

# International Conference on Teaching Science and Mathematics in Culturally and Linguistically Diverse Settings

20-22 May 2019

University of Nicosia, Cyprus

The conference is organized as part of the [IncluSMe](https://inclusme-project.eu) (<https://inclusme-project.eu>) project and in collaboration with the Unesco Chair of Cultural Diversity and Intercultural Dialogue for a Culture of Peace of the University of Nicosia (UNic).

Please register to the conference by May 5<sup>th</sup> using the form here: <https://forms.gle/B1rSThgbUPayJvY2A>

## Day 1: May 20<sup>th</sup> 2019

Room: Unesco Amphitheater

2.00pm – 3.00pm Conference Registration and Coffee

3.00pm – 4.30pm Session 1

*Prospective mathematics teachers task designs for multicultural classrooms.*

**Presenters:** Maha Farah; Chrissavgi Triantafillou; Giorgos Psycharis; Despina Potari; Theodossios Zachariades/ National and Kapodistrian University of Athens, Greece

*Exploring pre-service teachers' views about teaching science in culturally diverse settings as they engage in an international summer school.*

**Presenters:** Maria Evagorou, University of Nicosia, Cyprus/ Anne Bonnevie Lund, Ragnhild Lyngved Staberg, Maria I. Maya Febri, Jardar Cyvin, Norwegian University of Science and Technology (NTNU), Norway/ Marta Romero-Ariza, Antonio Quesada, Faculty of Humanities and Educational Sciences, University of Jaén, Spain

*Border Crossing: The transformational journeys of preservice STEM teachers toward culturally responsive pedagogical knowledge.*

Presenter: Justina Ogodo/ The Ohio State University, USA





United Nations  
Educational, Scientific and  
Cultural Organization



UNESCO Chair on Cultural Diversity  
and Intercultural Dialogue  
for a Culture of Peace



IncluSMe

*Strengthening STEM Teachers' Competencies for Equitable and Effective Teaching and Learning Practices.*

Presenter: Kadir Demir/ Georgia State University, USA

4.30pm – 6.00 pm Parallel Workshops (Rooms will be announced later - please register for the workshops when you register for the conference – Workshop descriptions are available at the end of the schedule)

**Workshop titles:**

Workshop 1: *Scaffolding Explanation and Argumentation in Inquiry-Based Science Lessons (Language of workshop: English)*

Organizers:

Clara Bauler, Emily Kang - Adelphi University, USA

Lauren Swanson, Whittier College, USA

Workshop 2: *Critical Mathematics Education: ideas for teachers (Language of workshop: Greek)*

Organizer:

Constantinos Xenofontos, University of Sterling, UK

**Day 2: May 21<sup>th</sup> 2019**

*Room: Unesco Amphitheater*

8.30am – 9.00am Conference Registration

9.00am – 9:30am *Introduction to the IncluSMe project*

Presenter: Maria Evagorou, University of Nicosia, Cyprus

9.30am – 10.30am *Exploring the role of language and culture in the mathematics classroom*

Keynote speaker: Constantinos Xenofontos, University of Sterling, UK

10.30am – 12.00pm Session 2

*The Effects of Language and Parents' Education on Performance in Mathematics and Science.*

Presenters: Rayya Younes, Maya Antoun & Sara Salloum/ University of Balamand, Lebanon

*Evaluating a Professional Development Program for Middle School Teachers of Syrian Refugees in Lebanon: Addressing the Challenge of the Foreign Language of Instruction in Science and Mathematics.*

Presenters: Tamer Amin; Rabih El-Mouhayar/ American University of Beirut, Lebanon





United Nations  
Educational, Scientific and  
Cultural Organization



UNESCO Chair on Cultural Diversity  
and Intercultural Dialogue  
for a Culture of Peace



IncluSMe

*Responsive Professional Development in Multilingual Science Classrooms: Insights from a Bakhtinian and Activity Theory Perspective.*

Presenters: Saouma BouJaoude/ American University of Beirut, Lebanon and Sara Salloum/ University of Balamand, Lebanon

*Functions of Arabic language use in bilingual classrooms during pattern generalization.*

Presenters: Rabih El Mouhayar/ American University of Beirut, Lebanon

12 pm – 12.15am: Coffee break

12.15am -1.45pm

Session 2

results.

