

**11<sup>th</sup> International Conference  
“Modern trends in science”  
FMNS-2025**

**BOOK OF ABSTRACTS**



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## **Conference Program**

### **Registration (11.06.2025)**

13:00 – 18:30

University Conference Centre “Bachinovo”

### **Opening Ceremony (12.06.2025)**

10:00 – 10:30

Central Auditorium of the Conference Center

### **Plenary Lectures (12.06.2025)**

Central Auditorium of the Conference Center

**10:30 – 11:10**

**Prof. DSc Peter Boyvalenkov, Institute of Mathematics and Informatics,  
Bulgarian Academy of Sciences**

"Polarization of spherical codes and designs"

**11:10 – 11:50**

**Prof. Vesna Stankov Jovanović, PhD, University of Niš**

“Advancements in Sample Preparation Techniques for the Analysis of  
Persistent Organic Pollutants: A Focus on PAHs”

**11:50 – 12:30**

**Assoc. prof. António Domingos, PhD, Universidade Nova de Lisboa**

“What is the professional  
knowledge of teachers to integrate STEM into their teaching practices?”

**Group photo - in front of the central entrance of the educational center of  
South-West University - "Bachinovo"**

**12.06.2025**

**12:30**

**Plenary Lectures (13.06.2025)**

Central Auditorium of the Conference Center

**10:30 – 11:10**

**Assoc. prof. Sanka Velichkova Gateva-Kostova, PhD, Institute of Electronics,  
Bulgarian Academy of Sciences**

“Coherent Magneto-Optical Resonances in alkali atoms and their applications”

**11:10 – 11:50**

**Prof. Stoyan Nedkov, PhD, National Institute of Geophysics, Geodesy and  
Geography, Bulgarian Academy of Sciences**

"Mapping of ecosystem services and the transformative change of the  
European environmental policy"

**11:50 – 12:30**

**Prof. Krasimir Manev, PhD, New Bulgarian University**

„Mathematics in the early education of programmers”

**Sessions**

**12.06.2025 and 13.06.2025**

13:30 – 15:30 and 16:00 – 18:00

University Conference Center “Bachinovo”

**Poster sessions**

**12.06.2025 and 13.06.2025**

**18:00 – 19:30**

**Special session**

Conference Hall

***“Challenges and Opportunities for Implementing STEM Approaches in  
Secondary and Higher Education”***

**14.06.2025**

**10:00 – 12:00**

**Welcome Party**

**12.06.2025**

**18:00 - 20:00**

University Conference Center “Bachinovo”

**Official dinner**

**13.06.2025**

**20:00**

University Conference Center “Bachinovo”

**Social program**

**14.06.2025**

**09:30 – 14:00**

**Section: Chemistry**  
**Hall 4**

<b>Thursday, June 12<sup>th</sup></b>	
Chairman: <b>Assoc. Prof. Mitko Stoev</b>	
13:30-13:45	<b>O-C-1</b> Chemical composition of underground waters as a tool for finding connections between caves (applied for Nanzheng area, Shaanxi province, Central China) <i>David Havlíček, Michal Filippi, Zdeněk Motyčka, Kateřina Havlíčková</i>
13:45-14:00	<b>O-C-2</b> Preparation and characterization of molecular crystal based on 2D carriers of NLO properties <i>Ivan Němec, Irena Matulková, Ivana Čísařová, Soňa Kohúteková, Petr Němec</i>
14:00-14:15	<b>O-C-3</b> Isoindoline-1,3-diimine Derivatives Investigated by NMR/XRD/DFT Approach <i>Stanislava Majerova, Ales Ruzicka</i>
14:15-14:30	<b>O-C-4</b> Structurally Tunable Main Group Metal Complexes Bearing an Electronically Versatile/Fluxional Biguanide Ligand <i>Lukas Vlk, Tomas Chlupaty, Alena Hoffmannova, Zdenka Ruzickova, Ales Ruzicka</i>
14:30-14:45	<b>O-C-5</b> Hydrogen Peroxide Production: A Sustainable Electrochemical Perspective <i>Desislava Apostolova, Ivo Bardarov, Maris Mathew, Anders Tjell, Ema Gričar, Mark Stari, Igor Plazl, Pedro Martins, Miha Nosan, Torsten Mayr, Dušan Strmcnik, Boštjan Genorio</i>
14:45-15:00	<b>O-C-6</b> Upcycling Carbon Fiber Composites into Flash Graphene: A HighEfficiency Electrocatalyst for H <sub>2</sub> O <sub>2</sub> Synthesis <i>Ivo Bardarov, Elitsa Chorbadzhiyska, Desislava Apostolova, Pedro Martins, Bostjan Genorio</i>
15:00-15:15	<b>O-C-7</b> The electrochemical activation of a ceria-based sensor for ofloxacin detection <i>Aleksandar Stanojević, Tijana Jovanović, Emilija Pecev-Marinković, Mihajlo Kulizić, Aleksandar Lolić, Aleksandra Pavlović, Ivana Rašić Mišić</i>
15:15-15:30	<b>O-C-8</b> The comparative evaluation of post-modification activated CPEs modified with MWCNTs, ZrO <sub>2</sub> and Gd <sub>2</sub> O <sub>3</sub> for fluoroquinolone detection <i>Tijana Jovanović, Aleksandar Stanojević, Boris Stanković, Emilija Pecev-Marinković, Branka Petković, Milica Petrović, Ivana Rašić Mišić</i>
Coffee break	
Chairman: <b>Assoc. Prof. Petko Mandjukov</b>	
16:00-16:15	<b>O-C-9</b> Production of hydrochar from rice husk by hydrothermal carbonization <i>A.B.Toibazarova, N.O.Appazov</i>
16:15-16:30	<b>O-C-10</b> Extraction of rice husk and preparation of fatty acid monoglycerides from rice husk extract. <i>Bekzhan Alimkhan, Nurbol Appazov, Magzhan Bekhozhaev</i>
16:30-16:45	<b>O-C-11</b> Battery Emulator built by using RISC Microcontroller architecture <i>Dimitar Boychev, Blagoy Burdin, Daria Vladikova</i>

