiula, A.	112	Fandáková, M.	1543
Coza, A.	128	Faria, S.	314, 326
Cristofoli, A.	112	Fekete, A.	1581
Cserép, M.	1581	Feoktistov, A.G.	1531
Cuate, O.	149	Ferhatbegovic, E.	1559
Cunha, F.	326	Fetaji, B.	747
Dadic, M.	491	Fetaji, M.	747
Darabkh, K.A.	496	Filipovic Tretinjak, M.	547
Dartmann, G.	1025	Fonseca-Pinto, R.	314, 326
Davidovic, D.	309	Forte, M.D.	877
Dazzi, M.	112	Fosic, I.	1548
De Bortoli, L.	989	Francia, M.	1238
Deçolli, E.	1565	Friganovic, K.	1479
Delac, G.	919, 925	Friscic, F.	491
Delija, D.	1175, 1213, 1423	Funk, H.S.	1, 7
Delina, R.	1256, 1271	Futo, M.	262
Deljkic, Z.	1457	Fuzul, E.	521
Demirovic, D.	251	Gaiani, S.	1368
Depolli, M.	200, 309	Gallinucci, E.	1238
Detelj, K.	1396	Gartner, S.	622
Deutschmann, B.	102	Gay, P.	190

Gebert, L.	13	Iles, S.	960
Georgiev, G.	594, 1485	Iliev, T.B.	441, 447
Georgiev, T.S.	611	Ilievski, A.	284
Georgieva, P.V.	1066, 1451	Ilijas, T.	1414
Gillon, R.	82	Ilisevic, D.	404
Glavan, M.	47	Incipini, L.	463, 469
Glavas, J.	1391	Ionova, I.M.	779
Gleich, D.	251	Isgum, V.	1479
Glusac, D.	1609	Issa, M.F.	369
Glushnev, V.D.	143	Ivanjko, T.	537, 617
Golusin, L.-M.	138	Ivanoska, I.	983, 1013, 1019
Gorbatenko, D.	1199	Ivanov, A.	1463
Gorsky, S.A.	236, 1043, 1531	Ivanova, A.S.	649
Gradisnik, M.	1537	Ivanova, G.I.	773, 1445, 1463
Grasso F.	149, 153	Ivanova, S.	594, 1485
Grbic, R.	1076	Ivasic-Kos, M.	995, 1126
Grd, P.	1099	Ivkovic, L.	1194
Grenier, T.	190	Ivsic, B.	491
Grgic, B.	949	Jaakkola, H.	818, 860
Grgic, H.	1677	Jakovcic, A.	451
Grgic, S.	138	Jaksic, D.	1641
Grollitsch, W.	112	Jan, M.	301
Grönman, J.	1055, 1072	Janatova, M.	381
Grubesa, T.	138	Jazbinsek, V.	357
Grubisic, I.	309	Jelic, S.	1105
Grubjesic, I.	617	Jericevic, Z.	218
Gruicic, S.	1175	Jodko-Wladzinska, A.	357
Gryazin, I.V.	1244	Jovic, A.	977
Guberovic, E.	913	Jovic, M.	1349, 1386
Gusev, M.	186, 284, 295, 336, 342	Jugo, I.	753, 759
Guzzi, F.	989	Juhasz, Z.	196, 369
Hackl, H.	102	Jukan, A.	435
Hallawa, A.	1025	Jukic, O.	431
Hamar, V.	190	Jurekovic, D.	568
Hausknecht, K.	1159, 1175, 1213	Juricic, V.	521, 542
Hedji, I.	431	Juriscic, D.	128
Henno, J.	818, 860	Kadoic, N.	849, 1396
Hernandez, F.	190	Kadriu, A.	737
Höfler, M.	552	Kadunc Kos, V.	279
Hoic-Bozic, N.	677	Kafadar, M.	256
Holenko Dlab, M.	677	Kaila, E.	627, 643, 1519
Homen Pavlin, M.	709	Kajasilta, H.	643
Hrga, I.	995	Kakalejcik, L.	661
Hristov, G.	907, 1060, 1319	Kalajdziski, S.	983
Hrustek, L.	1304	Kalajzic, V.	831
Hrvatnic, K.	960	Kalmukov, Y.	1553
Hujala, M.	557	Kaluza, M.	1187
Hurbyk, Y.	1374	Kaniski, M.	637
Hynninen, T.	557, 1593	Kao, C.-H.	1150
Hyrynsalmi, S.	1408, 1519	Karabegovic, A.	1559
Ibel, M.	102	Karakatic, S.	1492, 1537
Ibrani, M.	157, 480, 486	Karanikic, P.	1419

Karunaratne, T.	627	Kyostebekov, E.	907, 1319
Karuovic, D.	1609	Laakso, M.-J.	627, 643, 687
