IHPST2019 CONFERENCE

PROGRAMME
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<tr>
<td>9:30 – 11:00</td>
<td>SUMMER SCHOOL 1</td>
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<td>11:00 – 11:30</td>
<td>COFFEE BREAK</td>
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<td>11:30 – 13:00</td>
<td>SUMMER SCHOOL 2</td>
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<td>11:30 – 16:30</td>
<td>IHPST COUNCIL MEETING</td>
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<td>16:00 – 17:30</td>
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<td>18:00 – 19:30</td>
<td>OPENING SESSION – 1ST PLENARY LECTURE</td>
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<td>Informing the History and Philosophy of Science through Science Education</td>
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<td>Pierre Boulos</td>
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<td>University of Windsor</td>
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<td>Canada</td>
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<td>WELCOME RECEPTION</td>
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TUESDAY JULY 16, 2019

PARALLEL 1.1  9:30 – 11:00
Science for the people

ps1.1.1
Stop teaching science: A philosophical framework to depart from Science Education into Deep Ecological Education
Nathan Willig Lima & Cristiano Moura
Universidade Federal do Rio Grande do Sul
Centro Federal de Educação Tecnológica Celso Suckow da Fonseca
Brazil

ps1.1.2
Nature of Science on Creator-Driven Popular Science YouTube Videos
Veli-Matti Vesterinen & Jaakko Lamminpää
University of Turku
Finland

ps1.1.3
Enjoy science! The ATLAS MOOC approach for science citizenship
Anna Leci & Fanny Seroglou
Aristotle University of Thessaloniki
Greece

PARALLEL 1.2  9:30 – 11:00
Enhancing Nature of Science Instruction through Research-based Strategies I
Series of panels organized by William McComas

ps 1.2.1
Considering the Meaning of, Advocacy for and Instructional Rationales Associated with the Nature of Science (NOS)
William F. McComas & Jennifer Oramous
University of Arkansas
USA

ps 1.2.2
Major Elements of NOS to Guide K-12 Science Teaching and Learning: Considering Consensus
William F. McComas
University of Arkansas
USA

ps 1.2.3
Teaching Aspects of the Nature of Science: A Review of the Literature with Implications for Effective NOS Instruction
William McComas & Noushin Nouri
University of Arkansas - University of Texas
USA
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<td>PARALLEL 1.3</td>
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<td><strong>Experiments for the science classroom inspired by the history of science</strong></td>
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| 9:30 – 11:00 |      | ps 1.3.1 **Following Al-Jazari's Footsteps in the Science Laboratory**                                     | Hakki Ilker Koştur & Hasan Özcan  
Baskent University - Aksaray University  
Turkey                                                                                     |
|              | C -  | ps 1.3.2 **Integrated View of Understanding NOS: The Case of Ptolemy's Experiments on Refraction**         | Constantina Stefanidou & Vasiliki Psoma  
National and Kapodistrian University of Athens  
Greece                                                                                     |
|              |      | ps 1.3.3 **Students recreate the historical experiments of Galileo**                                      | Agtzidis Ioannis & Hariton M. Polatoglou  
Aristotle University of Thessaloniki  
Greece                                                                                     |
| PARALLEL 1.4 |      | **Philosophical inputs to science education**                                                             |                                                                                                |
| 9:30 – 11:00 |      | ps 1.4.1 **R. Descartes' contribution to science teaching**                                               | Zuraya Monroy Nasr  
National Autonomous University of México  
Mexico                                                                                     |
|              | D -  | ps 1.4.2 **Atwood and Einstein**                                                                          | Paulo F. Borges & Ricardo Lopes Coelho  
Universidade Federal Fluminense - Rio de Janeiro - Brazil  
Universidade de Lisboa – Lisboa - Portugal                                                                 |
|              |      | ps 1.4.3 **The Theory at the Fingertips**                                                                  | Pierre Lauginie  
University Paris-Sud  
France                                                                                     |
PARALLEL 1.5  9:30 – 11:00  
Logic and rational in science learning

ps 1.5.1  
**More than a Method: The Science Logic Framework is Inherent to Science**  
Lori Maramante  
Delaware Technical Community College  
USA

ps 1.5.2  
**Towards an Educational Model for Scientific Explanation as a means to foster Scientific Literacy**  
Elisa Izquierdo-Acebes & Keith S. Taber  
University of Cambridge  
United Kingdom

ps 1.5.3  
**Give me some equations (and a bit of irrationality) and I will raise the World: A genealogy of de Broglie’s conception on quanta**  
Nathan Willig Lima, Thiago da Silva Peron & Andreia Guerra de Moraes  
Centro Federal de Educação Tecnológica Celso Suckow da Fonseca  
Brazil

COFFEE BREAK 11:00 – 11:30

2ND PLENARY LECTURE  11:30 – 13:00 - ROOM A  
Transformative Science Education activities supported by a historical, philosophical and sociocultural background  
Katerina Plakitsi  
University of Ioannina  
Greece