16:45-17:00	<b>O-C-12</b> Porous One-dimensional Carbon Nanostructures Derived from Biomass Wastes as Efficient Pt-free Cathodes for Green Hydrogen Production <i>Sara Mahmood Adnan, Eiman. K. Almohannadi, <u>Kamel Eid</u></i>
17:00-17:15	<b>O-C-13</b> Technologies for the production of activated carbon and features of the raw materials used <i>Saken A. Kanzhar, Nurlan O. Appazov</i>
17:15-17:30	<b>O-C-14</b> Metrological aspects of analysis of methyl-mercury in marine sediment and biota <i>Ava Amideina, Anna Maria Orani, Sabine Azemard, Petko Mandjukov</i>
17:30-17:45	<b>O-C-15</b> MP – AES determination of trace elements in waters. Method validation <i>Ava Amideina, Tsvetanka Avramova, <u>Petko Mandjukov</u></i>

### Section: Physics Conference hall

<b>Friday, June 13<sup>th</sup></b>	
Chairman: <b>Assoc. Prof. Svetoslav Kolev</b>	
13:30-13:45	<b>O-P-1</b> Multiferroics- preparation method and physical properties <i>Svetoslav Kolev, Tatyana Koutzarova, Borislava Georgieva, Todor Cholakov</i>
13:45-14:00	<b>O-P-2</b> Impact of Nutritional Fortification on the Pulsed Photostimulated Luminescence Response of Salts <i>Aleksandar Krleski, Kristina Smokrović, Ivica Đilović, Luka Bakrač, Nadica Maltar-Strmečki, Ralitsa Stanoeva</i>
14:00-14:15	<b>O-P-3</b> Thermoluminescent Properties of Salt-Based Materials Modified by Nutritional Supplementation <i>Aleksandar Krleski, Ralitsa Stanoeva, Ivana Fabijanikj Sandeva, Lihnida Stojanovska-Georgievska, Margarita Ginovska, Hristina Spasevska</i>
14:15-14:30	<b>O-P-4</b> Gelatine - glass microbubbles hydrocolloid as potential medical phantom material in computed tomography <i>Ginka Exner, Veselina Georgieva, Yordan Marinov, Georgi Tankovski, Nikoleta Traikova</i>
14:30-14:45	<b>O-P-5</b> Some physical and physicochemical properties of jelly dessert prepared from gelatin and orange juice <i>Georgi Tankovski, Ivan Bodurov, Ginka Exner</i>
14:45-15:00	<b>O-P-6</b> Latest observations with the telescopes of the Astronomical Observatory at the University of Shumen <i>Dragomir Marchev, Borislav Borisov, Sunay Ibryamov, Teodora Atanasova-Sartliiska, Galina Yordanova, Alex Georgiev</i>
15:00-15:15	<b>O-P-7</b> Superscaling analysis of inclusive electron and (anti)neutrino scattering within the coherent density fluctuation model <i>Martin Ivanov, Anton Antonov</i>
Coffee break	

**Section: Ecology and Environmental Protection**  
**Hall 4**

<b>Friday, June 13<sup>th</sup></b>	
Chairman: <b>Assist. Prof. Miroslav Ivanov</b>	
13:30-13:45	<b>O-EEP-1</b> Invasive alien freshwater fish species in Black Sea rivers and coastal lakes <i>Luhezar Pehlivanov, Stefan Kazakov, Tihomir Stefanov, Teodora Trichkova</i>
13:45-14:00	<b>O-EEP-2</b> Development of Asphalt Concrete Production Technologies Using Ash Residues from Thermal Power Plants and Oil Waste <i>Zhangyl Abilbek, Panabek Tanzharikov, Koktem Yerimbetov, Nurzhan Suleymenov and Saken Seitzhanov</i>
14:00-14:15	<b>O-EEP-3</b> External moss walls: from the inside out <i>Gana Gecheva, Zhana Petkova, Stoyan Damyanov, Deyana Georgieva, Vesselin Baev, Mariyana Gozmanova, Elena Apostolova, Galina Yahubyan</i>
14:15-14:30	<b>O-EEP-4</b> Comparison of the density and biomass of macrobenthic communities from two regions of Marine Antarctic <i>Lyubomir Kenderov, Eli Mincheva, Raina Hristova</i>
14:30-14:45	<b>O-EEP-5</b> Development of an efficient "Compact module for filter water" <i>Polvon Sharipov, Khasan Khasanov</i>
14:45-15:00	<b>O-EEP-6</b> A new metric for ecological status assessment of standing water bodies in Bulgaria <i>Emilia Varadinova, Georg Wolfram, Violeta Tyufekchieva, Yanka Vidinova, Rabia Soufi, Monika Grosschartner</i>
15:00-15:15	<b>O-EEP-7</b> Macrophyte-Based Assessment of Upland Rivers: Reference Index and Pollution Index <i>Silviya Stankova, Gana Gecheva</i>
15:15-15:30	<b>O-EEP-8</b> Risk Assessment in Oil and Gas Production: A Case Study of the Kyzylorda Region <i>Zhangyl Abilbek, Panabek Tanzharikov, Aidana Nurman, Aigul Erzhanova, Nurlybek Akhmetov</i>
Coffee break	
Chairman: <b>Assit. Prof. Veselina Dalgacheva</b>	
15:45-16:00	<b>O-EEP-9</b> Impact of coal fired power plant activity on the ecological status of the river ecosystems: Case study of Sokolitsa River, Bulgaria <i>Vanina Mitseva, Tsevetila Isheva, Mila Ihtimanska, Emilia Varadinova</i>
16:00-16:15	<b>O-EEP-10</b> Herpetofauna in the Northwestern Foothills of the Pirin Mountains <i>Aleksander Pulev, Emanuil Mitrevichin, Lidia Sakelarieva, Hristo Peshev, Krasimir Stoyanov, Galina Bezinska</i>
16:15-16:30	<b>O-EEP-11</b> Remote sensing based burn severity mapping and assessing post-fire impacts on forests vegetation in three cases of forest fires in Bulgaria <i>Miroslav Ivanov, Konstantin Tyufekchiev, Veselina Dalgacheva</i>