*The Scientix Translation on demand service – 9 years, limited*

Presenters: Adrienn Pap, Eleni Myrtsioti, Agueda Gras/ European Schoolnet

*Ecological Feedback Loop Reasoning And Knowledge Sources in Three Countries.*

Presenters: Hayat Hokayem, Hui Jin, Etsuji Yamaguchi/ Texas Christian University, USA, Educational Testing Service, USA, and Kobe University, Japan

*The Effect of Multiple Vocabulary Strategies for Linguistically Diverse Learners in High School Math and Science*

Presenters: Angela Chapman, Revathi Srinivas/ University of Texas Rio Grande Valle

*Climate Change through Science, Technology, Engineering and Mathematics: to students with different cultural background.*

Presenter: Marios Demosthenous, Ministry of Education and Culture, Cyprus

1.45pm –3.00pm

Lunch (on your own) & time to view posters

3.00pm -4.30pm

Session 3

*Intersections of Voice and Space in Culturally and Linguistically Diverse Classrooms.*

Presenters: Christina SIRY and Sara WILMES/ University of Luxembourg

*Teaching Mathematics and Science to primary school students who speak Greek as a second language.*

Presenters: Niki Petsi, Stefanos Asimopoulos, Triandafillos A. Triandafillidis/ Department of Primary Education, University of Thessaly, Greece





United Nations  
Educational, Scientific and  
Cultural Organization



UNIVERSITY  
of NICOSIA

UNESCO Chair on Cultural Diversity  
and Intercultural Dialogue  
for a Culture of Peace

IncluSMe

*Students with Migrant Background in Cyprus: divergent perspectives, teachers' profiles and teaching practices in teacher professional learning experiences through the lenses of teacher trainers.*

Presenters: Pavlina Hadjitheodoulou Loizidou/ Cyprus Pedagogical Institute, Cyprus

*Documenting the unwritten rules of undergraduate research in biology at a large, public, research intensive higher education institution in the United States.*

Presenter: Katelyn Cooper, Arizona State University, USA

4.30pm-6.00pm

Parallel Workshops (Rooms will be announced later - please register for the workshops when you register for the conference – *Workshop descriptions are available at the end of the schedule*)

**Workshop titles:**

Workshop 1:

Relevance of language in science teaching (IO9) (Language of workshop: English)

Organizer:

Maria Evagorou, University of Nicosia, Cyprus

Workshop 2:

Relevance of language for mathematics education (IO8) (Language of workshop: Greek)

Organizer:

Nicolas Mousoulides, Ministry of Education and Culture, Cyprus

**Day 3: May 22<sup>th</sup> 2019**

*Room: Unesco Amphitheater*

9.00am-12.00pm:

Workgroups organized based on special interests. The workgroups will be set during the second day of the conference based on participants' interest.

12pm-2.00pm:

Presentation of main themes from group work. The organizers will prepare a technical report based on the outcomes for dissemination to stakeholders.



## Workshop Descriptions

### May 20<sup>th</sup>, workshop descriptions

#### Workshop 1: *Scaffolding Explanation and Argumentation in Inquiry-Based Science Lessons (Language of workshop: English)*

