

# International Conference New Perspectives in Science Education

13th Edition  
In Florence and Online

## Conference Programme

14 - 15 March 2024



Organized by





## Online Event Wednesday 13 March

09:00 – 09:10
Introductory Speech and Practicalities
09:10 – 11:15
First online session
14:00 – 15:15
Second online session

## Onsite Event Thursday 14 March 2024

Room A 9:45 – 11:00	Room B 9:45 – 11:00
STEM Education	Chemistry Education

Posters session & Coffee Break  
11:00 – 11:30

Room A 11:30 – 13:10	Room B 11:30 – 13:10
STEM Education	Games and Extra Curricula Activities

Lunch  
13:10 – 14:30

Room A 14:30 – 16:10	Room B 14:30 – 16:10
Educational Strategies	Teacher Professional Development

Posters session & Coffee Break  
16:10 – 16:40

Room A 16:40 – 17:55
Educational Strategies

## Friday 15 March 2024

Room A 9:00 – 11:05
Educational Strategies

Posters session & Coffee Break  
11:05 – 11:35

Room A 11:35 – 12:50
Enhancing Student Engagement

Lunch  
13:00 – 14:30

Room A 14:30 – 15:45
Science and Society

Posters session & Coffee Break  
15:45 – 16:15

Room A 16:15 – 17:55
Science and Environment



## Wednesday 13 March Online Event

**09:00 – 09:10**

**Introductory Speech and Practicalities**

### Online session: 09:10 – 11:15

*Moderator:*

**9:10 – 9:35**

University of Malta Courses with Intermediate/Advanced Chemistry as a Requirement and/or Option: an Analysis of Students' Choices

**Edward Thake**, *St Theresa College Imrieħel Secondary School and San Ġorg Preca College Ħamrun Secondary School, Malta*

**9:35 – 10:00**

Activating the Student's Prior Knowledge in the Learning of Third Newton Law Through a P.O.E. ("Predict-Observe-Explain") Strategy

**Juan Sabin**, *Santiago de Compostela University, Spain*

**10:00 – 10:25**

Building the Conceptual Profile of Chemical Analysis: The Sociocultural Domain

**Maria Mavridi**, *Department of Environment - Ionian University, Greece*

**Dionysios Koulougliotis**, *Department of Environment - Ionian University, Greece*

**10:25 – 10:50**

Popularization Strategies in Public Health Discourse: a Corpus-based Analysis in Portuguese and Chinese

**Huanqi Sun**, *University of Aveiro, Portugal*

**10:50 – 11:15**

The Impact of a M.Sc. Programme on the Career Paths of Postgraduate Students

**Katerina Paschalidou**, *National and Kapodistrian University of Athen, Greece*

### Online session: 14:00 – 15:15

*Moderator:*

**14:00 – 14:25**

Exploring the Digital Landscape of STEAM Learning Discourse: Insights from GPT-4 based Twitter Data Analysis

**Sherif Abdelhamid**, *Virginia Military Institute, United States*

**14:25 – 14:50**

Teacher Professional Development to Support STEM Equity

**Janelle Johnson**, *Metropolitan State University of Denver, United States*

**14:50 – 15:15**

Accessible and Enriched Community-Engaged Learning: A Botanical Virtual Classroom Field Trip

**Poh Tan**, *Simon Fraser University Institute for Environmental Learning, Canada*

**Zandvliet David**, *Simon Fraser University Institute for Environmental Learning, Canada*



**Thursday 14 March 2024**  
**Morning Session**

**Room A: 09:00 – 09:10**

**Introductory Speech and Practicalities**

**Room A: Opening Speech 09:10 – 09:45**

[TBC]

**First Morning Session | 9:45 – 11:00**

	Room A	Room B
	STEM Education	Chemistry Education
	Moderator: <b>Martin Musumeci</b> University of Malta, Malta	Moderator: <b>Timm Wilke</b> Carl von Ossietzky University Oldenburg, Germany
9:45 – 10:10	The Bioscience Project: Threshold Concepts and Transformation <b>Carloalberto Petti</b> , South East Technological University, Ireland	Situational Interest in Medicinal Contexts for Chemistry Education: Construction of a Survey Instrument <b>Elisabeth Dietel</b> , Carl von Ossietzky Universität Oldenburg, Germany
10:10 – 10:35	Integrating the STEM Approach in In-Service Teacher Education. A Practical Example. <b>Carmen Julve-Tiestos</b> , University of Zaragoza, Spain	Variation of the Synthesis for Influencing the Optical Properties of Carbon Quantum Dots <b>Malte Petersen</b> , Carl von Ossietzky Universität Oldenburg, Germany
10:35 – 11:00		Nanomedicine: a Digital Learning Module for Chemistry Education <b>Antonia Fruntke</b> , Carl von Ossietzky Universität Oldenburg, Germany