LUNCH BREAK  13:00 – 14:00
pos 1.1
**Travelling with the students to the Center of the Earth**  
Anastasia Boutzeti & Ourania Samara  
Aristotle University of Thessaloniki  
Greece

pos 1.2
**Aretological values: Contributing to educational leadership and science education**  
Stella Chatzikou, Fanny Seroglou & Joannis N. Markopoulos  
Aristotle University of Thessaloniki  
Greece

pos 1.3
**A comparative study of slowmation narratives**  
Eftyhia-Despoina Dalla, Dimitra Pagarliota, Ioanna Petropoulou, Georgia Pozariti  
Aristotle University of Thessaloniki  
Greece

pos 1.4
**Semiotic systems in the teaching of science**  
González, Sonia Beatriz & Escudero, Consuelo  
National University of San Juan  
Argentina

pos 1.5
**Images of Science in Higher Education: a Discussion on Methods and Languages**  
Giselle Faur de Castro Catarino, Luciana Santana da Silva & José Claudio de Oliveira Reis  
Universidade do Estado do Rio de Janeiro  
Brazil

pos 1.6
**History and Philosophy of Science and the Experiments in the Physics Teaching: A Galilean Didactic Sequence**  
Giselle Faur de Castro Catarino, Henrique de Souza Santos, José Claudio de Oliveira Reis & Adelino Carlos Ferreira de Souza  
University of the State of Rio de Janeiro  
Brazil
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<tr>
<th>pos 1.7</th>
<th>Dialogues on Climate Change – Training Teachers to Handle Complexity and Uncertainty in Biology Classes</th>
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<tr>
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<td>Verena Frantz &amp; Arne Dittmer</td>
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<td>University of Regensburg, Regensburg, Germany</td>
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<td>pos 1.8</td>
<td>Reframing Theoretical Model to Promote Medical Professionalism from a STEAM curriculum in Science Education</td>
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<td>Chia-Hui Hung</td>
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<td>Chung Shan Medical University</td>
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<td>Taiwan</td>
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<td>pos 1.9</td>
<td>atlaswiki: 10 years web-based science education for digital citizenship</td>
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<td>Vassilis Koulountzos &amp; Fanny Seroglou</td>
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<td>Aristotle University of Thessaloniki, Greece</td>
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<tr>
<td>pos 1.10</td>
<td>Can Elementary Student Teachers Differentiate Weight and Mass Conceptions?</td>
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<td>Sunggi Kwon</td>
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<td>Daegu National University of Education, South Korea</td>
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<td>pos 1.11</td>
<td>Eugenic scientific practices in Brazil: a way to discuss Brazilian science in basic education?</td>
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<td>Mary Anne Marques, Andreia Guerra, &amp; Tânia Camel</td>
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<td>Centro Federal de Educação Tecnológica Celso Suchow da Fonseca Rio Brazil</td>
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<tr>
<td>pos 1.12</td>
<td>Virtual Reality Applications in Science Education</td>
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<td>Zinovia Ouzounidou</td>
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<td>Aristotle University of Thessaloniki, Greece</td>
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</table>
pos 1.13
The classroom study of the wave-particle duality of Louis de Broglie from the scientific publications
Thiago Silva Peron, Andreia Guerra de Moraes & Nathan Willig Lima
Instituto Federal do Sudeste de Minas Gerais
Centro Federal de EducaçãoTecnológica Celso Suckow da Fonseca
Brazil

pos 1.14
Science and Art: A path of insertion for the Nature of Science in the physics teaching
José Claudio de Oliveira Reis, Tainá de Araújo Carvalho & Andreia Guerra
Universidade do Estado do Rio de Janeiro
Brazil

pos 1.15
Teaching Nature and History of Science in context with ecological concepts: guiding documents and textbooks
Cristina Sousa & Isabel Chagas
Universidade do Porto - Universidade de Lisboa
Portugal

pos 1.16
Developing blood-donation related values and attitudes
Angeliki Taratsa
Aristotle University of Thessaloniki
Greece

pos 1.17
Detective stories for science teaching
Iasonas Toskas
Aristotle University of Thessaloniki
Greece

pos 1.18
A review on STEM origins and evolution
Vasiliki Zervoglou
Aristotle University of Thessaloniki
Greece

COFFEE BREAK 15:30 – 16:00
TUESDAY JULY 16, 2019

PARALLEL 2.1 16:00 – 17:30
Logic, mathematics and problem solving in science learning

ps 2.1.1 Exploring the Interpretations of ‘OR’ in the Scientific Language: Evidences from Science Textbooks in Taiwan
Shih-Wen Chen, Chih-Hsiung Ku & Yi-Chun Chen
National Academy for Educational Research
National DongHaw University
Cheng-Kung Primary School in Keelung
Taiwan

ps 2.1.2 The effectiveness of problem base learning and history of science approach to enhance the understanding about scientific inquiry of Turkish science preservice teachers
Nihal Dogan, Manassero-Mas MA. & Vázquez-Alonso Á.
University of the Balearic Islands
Spain

ps 2.1.3 Calculus and the Age of Processive Imagination
Robert N. Carson & Stuart K. Rowlands
Montana State University – USA
University of Plymouth - UK