##### Organizers:

Clara Bauler, Emily Kang - Adelphi University, USA

Lauren Swanson, Whittier College, USA

**Description:** This workshop will help science teachers focus on providing linguistically diverse learners (LDLs) meaningful opportunities to practice language associated with scientific sense-making. Presenters will model one elementary and one secondary inquiry-based science unit aligned to the Next Generation Science Standards (NGSS Lead States, 2013) used in many schools across the United States. Both units embody three principles supporting our pedagogical approach for designing science and engineering curriculum: immerse students in authentic, real-world problems based on community needs; integrate language supports in all tasks; and leverage students' cultural and community assets and home languages. The plate tectonics unit was designed for middle school students in a bilingual science classroom (Spanish and English) so materials were provided in both languages. The unit consisted of authentic tasks that asked students to connect their understanding of plate tectonics to a real-life situation—earthquake safety drills. Lessons immersed students in real contexts, involving places that the students knew or were from, such as El Salvador and their school. Activities promoted use of language for authentic communicative purposes, having students construct an argument on whether earthquake drills were needed in a certain location. Assessments focused on students' level of proficiency in constructing and communicating scientific arguments and explanations. The erosion unit was designed to support second-grade students in sensemaking around an authentic phenomenon - flooding of an area in the students' town. Lessons about maps as representations of landscapes focused on locations close to the school, within their home state or country. Students were encouraged to tap into all their linguistic repertoires and community assets. Activities were designed to promote authentic uses of language to support explanation as students compared different representations of the same location and the maps they created. Hands-on activities allowed students to visualize, then depict in drawing and writing how landforms changed over time. The final solution engaged students in designing, testing, and arguing for a way to prevent water erosion in a stream table to tackle the local flooding problem. By engaging in each unit as learners, the workshop will provide science teachers with an accessible framework and concrete strategies to recognize and capitalize on LDLs' resources while providing necessary language supports, focusing on scaffolding the scientific practices of explanation and argumentation. We encourage participants to move beyond a deficit model perspective to embrace what LDLs can do with respect to their emerging language and scientific understandings, recognizing that LDLs can engage in complex scientific practices no matter their level of language proficiency (Lee & Llosa, 2015).

#### Workshop 2: *Critical Mathematics Education: ideas for teachers (IO6) (Language of workshop: Greek)*

Organizer:

Constantinos Xenofontos, University of Sterling, UK

**Description:** The purpose of this workshop is provide an overview of pedagogical approaches and teaching methods suitable to deal with diversity, heterogeneity, multilingualism and to create equal opportunities for pupils in mathematics and science learning.

**May 21<sup>st</sup>, workshop descriptions**

**Workshop 1: Relevance of language in science teaching (IO9) (Language of workshop: English)**

Organizer:

Maria Evagorou, University of Nicosia, Cyprus

**Description:** This workshop will address learning and teaching mechanisms in multicultural classrooms that hinder concept development in these subjects (e.g. Dijk et al., 2012). One hindering aspect might be that due to language barriers immigrant pupils do not ask questions, whilst teachers expect them to ask questions when they do not understand something. The absence of questions might be misinterpreted by the teacher as pupils having understood the lesson's topic. Furthermore, due to language barriers immigrant pupils might talk in short or incorrect sentences, which do not reflect their (higher) level of comprehension. The purpose of the workshop is to

- Investigate the role of language in science education;
- Become aware of the connections and the discrepancies differences between street, school and formal scientific language for scientific concepts, procedures, and competences;
- Become aware of the difficulties, pupils face in the learning of science when the teaching (local) language is not their mother tongue;
- Learn to develop scaffolding strategies for their pupils in language-oriented science lessons;
- Learn to value the use of various representations/visualisations (pictures, video clips, animations and image-based interactive tools) as a bridge for understanding and developing language skills in science education;
- Develop pedagogical approaches which promote an unprejudiced, open minded and appreciative attitude towards other cultures that allow reflections and own explorations and investigations in the sciences.

**Workshop 2: Relevance of language for mathematics education (IO8) (Language of workshop: Greek)**

Organizer:

Nicolas Mousoulides, Ministry of Education and Culture, Cyprus

**Description:** Learning the local language (second language for immigrants or refugees) on the one hand and learning maths or science on the other hand are usually perceived as not connected. As soon as refugees or immigrants have completed preparatory

courses on the local language and have been integrated into regular classrooms, they are expected to be able to learn maths and science in the new language. But maths and science classes are challenging because of required language competencies. Even for 'first language' students (native or second/third generation immigrants) learning maths and science is challenging, as expressions used in this context often have a different meaning from their meaning in daily life. The challenge is even greater when pupils are no native speakers. The result is that many young immigrants perform worse in maths and science, despite their talent and potential capabilities in these subjects. This workshop will enable teachers to:

- Investigate the role of language in maths education;
- Become aware of connections and discrepancies between street, school and special language for mathematical concepts and procedures;
- Become aware of difficulties pupils face in maths learning when the teaching (local) language is not their mother tongue;
- Learn to develop scaffolding strategies for their pupils in language-oriented maths lessons;
- Learn to value the role of various representations and visualisations (pictures, video clips, animations and image-based interactive tools) as a bridge for understanding and developing language skills in maths education.