

24th
INTERNATIONAL CONFERENCE
ON COMPUTER SYSTEMS
AND TECHNOLOGIES

CompSysTech'23

16-17 June 2023
University of Ruse
BULGARIA

P R O G R A M M E



**"WORK,
FINISH,
PUBLISH"**

Michael Faraday

◆ CONFERENCE OBJECTIVE

The CompSysTech'23 International conference is organised by THE BULGARIAN ACADEMIC SOCIETY OF COMPUTING and its ACM chapter BgASC. Its OBJECTIVE is to intensify the information exchange of the results in theoretical research and practical developments in this field. Its papers will be published in the ACM International Conference Proceedings Series.

CompSysTech'23 is organized under the patronage of the:

- Bulgarian Ministry of Education and Science;
- John Atanasoff Union of Automation and Informatics;
- University of Ruse

◆ INTERNATIONAL PROGRAMME COMMITTEE

• Honorary Co-Chairs:

Kiril Boyanov (Member of BAS, Bulgaria)

Vasil Sgurev (Member of BAS, Bulgaria)

• Co-Chairs:

Roumen Trifonov (Bulgaria)

Tzvetomir Vassilev (Bulgaria)

• Scientific Secretary:

Dimo Dimov (Bulgaria)

• Secretary:

Pavel Zlatarov (Bulgaria)

• Members:

Adilson Vahldick	Brazil	Janusz Jablonowski	Poland
Adriana Borodzhieva	Bulgaria	Jose Maria Alvarez Rodriguez	Spain
Alejandro Rodriguez Gonzalez	Spain	Jouni Ikonen	Finland
Aleksandra Milicevic	Serbia	Juan Miguel Gomez-Berbis	Spain
Alessandro Ortis	Italy	Juliana Peneva	Bulgaria
Amar Ramdane-Cherif	France	Karl Jones	UK
Amelia Badica	Romania	Katalina Grigorova	Bulgaria
Anabela Gomes	Portugal	Ke Wei	Macao
Andreas Panayides	Cyprus	Kemal Tutuncu	Turkey
Aneliya Ivanova	Bulgaria	Krassen Stefanov	Bulgaria
Angel Velazquez Iturbide	Spain	Leon Rothkrantz	Netherlands
Anna Rozeva	Bulgaria	Leoneed Kirilov	Bulgaria
Antanas Zilinskas	Lithuania	Levent Eren	Turkey

Antonio Mendes	Portugal	Ljiljana Brankovic	Australia
Asrun Matthiasdottir	Iceland	Manolo Hina	France
Avram Eskenazi	Bulgaria	Manuel Ortega	Spain
Barbara Seljak	Slovenia	Marco Porta	Italy
Bayram Jumayev	Turkmenistan	Margarita Todorova	Bulgaria
Betim Cico	Albania	Maria Jose Marcelino	Portugal
Bojan Cestnik	Slovenia	Marios Neofytou	Cyprus
Carina Gonzales	Spain	Marite Kirikova	Latvia
Carmen Alina Lupascu	Italy	Martin Llamas Nistal	Spain
Chantong Lam	Macao	Mary Sanchez Gordon	Norway
Christos Loizou	Cyprus	Michele Nappi	Italy
Costin Badica	Romania	Milan Dimitrijevic	Serbia
Dana Petcu	Romania	Mirjana Ivanovic	Serbia
Danail Dochev	Bulgaria	Murat Koklu	Turkey
Daniela Chuda	Slovakia	Murat Yilmaz	Turkey
Davide Taibi	Italy	Nikola Kasabov	New Zealand
Diana Kalibatiene	Lithuania	Peter Kaczmarek	Belgium
Dimo Dimov	Bulgaria	Peter Stanchev	USA
Domenico Tegolo	Italy	Plamen Zahariev	Bulgaria
Douglas Harms	USA	Ravi Tomar	India
Efthymou Kyriacou	Cyprus	Rebecca Bartlett	UK
Erika Nazaruka	Latvia	Ricardo Colomo-Palacios	Norway
Fabio Narducci	Italy	Ricardo Aguasca Colomo	Spain
Francesco Rundo	Italy	Roumen Nikolov	Bulgaria
Georgi Georgiev	Bulgaria	Sanjay Misra	Norway
Georgi Tsochev	Bulgaria	Saulius Gudas	Lithuania
Georgi Todorov	Bulgaria	Sergey Stupnikov	Russia
Georgi Hristov	Bulgaria	Stavros Nikolopoulos	Greece
Grisha Spasov	Bulgaria	Stoicho Stoichev	Bulgaria
Heinz-Dietrich Wuttke	Germany	Svetlana Stefanova	Bulgaria
Isaac Agudo	Spain	Tsvetozar Georgiev	Bulgaria
Iulia Lefter	Netherlands	Ville Leppanen	Finland
Ivan Jelinek	Czech Republic	Yalcin Cekic	Turkey
Jan Lang	Slovakia	Yassine Meraihi	Algeria
Janis Grundspenkis	Latvia	Zoltan Geler	Serbia