Kastelan, I.	667	Lackovic, A.	843
Kasurinen, J.	1509, 1593	Lai, Y.-C.	1150, 1154
Katulic, T.	1219	Lamani, L.	1565
Kavran, N.	1386	Larsson, P.	687
Kedmenec, I.	1396	Lartizien, C.	190
Keselj, A.	457	Lasic, A.	174
Keser, T.	163	Leka, E.	1565
Khalifeh, A.F.	496	Lenart, G.	1380
Khristyuk, V.	1132	Lenart, M.	381
Kinaneva, D.	907, 1060, 1319	Li, G.	1049
Klarin, K.	1402	Limani Fazliu, Z.	157, 480
Kljajic Borstnar, M.	1414	Lin, S.-R.	1154
Knezevic, T.	24, 30	Lindén, M.	270, 275, 301
Knutas, A.	557, 1593	Linna, P.	1072
Kocaleva, M.	1609	Ljubicic, L.	1331
Kocan, M.	398	Ljubovic, V.	242, 571
Kocev, D.	320	Lo, N.-W.	1150, 1154
Kochemazov, S.	1121, 1199	Lokar, N.	41
Kondratiuk, S.M.	779	Lovic, A.	589
Koopman, P.	1587	Lubbers, M.	1587
Korecko, S.	1604	Luburic, N.	1169
Koricic, M.	70	Lucic, B.	266
Köse Cihangir, N.	1001	Luma, A.	1205
Kosec, G.	206, 212	Macik, M.	1256, 1271
Koska, S.	262	Mahmutovic, A.	1314
Koskinen, J.	1408	Major, V.	82
Kostelac, L.	949	Mäkelä, J.	818, 860
Kostovska, A.	1110	Males, L.	1093
Kostylev, D.	943	Malnar, B.	1001
Kous, K.	1498	Maloku, H.	157, 480
Kováč, M.	53	Maltugueva, G.S.	1031
Kovac, M.	966	Mandic, B.	1391
Kovacic, B.	753, 759, 1331	Mandic, T.	108
Kozov, V.	1445	Marcetic, D.	1093
Kraft, J.	36	Marcon, M.	112
Krakers, M.	30	Marhl, U.	357
Kranjcevic, L.	375	Maric, J.	348
Krasna, M.	622	Markovic, I.	949
Kristo, F.	913	Markovinovic, I.	122
Kristo, M.	1126	Marolt, M.	1380
Krivic, P.	913	Mars, A.	1226
Kruselj, D.	174	Marsi, S.	989
Kudrina, O.	1374	Martin, L.	1025
Kuhar, S.	1498	Matejic, M.	843
Kulakov, A.	1013	Mateljan, V.	421
Kundrata, J.	133	Matetic, M.	1282
Kurdija, A.S.	919, 925	Matijascic, M.	117
Kurvinen, E.	643	Matijevic, D.	330
Kutnjak, A.	1293	Matulja, M.	1419
Kuzmic, S.	47	Matusko, J.	960

Mausa, G.	1537	Nikitaeva, A.Y.	1571
Mayer, A.	1209	Nikitovic, M.	1314
Medved Rogina, B.	309	Nikolaychuk, O.A.	1138
Meinhardt, G.	36	Nikolova, E.P.	1451
Mekuli, A.	157, 486	Nonis, R.	112
Mekyska, J.	289	Norget, J.	1209
Menin, D.	112	Novak, N.M.	1355
Merzel, F.	133	Nuic, H.	230
Mesko, M.	1261	Nyarko, E.K.	1076
Mestrovic, A.	1619	Oehme, M.	7
Mészáros, M.	1581	Okanovic, V.	693
Mezak, J.	697	Olejárová, R.	1256, 1271
Mihajlovic, Z.	230	Omelyanenko, V.	1374
Mihaljevic, B.	1671, 1677	Op't Landy, S.	108
Mihaylov, G.Y.	447	Oparin, G.A.	236
Mijic, I.	1007	Orehovacki, T.	882, 1629, 1635, 1647
Mikhailov, A.	1037, 1132	Orescanin, D.	1232
Mikulic, J.	59, 65	Osrecki, Z.	70
Milanov, D.	1609	Ostroha, M.M.	789
Milenkovic, M.	1343	Paiva, R.	314
Milenkovski, M.	983	Pajic, E.	571
Miletic, M.	168	Pale, P.	1194, 1457
Miljkovic, D.	931, 937	Palestri, P.	112
Miloloza, I.	806	Palma, L.	463, 469
Milosavljevic, B.	1169	Palmovic, M.	1479
Milovan, D.	955	Paľová, D.	661
Miocic, J.	1362	Panov, P.	1110
Mirceva, G.	1013, 1019	Pap, K.	1087
Misaki, E.	1368	Papic, A.	508