**Posters session & Coffee Break**  
**11:00 – 11:30**





## Second Morning Session | 11:30 – 13:10

### Room A

#### STEM Education

Moderator: **Sarah Haines**  
Towson University, United States

### Room B

#### Games and Extra Curricula Activities

Moderator: **Thomas Waitz**  
Georg-August-University Göttingen, Germany

11:30 – 11:55

Using Folding Back as a Pedagogical Design Tool Under the Lens of the Van Hiele Model With Preservice Teachers  
**Víctor Manero**, University of Zaragoza, Spain

Sorting Materials using Programmable Lego® Robot: an Educational Activity to Promote Sustainability among Youngsters  
**Andrea Ienco**, Consiglio Nazionale delle Ricerche, Istituto di Chimica dei Composti OrganoMetallici (CNR-ICCOM), Italy

11:55 – 12:20

Fostering Citizenship: Systematic Refutation of False Information in Social Media by Senior Pre-University Physics Students Using a Pedagogical Tool  
**Süleyman Turşucu**, University of Amsterdam, The Netherlands

“Expli’CIT”: A New Serious Game to Strengthen Science-Society Dialogue Making Explicit Research Processes  
**Juliette Anglade**, Université de Lorraine, France

12:20 – 14:45

Conceptions of Inquiry-Based Learning in High School Biology in Japan and China  
**Jiamin He**, Toyo University, Japan

Open Source Gamified Remote Labs in Photonics Education  
**Johannes Kretzschmar**, Friedrich Schiller University Jena, Germany

12:45 – 13:10

Exploring Changes in Students’ Understanding the Basic Concepts of Data Analysis in Introductory Laboratory Course “Search for Physics Laws”  
**Oksana Lozovenko**, Offenburg University of Applied Sciences, Germany; National University “Zaporizhzhia Polytechnic”, Ukraine

Let's Go Out! Popular Outdoor Education - Limited Factors Versus Positives  
**Dagmar Vašutová**, Palacký University in Olomouc, Czech Republic

## Lunch 13:10 – 14:30



**Thursday 14 March 2024**  
**Afternoon Session**

First Afternoon Session   14:30 – 16:10	
Room A	Room B
Educational Strategies	Teacher Professional Development
Moderator:	Moderator: <b>Andrea Ienco</b> Consiglio Nazionale delle Ricerche, Istituto di Chimica dei Composti OrganoMetallici (CNR-ICCOM), Italy
14:30 – 14:55	
Is There a Place for Regular Mid-Semester Assessments in Higher Education? <b>Péter Tasi</b> , Aston University, United Kingdom	Integrated STEM Professional Development: Utilizing Best Practices in an Online Format <b>Sarah Haines</b> , Towson University, United States
14:55 – 15:20	
	Experiences with the Teacher Training Avatar Program and the Usefulness of the Program as Seen in the Discussion <b>Hijiri Okinaka</b> , Toyo University, Japan
15:20 – 15:45	
	Comparison of Mathematical Activities with Preservice Teachers: Manipulatives Vs. Paper and Pencil <b>Alberto Arnal-Bailera</b> , University of Zaragoza, Spain
15:45 – 16:10	
	Embracing Multidisciplinarity: Exploring Challenges and Identities of Teachers in the Subject Integrated Sciences <b>Jasper Cirkel</b> , Georg-August-Universität Göttingen, Germany

**Posters session & Coffee Break**  
**16:10 – 16:40**



**Second Afternoon Session | 16:40 – 17:55**

**Room A**

**Educational Strategies**

*Moderator: **Péter Tasi**  
Aston University, United Kingdom*

**16:40 – 17:05**

Effectiveness of Self-Directed Learning in Undergraduate Medical Education: A Systemic Review and Meta-Analysis  
**Prakash V.A.K. Ramdass**, *St. George's University School of Medicine, Grenada*