◆ **NATIONAL ORGANIZING COMMITTEE**

• **Co-Chairs:**

Galina Ivanova (Bulgaria)
Aneliya Ivanova (Bulgaria)

• **Secretary:**

Eugenia Dimitrova (Bulgaria)

• **Members:**

Tsvetozar Georgiev (Bulgaria)	Yuksel Aliev (Bulgaria)
Stoyanka Smrikarova (Bulgaria)	Rumen Rusev (Bulgaria)
Angel Smrikarov (Bulgaria)	Desislava Baeva (Bulgaria)
	Elitsa Ibryamova (Bulgaria)

◆ **TOPICS**

1. **Computer Hardware.**
2. **Computer Software.**
3. **Application Aspects of Computer Systems and Technologies.**
4. **Educational Aspects of Computer Systems and Technologies (ICT-based educational technologies).**

Friday, 16th June 2023

15:00

OPENING

WELCOME

Chair: **Galina Ivanova**

2Г.204, Hall Siemens

<https://meet1.uni-ruse.bg/b/awu-zhk-ngm>



PLENARY SESSION

Chair: Tzvetomir Vassilev

Room: 2Г.204, Hall Siemens

<https://meet1.uni-ruse.bg/b/awu-zhk-ngm>



Virginio Cantoni
Emeritus Professor, Computer Vision and
Multimedia Lab, Pavia University, Italy

Keynote on:
**New Technologies And The Support And
Accessibility Of Cultural Heritage**



Prof. Dr. Jinghui Yang
Professor of Intelligent Manufacturing at the
school of Intelligent Manufacturing and
Control Engineering in Shanghai Polytechnic
University

Keynote on:
**Construction of regional industrial Internet
network cooperation platform**



**Jordan Kolev, IEEE Bulgaria Section LMAG
Chair**
Dr., Assoc. Professor, Ret., Former Dean of the
Faculty of Electronics at the Technical
University of Varna.

Keynote on:
**Increasing the interest of high school students
to scientific and engineering professions**

DISCUSSIONS

PROGRAMME SUMMARY

Saturday, 17th June 2023

17th June 9:00	9:00 Session A Number of papers: 7 Room 1.322	9:00 Session C Number of papers: 6 Room 1.422	9:00 Session E Number of papers: 5 Room 1.411-4
	COFFEE BREAK Room 1.311		
	11:00 Session B Number of papers: 6 Room 1.322	11:00 Session D Number of papers: 6 Room 1.422	10:15 Session F (Youth Session) Number of papers: 9 Room 1.411-4
17th June 12:30 – 13:30	17th June Session G Room 1.411-4 ROUND TABLE Increasing the interest of high school students to scientific and engineering professions		
17th June 13:30	THE BEST PAPERS AWARDS 2Г.204, Hall Siemens https://meet1.uni-ruse.bg/b/awu-zhk-ngm		

Session A

Chair: **Marco Porta**
Co-Chair: **Angela Slavova**
Scientific Secretary: **Anelya Ivanova**

Saturday, 17 June 2023
9:00 – 10:30
1.322 , <https://meet1.uni-ruse.bg/b/pv2-7qf-jzv>

COMPUTER HARDWARE & IoT

1. **Design and Implementation of firmware for an embedded system that creates lighting and laser effects**
Svetozar Ilchev
2. **Smart charging mechanism for electronic devices to save battery life**
Bayram Jumayev
3. **Secure Heterogeneous Architecture based on RISC-V and root-of-trust**
Stefan Stoyanov, Nikolay Kakanakov and Maria Marinova
4. **IoT based beehive monitoring system**
Todor Todorov and Valentin Tonkov