PARALLEL 2.2 16:00 – 17:30
WORKSHOP 1
Make your own version of an instrument from the history of physics
Peter Heering
Europa-Universität Flensburg- Germany

PARALLEL 2.3 16:00 – 17:30
Re-contextualizing the science content

ps 2.3.1 Historical scientific drawings and the “Samba de Coco”: teaching botany through the history of science and popular culture
Thailine Lima, Silvia Figueirôa & Fernando Santiago dos Santos
University of Campinas
Brazil

ps 2.3.2 A proposal for scientific literacy in second chance education: The 2CHANCE model
Anna Tzampazi
Aristotle University of Thessaloniki
Greece

ps 2.3.3 Teaching Geology Content and Process and the Nature of Science Through a Historically Contextualized Curriculum
Glenn Dolphin, Nicole LaDue & El-Mahadia Ibrahim
University of Calgary – Canada
Northern Illinois University - USA
PARALLEL 2.4 16:00 – 17:30
NOS and History of Science for young children

ps 2.4.1
Teaching NOS in preschool through book talks
Lena Hansson, Lotta Leden & Susanne Thulin
Kristianstad University
Sweden

ps 2.4.2
From teacher NOS training to preschool NOS learning inspired by women scientists
Areti Botaiti, Despina Kouklidou, Fanny Seroglou & Dimitra Kogidou
Aristotle University of Thessaloniki
Greece

ps 2.4.3
Exploring History of Science in a Science Curriculum for the Early Grades
Eleni Kolokouri & Katerina Plakitsi
University of Ioannina
Greece

PARALLEL 2.5 16:00 – 17:30
History of Science and NOS insights to educational material and textbooks

ps 2.5.1
Digital educational material of the history of Arrhenius’ researches over the Greenhouse Effect
Dagkas Dimitrios & Hariton M. Polatoglou
Hellenic Open University - Aristotle University of Thessaloniki
Greece

ps 2.5.2
Diving into the Reality of Waves: An ontological discussion about the nature of Waves in undergraduate Physics textbooks used in Brazil
Nathan Willig Lima, Rodrigo Rodrigues Machado, Mariana Faria Brito Francisquini & Sergio Duarte
Universidade Federal do Rio Grande do Sul
Centro Federal de Educação Tecnológica Celso Suckow da Fonseca
Instituto Federal de Educação - Ciência e Tecnologia do Rio de Janeiro
Brazil

ps 2.5.3
Nature of Computer Simulation Models and Implications for Science Education
Maria Develaki
Hellenic Ministry of Education
Greece
TUESDAY JULY 16, 2019

CITY TOUR 17:30
With a local guide, we will visit some of the most popular highlights of the city listed among the 15 World Heritage Sites of Thessaloniki:
- Rotunda - 3rd century Roman circular building with famous mosaics
- Galerius Arch - an impressive Triumphal Arch built between the 3rd and 4th century
- Agia Sophia - one of the oldest and most imposing byzantine churches in Greece
- White Tower - the symbol-building of Thessaloniki located at the Waterfront
- Monument of Alexander the Great at the Waterfront

WEDNESDAY JULY 17, 2019

PARALLEL 3.1 9:30 – 11:00
NOS perspectives on Science Education

ps 3.1.1
It’s a lot of people in different places working on many ideas: possibilities from Global History of Science to learning about Nature of Science
Haira Emanuela Gandolfi
University College London - Institute of Education
UK

ps 3.1.2
Values in Science Education: A Critical Appraisal of Nature of Science in the Next Generation Science Standards
Sindhuja Bhakthavatsalam
California State University
USA

ps 3.1.3
Abduction as a Mode of Inference in Science Education
Agustín Adúriz-Bravo & Alger Sans Pinillos
Universidad de Buenos Aires - Argentina
UAB-Universitat Autònoma de Barcelona
Catalonia, Spain
Enhancing Nature of Science Instruction through Research-based Strategies II
Series of panels organized by William McComas

**PARALLEL 3.2  9:30 – 11:00**

**ps 3.2.1**

*Supporting Science Teachers’ Nature of Science Understandings through a Specially Developed Philosophy of Science Course*

Kostas Kampourakis
University of Geneva
Switzerland

**ps 3.2.2**

*Introducing the human elements of science through a context rich thematic project*

Lotta Leden & Lena Hansson
Kristianstad University
Sweden

**ps 3.2.3**

*Learning Aspects of the Nature of Science through a Variety of Authentic Science Experiences: Realities and Potential*

Dina Tsybulsky
Technion – Israel Institute of Technology
Israel

**ps 3.2.4**

*Use of the Pendulum in Teaching Aspects of the History and Nature of Science*

Michael R. Matthews
University of New South Wales
Australia

**PARALLEL 3.3  9:30 – 11:00**

**Current proposals for biology education**

**ps 3.3.1**

*Students as science communicators: an analysis of multimodal designs in a Biology classroom*

Cecilia Molinari de Rennie & Victoria Auyanet
Universidad de la República
Uruguay

**ps 3.3.2**

*Debate: Food additives as a socio-scientific issue*

Ganime Aydin & Deniz Saribas
Canakkale 18 Mart University - Istanbul Aydin University
Turkey