**17:05 – 17:30**

Heritage and Computational Thinking: Intersections for Meaningful Learning in Primary School  
**[ONSITE] Paula Quadros-Flores**, *School of Education of the Polytechnic Institute of Porto, Portugal*  
**[ONLINE] Cristina Maia**, *School of Education of the Polytechnic Institute of Porto, Portugal*

**17:30 – 17:55**

Reflecting on School through the Voice of Children  
**Dárida Fernandes**, *School of Education of the Polytechnic Institute of Porto, Portugal*

**End of Conference Day One**



## Friday 15 March 2024 Morning Session

First Morning Session   9:00 – 11:05	
Room A	
Educational Strategies	
Moderator:	
9:00 – 9:25	
Novel Approach for Teaching AI in Entry Level Education <b>Christian Bildhauer-Buggle</b> , Furtwangen Hochschule University, Germany	
9:25 – 9:50	
What Can Educational Case Studies Reveal About How Teachers Implement the Model of Educational Reconstruction in Biology Instruction? <b>Martin Jáč</b> , Palacký University Olomouc, Czech Republic	
9:50 – 10:15	
Integration of Interdisciplinary and System-Based Assessment Methodologies into Higher Education Programmes at the UAS Technikum Wien <b>Natalie Taupe</b> , University of Applied Sciences Technikum Wien, Austria	
10:15 – 10:40	
The Effect of Teaching-Learning Approaches on Social Innovation Competencies Development <b>Adela García-Aracil</b> , INGENIO (CSIC-UPV), Universitat Politècnica de València, Spain	
10:40 – 11:05	
Future Perspectives in European Cooperation for the Promotion of Science Education <b>Elisabetta Delle Donne</b> , Pixel, Italy	

## Posters session & Coffee Break 11:05 – 11:35



**Second Morning Session | 11:35 – 12:50****Room A****Enhancing Student Engagement**

*Moderator: **Christian Bildhauer-Buggle**  
Furtwangen Hochschule University, Germany*

**11:35 – 12:00**

Using Visual Notetaking to Promote Participatory Equity in a Science and Math Methods Course

**Michael R. Taber**, *Colorado College, United States*

**12:00 – 12:25**

Assessment Methods Used in Multilingual High Schools in the Teaching of Biology in the Czech Republic

**Onyedika Emmanuel Okpala**, *Charles University Prague, Czech Republic*

**12:25 – 12:50**

Theoretical Perspectives on Paired Mentoring in Science: Experiences from Involvement in Multiple Interventions

**[ONSITE] Nikolaos Fotou**, *University of Lincoln, United Kingdom*

**[ONLINE] Rachael Sharpe**, *University of Lincoln, United Kingdom*

**Lunch 13:00 – 14:30**



## Friday 15 March 2024 Afternoon Session

### First Afternoon Session | 14:30 – 16:10

#### Room A

#### Science and Society

*Moderator:*

**14:30 – 14:55**

The Post-Pandemic Takeaways on STEM Literacy

**Nikolaos Fotou**, *University of Lincoln, United Kingdom*

**Marina Constantinou**, *Independent Researcher, United Kingdom*

**14:55 – 15:20**

Integrating Artistic Research into German University of Applied Sciences Curricula: A New Paradigm in Science Education

**[ONSITE] Sebastian Grobler**, *OWL Technical University of Applied Sciences & Arts, Germany*

**[ONLINE] Tobias Schmohl**, *OWL Technical University of Applied Sciences & Arts, Germany*

**15:20 – 15:45**

Misconceptions About Current Biotechnology in Society: What to Focus On in School and Lifelong Education?

**Michaela Horniaková**, *Palacký University Olomouc, Czech Republic*

## Posters session & Coffee Break 15:45 – 16:15



## Second Afternoon Session | 16:15 – 17:55

### Room A

#### Science and Environment

Moderator: **Michael R. Taber**  
Colorado College, United States

16:15 – 16:40

CO2 Monitoring to Enhance Digital and Green Competences in VET  
**Mariaconcetta Canino**, National Research Council CNR, Institute for Microelectronics and Microsystems IMM, Italy

16:40 – 17:05

Situational Interest in Geology Learning: What Learning Strategies Promote Student Interest in Geological Topics?  
**Jitka Kopecká**, Palacký University Olomouc, Czech Republic