EDUCATIONAL ASPECTS OF COMPUTER SYSTEMS AND TECHNOLOGIES (ICT-based Educational Technologies)

5. **Commitment Threshold – On Student Retention in MOOCs**
Erkki Kaila, Antti Laaksonen, Emilia Oikarinen and Kjell Lemström
6. **Effects of Computer-Aided Laboratory Assignments on Course Comprehension in case of Teaching Electrical Machines**
Serdar Nazarov, Bayram Ashyrmiradovich Jumayev and Dovletgeldi Yusubov
7. **Enhancing the Understanding of Computer Engineering Students in Financial Analysis through Educational Authoring Software**
Angel Popgeorgiev, Elitsa Ibryamova and Galina Ivanova

DISCUSSIONS

Coffee Break
1.311

Session B

Chair: **Valentin Tonkov**
Co-Chair: **Anelya Ivanova**
Scientific Secretary: **Angel Popgeorgiev**

Saturday, 17 June 2023

11:00 – 12:30

1.322 , <https://meet1.uni-ruse.bg/b/pv2-7qf-jzv>

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

1. **Spatio-Temporal dependency preserving Cognitive-assisted Continuous Chinese Sign Language Recognition**
Priyanka Ganesan, Senthil Jagatheesaperumal, Silvia Gaftandzhieva and Rositsa Doneva
2. **Cellular Neural Networks computing of EEG signals**
Angela Slavova and Ventsislav Ignatov
3. **Predictive Analytics intelligent decision-making framework and testing it through sentiment analysis on Twitter data**
Otmane Azeroual, Radka Nacheva, Anastasija Nikiforova, Uta Störl and Amel Fraise
4. **The digital transformation of Bulgarian municipal administration in the era of artificial intelligence**
Elitsa Lazarova and Nadezhda Veselinova
5. **Distributed Task Allocation in Network of Agents based on Ant Colony Foraging Behavior**
Dorian Minarolli
6. **A Study on Eye Tracking for Mobile Devices Using Deep Learning**
Le Hoang Nam and Marco Porta

DISCUSSIONS

13:30

2Г.204, Hall Siemens,

<https://meet1.uni-ruse.bg/b/awu-zhk-ngm>

THE BEST PAPERS AWARDS

Session C

Chair: **Dorian Minarolli**
Co-Chair: **Desislava Baeva**
Scientific Secretary: **Metodi Dimitrov**

Saturday, 17 June 2023
9:00 – 10:30

1.422.4 , <https://meet1.uni-ruse.bg/b/cfq-8wo-xqo-pnf>

COMPUTER SOFTWARE

1. **Multi-level access to information systems by QR codes for wearable devices**
Zaza Davitadze, Gregory Kakhiani, Konstantin Datunishvili and Zurab Meskhidze
2. **Models and Computation of Traffic Resilience**
Leon Rothkrantz
3. **An Approach to Introduce the Concept of Lexical Analysis through FPGA Based Finite State Machines**
Aneliya Ivanova and Nikolay Kostadinov
4. **Software Implementations of the Trithemius Progressive Key for English and Bulgarian Texts Using MATLAB**
Adriana Borodzhieva

IMAGE PROCESSING & VISUALIZATION

5. **Adaptive Blind Color Image Watermarking Approach using BRISK Features Based on CT and CNN**
Prasant Vaidya, Chandra Mouli, Kandala Rajesh, Silvia Gaftandzhieva, Rositsa Doneva and Sadiq Hussain
6. **Predicting Human Body Measurements from a Front Image**
Tzvetomir Vassilev and Metodi Dimitrov

DISCUSSIONS

10:30 – 11:00
Coffee Break
1.311

Session D

Chair: **Leon Rothkrantz**
Co-Chair: **Adriana Borodzhieva**
Scientific Secretary: **Elitsa Ibryamova**