**ps 3.3.3**

*Modes of observation in biology. Historical cases for science teacher education*

Anne Lien
The University of Agder
Norway
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<td><strong>Narratives in science education I</strong></td>
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<td><strong>ROOM D - ps3.4</strong></td>
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</table>
| ps 3.4.1 **Designing VISUAL-GNOSIS, a research model for analyzing multimedia activities, on scientific literacy**  
Alexandra Gkioka & Fanny Seroglou  
Aristotle University of Thessaloniki  
Greece |
| ps 3.4.2 **Developing Scientific Literacy Through Science Fiction: A Discussion Activity**  
Hakki İlker Koştur & Merve Koştur  
Baskent University  
Turkey |
| ps 3.4.3 **E-book narratives about the nature of science**  
Eleni Gentzi & Fanny Seroglou,  
Aristotle University of Thessaloniki  
Greece |
| **PARALLEL 3.5  9:30 – 11:00** |
| **History of science and philosophy of science I** |
| **ROOM E - ps3.5** |
| ps 3.5.1 **Epistemological Construction: The Role of History and Philosophy of Science**  
Isabel Serra & Elisa Maia  
University of Lisbon  
Portugal |
| ps 3.5.2 **The Optics of Moving Bodies Under the View of Structural Realism**  
Felipe Prado Corrêa Pereira & Ivã Gurgel  
University of São Paulo  
Brazil |
| ps 3.5.3 **Towards Periodizations of Science in the History of Science**  
Alexander Gabovich & Vladimir Kuznetsov  
National Academy of Sciences of Ukraine NASU  
Ukraine |
| **3rd PLENARY LECTURE  11:30 – 13:00 - ROOM A** |
| **Sculpting the image of science: Communicating through icons**  
Andrea Woody  
University of Washington  
USA |
| **LUNCH BREAK  13:00 – 14:00** |
ps 4.1.1
What is a chemical substance? $C_{60}$ diffraction experiment
José A. Chamizo
Universidad Nacional Autónoma de México
Mexico

ps 4.1.2
The role of experimentation in the construction of discourses on the refraction of light: elements for teacher training
Lisbeth L. Alvarado-Guzmán, Nelson E. Hoyos, Edwin G. García Arteaga & Roberto Nardi
State University of São Paulo “Júlio de Mesquita Filho”
University of Valle
Brazil

ps 4.1.3
The dust catcher: transforming dusty collections of scientific instruments into tools of education
Marta Rinaudo & Matteo Leone
University of Turin
Italy

ps 4.1.4
Teaching the Millikan Oil Drop Experiment Historically: Problems and Perspectives
Peter Heering
Europa-Universität Flensburg
Germany
WEDNESDAY JULY 17, 2019

PARALLEL 4.2  14:00 – 15:30
Symposium organised by Andrea Guerra
Science Education in a Damaged World: Nature of Science and Social Justice I

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**Nature of Science and Social Justice: contributions from the South**
Cristiano Moura & Andreia Guerra
Centro Federal de Educação Tecnológica Celso Suckow da Fonseca
Brazil

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**Images of scientists in textbooks aimed at students in need of adjustments**
Lena Hansson & Lotta Leden
Kristianstad University
Sweden

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**Stereotypes about Scientists as Resources for Teaching Nature of Science**
Hagop A. Yacoubian
Lebanese American University
Lebanon

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**Using the FRA to NOS Framework to Support Teaching Science for Social Justice**
Zoubeida R. Dagher
University of Delaware
USA

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**Political Entanglement and the Changing Nature of Science**
Jesse Bazzul
University of Regina
Canada
**WEDNESDAY JULY 17, 2019**

### PARALLEL 4.3  14:00 – 15:30

**Scientific thinking and the construction of knowledge**

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<td>ps 4.3.1</td>
<td><strong>Scientific Thinking and Critical Thinking: A Keystone for History, Philosophy and Sociology of Science Teaching</strong></td>
<td>Ángel Vázquez-Alonso &amp; María-Antonia Manassero-Mas, University of the Balearic Islands, Spain</td>
</tr>
<tr>
<td>ps 4.3.2</td>
<td><strong>Science and its representations: implications in the construction of scientific knowledge</strong></td>
<td>Dayvisson Luís Vittorazzi &amp; Alcina Maria Testa Braz da Silva, Centro Federal de Educação Tecnológica Celso Suckow da Fonseca, Brazil</td>
</tr>
<tr>
<td>ps 4.3.3</td>
<td><strong>Consciousness and Physics</strong></td>
<td>Ian Winchester, University of Calgary, Canada</td>
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### PARALLEL 4.4  14:00 – 15:30