17:05 – 17:30

Active Learning for Circular Economy Businesses, Fostering a Sustainable Mindset  
**Sabrina Fontanella**, Sapienza Università di Roma, Italy

17:30 – 17:55

Sustainable and Healthy Nutrition - How Do Young People Eat?  
**Julia Holzer**, Institute for Science Education, University of Bremen, Germany  
**Doris Elster**, Institute for Science Education, University of Bremen, Germany

## Room A: Closing Speech 18:00 – 18:15

[TBC]

## Closing Cocktail



## Onsite Poster Presentations

Adapted Primary Literature about CO<sub>2</sub> Reduction Reaction – Chemists' Research Approach to Protect the Climate

**Mona Christin Maaß**, Georg-August-University Göttingen, Germany

Bridging the Gap between School and University by a Laboratory Course on Functional Surfaces

**Philipp Lanfermann**, Georg-August-Universität Göttingen, Germany

Case/Problem-Based Learning in a Flipped Classroom and Under a Learning Contract as Didactic Tools for Collaborative Learning of Metabolic Regulation

**Miguel Ángel Medina**, University of Málaga, Spain

Concept of a Public Outreach Project on PCET Reactions

**Christoph Weidmann**, Georg-August-University Göttingen, Germany

Cyclic Voltammetry in Chemistry Classes

**Vivian Keune**, Georg-August-Universität Göttingen, Germany

Design of Inquiry-based Laboratory Projects for an Active Learning of (Bio)Chemistry, Focused On Problem Solving in a Professional Setting

**Ana R. Quesada**, University of Malaga, Spain

Designing the Periodic Table Solitaire Mobile App

**María José Cano-Iglesias**, University of Málaga, Spain  
**Antonio Joaquín Franco Mariscal**, University of Málaga, Spain

Experimental Escape Games with Digital Enrichment - An Innovative Format in Science Education

**Isabel Rubner**, University of Education Weingarten, Germany

Go Extinct! The Educational Game for Learning about Invertebrates

**María-del-Mar López-Fernández**, University of Málaga, Spain

Problem Solving Processes in Science Education: Integrating the Representational Pluralism Perspective

**Alexandre Hagan**, Université du Québec à Montréal, Canada

Senac University Center Levenling Program – An Experience that Integrates Knowledge and Creativity

**Luciana Mara Ribeiro**, Senac University Center, Brazil

"The Complementary Structure of Deoxyribonucleic Acid" – Adapting the Crick and Watson Paper for Science Education

**Hilko Aljets**, Georg-August-University Göttingen, Germany

The Energy Blackout in Debate. An Activity to Develop Argumentation in Pre-Service Primary Teachers

**Jose Manuel Hierrezuelo-Osorio**, University of Málaga, Spain

The Level of Scientific Literacy Among Primary School Pupils: Preliminary Results

**Petr Kovarik**, J. E. Purkyne University, Czech Republic  
**Romana Adamkova**, J. E. Purkyne University, Czech Republic  
**Milan Kubiato**, J. E. Purkyne University, Czech Republic

The Self-Management of Home Therapy: When Creativity and the Art of Doing Become Conditions to Be Amazed

**Sabrina Grigolo**, University of Turin and Patient expert EUPATI - Accademia del Paziente Esperto EUPATI, Italy

Transparent Inorganic Metal Oxide Solar Cells in Chemistry Class

**Edwin Bogdan**, Georg-August-University Goettingen, Germany



## Virtual Presentations

(Available on the Conference Website)

A Reflective Perspective on the Initial Training in Science for Primary School Teachers at CRMEFs in Morocco

**Fatima Zahra El Ouahab**, Regional Center for Education and Training Professions Rabat-Sale-Kenitra, Morocco

Creating Field Experiences to Promote Scientific Learning  
**Melissa Caspary**, Georgia Gwinnett College, United States

**Diane Boothe**, Boise State University, United States

Educational Tourism in Bulgaria: New Research Project

**Sonya Spasova**, University of Library Studies and Information Technologies, Bulgaria

Laboratory Teaching Proposal on the Characteristics of an RC Circuit

**Ninfa Radicella**, Liceo Scientifico "Filippo Silvestri", Italy

Librarians in Bulgaria and the Trends in the Information Environment

**Tania Todorova**, State University of Library Studies and Information Technologies (SULSIT), Bulgaria

Regarding Collaborative Efforts Among Universities, High Schools, and Boards of Education to Develop Scientific Skills

**Mika Tsuyukubo**, Toyo University, Japan

Students After the Pandemic: What Are the Differences in Their Achievement Motivation and Metacognitive Skills?