16:30-16:45	<b>O-EEP-12</b> Remote sensing based assessment of water quality in the Nador lagoon, Morocco <i>Miroslav Ivanov, Emilia Varadinova, Veselina Dalgacheva, Ouiam El Mekki, Konstantin Tuefekchiev</i>
16:45-17:00	<b>O-EEP-13</b> First Records of Autumn Activity of <i>Xerotyphlops vermicularis</i> (Merrem, 1820) (Reptilia: Typhlopidae) in Bulgaria <i>Aleksander Pulev, Lidia Sakelarieva, Krasimir Stoyanov, Emanuil Mitrevichin</i>
17:00-17:15	<b>O-EEP-14</b> New Records of Winter Activity of <i>Mediodactylus kotschy</i> (Steindachner, 1870) (Reptilia: Gekkonidae) in Bulgaria <i>Aleksander Pulev, Lidia Sakelarieva, Krasimir Stoyanov, Hristo Peshev, Daniel Bisset, Emanuil Mitrevichin</i>
17:15-17:30	<b>O-EEP-15</b> Trail cameras based estimation of the brown bear ( <i>Ursus arctos</i> Linnaeus, 1758) density in one isolated part of Rila National Park <i>Miroslav Ivanov, Georgi Manolev, Veselina Dalgacheva</i>
17:30-17:45	<b>O-EEP-16</b> Comparative analysis of the production and technological potential of the Stanushina variety under the condition of organic/intensive cultivation <i>Aleksandar Klincharov</i>

## Geography Hall 3

Thursday, June 12 <sup>th</sup>	
Chairman: <b>Assist. Prof. Vladimir Karadzhev</b>	
13:30-13:45	<b>O-G-1</b> Spatial Analysis of Employment and the Working Poor <i>Aleksandra Ravnachka, Velimira Stoyanova, Boris Kazakov, Poli Roukova, Emilia Patarchanova</i>
13:45-14:00	<b>O-G-2</b> Health status and integration of the Roma into the healthcare system of Bulgaria <i>Boris Kazakov, Aleksandra Ravnachka, Velimira Stoyanova</i>
14:00-14:15	<b>O-G-3</b> Social policy and the working poor in the context of regional demographic characteristics in Bulgaria <i>Gergana Nikolova, Emilia Patarchanova, Alexandra Ravnachka, Miroslav Ivanov, Vasil Pandurski, Boris Kazakov</i>
14:15-14:30	<b>O-G-4</b> Mapping and spatial analysis of vertical relief reshaping in the landslide near the village of General Geshevo (Eastern Rhodopes) <i>Alexander Gikov, Stelian Dimitrov, Martin Iliev</i>
14:30-14:45	<b>O-G-5</b> Integrating GIS in Water Resources Governance for Regional Sustainability: A Case Study from Blagoevgrad Province, Bulgaria <i>Galina Bezinska, Siyka Keseva, Krasimir Stoyanov</i>
14:45-15:00	<b>O-G-6</b> GIS and Internet of Things <i>Matija Milić</i>

15:00-15:15	<b>O-G-7</b> A socio-geographical analysis of demographic aging in Bulgaria and Italy at the Nuts II level <i>Dimitar Simeonov</i>
Coffee break	
Chairman: <b>Assist. Prof. Miroslav Ivanov</b>	
15:45-16:00	<b>O-G-8</b> Heavy metal content in bottom sediments of the Arda River basin upstream of the Kardzhali Dam <i>Zornitza Cholakova</i>
16:00-16:15	<b>O-G-9</b> Spatial and temporal analysis of the distribution of copper in soils affected by a long-term impact of copper smelter <i>Nadezhda Nikolova, Miglena Zhiyanski</i>
16:15-16:30	<b>O-G-10</b> Morphological and Hydrological Features of the Krajiste Region (Southeastern Serbia) <i>Milena Milenova; Krasimir Stoyanov; Galina Bezinska</i>
16:30-16:45	<b>O-G-11</b> Climatic Characteristics of the Krajiste Region (South-east Serbia) and Their Impact on Relief and Geomorphological Processes <i>Krasimir Stoyanov; Milena Milenova; Galina Bezinska</i>
16:45-17:00	<b>O-G-12</b> An overview of European geographical research on natural borders and their effects <i>Marina Pehlivanova</i>
17:00-17:15	<b>O-G-13</b> Virtual Tourism as a Tool for Enhancing Destination Accessibility and Sustainability <i>Vladimir Karadzhev, Emilia Patarchanova</i>
17:15-17:30	<b>O-G-14</b> Contemporary tourism-geographical development of Karlovy vary – a comprehensive model for sustainable development <i>Maria Nosikova</i>