**History of Science and Philosophy of Science II**

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<td>ps 4.4.1</td>
<td><strong>Academic Writing in the Middle Ages: Considerations of Al-Jazari</strong></td>
<td>Merve Koştur &amp; Hakki İlker Koştur, Baskent University, Turkey</td>
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<tr>
<td>ps 4.4.2</td>
<td><strong>What can Science Education learn from Relativism?</strong></td>
<td>Gabriel Wolter Martell, Nathan Willig Lima &amp; Fernanda Ostermann, Federal University of Rio Grande do Sul, Brazil</td>
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<td>ps 4.4.3</td>
<td><strong>Nurturing epistemic insight via reading science-related classics</strong></td>
<td>Kai Ming Kiang, The Chinese University of Hong Kong, Hong Kong</td>
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ps 4.5.1
**Characterization of the History of Science in Portuguese textbooks**
Paulo Maurício, Ricardo Lopes Coelho, Mónica Baptista, Bianor Valente, Isabel Chagas, Cláudia Faria, Filomena Amador & Edite Bolacha
Institute Polytechnic of Lisbon - University of Lisbon
Open University - Ministry of Education
Portugal

ps 4.5.2
**The Interaction between Ethics and Science from a Philosophical Perspective**
Sofia Alexiadou
Aristotle University of Thessaloniki
Greece

ps 4.5.3
**An Analysis of Turkish Elementary Science Textbook: How Meaning-Making Affordances are Constructed by Different Semiotic Modes**
Zekai Ayik, M. Davut Gul, and Cecilia Molinari de Rennie
Universidad de la República
Uruguay

ps 4.5.4
**Not to Confuse the World with its Theories: Wittgensteinian Insights on the Dependence Between Theories, Language and World-Picture Supported by Examples in Newtonian Mechanics**
Maristela do Nascimento Rocha & Ivã Gurgel
University of Sao Paulo
Brazil

**COFFEE BREAK 15:30 – 16:00**
**WEDNESDAY JULY 17, 2019**

### PARALLEL 5.1  16:00 – 17:30

**Feminist Ethics in Science**

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<td>ps 5.1.1</td>
<td>Feminist Ethics Reflections on Modern Science and Technology</td>
<td>Panatsa Natalia &amp; Panatsa Vasiliki Maria</td>
<td>Aristotle University of Thessaloniki, University of Western Macedonia</td>
<td>Greece</td>
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<tr>
<td>ps 5.1.2</td>
<td>The Historical Emergence of Patriarchy in Science and Technology: A Critical Feminist Ethics Approach</td>
<td>Panatsa Natalia &amp; Panatsa Vasiliki Maria</td>
<td>Aristotle University of Thessaloniki, University of Western Macedonia</td>
<td>Greece</td>
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<tr>
<td>ps 5.1.3</td>
<td>Feminist Standpoint Epistemology in Education</td>
<td>Nefeli Glezou</td>
<td>University of Ioannina</td>
<td>Greece</td>
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### PARALLEL 5.2  16:00 – 17:30

**Science, Society and Culture**

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<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
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<tr>
<td>ps 5.2.1</td>
<td>Teaching environmental issues associated with climate change through the use of alternative activities in the elementary school</td>
<td>Chrysoula Tsilifika, Fanny Seroglou</td>
<td>Aristotle University of Thessaloniki</td>
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<td>ps 5.2.2</td>
<td>The Study of the Human Body Through the Cultural History of Science: Discussing Practices and Social Actors of Science in Elementary Education</td>
<td>Priscila do Amaral, Tania de Oliveira Camel, Andreia Guerra, Research Group on Teaching History of Science and Culture</td>
<td>Brazil</td>
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<td>ps 5.2.3</td>
<td>Science Ethics in Digital Narratives: The case of forest</td>
<td>Konstantinos Katsinikas, Eleni Gentzi, Antonios Tzortzis, Fanny Seroglou</td>
<td>Aristotle University of Thessaloniki</td>
<td>Greece</td>
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**WEDNESDAY JULY 17, 2019**

**PARALLEL 5.3 16:00 – 17:30**

**NOS in Science Education**

<table>
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<tr>
<th>Session</th>
<th>Title</th>
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<tr>
<td>ps 5.3.1</td>
<td><strong>The Effect of Question Type on Engagement with NOS Ideas</strong></td>
<td>Jerrid Kruse, Isaiah Kent-Schneider, Jaclyn Easter, Kinsey Zacharski &amp;</td>
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<td>Molly Rockefeller</td>
<td>Drake University</td>
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<td>ps 5.3.2</td>
<td>**Changes in pre-service science teachers’ understanding of the</td>
<td>Sila Kaya, Orla McCormack, Sibel Erduran &amp; Naomi Birdthistle</td>
<td>University of Limerick - Ireland</td>
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<td>social aspects of nature of science**</td>
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<td>University of Oxford – England</td>
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<td>Swinburne University of Technology - Australia</td>
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<td>ps 5.3.3</td>
<td><strong>Pre-Service Science Teachers’ Incorporation of Aspects of NOS in</strong></td>
<td>Deniz Saribas &amp; Mehpare Saka</td>
<td>Istanbul Aydin University - Trakya University</td>
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<td>Formal and Informal Learning Setting Designs**</td>
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<td>ps 5.3.4</td>
<td><strong>Fostering Pre-Service Science Teachers’ Learning About Nature of</strong></td>
<td>Cristina Sousa &amp; Isabel Chagas</td>
<td>Universidade do Porto - Universidade de Lisboa</td>
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<td>Science Using a Problem-Based Learning Activity on Biogeography**</td>
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**PARALLEL 5.4 16:00 – 17:30 - ROOM D**