Mladenova, T.	1299	Papic, S.	731
Mlinaric, H.	966	Paramonov, V.	1037, 1132
Mocnik-Berljavac, J.	212	Pashinin, A.A.	236
Mohammad, M.	971	Paukovic, H.	168
Mohorcic, M.	309	Pauletic, I.	1659
Molnar, G.	117	Paunovic, V.	1439
Moreira, A.	703	Pavkovic, B.	667
Mota, N.	877	Pavlenko, A.	1144
Mozek, M.	41	Pavlinic, K.	1653
Mrvac, N.	637	Pavlovski, M.	577, 583
Muha, D.	491	Pecar, B.	41
Mujezinovic, A.	242	Peer, P.	1624
Mulhem, S.	971	Peine, A.	1025
Musil, B.	622	Pejcinovic, B.	1427
Mutkov, V.A.	1469	Pejic Bach, M.	806, 1261, 1325
Nacinovic Prskalo, L.	1659	Pejic Papak, P.	697
Nagy, G.	1575	Penkova, T.G.	1244
Namestovski, Z.	1609	Pereira, P.	314
Nanver, L.K.	24, 30	Peric, A.	168, 180
Narra, N.	1072	Permozer, I.	1629
Naumoski, A.	1013, 1019	Pesek, I.	622
Nazor, I.	1402	Petrenko, V.	1374
Nicheporchuk, V.V.	1244	Petrenko, Y.I.	795

Petrinovic, D.	1007	Resnik, D.	41
Petrovic, J.	1194, 1457	Révészová, L.	681
Petrovic, N.	270, 275	Rezaee Borj, P.	1049
Petrushevski, S.	186	Ribaric, S.	1093
Phung, C.V.	435	Ribeiro, J.	703
Pierleoni, P.	463, 469	Risman, P.O.	270
Pihir, I.	1293, 1304	Rodic, B.	655
Pilat, N.	180	Rozumenko, A.M.	789
Piljic, I.	966	Ruzic, I.	877
Pintar, D.	1266	Saari, M.	1055
Pirkic, B.	375	Saenko, O.	1374
Plasmeijer, R.	1587	Safarova, K.	289
Podgorelec, V.	1492	Sag, A.	1647
Poljak, M.	47	Sagmeister, M.	36
Polonijo, B.	1187	Sajn, L.	363
Ponjavic, M.	1559	Salem, A.-B.	1571
Poposka, L.	336	Salihbasic, A.	1635
Popovic, M.	667	Sambas, A.	153
Poscic, P.	1641	Sander, T.H.	357
Potocný, M.	53	Sarabok, A.	431
Povolni, P.	7	Sarcevic, A.	1266
Pozek, M.	925	Savchenko, D.	1509
Prasljivic, A.	387	Scapol, M.	112
Prazina, I.	693	Schatten, M.	1099
Prohaska, Z.	896	Schatzberger, G.	59, 65
Prohaska, Z.	896	Schmeink, A.	1025
Prole, B.	1087	Schoegler, J.	36
Protrka, N.	1219	Schuetze, O.	149
Pucihar, A.	1380	Schulze, J.	1, 7, 13, 19
Pufek, P.	1677	Schwarz, D.	1, 7, 13, 19
Puh, M.	1250	Sela, E.	480
Puja, I.	1641	Selimi, B.	1565
Pürcher, P.	552	Semenikhina, O.V.	779
Pusnik, M.	1498	Semenov, A.	1121, 1144, 1199
Rabiee, M.	1355	Senderáková, L.	1256, 1271
Radic, J.	163	Seremet, I.	415
Radkov, M.	1463	Serifovic Trbalic, A.	251
Radolovic, D.	868	Serna Marjanovic, I.	1503
Radosevic, D.	637	Serov, A.N.	143
Radosevic, M.	521, 542	Serov, N.A.	143
Radovan, A.	1671	Serra, C.	1
Ramic, A.	387	Sertic, M.	514
Ramponi, G.	989	Sevrani, K.	1165
Rantanen, M.M.	1408	Shigarov, A.	1037, 1132
Rantanen, P.	1055	Shishenko, I.V.	795
Rashkovska Koceva, A.	275, 279, 320	Sidorov, I.A.	1531
Rasic, M.	1343	Sikic, L.	919, 925
Rauti, S.	1519	Sikic, M.	348
Raychev, J.	907, 1060, 1319	Silic, M.	919, 925
Raznjevic Zdrilic, M.	831	Sillberg, P.	1055
Rendulic, J.	138	Simic, M.	671
Repnik, R.	715	Simic, S.D.	1309

Simidjievski, N.	1110	Tan, R.	1232
Sinkovic, B.	766	Tanash, R.M.	496
Sipek, M.	1671	Tanovic, A.	1503, 1514
Siranovic, Z.	600	Tasic, I.	1609
Siroki, T.	262	Távora, L.	314, 326
Sirovatka, G.	1159, 1175, 1423	Tchernykh, A.	1531
Skala, K.	222, 266, 375	Thalheim, B.	860
Skejic, E.	251	Tijan, E.	1349, 1386, 1419
Skendzic, A.	1331	Tjoa, A M.	1355
Skopljanac-Macina, F.	837	Tlelo-Cuautle, E.	149, 153
Skorin-Kapov, L.	1653	Todorovski, L.	1110
Skracic, K.	475, 1194	Tolic, I.P.	59
Sladic, G.	1169	Tolovski, I.	1110
Sladovic, D.	1159	Tolstikhin, A.	943
Slak, J.	206, 212	Tomasic, I.	270, 275, 301
Slavuj, V.	753	Tomic, D.	375
Smekal, Z.	289	Tomic, S.	1439
Smirnov, Y.	87	Tomicic Furjan, M.	1293, 1304
Smolander, K.	901	Tomicic, I.	1099
Sojat, Z.	222	Topolcic, D.	1159, 1175, 1213
Sokele, M.	532	Trbalic, A.	251
Sokolov, S.A.	441	Trinajstic, N.	266
Solic, K.	1548	Trivodaliev, K.	983
Sorgo, A.	1492	Trobec, R.	200, 301, 309
Soric, I.	1288	Tsaregorodtsev, A.	190
Soric, K.	854	Tulicic, D.	1175, 1423
Sovic Krzic, A.	589	Tulupov, M.	87
Spernjak, A.	827	Tunjic, A.	1276
Stancin, I.	977	Tuparov, G.	727
Stanisavljevic, V.	247	Tuparova, D.	722, 727
Stapic, Z.	742	Tutavac, J.	138
Stepankova, O.	381	Udovychenko, O.M.	789
Stipic, A.	1087	Ul'yanov, S.	943
Stipic, D.	138	Ullah, M.	901
Stockreiter, C.	102	Uller, M.	381
Stoev, I.I.	1469	Ulyantsev, V.	1144
Stojanovic, B.	206	Ungermanns, C.	783
Stojkovic, N.	122	Unnervik, A.	1001
Stopjaková, V.	53	Urem, F.	568, 1433
Stoyanov, I.S.	441, 447	Uroda, I.	896, 1391
Subotskaya, V.	87	Ushakov, A.V.	1116
Suligoj, T.	24, 70	Vaidyanathan, S.	153
Sumak, B.	1492, 1498	Valencic, D.	421
Sunde, V.	168, 174, 180	Valova, I.	1553
Suznjevic, M.	709	Vasiljevic Toskic, M.	163
Svec, M.	960	Vasilyev, I.	1116
Svelec, D.	392	Vaupotic, N.	715
Sverko, Z.	122	Vejacka, M.	562
Szabó, C.	1599, 1609	Veleva, V.	727
Tadic, L.	919	Velikic, G.	667
Tadic, V.	600	Velki, T.	1209
Taipale, O.	1509	Vidacek Hains, V.	1609

Vidmar, D.	1380	Yang, C.-K.	1150
Vinko, D.	92, 98	Yurchenko, A.O.	789
Vitali, F.	1238	Yurin, A.Y.	1031, 1138
Vlad, C.	1433	Zábovská, K.	1525, 1543
Vladimir, K.	919, 925	Zábovský, M.	1525
Vlahinic, S.	122	Zagar, M.	1175, 1423, 1439
Vlahovic, N.	1337	Zahariev, P.	907, 1060, 1319
Vlaskovic, M.	36	Zaikin, O.	1144
Vojkovic, G.	1343	Zakarija, I.	837
Voncilă, I.	1433	Zdraveski, V.	186
Vrana, R.	526	Zekanovic-Korona, L.	1362
Vranesic, P.	766	Zelenika Zeba, M.	1479
Vranic, M.	1266	Zhou, K.-Z.	1154
Vranjes, M.	667	Zigunov, V.M.	795
Vrebcevic, N.	1007	Zilak, J.	70
Vrkic, D.	812	Zilak, M.	457
Vrtacnik, D.	41	Zima Krnelic, L.	877
Vukelic, B.	1187	Zimmermann, H.	36
Vukic, M.	949	Zlatarov, P.	773, 1445
Vukmirovic, S.	888	Zmuk, B.	1325
Vulinovic, K.	1194	Zoroja, J.	806, 1325
Wagner, M.	783	Zovak, T.	1266
Wassong, P.	190	Zupan, I.	174
Weiser, M.C.	1	Zuppa Baksa, V.	633
Weißhaupt, D.	1, 7	Zvoncak, V.	289
Werth, W.	783		