<b>Friday, June 13<sup>th</sup></b>	
Chairman: <b>Assoc. Prof. Aleksandra Ravnachka</b>	
13:30-13:45	<b>O-G-15</b> Geography of the transport system in the academic field of the Velikotarnovski geographical school <i>Emel Bilyalova</i>
13:45-14:00	<b>O-G-16</b> Classification of Rural Areas in Southwest Planning Region in Bulgaria Based on Socioeconomic Development Criteria <i>Krasina Radomirska, Plamen Patarchanov</i>
14:00-14:15	<b>O-G-17</b> Social Processes in the Border Municipalities of the Southwest Region in Bulgaria <i>Vasil Pandurski</i>
14:15-14:30	<b>O-G-18</b> Household well-being and the risk of poverty <i>Emilia Patarchanova, Gergana Nikolova, Aleksandra Ravnachka, Veselina Dalgacheva, Vladimir Karadzhev</i>

14:30-14:45	<b>O-G-19</b> Foreign Direct Investment in the Trakia Economic Zone: Models and Economic Effects <i>Olga Gavrilova</i>
14:45-15:00	<b>O-G-20</b> The Policy of the European Union for the Development of the Agricultural Sector in Rural Areas. <i>Valentin Shlyakov</i>
15:00-15:15	<b>O-G-21</b> Conditions, factors and spatial organization of viticulture in Pazardzhik region <i>Doycho Vaklinov</i>
Coffee break	

### Section: Mathematics Hall 5

<b>Thursday, June 12<sup>th</sup></b>	
Chairman: <b>Prof. DSc Peter Boyvalenkov</b>	
13:30-13:45	<b>O-M-1</b> An algebraic approach for construction of $(t, s)$ -sequences <i>Vassil Grozdanov, Vesna Dimitrievska-Ristovska, Petar Sekuloski</i>
13:45-14:00	<b>O-M-2</b> Multidimensional Quasi-Monte Carlo integration in weighted anchored Sobolev spaces <i>Vassil Grozdanov, Elmi Shabani</i>
14:00-14:15	<b>O-M-3</b> The Erdős-Turán-Koksma inequality in Cantor systems <i>Atidzhe Hodzhova, Vassil Grozdanov</i>
14:15-14:30	<b>O-M-4</b> About a new view on the golden ratio <i>Mikhail Kolev, Stanislava Stoilova</i>
14:30-14:45	<b>O-M-5</b> On some methods of calculation of specific types of integrals <i>Mikhail Kolev, Stanislava Stoilova, Yana Vasileva</i>
14:45-15:00	<b>O-M-6</b> Criterion of connectedness by clopen coverings <i>Zoran Misajleski</i>
15:00-15:15	<b>O-M-7</b> On sequence convergence in $(3, j)$ -metric spaces, $j \in \{1, 2\}$ <i>Tomi Dimovski, Dončo Dimovski, Pavel Dimovski</i>
15:15-15:30	<b>O-M-8</b> Some asymptotic results for the generalized directional short-time Fourier transform with fixed direction <i>Jasmina Veta Buralieva</i>
Coffee break	
Chairman: Prof. Dr. Mikhail Kolev	
16:00-16:15	<b>O-M-9</b> Simulations of Electoral Systems: How Different Methods of Vote Allocation Affect Political Representation <i>Georgi Bratkov, Boyana Garkova</i>
16:15-16:30	<b>O-M-10</b> On Some Applications of Second-Order Linear Differential Equations in Economy <i>Sashka Kandilarova</i>

16:30-16:45	<b>O-M-11</b> Estimation of the difference between continuous and impulsive models <i>Tzanko Donchev, Nikolay Kitanov, Saba Iftikhar, Dimitar Kolev, Boyana Garkova</i>
16:45-17:00	<b>O-M-12</b> Existence and stability for a parabolic initial and boundary value problem <i>Tzanko Donchev, Boyana Garkova, Saba Iftikhar, Dimitar Kolev, Nikolay Kitanov</i>
17:00-17:15	<b>O-M-13</b> Attractors of M-Dissipative Evolution Inclusions <i>Tzanko Donchev, Iveta Nikolova, Nikolay Kitanov, Alina I. Lazu</i>
17:15-17:30	<b>O-M-14</b> Mixed Semicontinuous Riemann-Liouville Evolution Inclusions <i>Tzanko Donchev, Boyana Garkova, Alina I. Lazu, Iveta Nikolova</i>