Saturday, 17 June 2023
11:00 – 12:30

1.422.4, <https://meet1.uni-ruse.bg/b/cfq-8wo-xqo-pnf>

APPLICATION ASPECTS OF COMPUTER SYSTEMS AND TECHNOLOGIES

1. **Creating an extreme 3D game to study the impact of stress on cardiac data**
Penio Lebamovski and Evgeniya Gospodinova
2. **Enhancing Healthcare Accessibility: A Teleconsultation Mobile Application for Patient-Centric Care in Cyprus**
Ionut Cristian Canciu, Constantinos S. Pattichis, Marios Christodoulou, Louiza Agroti, Maria Papaioannou, Andreas Neocleous, Panayiotis Savva, Constantinos Yiasemi, Marios Neofytou, Andreas Panayides, Zinonas Antoniou and Ioannis Constantinou

NETWORK AND INFORMATION SECURITY

3. **Tamper Detection and Localization in Forensic Images**
Maria Chroni, Athanasia Katsi, Stavros Nikolopoulos, Iosif Polenakis and Vasileios Vouronikos
4. **Enhancing a cybersecurity curriculum development tool with a competence framework to meet industry needs for cybersecurity**
Anne-Maarit Majanoja and Antti Hakkala
5. **An assessment of privacy policies for smart home devices**
Timi Heino, Sampsa Rauti and Robin Carlsson
6. **Third-party services as a privacy threat on university websites**
Timi Heino, Sampsa Rauti, Robin Carlsson and Ville Leppänen

DISCUSSIONS

13:30
2Г.204, Hall Siemens,
<https://meet1.uni-ruse.bg/b/awu-zhk-ngm>

THE BEST PAPERS AWARDS

Session E

Chair: **Virginio Cantoni**
Co-Chair: **Galina Ivanova**
Scientific Secretary: **Pavel Zlatarov**

Saturday, 17 June 2023
9:00 – 10:15

1.411.4, <https://meet1.uni-ruse.bg/b/awu-zhk-ngm>

**EDUCATIONAL ASPECTS
OF COMPUTER SYSTEMS AND TECHNOLOGIES
(ICT-based Educational Technologies)**

- 1. Implementation strategy of IT-integrated STEM methodology at Higher Education Institutions: Case of Turkmenistan**
Bayram Jumayev and Serdar Nazarov
- 2. Determination of the level of university digitalization by the method of the higher education institutional ranking of the Kyrgyz Republic**
Bibigul Koshoeva, Mirlan Chynybaev and Aigiuzel Bakalova
- 3. Automated tool for assessment of spreadsheet type assignments**
Igor Sheludko
- 4. Collaborative methodology for semantic modeling of learning domain knowledge**
Tatyana Ivanova
- 5. Semi-automatic ontology development for supporting personalized tutoring**
Tatyana Ivanova

DISCUSSIONS

10:30 – 11:00
Coffee Break
1.311

Session F

Chair: **Petar Kenderov**
Co-Chair: **Angel Smrikarov**
Scientific Secretary: **Pavel Zlatarov**

Saturday, 17 June 2023

10:15 – 12:30

1.411-4 , <https://meet1.uni-ruse.bg/b/awu-zhk-ngm>

1. **Cook it**
Lyuboslav Dimov, Nikola Velikov, Syuzan Feimova
2. **Mentor X**
Nikolay Parishev, Syuzan Feimova
3. **Symbol – encryption and password creation**
Aleksandar Slavov, Denislav Evtimov, Syuzan Feimova
4. **Questreign – the numbers from 1 to 10**
Denislav Stoyanov, Syuzan Feimova
5. **MediQuick**
Amer Pandzharov, Donka Simeonova
6. **AR training cards**
Alexander Nyagolov, Donka Simeonova
7. **Architecture and Design of Distributed Web Systems**
Marian Ileana
8. **Association between genetic variants and human disease**
Maria Kirilova, Vesela Nikolova, Vanesa Getseva
9. **Space Explorers**
Andrey Ivanova

DISCUSSIONS

13:30

2Г.204, Hall Siemens,

<https://meet1.uni-ruse.bg/b/awu-zhk-ngm>

THE BEST PAPERS AWARDS

Session G

Chair: **Jordan Kolev**
Co-Chair: **Galina Ivanova**
Scientific Secretary: **Pavel Zlatarov**

Saturday, 17 June 2023
12:30 – 13:30
1.411-4 , <https://meet1.uni-ruse.bg/b/awu-zhk-ngm>