**Patricia Morales Bueno**, Pontificia Universidad Católica del Perú PUCP, Perú

The Crystal Lake's Mystery: Interactive Eco-Crime Game for Learning about Environmental Sustainability

**Armida Torreggiani**, CNR-ISOF, Institute for Organic Synthesis and Photoreactivity, National Research Council, Italy

The Impact of the Curriculum on the Teaching of Integrated Learning (Inquiry) Time the Effects of Changing Attitudes and Developing 'STEAM Education Skills'

**Kenichi Goto**, Toyo University, Japan

The Teachers' Action for Health – Teachers' First Aid Intervention in Emergency Cases at School

**Stefan Colibaba**, Al. I. Cuza University, Romania

Vermicomposting: an Idea to Work Science and Mathematics in Primary Education

**Ana Cruz**, ISEC Lisboa – Instituto Superior de Educação e Ciências, Portugal

## Virtual Posters

(Available on the Conference Website)

STEM Engaging Teaching and Learning for the Heart in Bioscience Education

**Marina Minoli**, Royal Society of Biology, United Kingdom; Biologists Order Federation, STEM DidalInnovaBiolab, Italy

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# International Conference New Perspectives in Science Education



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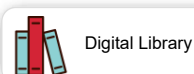
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## Edition 13

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## Accepted Abstracts

## Design of Inquiry-based Laboratory Projects for an Active Learning of (Bio)Chemistry, Focused On Problem Solving in a Professional Setting

Angel Luis G. Ponce, *University of Malaga (Spain)*

José Antonio Torres Vargas, *University of Malaga (Spain)*

Aurelio Moya, *University of Malaga (Spain)*

Melissa García-Caballero, *University of Malaga (Spain)*

Ana R. Quesada, *University of Malaga (Spain)*

### Abstract

Being aware that a change was needed in the style of laboratory teaching at our university, mainly based in the use of cookbook laboratory protocols, our Educational Innovation Group TR4BIOCHEM (PIE22-067) is working in the design and implementation of new training activities based on Problem Based Learning, applicable to different subjects of the last courses of the degrees of the Faculty of Sciences. In this way, the learning process of disciplines such as biochemistry and analytical chemistry, is transformed through a competency-based approach, making students to get more actively involved in their learning process, with the professor as a mere "facilitator". Thus, many of these students have to face for the first-time issues that are common in a professional setting, such as the acquisition of reagents and materials, the assessment of the necessary instruments and equipment, the adaptation and scaling of experimental protocols, and the analysis of costs and operational feasibility, among others. This new approach motivates the students' interest, as they are in the final phase of their studies and are particularly concerned about their upcoming incorporation into an increasingly demanding job market. This communication will present our experience from the last years at University of Malaga in the design and implementation of new teaching resources in which the hands-on laboratory work was just a part of a more complete sequence of learning activities [1-3]. [Supported by funds ranted to Innovative Education project PIE22-067, University of Málaga, Spain]

Keywords: Problem-based learning, laboratory experiments, Laboratory instruction, Hands-on learning, Bioanalytical chemistry, Undergraduate

### References

[1] García-Caballero M, Moya-García A, Torres-Vargas JA, García-Ponce ÁL, Rodríguez-Quesada A. A course-based undergraduate research experience to illustrate the early stages of the drug discovery process. *Biochem Mol Biol Educ*. 2022; 50(5):437-439

[2] García-Ponce, A. L., Torres-Vargas, J. A., García-Caballero, M., Medina, M. A., Blanco-López, A., Quesada, A.R. Bringing light to science undergraduate students: A successful laboratory experiment illustrating the principles and applications of bioluminescence. *J Chem Educ.*, 2021; 98(7), 2419-29.

[3] García-Ponce, A. L., Martínez-Poveda, B., Blanco-López, A., Medina, M. A., Quesada, A. R. Not all has been said about glucose oxidase/peroxidase: New pedagogical uses for a classical and robust undergraduate laboratory experiment. *Biochem Mol Biol Educ*. 2019; 47(3):341-347.

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