<b>Friday, June 13<sup>th</sup></b>	
Chairman: Assoc. Prof. DSc Vassil Grozdanov	
16:45-17:00	<b>O-M-15</b> Tolerance and Interval Graphs for Strategic Planning During Health Crises <i>Limonka Koceva Lazarova, Natasa Stojkovic, Aleksandra Stojanova Ilievska, Marija Miteva, Dusan Bikov</i>
17:00-17:15	<b>O-M-16</b> Graph Theory Applications in Investment Analysis and Risk Modeling <i>Limonka Koceva Lazarova, Anastasija Antova, Natasa Stojkovic, Aleksandra Stojanova Ilievska, Vasko Kokalanov</i>
17:15-17:30	<b>O-M-17</b> One More Result on Products of Distributions in Colombeau Algebra <i>Marija Miteva, Limonka Koceva Lazarova, Biljana Zlatanovska</i>
17:30-17:45	<b>O-M-18</b> Persistent Homology-Based Regime Detection for Time Series Forecasting <i>Petar Sekuloski, Vesna Dimitrievska Ristovska</i>
17:45-18:00	<b>O-M-19</b> Applications of LLM in geometry teaching <i>Petar Sokoloski</i>

## Section: Informatics Hall 5

<b>Friday, June 13<sup>th</sup></b>	
Chairman: <b>Assoc. Prof. Nadezhda Borisova</b>	
13:30-13:45	<b>O-I-1</b> Integrating Exon–Gene Structure into Neural Architectures for RNAseq Classification <i>Aleksandar Jovanović, Michael Sammeth</i>
13:45-14:00	<b>O-I-2</b> Applications of Machine Learning Algorithms <i>Eyal Sadeh</i>
14:00-14:15	<b>O-I-3</b> Comparative Analysis of Classification Algorithms on Big Datasets using WEKA <i>Aleksandar Stoimenovski, Irena Atanasova</i>
14:15-14:30	<b>O-I-4</b> The Accessibility Impact from Changing Existing Schools into Experimental Schools without the Establishment of New Schools: Analyzing Kindergarten and Primary Schools of Florina, Greece, a Case Study <i>Irena Atanasova, Ilias Solakis</i>

14:30-14:45	<b>O-I-5</b> Some Robotic Process Automation (RPA) Use Cases and Applications in Financial Industry <i>Vladislav Yurukov, Irena Atanasova</i>
14:45-15:00	<b>O-I-6</b> Data mining - based predicting of students' evaluation and students' acceptance of Distance E-learning. Case study: South-West University "Neofit Rilski" <i>Irena Atanasova, Aleksandar Stoimenovski</i>
Coffee break	
Chairman: <b>Assoc. Prof. Irena Atanasova</b>	
15:30-15:45	<b>O-I-7</b> Collaborative mindset and AI empowered Knowledge Management <i>Vladislav Yurukov, Irena Atanasova</i>
15:45-16:00	<b>O-I-8</b> Numerical solution of some facility location and inventory control problems <i>Stefan Stefanov</i>
16:00-16:15	<b>O-I-9</b> Analysis of data mining algorithms for predicting physical activity of urban populations <i>Irena Atanasova, Svetoslav Petkov</i>
16:15-16:30	<b>O-I-10</b> Enhancing Computational Thinking and Code Comprehension through Advanced Parsons Puzzles <i>Ivo Damyanov, Martin Madzhov</i>

### Section: Methodology in Education Conference Hall

<b>Thursday, June 12<sup>th</sup></b>	
Chairman: <b>Assist. Prof. Dr Damyana Grancharova</b>	
13:30-13:45	<b>O-ME-1</b> STEAM: learning content development, how to use it, difficulties <i>Ginka Exner</i>
13:45-14:00	<b>O-ME-2</b> Distance and Independent Learning Contents in a Digital Environment <i>Juraqulova Zulayxo Ixtiyor, Boboev Abrorjon Khotamovich, Toshniyozova Farangiz Burxon</i>
14:00-14:15	<b>O-ME-3</b> Application of Metacognitive Strategies and Artificial Intelligence in the Learning Process <i>Lyuba Petrova</i>
14:15-14:30	<b>O-ME-4</b> Continuity issues in the content of the chemistry course between secondary school and university <i>A.B. Toibazarova, N.O. Appazov</i>
14:30-14:45	<b>O-ME-5</b> Cross curricular relationships in teaching mathematics and informatics in lower secondary school <i>Mediha Topalova, Daniela Tuparova</i>
14:45-15:00	<b>O-ME-6</b> Methods for Introducing Optimization Algorithms and Mathematical Modeling into the High School Mathematics Curriculum (Grades 8–10) through Interactive Platforms – Wolfram Alpha and Matlab

	<i>Elitsa Atanasova, Feim Musankov</i>
15:00-15:15	<b>O-ME-7</b> <i>Trakya University STEM Innovation Lab: Philosophy, Structure, Projects, and Future Vision</i> <i>Sertaç Arabacıoğlu, Eylem Bayir</i>
15:15-15:30	<b>O-ME-8</b> Modeling with scratch for solving movement problems at the lower gymnasium level <i>Rositsa Georgieva</i>
Coffee break	
Chairman: <b>Assist. Prof. Aleksandra Tencheva</b>	
16:00-16:15	<b>O-ME-9</b> Interactive Learning with Virtual Reality and 3D Printing <i>Damyana Grancharova</i>
16:15-16:30	<b>O-ME-10</b> Non-formal style in mathematics teaching <i>Nataliya Pavlova</i>
16:30-16:45	<b>O-ME-11</b> Integrating Sudoku into 5th grade mathematics classes <i>Ivayla Gergova, Boyana Garkova</i>
16:45-17:00	<b>O-ME-12</b> Prospective Teachers' Demographic Characteristics and Their Beliefs about Their Preparedness to Teach Mathematics <i>Metodi Glavche</i>
17:00-17:15	<b>O-ME-13</b> The role of the competency-based approach in stem education <i>Krasimir Harizanov</i>
17:15-17:30	<b>O-ME-14</b> Creative Activity in Food Industry Engineering <i>Rano Mirsamikova, Botir Usmonov</i>
17:30-17:45	<b>O-ME-15</b> The implementation of stem education in the higher education system <i>Gulnora Aripova, Abror Boboev, Mahmuda Tadjibaeva</i>
17:45-18:00	<b>O-ME-16</b> Application of a research approach in stem education <i>Sevinch Mustan</i>
18:00-18:15	<b>O-ME-17</b> Challenges in Informatics Education: Analysis and Improvement Proposals <i>Samuil Zharev, Elena Karashtranova</i>

### Special session

Central Auditorium of Conference Center

### ***“Challenges and Opportunities for Implementing STEM Approaches in Secondary and Higher Education”***

**14.06.2025**

**10:00 – 12:00**

**12:00-12:30 Coffee break**

## POSTER SESSION

Chemistry	
P-C-1	Could an Auophilicity play a role in dimeric Au (III) Diiminoisoindole Complexes? The Group 11 Complexes for the 11th FMNS! <i>Stanislava Majerova, Zdenka Ruzickova, Ales Ruzicka</i>
P-C-2	Positively charged heteroboranes: Synthesis and reactivity <i>Vlastimil Němec, Josef Holub, Maksim A. Samsonov, Jan Vrána, Aleš Růžička</i>
P-C-3	Biosorption of industrial dyes by the dried and inactivated lichen <i>Usnea barbata</i> <i>Katarina Stepić, Radomir Ljupković, Jovana Ickovski, Slobodan Ćirić, Aleksandra Đorđević, Tijana Jovanović, Aleksandra Zarubica</i>
P-C-4	Ethnopharmacological applications of <i>Salvia officinalis</i> L. in the Niš district: Traditional use in oral health disorders <i>Jovana Ickovski, Slobodan Ćirić, Aleksandra Đorđević, Katarina Stepić, Radomir Ljupković, Marija Marković, Vesna Stankov Jovanović</i>
P-C-5	Antimicrobial activity of <i>Hypericum barbatum</i> Jacq. essential oil <i>Aleksandra Đorđević, Goran Petrović, Jovana Ickovski, Radomir Ljupković, Jelena Stamenković, Slobodan Ćirić, Katarina Stepić</i>
P-C-6	Using innovative USB sensors in chemistry <i>Aleksandra Tencheva, Elitsa Chorbadzhiyska</i>
P-C-7	Characterization of electrocatalysts for cathodes in a microbial electrolysis cell <i>Katerina Angelova, Yordan Angelov, Elitsa Chorbadzhiyska</i>
P-C-8	Quantitative determination of calcium in the chicken eggshell by ICP-OES method <i>Emilija Pecev-Marinković, Aleksandra Pavlović, Jelena Mrmošanin, Ivana Rašić Mišić, Enisa Selimović, Katarina Milenković, Stefan Petrović, Denis Mitov</i>
P-C-9	DFT Study of the Thermodynamic Aspects of Lutein Oxidative Transformations <i>V. Staykov, Zh. Velkov</i>
P-C-10	Boron and Aluminum Complexes of Electronically Diverse Biguanide Ligand: Synthesis and Reactivity <i>Alena Hoffmannova, Lukas Vlk, Tomas Chlupaty, Zdenka Ruzickova, Ales Ruzicka</i>
P-C-11	Evaluation of Antioxidant Activity and Total Phenolic Content of Red and Green Pepper ( <i>Capsicum annum</i> L.) <i>Jelena Nikolić, Violeta Mitić, Milica D. Nikolić, Milijana Zlatković, Mihajlo Halilović, Milan Mitić, Vesna Stankov Jovanović</i>
P-C-12	Assessment of the chemical composition and biological activity of essential oil from Bulgarian yarrow ( <i>Achillea millefolium</i> ) <i>Krastena Nikolova, Natalina Panova, Anelia Gerasimova, Yulian Tumbarski, Ivan Ivanov, Ivayla Dincheva, Christina Tzvetkova, Galia Gentscheva</i>

P-C-13	Determination of Cd, Cu, and Zn in White, Integral, and Red Rice Varieties Using ICP-OES <i>Stefan Petrović, Snežana Tošić, Milica Marković, Ava Amideina, Violeta Mitić, Jelena Nikolić, Vesna Stankov Jovanović</i>
P-C-14	Impact of Wildfire on the Antioxidant Potential of <i>Doronicum columnae</i> : A Biochemical Assessment of Methanolic Extracts from Fire-Affected and Control Sites <i>Vesna Jovanović, Jelena Nikolić, Marija Marković, Marija Ilić, Marija Dimitrijević, Milan Mitić, Violeta Mitić</i>
P-C-15	Argan shell-derived carbon material as an efficient sorbent for water treatment <i>Petranka Petrova, Elitsa Chorbadzhiyska, Maya Chochkova, Tarik Chafik, Katerina Angelova, Jordan Angelov, Georgios Uzunis</i>
P-C-16	Design and multifunctional performance of a novel zinc-based MOF constructed from TCPT ligand <i>Rusi Rusew, Hristina Lazarova, Magdalena Angelova, Vanya Kurteva, Rositsa Nikolova, Boris Shivachev</i>
P-C-17	Mineral resource base of Uzbekistan for obtaining modern geopolymers <i>Zebo Babakhanova, Shokhnoza Ruzimova</i>
P-C-18	<i>New cysteine derivatives with amantadine, rimantadine and memantine and evaluation of their chemical stability</i> <i>Antoniya Stoymirska, Kiril Chuchkov, Radoslav Chayrov, Ivanka Stankova</i>
P-C-19	Chemical stability of new aminoadamantane analogues with N-acetylcysteine <i>Antoniya Stoymirska, Kiril Chuchkov, Radoslav Chayrov, Ivanka Stankova</i>
P-C-20	Double-layer leather handcraft belt: Design, Technology and Chemistry <i>Mitko Stoev, D. Zheleva, N. Spasova</i>
P-C-21	Substrates with natural zeolites and fertilizers for smart orchid cultivation <i>Mitko Stoev, Elitsa Chorbadzhiyska</i>
P-C-22	A Direct Microwave-Accelerated Wittig reaction for synthesis of substituted cinnamates <i>Maya Chochkova, Ernst Lankmayr, Petranka Petrova, Tsenka Milkova</i>
P-C-23	Synthesis, hydrolytic stability and antiviral studies of Sulfur-based anti-influenza drugs <i>Maya Chochkova, Boyka Stoykova, Petranka Petrova, Nejc Petek, Martin Štícha, Jurij Svete, Lubomira Nikolaeva-Glomb, Yuhuan Li</i>
P-C-24	Residual Deviations Analysis – A Powerful Calibration Linearity Criterion. Visual Test or Reliable Statistical Tool? <i>Ava Amideina, Petko Mandjukov</i>

<b>Physics</b>	
P-P-1	Electron beam welding of titanium and aluminum alloys with a vanadium filler <i>Darina Kaisheva, Georgi Kotlarski, Maria Ormanova, Vladimir Dunchev, Angel Anchev, Borislav Stoyanov, Stefan Valkov</i>
P-P-2	Investigation of laser produced noble metal-semiconductor nanostructures <i>Mihaela Koleva, Anna Dikovska, Nikolay Nedyalkov, Tsanislava Genova</i>
P-P-3	All-optical characterization of the magnetic properties of nanocomposite bulk samples <i>Elena Taskova, Svetoslav Kolev, Tatyana Koutzarova</i>
P-P-4	Crystallography and electrical impedance spectroscopy of TiO <sub>2</sub> thin films deposited on Al substrates <i>Daniela Stoeva, Georgi Kotlarski, Dimitar Dechev, Nikolay Ivanov, Stefan Valkov, Maria Ormanova, Valentin Mateev, Iliana Marinova</i>
P-P-5	Influence of diffusion on the propagation of optical beams in alkali metal vapors <i>Nikola Nikolov, Stoyan Tsvetkov, Sanka Gateva</i>
P-P-6	Analysis of the decay of the <sup>9</sup> B nucleus in the dissociation of the <sup>10</sup> C nucleus <i>Ralitsa Stanoeva</i>
P-P-7	Modeling in electrochemical characterization of electrode materials <i>Pavel Chorbadzhiyski, Metodi Popstoilov, Elitsa Chorbadzhiyska</i>
P-P-8	Modeling in energy efficiency - autonomously powered systems <i>Pavel Chorbadzhiyski, Metodi Popstoilov, Elitsa Chorbadzhiyska</i>
P-P-9	Stimulated Raman Scattering in quartz fibers around the point of zero dispersion <i>Lyuben Ivanov</i>
P-P-10	Applicability of quartz for dosimetric purposes <i>Ivana Fabijanikj Sandeva, Aleksandar Krleski, Lihnida Stojanovska-Georgievska, Margarita Ginovska, Hristina Spasevska</i>

<b>Geography</b>	
P-G-1	Anthropophysiological characteristics of the contemporary Bulgarian population in Northeastern Bulgaria <i>Nadezhda Paraskova, Magdalena Pirinska – Apostolu</i>
P-G-2	Presence of wormian bones in adult human skulls from Late Roman period - Salona, Dalmatia <i>Ralitsa Bogdanova, Magdalena Pirinska-Apostolu</i>
P-G-3	The influence of social factors on the physical development and maturation of girls (12-16 years old) from Sliven district - Bulgaria <i>Pirinska - Apostolu Magdalena, Nadezhda Paraskova, Ralitsa Bogdanova</i>
P-G-4	Geographical studies of urbanization processes and their spatial organization in Bulgaria <i>Evelina Filatova, Emilia Patarchanova</i>

P-G-5	Evaluating Urban Expansion Using a City-Scale Dasymetric Population Map: A Case Study of Bursa, Türkiye <i>Mustafa Köse; Nilanchal Patel, Galina Bezinska</i>
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<b>Ecology and Environmental Protection</b>	
P-EEP-1	First and confirmative records of four mayflies (Insecta: Ephemeroptera) from the Republic of North Macedonia <i>Biljana Rimcheska, Yanka Vidinova</i>
P-EEP-2	Optimizing nitrogen retention through novel magnesium-urea complexes: monitoring ammonia emissions in soil environments <i>Gergana Velyanova</i>
P-EEP-3	Some aspects of the chemical pollution from CFPPs of Razmetanitsa and Sokolitsa rivers <i>Vanina Mitseva, Elena Karashtranova, Emilia Varadinova</i>
P-EEP-4	Monitoring European beech phenology in two long-term ecological research sites by remote sensing <i>Svetoslav Anev, Sonya Damyanova</i>
P-EEP-5	Microbiological status of soils within the scope of the site Petrohan, LTER-BG <i>Bilyana Grigorova-Pesheva, Sonya Damyanova, Pavel Pavlov</i>
P-EEP-6	Data Fusion for Ecosystem Services Assessment: a Case Study in Bulgarian South-western Rila Mountains <i>Kostadin Katrandzhiev, Kremena Gocheva, Radka Fikova, Svetla Doncheva</i>