**Discussion**

Reflections from the Editors of Science & Education on research on History, Philosophy and Sociology of Science in Science Education

Kostas Kampourakis, University of Geneva, Switzerland

Sibel Erduran, University of Oxford, United Kingdom

**SCIENCE & EDUCATION EDITORIAL BOARD MEETING**

17:30 ROOM F
### PARALLEL 6.1 9:30 – 11:00
Socio-scientific perspectives on NOS education

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<tr>
<th>Room A</th>
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<tbody>
<tr>
<td></td>
<td><strong>Re-conceptualizing Nature-of-Science Education in the Age of Social Media</strong></td>
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<td>Dietmar Höttecke &amp; Douglas Allchin</td>
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<td>University of Hamburg – Germany</td>
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<tr>
<td></td>
<td><strong>How Do University Students Perceive Social-Institutional Aspects of Nature of Science?</strong></td>
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<td>Selin Akgun &amp; Ebru Kaya</td>
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<td></td>
<td><strong>Reconceptualising the Teaching of Socio-Scientific Reasoning in the Post-Truth Era</strong></td>
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<td>Arne Dittmer, Marcus Grace &amp; Jürgen Menthe</td>
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<td>University of Regensburg - University of Hildesheim - Germany</td>
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<td><strong>Investigation of pre-service science teachers’ understanding of the concepts ‘science’ and ‘pseudoscience’</strong></td>
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<td>Yasemin Doygun, Hasan Ozcan &amp; Mehmet FatihTasar</td>
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### PARALLEL 6.2 9:30 – 11:00
Enhancing Nature of Science Instruction through Research-based Strategies III
Series of panels organized by William McComas

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<tr>
<th>Room B</th>
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<tr>
<td></td>
<td><strong>A Critical Thinking Approach for Teaching Nature of Science: Rationale, Procedure and Feasibility Study</strong></td>
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<td>Hagop A. Yacoubian</td>
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<td>Lebanese American University</td>
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<td></td>
<td><strong>Storytelling as a Pedagogical Tool in Nature of Science Instruction</strong></td>
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<td>Nausica Kapsala and Evangelia Mavrikaki</td>
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<td>National &amp; Kapodistrian University of Athens</td>
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<td><strong>Teaching the Limits of Science with Card Sorting Activities</strong></td>
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<td>Lena Hansson</td>
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<td>Kristianstad University</td>
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## PARALLEL 6.3 9:30 – 11:00  
**Epistemological and practical insights on science learning**

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Speakers</th>
</tr>
</thead>
</table>
| ps 6.3.1 | Practical Foundations for a Science of Education | Paul Zachos & Monica De Tuya  
ACASE – The Association for the Cooperative Advancement of Science and Education  
USA |
| ps 6.3.2 | Theories and Research on Conceptual Change: Between Philosophy of Science and Science Teaching. An Approach to its Epistemological Problems | Zamudio, Alicia Mabel  
Universidad Nacional de Lanus  
Universidad Nacional de Tres de Febrero  
Argentina |
| ps 6.3.3 | Teaching and Learning of the First Thermodynamics Law: The Sufficiency of the Macroscopic Framework from an Epistemological and Didactical Perspective | Kalliopi Meli & Dimitrios Koliopoulos  
University of Patras  
Greece |

## PARALLEL 6.4 9:30 – 11:00  
**Narratives in science education II**

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<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Speakers</th>
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</thead>
</table>
| ps 6.4.1 | Engaging Students in Science: The Potential Role of Narrative Thinking and Romantic Understanding | Yannis Hadzigeorgiou & Roland M. Schulz  
Simon Fraser University - Canada  
University of the Aegean - Greece |
| ps 6.4.2 | Revealing Science’s Hidden-actors through Writing Narratives in a Cultural Approach to Physics Classes | Hermann Schiffer & Andreia Guerra  
Centro Federal de Educação Tecnológica Celso Suckow da Fonseca  
Brazil |
| ps 6.4.3 | The Science Edutainment Pathway towards Learning | Fanny Seroglou, Christina Konstantinidou, Dimitra Prekka, Maria Seroglou, Christina Duka & Kyriaki Vogiatzi  
Aristotle University of Thessaloniki  
Greece |
### Thursday July 18, 2019