**INCREASING THE INTEREST OF HIGH SCHOOL STUDENTS
TO SCIENTIFIC AND ENGINEERING PROFESSIONS
(Round table)**

DISCUSSIONS

Saturday, 17th June 2023

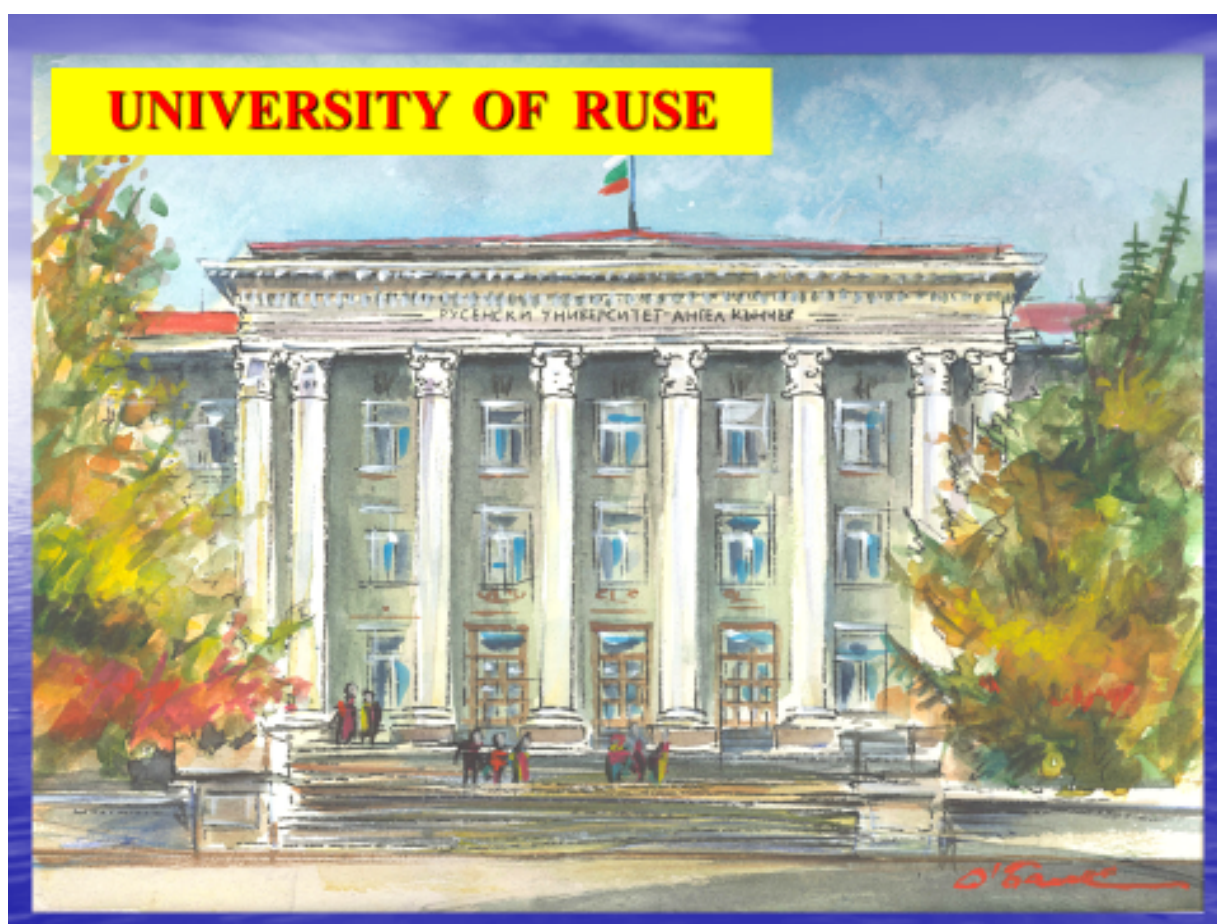
13:30

2Г.204, Hall Siemens,

<https://meet1.uni-ruse.bg/b/awu-zhk-ngm>

**The CHAIRS
of the PROGRAMME COMMITTEE
and
the ORGANIZING COMMITTEE
will bestow
a CRYSTAL PRIZE
to the authors of the best papers.**

Paintings from RUSE



RUSE - LIBRARY



RUSE - MUSEUM



REMARKS