<b>Mathematics</b>	
P-M-1	Obtaining an Analytical Solution of First-Order Differential Equations with ChatGPT <i>Biljana Zlatanovska, Marija Miteva, Natasa Koceska, Saso Koceski, Limonka Koceva Lazarova, Mirjana Kocaleva Vitanova</i>

<b>Informatics</b>	
P-I-1	Application of Computer Visualizations in Scientific Data Analysis <i>Radoslav Mavrevski, Miglena Trencheva, Metodi Traykov, Tereza Trencheva, Ivan Trenchev</i>
P-I-2	Adaptive Learning in Mixed Reality: New Horizons for Personalized Education <i>Vladimir Angelov, Yana Karshiyska, Kamelia Shumanova, Borislav Zashev</i>
P-I-3	Construction and optimization of the seventh-order polynomial convolutional interpolation 2P kernel <i>Zoran Milivojevic, Nataša Savić, Bojan Prlinčević, Violeta Stojanović, Dijana Kostić</i>

<b>Methodology in Education</b>	
P-ME-1	Robots and Reassurance: Teacher Insights into a New Curriculum for Anxiety-Free Math Learning <i>Nadezhda Borisova, Elena Karashtranova, Ineta Helmane, Linda Daniela, Hasan Arslan, Yasemin Abalı Öztürk, Kadir Tunçer, Danguole Rutkauskiene, Kornelia Daukintyte, Aleksandra Zajqc</i>
P-ME-2	Chemistry - fun and interesting using STEM approaches <i>Aleksandra Tencheva, Elitsa Chorbadzhiyska</i>
P-ME-3	How Important is STEM Integration in Modern Teaching: Survey Insights <i>Damyana Grancharova</i>

## **P-C-4 Ethnopharmacological applications of *Salvia officinalis* L. in the Niš district: Traditional use in oral health disorders**

Jovana Ickovski<sup>1</sup>, Slobodan Ćirić<sup>1</sup>, Aleksandra Đorđević<sup>1</sup>, Katarina Stepić<sup>1</sup>,  
Radomir Ljupković<sup>1</sup>, Marija Marković<sup>2</sup>, Vesna Stankov Jovanović<sup>1</sup>

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**Abstract:** *Salvia officinalis* L., commonly known as sage, is a well-known medicinal plant traditionally employed across various cultures for its antiseptic, anti-inflammatory, and antimicrobial properties. In the Balkan region, particularly in southeastern Serbia, sage holds a prominent place in traditional medicine. Despite its widespread use, there is limited ethnopharmacological documentation specific to local regions such as the district of Niš. This study aims to investigate the traditional uses of *S. officinalis* in Niš, focusing on its role in treating oral and throat conditions.

A cross-sectional ethnobotanical survey was conducted among 47 residents of the Niš district using online survey. Respondents were asked about their use of *S. officinalis*, including the parts of the plant used, preparation methods, and specific health conditions treated. Use Report (UR) was used as a reflection of how frequently a condition is associated with a particular treatment or remedy in the dataset by participants. Among the 47 respondents, 14 (29.8%) reported using *S. officinalis* primarily for the treatment of oral and throat-related ailments. The most frequently cited conditions included oral infections (UR = 10) and sore throat (UR = 9), followed by gum disease, toothache, and mouth ulcers (each with UR = 1). In all cases, the aerial parts of the plant were utilized, typically prepared as an infusion (tea), either for gargling or oral consumption. It is interesting to note that the majority of respondents (76.6%) do not think that the taste of tea is pleasant but despite of that they still use it regularly for the aforementioned medical conditions. That together with the frequency of citation highlights a culturally significant role of sage in folk remedies for maintaining oral hygiene and managing infections. The high incidence of reported use for oral and throat conditions aligns with existing

pharmacological studies confirming the antimicrobial and anti-inflammatory properties of *S. officinalis*. The local preference for using aerial parts of the plant as tea suggests both practical knowledge and potential consistency with pharmacognostic data. Moreover, the congruence between traditional applications and modern biomedical evidence underscores the potential value of sage in integrative therapeutic approaches, especially in rural or medically underserved communities. This ethnopharmacological assessment confirms the cultural importance of *S. officinalis* in the Niš district, particularly in the management of oral and throat ailments. The findings support further phytochemical and clinical studies to validate traditional knowledge and explore potential for incorporation into evidence-based health practices. Documenting such regional uses contributes to the broader understanding of medicinal plant heritage in Serbia and the Balkan Peninsula.

**Keywords:** *Salvia officinalis*, ethnopharmacology, Niš district, traditional medicine, oral health, herbal tea.

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## **P-C-5 Antimicrobial activity of *Hypericum barbatum* Jacq. essential oil**

*Aleksandra Đorđević<sup>1</sup>*, *Goran Petrović<sup>1</sup>*, *Jovana Ickovski<sup>1</sup>*, *Radomir Ljupković<sup>1</sup>*,  
*Jelena Stamenković<sup>2</sup>*, *Slobodan Ćirić<sup>1</sup>*, *Katarina Stepić<sup>1</sup>*

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**Abstract:** Essential oils have been used since ancient times as important medicinal remedies. Today, they are widely applied in various branches of medicine, including pharmacy, balneology, massage therapy, and homeopathy.