#### PARALLEL 6.5 9:30 – 11:00

**History of science and NOS in educational programmes**

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors/Institutions</th>
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<tbody>
<tr>
<td>6.5.1</td>
<td>The image of science sculpted by the Brazilian higher education access policy</td>
<td>Matheus Monteiro Nascimento, Gabriel Viero &amp; Nathan Willig Lima, Federal University of Rio Grande do Sul, Brazil</td>
</tr>
<tr>
<td>6.5.2</td>
<td>Promoting Aspects of the Nature of Scientific Measurement during a Program about Climate and Energy Literacy in Primary Education</td>
<td>Panagiotis Piliouras, Vasiliki Ioakimidou, Maria Dimopoulou, Vasilis Aidinopoulos, Katerina Vlahostergiou, Katerina Plakitsi &amp; Fanny Seroglou, Ministry of Education, University of Ioannina, Aristotle University of Thessaloniki, Greece</td>
</tr>
<tr>
<td>6.5.3</td>
<td>The status of the history of science in the frame of different educational programmes: a case of Southern Federal University (Russia)</td>
<td>Konstantin Skripnik &amp; Ekaterina Shashlova, Southern Federal University, Russia</td>
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#### COFFEE BREAK 11:00 – 11:30

#### PARALLEL 7.1 11:30 – 13:00

**STEM education**

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors/Institutions</th>
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<tbody>
<tr>
<td>7.1.1</td>
<td>The Philosophy in/of Integrated STEM Education</td>
<td>Jairo Ortiz-Revilla, Ileana M. Greca &amp; Agustín Adúriz-Bravo, Universidad de Burgos – Spain, Universidad de Buenos Aires - Argentina</td>
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<tr>
<td>7.1.2</td>
<td>Socrates’ house: A suitable paradigm to introduce pre-service teachers to Education for Sustainable Development</td>
<td>Anthoula Maidou, Katerina Plakitsi &amp; Hariton M. Polatoglou, University of Ioannina, Aristotle University of Thessaloniki, Greece</td>
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<tr>
<td>7.1.3</td>
<td>A STEM education proposal for pre-service teachers</td>
<td>Vassilis Koulountzos, Ioannis Papadopoulos, Nikos Lambrinos &amp; Fanny Seroglou, Aristotle University of Thessaloniki, Greece</td>
</tr>
</tbody>
</table>
THURSDAY JULY 18, 2019

PARALLEL 7.2 11:30 – 13:00
NOS in Biology Education

ps 7.2.1
When the East meets the West: A comparative approach of teaching traditional Chinese medicine in a science general education course
Wai Man Szeto
The Chinese University of Hong Kong
Hong Kong

ps 7.2.2
History and Nature of Science about the Origin of Life: Analysing Textbooks and Guidelines for a Novel Teaching Approach
Cristina Sousa & Isabel Chagas
Universidade do Porto - Universidade de Lisboa
Portugal

ps 7.2.3
Co-teaching and interdisciplinary activity in teachers training: does the phytoplankton know physics?
Armando Gil Ferreira dos Santos, Gloria Regina Pessoa Campello Queiroz, Patrícia Domingos & Giselle Faur de Castro Catarino
Universidade do Estado do Rio de Janeiro
Centro Federal de Educação Tecnológica Celso Suckow da Fonseca
Brazil

PARALLEL 7.3 11:30 – 13:00
The Mathematics Culture

ps 7.3.1
Is mathematics the language of physics? The case of matematization of electostatics
Lucas Cavalari Nardi, Ciro T. T. Ferreira & Cibelle Celestino Silva
University of São Paulo
Brazil

ps 7.3.2
History and Philosophy as Facilitating Understanding of Mathematics Knowledge as a Culture
Lina Vinitsky-Pinsky & Igal Galili
Achva Academic College and the Hebrew University of Jerusalem
Israel

ps 7.3.3
Philosophy and History as an Epic Narrative in Secondary School Mathematics
Stuart Rowlands & Robert Carson
University of Plymouth
UK
### THURSDAY JULY 18, 2019

**PARALLEL 7.4 11:30 – 13:00**

#### Proposals for Science Education inspired by Galileo

<table>
<thead>
<tr>
<th>Room</th>
<th>Topic</th>
<th>Authors</th>
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</table>
| D - ps7.4 | **A Science Festival approach to History of Science The case of Galileo’s Dialogue** | Maria Panagopoulou, Constantina Stefanidou, Anthimos Chalkidis, Constantine Skordoulis & Kosmas Gazeas  
National and Kapodistrian University of Athens  
Greece |
| D - ps7.4 | **History of Science through Art for Science Education: the case of Galileo** | María-Antonia Manassero-Mas, Margarita-Ana Vázquez-Manassero & Ángel Vázquez-Alonso  
University of the Balearic Islands - Autonomous University of Madrid  
Spain |
| D - ps7.4 | **Galileo, Brecht and the Nature of Science: Science Teaching inspired by Drama and History of Science** | Vasiliki Ioakeimidou, Kyriaki Vogiati, Panagiotis Piliouras & Fanny Seroglou  
Aristotle University of Thessaloniki  
Greece |

### PARALLEL 7.5 11:30 – 13:00

#### History of science in science teaching

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<tr>
<th>Room</th>
<th>Topic</th>
<th>Authors</th>
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</table>
| E - ps7.5 | **The Scientist’s Journey: Writing Scientific Stories Based on the Archetypical Story Structure to Teach Science** | Nausica Kapsala & Evangelia Mavrikaki  
National and Kapodistrian University of Athens  
Greece |
| E - ps7.5 | **Olbers’ paradox: the development of a riddle. A stereotypical approach that reshape the conception of the world** | Argiana Foteini  
University of Aegean  
Greece |
| E - ps7.5 | **Investigative Community: Re-introducing Science through Continuity in Teaching and Learning among Classroom Members and Those of Other Times** | Elizabeth Cavicchi  
Edgerton Center - MIT  
USA |
| E - ps7.5 | **An Investigation on Science Teacher Candidates’ Interpretations of the Serendipity Concept** | Hasan Ozcan & Yasemin Doygun  
Aksaray University  
Turkey |
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<td>LUNCH BREAK</td>
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<td>14:00 – 15:30</td>
<td>IHPST MEMBERS MEETING</td>
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<td>15:30 – 16:00</td>
<td>COFFEE BREAK</td>
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<td>16:00 – 17:30</td>
<td>PARALLEL 8.1 WORKSHOP 2: Developing slowmation narratives for NOS teaching</td>
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<td></td>
<td>Fanny Seroglou, Vassilis Koulountzos, Anna Letsi &amp; Eleni Gentzi</td>
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<td>16:00 – 17:30</td>
<td>PARALLEL 8.2 Philosophy of Science and Science Education</td>
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<td>pA 8.2.1</td>
<td>Mario Bunge at 100 years: The Enlightenment Project and Science Education</td>
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<td>Michael R. Matthews</td>
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<td>pA 8.2.2</td>
<td>Do Selective Realists Conceded Too Much to Non-realists?</td>
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<td>Alberto Cordero</td>
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<td>pA 8.2.3</td>
<td>Writing philosophy in science teachers education: addressing some obstacles</td>
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<td>Ana C. Couló</td>
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**PARALLEL 8.3 16:00 – 17:30**

**NOS redefining the science content**

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<tr>
<td>ps 8.3.1</td>
<td><strong>Pedagogical Content Knowledge (PCK) for the experimental activity Chemical Kinetics: possible relations with the Nature of Science (NdC)</strong></td>
<td>Kaíza M. P. H Cavalcanti, Glória R. P. C. Queiróz &amp; Roberto S. C. Hastenreiter</td>
<td>Universidade Estadual do Rio de Janeiro, Brazil</td>
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<tr>
<td>ps 8.3.2</td>
<td><strong>History of pressure implemented in a Nature of Science Professional Development Program for science teachers</strong></td>
<td>Anna Koumara</td>
<td>University of Ioannina, Greece</td>
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<td>ps 8.3.3</td>
<td><strong>Sacrificing Content for NOSK? Tales From the Trenches</strong></td>
<td>Ami J. Friedman</td>
<td>Walled Lake Western High School, USA</td>
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**PARALLEL 8.4 16:00 – 17:30**

**History of science and the science content**

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<tr>
<td>ps 8.4.1</td>
<td><strong>Organizing knowledge for teaching: Conceptual groundings of electric field and their historical connections</strong></td>
<td>Terhi Mäntylä, Maija Nousiainen &amp; Ismo Koponen</td>
<td>Tampere University - University of Helsinki, Finland</td>
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<td>ps 8.4.2</td>
<td><strong>Teaching and Learning the Language of Chemistry: The Role of History and Philosophy of Science</strong></td>
<td>Elisa Maia &amp; Isabel Serra</td>
<td>University of Lisbon, Portugal</td>
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<td>ps 8.4.3</td>
<td><strong>The Polysemic Nature of Photons: Hybridization and Backwards Causation in Contemporary Undergraduate Quantum Physics Textbooks</strong></td>
<td>Nathan Willig Lima, Matheus Monteiro Nascimento, Cláudio José de Holanda Cavalcanti &amp; Fernanda Ostermann</td>
<td>Federal University of Rio Grande do Sul, Brazil</td>
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**NEW IHPST COUNCIL MEETING**

17:30 – 19:30

**ROOM F**

**CONFERENCE DINNER** 19:30
FRIDAY JULY 19, 2019

PARALLEL 9.1 9:30 – 11:00
Digital application in education

ps 9.1.1

**History of 3D printing in a teacher training course**
Dimitrios D. Tsiastoudis & Hariton M. Polatoglou
Deaf and H.O.H. School - Greek Ministry of Education
Aristotle University of Thessaloniki
Greece

ps 9.1.2

**Exploring how the Strategic Undergraduate STEM Talent Acceleration Initiative (SUSTAIN) influenced students’ understanding of the nature of science in a first-year forum course**
Gaye Ceyhan, Alia Thompson, Jeremy Sloane, John W. Tillotson & Jason Wiles
Syracuse University
USA

ps 9.1.3

**Transformations and Emerging Implementations of Scientific Practices in the Digital Age**
Dina Tsybulsky
Technion – Israel Institute of Technology
Israel

PARALLEL 9.2 9:30 – 11:00
Symposium organized by Vassilis Koulountzos
Creativity Art and Science in Primary Education (CASE)

ROOM A - ps9.1

ps 9.2.1

**Learning Science Through Theater**
Menelaos Sotiriou & George Triantafyllou
Science View
Greece

ps 9.2.2

**Learning Science Through Digital Storytelling**
Giannis Alexopoulos & