



**Technical University of Sofia**  
**Faculty of Computer Systems and Technologies**



# **P R O G R A M**

**9th BALKAN CONFERENCE IN INFORMATICS**

**26-28 September 2019**

**Technical University of Sofia, Bulgaria**

**General Sponsor**

**vmware®**

THE MAIN OBJECTIVE OF THE BCI SERIES OF CONFERENCES IS TO PROVIDE A FORUM FOR DISCUSSIONS AND DISSEMINATION OF RESEARCH ACCOMPLISHMENTS IN COMPUTER SCIENCE AND INFORMATION TECHNOLOGY AND TO PROMOTE INTERACTION AND COLLABORATION AMONG SCIENTISTS FROM THE BALKAN COUNTRIES AND THE REST OF THE WORLD, AND TO ENCOURAGE INVOLVEMENT OF YOUNG RESEARCHERS FROM THE REGION.

THE 9TH BALKAN CONFERENCE IN INFORMATICS (BCI 2019) CONTINUES THE TRADITION OF BCI CONFERENCES HELD IN SKOPJE (2017), CRAIOVA (2015), THESSALONIKI (2013), NOVI SAD (2012), THESSALONIKI (2009), SOFIA (2007), OHRID (2005), AND THESSALONIKI (2003).

## General Sponsor

The VMware logo is displayed in a dark grey, lowercase, sans-serif font. The letters are rounded and connected, with a registered trademark symbol (®) at the top right of the word.

## Gold Sponsor

The Visteon logo is in orange lowercase letters, and the KONTRAX logo is in green uppercase letters with a stylized, blocky font. Both logos include a registered trademark symbol (®).

## Silver Sponsor

The SAP logo consists of the letters 'SAP' in white, bold, uppercase font, set against a blue square background with a white diagonal line from the top-left to the bottom-right. A registered trademark symbol (®) is located at the bottom right of the logo.

### **CONFERENCE GENERAL CHAIRPERSONS**

**GEORGE ELEFThERAKIS, THE UNIVERSITY OF SHEFFIELD INTERNATIONAL FACULTY, GREECE  
MILENA LAZAROVA, TECHNICAL UNIVERSITY OF SOFIA, BULGARIA**

### **PROGRAM COMMITTEE CHAIRPERSONS**

**ADELINA ALEKSIEVA-PETROVA, TECHNICAL UNIVERSITY OF SOFIA, BULGARIA  
ANTONIYA TASHEVA, TECHNICAL UNIVERSITY OF SOFIA, BULGARIA**

### **ORGANIZING COMMITTEE**

**DANIELA MINKOVSKA, TECHNICAL UNIVERSITY OF SOFIA, BULGARIA  
GEORGY ZAPRYANOV, TECHNICAL UNIVERSITY OF SOFIA, BULGARIA  
IVA NIKOLOVA, TECHNICAL UNIVERSITY OF SOFIA, BULGARIA  
LYUDMILA STOYANOVA, TECHNICAL UNIVERSITY OF SOFIA, BULGARIA  
RALITSA PEYCHEVA, TECHNICAL UNIVERSITY OF SOFIA, BULGARIA  
ROUMEN TRIFONOV, TECHNICAL UNIVERSITY OF SOFIA, BULGARIA  
VALENTIN MOLLOV, TECHNICAL UNIVERSITY OF SOFIA, BULGARIA  
VIRGINIA DIMITROVA, TECHNICAL UNIVERSITY OF SOFIA, BULGARIA**

### **STEERING COMMITTEE CHAIR**

**YANNIS MANDLOPOULOS, ARISTOTLE UNIVERSITY, THESSALONIKI**

### **STEERING COMMITTEE MEMBERS**

**BETIM CICO, "EPOKA" UNIVERSITY, ALBANIA  
COSTIN BĂDICĂ, UNIVERSITY OF CRAIOVA, ROMANIA  
GEORGE EVANGELIDIS, UNIVERSITY OF MACEDONIA, THESSALONIKI, GREECE  
ILIANA NIKOLOVA, UNIVERSITY OF SOFIA, BULGARIA  
ILIA NINKA, UNIVERSITY OF TIRANA, ALBANIA  
KATERINA ZDRAVKOVA, UNIVERSITY OF STS CYRIL AND METHODIUS, NORTH MACEDONIA  
MARGITA KON-POPOVSKA, UNIVERSITY OF STS CYRIL AND METHODIUS, NORTH MACEDONIA  
MARJAN GUŠEV, UNIVERSITY OF STS CYRIL AND METHODIUS, NORTH MACEDONIA  
MIRJANA IVANOVIC, UNIVERSITY OF NOVI SAD, SERBIA  
PETROS KEFALAS, THE UNIVERSITY OF SHEFFIELD INTERNATIONAL FACULTY, CITY COLLEGE, GREECE  
ROUMEN NIKOLOV, UNIVERSITY OF LIBRARY STUDIES AND INFORMATION TECHNOLOGIES, BULGARIA  
ZORAN BUDIMAC, UNIVERSITY OF NOVI SAD, SERBIA**

## PROGRAM COMMITTEE MEMBERS

ADELINA ALEKSIEVA-PETROVA, TECHNICAL UNIVERSITY - SOFIA, BULGARIA  
ADRIAN GROZA, TECHNICAL UNIVERSITY OF CLUJ-NAPOCA, ROMANIA  
ADRIAN IFTENE, ALEXANDRU IOAN CUZA UNIVERSITY OF IASI, ROMANIA  
ALEKSANDRA KLASNJA-MILICEVIC, FACULTY OF SCIENCES, NOVI SAD, SERBIA  
ALEXANDER CHATZIGEORGIOU, UNIVERSITY OF MACEDONIA, THESSALONIKI, GREECE  
AMELIA BĂDICĂ, UNIVERSITY OF CRAIOVA, ROMANIA  
ANA PROYKOVA, UNIVERSITY OF SOFIA, BULGARIA  
ANASTAS MISHEV, UNIVERSITY OF STS. CYRIL AND METHODIUS, NORTH MACEDONIA  
ANCA VASILESCU, TRANSILVANIA UNIVERSITY OF BRAȘOV, ROMANIA  
ANTONIYA TASHEVA, TECHNICAL UNIVERSITY - SOFIA, BULGARIA  
ARDA YURDAKUL, BOGAZICI UNIVERSITY, ISTANBUL, TURKEY  
ARZUCAN ÖZGÜR, BOGAZICI UNIVERSITY, ISTANBUL, TURKEY  
AVGUSTOS TSINAKOS, TEI OF KAVALA, GREECE  
AZIR ALIU, SOUTH EAST EUROPEAN UNIVERSITY, TETOVO, NORTH MACEDONIA  
BAZIL PĂRV, BABEȘ-BOLYAI UNIVERSITY OF CLUJ-NAPOCA, ROMANIA  
BEKIM FETAJI, SOUTH EAST EUROPEAN UNIVERSITY, NORTH MACEDONIA  
BETIM CICO, "EPDKA" UNIVERSITY, ALBANIA  
BLAGOJ DELPETREV, UNIVERSITY GOCE DELCEV, NORTH MACEDONIA  
BORIS MILAŠINOVIC, UNIVERSITY OF ZAGREB, CROATIA  
BORIS RACHEV, TECHNICAL UNIVERSITY OF VARNA, BULGARIA  
BORIS TUDJAROV, TECHNICAL UNIVERSITY - SOFIA, BULGARIA  
CHRISTOS DOULIGERIS, UNIVERSITY OF PIRAEUS, GREECE  
CHRISTOS K. GEORGIADIS, UNIVERSITY OF MACEDONIA, THESSALONIKI, GREECE  
COSTIN BĂDICĂ, UNIVERSITY OF CRAIOVA, ROMANIA  
CVETA MARTINOVSKA, UNIVERSITY GOCE DELCEV, NORTH MACEDONIA  
CVETANA KRSTEV, UNIVERSITY OF BELGRADE, SERBIA  
DAMIR KALPIC, UNIVERSITY OF ZAGREB, CROATIA  
DANA PETCU, WEST UNIVERSITY OF TIMIȘOARA, ROMANIA  
DANA SIMIAN, LUCIAN BLAGA UNIVERSITY OF SIBIU, ROMANIA  
DANIELA MINKOVSKA, TECHNICAL UNIVERSITY - SOFIA, BULGARIA  
DANIELA ZAHARIE, WEST UNIVERSITY OF TIMIȘOARA, ROMANIA  
DEJAN GJORGJEVIKJ, UNIVERSITY ST. CYRIL AND METHODIUS, NORTH MACEDONIA  
DELYAN GENKOV, TECHNICAL UNIVERSITY - GABROVO, BULGARIA  
DEMOSTHENES STAMATIS, ALEXANDER TEI OF THESSALONIKI, GREECE  
DILYANA BUDAKOVA, TECHNICAL UNIVERSITY - SOFIA, BRANCH PLOVDIV, BULGARIA  
DIMITAR TRAJANOV, UNIVERSITY SS CYRIL AND METHODIUS, NORTH MACEDONIA  
DIMITRIS DRANIDIS, THE UNIVERSITY OF SHEFFIELD INTERNATIONAL FACULTY, GREECE  
DRAGAN JANKOVIĆ, UNIVERSITY OF NIS, SERBIA  
EFTHIMIOS TAMBOURIS, UNIVERSITY OF MACEDONIA, THESSALONIKI, GREECE  
ELINDA KAJO MECE, POLYTECHNIC UNIVERSITY OF TIRANA, ALBANIA  
ELIDR VILA, UNIVERSITY "ALEKSANDĚR XHUVANI", ALBANIA  
ELVIRA POPESCU, UNIVERSITY OF CRAIOVA, ROMANIA  
FLORIN LEON, GHEORGHE ASACHI TECHNICAL UNIVERSITY OF IASI, ROMANIA  
GALIDIA PETROVA, TECHNICAL UNIVERSITY - SOFIA, BRANCH PLOVDIV, BULGARIA  
GALINA ILIEVA, UNIVERSITY OF PLOVDIV "PAISII HILENDARSKI", BULGARIA  
GEORGE A. GRAVVANIS, DEMOCRITUS UNIVERSITY OF THRACE, GREECE  
GEORGE A. VOUDOS, UNIVERSITY OF PIRAEUS, GREECE  
GEORGE ELEFTHERAKIS, THE UNIVERSITY OF SHEFFIELD INTERNATIONAL FACULTY, GREECE  
GEOGI ZAPRYANOV, TECHNICAL UNIVERSITY - SOFIA, BULGARIA  
GEOGIOS EVANGELIDIS, UNIVERSITY OF MACEDONIA, THESSALONIKI, GREECE  
GORAN VELINOV, UNIVERSITY OF STS CYRIL AND METHODIUS, NORTH MACEDONIA  
GORDAN JEZIC, UNIVERSITY OF ZAGREB, CROATIA  
GRISHA SPASOV, TECHNICAL UNIVERSITY - SOFIA, BRANCH PLOVDIV, BULGARIA  
HORIA POP, BABEȘ-BOLYAI UNIVERSITY OF CLUJ-NAPOCA, ROMANIA  
HRISTO VALCHANOV, TECHNICAL UNIVERSITY - VARNA, BULGARIA  
ILIA NINKA, UNIVERSITY OF TIRANA, ALBANIA  
ILIAS SAKELLARIOU, UNIVERSITY OF MACEDONIA, THESSALONIKI, GREECE  
ILIJA JOLEVSKI, ST. CLEMENT OF OHRID UNIVERSITY, FACULTY OF ICT – BITOLA, NORTH MACEDONIA  
IRAKLIS PARASKAKIS, SOUTH EAST EUROPEAN RESEARCH CENTRE, GREECE  
IVA NIKOLOVA, TECHNICAL UNIVERSITY - SOFIA, BULGARIA  
IVAN JORDANOV, UNIVERSITY OF PORTSMOUTH, UK  
IVAN KOYCHEV, UNIVERSITY OF SOFIA "ST. KLIMENT OHRIDSKI", BULGARIA  
IVAN LIRKOV, BULGARIAN ACADEMY OF SCIENCES, BULGARIA  
IVAN LUKOVIĆ, UNIVERSITY OF NOVI SAD, SERBIA  
IVICA DIMITROVSKI, UNIVERSITY SS CYRIL AND METHODIUS, SKOPJE, NORTH MACEDONIA  
JOHN GALLETLY, AMERICAN UNIVERSITY IN BULGARIA, BULGARIA  
KATERINA ZDRAVKOVA, UNIVERSITY OF STS CYRIL AND METHODIUS, NORTH MACEDONIA  
KIRIL ALEXIEV, BULGARIAN ACADEMY OF SCIENCES, BULGARIA  
KRASIMIR MANEV, NEW BULGARIAN UNIVERSITY, BULGARIA  
KRASIMIRA STOILOVA, BULGARIAN ACADEMY OF SCIENCES, BULGARIA  
KRASSEN STEFANOV, SOFIA UNIVERSITY, BULGARIA  
LADISLAV HURAJ, UNIVERSITY OF SS. CYRIL AND METHODIUS IN TRNAVA, SLOVAKIA  
LEONID V. STOIMENOV, UNIVERSITY OF NIS, SERBIA  
LEONIDAS PALIOS, UNIVERSITY OF IOANNINA, GREECE  
LYUDMILA STOYANOVA, TECHNICAL UNIVERSITY - SOFIA, BULGARIA  
MARGARITA TODOROVA, UNIVERSITY OF VELIKO TURNOVO "ST CYRIL AND ST. METHODIUS", BULGARIA  
MARGITA KON-POPOVSKA, UNIVERSITY OF STS CYRIL AND METHODIUS, NORTH MACEDONIA  
MARIUS BREZOVAN, UNIVERSITY OF CRAIOVA, ROMANIA  
MARJAN BUŠEV, UNIVERSITY OF STS CYRIL AND METHODIUS, NORTH MACEDONIA  
MARO VLACHOPOULOU, UNIVERSITY OF MACEDONIA, THESSALONIKI, GREECE  
MICHAEL VASSILAKOPOULOS, UNIVERSITY OF CENTRAL GREECE, GREECE  
MIHAELA COLHON, UNIVERSITY OF CRAIOVA, ROMANIA  
MIHAELA OPREA, UNIVERSITY PETROLEUM-GAS OF PLOIEȘTI, ROMANIA  
MILEN PETROV, UNIVERSITY OF SOFIA, BULGARIA  
MILENA KAROVA, TECHNICAL UNIVERSITY - VARNA, BULGARIA  
MILENA LAZAROVA, TECHNICAL UNIVERSITY - SOFIA, BULGARIA  
MILOŠ RADOVANOVIC, UNIVERSITY OF NOVI SAD, SERBIA  
MILOŠ SAVIĆ, UNIVERSITY OF NOVI SAD, SERBIA  
MIREL COȘULSCHI, UNIVERSITY OF CRAIOVA, ROMANIA  
MIRJANA IVANOVIĆ, UNIVERSITY OF NOVI SAD, SERBIA  
NATASA HOIC-BOZIC, UNIVERSITY OF RIJEKA, CROATIA  
NEVENA ACKOVSKA, INSTITUTE OF INFORMATICS, NORTH MACEDONIA  
NIKITAS N. KARANIKOLAS, TEI OF ATHENS, GREECE  
OLGA GEORGIEVA, UNIVERSITY OF SOFIA, BULGARIA  
PANAYIOTIS BOZANIS, UNIVERSITY OF THESSALY, GREECE  
PATRIZIA POŠČIĆ, UNIVERSITY OF RIJEKA, CROATIA  
PAVEL BOYTCHEV, SOFIA UNIVERSITY, BULGARIA  
PECE MITREVSKI, ST. CLEMENT OF OHRID UNIVERSITY, NORTH MACEDONIA  
PETIA GEORGIEVA, UNIVERSITY OF AVEIRO, PORTUGAL  
PETIA KOPRINKOVA-HRISTOVA, BULGARIAN ACADEMY OF SCIENCES, BULGARIA  
PETR SALOUN, VSB - TU OSTRAVA, CZECH REPUBLIC  
PETROS KEFALAS, THE UNIVERSITY OF SHEFFIELD INTERNATIONAL FACULTY, GREECE  
PETYA ASENDOVA, NEW BULGARIAN UNIVERSITY, BULGARIA  
PETYA PAVLOVA, TECHNICAL UNIVERSITY - SOFIA, BRANCH PLOVDIV, BULGARIA  
SIMONA MOTOGNA, BABEȘ-BOLYAI UNIVERSITY OF CLUJ-NAPOCA, ROMANIA  
SOTIR SOTIROV, BURGAS "PROF. D-R. ASSEN ZLATAROV" UNIVERSITY, BULGARIA  
SPIROS SKIADPOULOS, UNIVERSITY OF PELLOPONNESE, GREECE  
SRDAN SKRBIC, UNIVERSITY OF NOVI SAD, SERBIA  
STANIMIR STOYANOV, UNIVERSITY OF PLOVDIV "PAISII HILENDARSKI", BULGARIA  
STANISLAV SIMENOV, BURGAS "PROF. D-R. ASSEN ZLATAROV" UNIVERSITY, BULGARIA  
STELIOS XINGALOS, UNIVERSITY OF MACEDONIA, THESSALONIKI, GREECE  
STOYAN BONEV, AMERICAN UNIVERSITY IN BULGARIA, BULGARIA  
STOYAN MALESHKOV, NEW BULGARIAN UNIVERSITY, BULGARIA  
SUZANA LOSHKOVSKA, UNIVERSITY SS CYRIL AND METHODIUS, SKOPJE  
THEODORE KASKALIS, UNIVERSITY OF MACEDONIA, THESSALONIKI, GREECE  
VALENTIN HRISTOV, TECHNICAL UNIVERSITY - SOFIA, BULGARIA  
VALENTIN MOLLOV, TECHNICAL UNIVERSITY - SOFIA, BULGARIA  
VALENTINA EMILIA BALAȘ, AUREL VLAICU UNIVERSITY OF ARAD, ROMANIA  
VALENTINA IVANOVA, NEW BULGARIAN UNIVERSITY, BULGARIA  
VALENTINA KUKENSKA, TECHNICAL UNIVERSITY - GABROVO, BULGARIA  
VASSILIOS DAGDILELIS, UNIVERSITY OF MACEDONIA, THESSALONIKI, GREECE  
VENETA ALEKSIEVA, TECHNICAL UNIVERSITY - VARNA, BULGARIA  
VIDREL NEGRU, WEST UNIVERSITY OF TIMIȘOARA, ROMANIA  
VIRGINIA DIMITROVA, TECHNICAL UNIVERSITY - SOFIA, BULGARIA  
VLADIMIR FILIPOVIC, UNIVERSITY OF BELGRADE, SERBIA  
VLADIMIR KURBALIJA, UNIVERSITY OF NOVI SAD, SERBIA  
VLADIMIR TRAJKOVIKJ, SS CYRIL AND METHODIUS UNIVERSITY, NORTH MACEDONIA  
VLADIMIR RAVEVSKI, SOUTH EAST EUROPEAN UNIVERSITY (SEEU), NORTH MACEDONIA  
VOLIN KARAGIOZOV, AMERICAN UNIVERSITY IN BULGARIA, BULGARIA  
YANNIS MANDLOPOULOS, ARISTOTLE UNIVERSITY OF THESSALONIKI, GREECE  
ZHANETA SAVOVA-TASHEVA, NATIONAL MILITARY UNIVERSITY, BULGARIA  
ZOLTÁN HORVÁTH, EÖTVÖS LORAND UNIVERSITY, BUDAPEST, HUNGARY  
ZOLTÁN PORKOLÁB, EÖTVÖS LORAND UNIVERSITY, BUDAPEST, HUNGARY  
ZORAN BOSNIC, UNIVERSITY OF LJUBLJANA, SLOVENIA  
ZORAN BUDIMAC, UNIVERSITY OF NOVI SAD, SERBIA

**9TH BALKAN CONFERENCE IN INFORMATICS**  
**26 – 28 SEPTEMBER 2019, SOFIA, BULGARIA**

<b>Thursday, September 26<sup>th</sup>, 2019</b>			
9:00 – 11:00	Registration (Library and Information Center of the Technical University of Sofia, 2nd floor)		
9:30 – 10:00	Opening (Conference Hall of Library and Information Center)		
10:30 – 12:00	Plenary Session (Conference Hall of Library and Information Center)		
12:00 – 13:00	Lunch Break		
13:00 – 15:00	SECTION 1: INFORMATION SYSTEMS (DATA) Session 1, room 2412	WORKSHOP ON TEL – TECHNOLOGY ENHANCED LEARNING room 2442	WORKSHOP INFORMATION SECURITY Session 1 room 1216
15:00 – 15:30	Coffee Break		
15:30 – 17:30	SECTION 2: NETWORK & SECURITY Session 1, room 2412	WORKSHOP INFORMATION SECURITY Session 2, room 1216	
17:30 – 19:30	Steering Committee Meeting room 2412		
<b>Friday, September 27<sup>th</sup>, 2019</b>			
9:00 – 11:00	SECTION 4: SOCIAL COMPUTING Conference Hall of Library and Information Center	UNITe 2019 Workshop: Smart and Sustainable Cities room 2442	
11:00 – 11:30	Coffee Break		
11:30 – 13:00	SECTION 5: SOFTWARE ENGINEERING Conference Hall of Library and Information Center		
13:00 – 14:00	Lunch Break		
14:00 – 15:30	SECTION 6: Theory of Computation & Computing Session 1 Conference Hall of Library and Information Center		
15:30 – 16:00	Coffee Break		
16:00 – 17:00	SECTION 6: Theory of Computation & Computing Session 2 Conference Hall of Library and Information Center		
19:00 – 23:00	Closing Ceremony and Conference Dinner (venue: “Magiko” restaurant)		
<b>Saturday, September 28<sup>th</sup>, 2019</b>			
8:30 – 16:00	Social event: Plovdiv City Tour		

**9:00 – 11:00      Registration**

*Library and Information Center of the Technical University of Sofia, 2nd floor*

**9:30 – 10:00**

**Opening**

*Conference Hall of Library and Information Center*

**10:00 – 12:00**

**Plenary Session**

Chairs: *Milena Lazarova* and *George Eleftherakis*

*Conference Hall of Library and Information Center*

**1. Lefteris Angelis**

*Statistical Analysis in The Research of Human Factor in Software Engineering*

**2. Petia Georgieva**

*Deep Learning in Brain Computer Interfaces*

**12:00 – 13:00      Lunch break**

## **SECTION 1**

### **INFORMATION SYSTEMS (DATA)**

#### **13:00 – 15:00 Session 1**

Chair: Milena Lazarova and Betim Cico

1. Extracting Data from General Practitioners' XML Reports in Bulgarian Healthcare to Comply with ISO/EN 13606  
*Kalinka Kaloyanova, Evgeniy Krastev and Emanuela Mitreva*
2. Meta-Model of the Teaching and Learning Environment Based on ICT Integration in the E-Learning Systems  
*Adelina Aleksieva-Petrova, Amaoussou Dorothee and Milen Petrov*
3. Automatic Identification of Skills' Dependency  
*Plamen Nachev, Olga Georgieva and Lefteris Angelis*
4. Development of Base Ontology for a Digital Library of the Bulgarian Museums' Collections  
*Radovesta Stewart, Stanislav Simeonov and Radoslav Pavlov*
5. Web-based VR Environment for Simulation and Visualization of Construction Manipulator Motion  
*Boris Tudjarov and Rosen Mitrev*
6. E-commerce Distributed Chatbot System  
*Stefan Angelov and Milena Lazarova*

#### **15:00 – 15:30 Coffee Break**

## **SECTION 2**

### **NETWORK & SECURITY**

#### **15:30 – 17:30 Session 1**

Chairs: Roumen Trifonov and Mirjana Ivanovic

1. Emerging and Secured Mobile Ad-Hoc Wireless Network (MANET) for SWARM Applications  
*Antouan Anguelov, Roumen Trifonov and Ognian Nakov*
2. Trends Review of the Contemporary Security Problems in the Cyberspace  
*Veneta Yasifova, Roumen Trifonov, Antoniya Tasheva and Ognian Nakov*
3. An Empirical Study of Wireless Security in City Environment  
*Hristo Valchanov, Jan Edikyan and Veneta Aleksieva*
4. GEMAT - Internet of Things Solution for Indoor Security Geofencing  
*Sasa Pesic, Milenko Tosic, Ognjen Ikovic, Miloš Radovanović, Mirjana Ivanovic and Dragan Bascovic*
5. Analysis of Keystream Produced by Generalized Shrinking Multiplexing Generator Controlled by Ternary-m-sequence  
*Zhaneta Savova-Tasheva and Antoniya Tasheva*
6. Security Improvement in a Modified Merkle-Tree  
*Ivaylo Chenchev*

**SECTION 3**  
**WORKSHOP ON TEL – TECHNOLOGY ENHANCED LEARNING**

**13:00 – 15:00 Session 1**

Chair: Mirjana Ivanovic

1. Voice Assistants and Artificial Intelligence in Education  
*Georgios Terzopoulos, Maya Satratzemi*
2. Facilitating Learning by Practice and Examples: a Tool for Learning Table Normalization  
*Junhu Wang, Bela Stantic*
3. Arduino and Numerical Mathematics  
*Đorđe Herceg, Dejana Herceg*
4. Inclusive Education Course Design for Informatics Teachers  
*Temenuzhka Zafirova-Malcheva, Pavel Boytchev, Eliza Stefanova, Pencho Mihnev, Krassen Stefanov*
5. Can a robot be an efficient mediator in promoting dyadic activities among children with Autism Spectrum Disorders and children of Typical Development?  
*Sofia Pliasa, Nikolaos Fachantidis*

**15:00 – 15:30 Coffee Break**



## **WORKSHOP INFORMATION SECURITY**

### **13:00 – 15:00 Session 1**

Chair: Kalinka Kaloyanova and Vladimir Dimitrov

1. Human Factor in Digitalization and Cyber Resilience of Public Administration  
*Silvia Matern, Gabriela Savova, Denitsa Goleva, Velizar Shalamanov*
2. Enhancing Security in Microservice Environments  
*Tihomir Tenev, Simeon Tsvetanov*
3. Semantics of Vulnerabilities and Intelligent Search  
*Vladimir Dimitrov*
4. Securing IoT Devices Against Cloning  
*Simeon Tsvetanov, Ivaylo Andonov, Stefan Dimitrov*
5. Cyber Threat Map for National and Sectoral Analysis  
*George Sharkov, Yavor Papazov, Christina Todorova, Georgi Koykov, Martin Georgiev and Georgi Zahariev*
6. Customer Data Security in Retail Industry with Profit Maximization  
*Soheil Sibdari*
7. Secure the Communication in Decentralized Networks with Blockchain  
*Ivaylo Chenchev, Adelina Aleksieva-Petrova*

### **15:00 – 15:30 Coffee Break**

## **WORKSHOP INFORMATION SECURITY**

### **15:30 – 17:30 Session 2**

Chairs: Kalinka Kaloyanova and Vladimir Dimitrov

1. Academic Support to Cyber Resilience: National and Regional Approach  
*Velizar Shalamanov, Georgi Penchev*
2. Securing User Data in Android Applications at Software Level  
*Milen Petrov, Peter Sabev*
3. Architecture and Process Oriented Approach to Institution Building of Network Organizations (Case of Cyber Security Competence Network)  
*Georgi Penchev, Velizar Shalamanov*
4. Framework for the Development of Cybersecurity Training Programs for Students of Engineering Specialties, Related to Computer Systems and Information Technologies  
*Roumen Trifonov, Ognian Nakov, Slavcho Manolov, Georgi Popov, Georgi Tsochev, Galya Pavlova*
5. Exploring Cybersecurity Curricula Designation Requirements  
*Kalinka Kaloyanova*
6. How to Apply ISO/IEC 27001 to the Education in Information Security Area  
*Kalinka Kaloyanova, Daniela Drozova*
7. Design of Cross Border Healthcare Integrated System and its Privacy and Security Issues  
*Snezana Savoska, Ilija Jolevski, Blagoj Ristevski, Natasha Blazeska-Tabakovska, Andrijana Bocevska, Boro Jakimovski, Ivan Chorbev, Vassilis Kilintzis*

**Friday, September 27<sup>th</sup>, 2019**

**Conference Hall of Library and Information Center**

## **SECTION 4: SOCIAL COMPUTING**

**9:00 – 11:00 Session 1**

Chair: Yannis Manolopoulos and Marjan Gusev

1. Applied Computing for Portfolio Optimization in Bulgarian Stock Exchange  
*Krasimira Stailova, Todor Stailov and Miroslav Vladimirov*
2. Female Students' Attitude Towards Studying Informatics and Expectations for Future Career – Balkan Case  
*Nevena Ranković, Mirjana Ivanović, Milos Savić, Elinda Kajo Mece, Asya Stoyanova-Doycheva and Dragica Ranković*
3. BI or not BI? Presence and Future of BI in Small and Medium-sized Enterprises from South Central Bulgaria  
*Stanislava Klisarova-Belcheva, Tania Yankova and Galina Ilieva*
4. A Framework for Predicting Community Behavior in Evolving Social Networks  
*Georgia Koloniari, Georgios Evangelidis, Nikolaos Sachpenderis and Ioannis Milanis*
5. Interactive Voice Assisted Home Healthcare Systems  
*Andrej Ilievski, Dimitri Dojchinovski and Marjan Gusev*
6. Smart Services for Managing the Design of Personalized Educational Video Games  
*Albena Antonova, Yavor Dankov and Boyan Bontchev*

**11:00 – 11:30 Coffee Break**

## **SECTION 5: SOFTWARE ENGINEERING**

**11:30 – 13:00 Session 1**

Chair: Ivaylo Atanassov and Georgios Evangelidis

1. Categorization of C++ Classes for Static Lifetime Analysis  
*Gábor Horváth and Norbert Pataki*
2. Software Technologies Skills: A Graph-Based Study to Capture Their Associations and Dynamics  
*Konstantinos Georgiou, Maria Papoutsoglou, Athena Vakali and Lefteris Angelis*
3. On the Validated Usage of the C++ Standard Template Library  
*Bence Babati, Gábor Horváth, Norbert Pataki and Attila Péter-Részeg*
4. Proportionate (m,k)-firm Scheduling for Multiprocessor Systems  
*Ivaylo Atanassov*
5. Detecting C++ Lifetime Errors with Symbolic Execution  
*Réka Kovács, Gábor Horváth and Zoltán Porkoláb*

**13:00 – 14:00 Lunch break**

**Friday, September 27<sup>th</sup>, 2019**

**Conference Hall of Library and Information Center**

**SECTION 6  
THEORY OF COMPUTATION & COMPUTING**

**14:00 – 15:30 Session 1**

Chair: Iva Nikolova and Marjan Gusev

1. Complexity Aspects of Unstructured Sparse Graph Representation  
*Martin Nehez and Peter Bartalos*
2. CRC Selection for Decoding of CRC-polar Concatenated Codes  
*Tsonka Baicheva and Peter Kazakov*
3. Applying a Quantum Amplification Over a System for Image Feature Matching and Image Recommendation  
*Desislav Andreev and Milena Lazarova*
4. An Experimental Comparative Performance Study of Demosaicing Algorithms on General-Purpose GPUs  
*Georgi Zapryanov and Iva Nikolova*
5. Bi-Source Verification Against Silent Data Corruption in High Performance Computing  
*Era Ajdaraga Krluku, Marjan Gusev and Vladimir Zdraveski*

**15:30 – 16:00 Coffee Break**

**SECTION 6  
THEORY OF COMPUTATION & COMPUTING**

**16:00 – 17:00 Session 2**

Chair: Antoniya Tasheva and Georgios Evangelidis

1. A GPU Implementation of FastICA in Audio Applications for Small Number of Components  
*Stefan Kanan, Marjan Gusev and Vladimir Zdraveski*
2. Reliable Cloud Software Development Architectures and Business Models Case Study: RIDEaaS and GAE Launcher  
*Orges Cico and Betim Cico*
3. The Effect of Parallelism on Data Reduction  
*Pavlos Ponos, Stefanos Dugiaroglou and Georgios Evangelidis*

**Friday, September 27<sup>th</sup>, 2019**  
**Block 2 of TU-Sofia, fl. 4, room 2412**



## **UNITe 2019 Workshop** **Smart and Sustainable Cities**

Chair: *Milena Lazarova*

**9:30 - 11:00**

**Friday, September 27th, 2019**  
**20:00**

**Closing Ceremony & Official Dinner**  
*"Magiko" restaurant*

**Saturday, September 28th, 2019**

**8:30 - 16:00**

**Social Event: Plovdiv City Tour**

# Conference Location: Technical University of Sofia, Bulgaria

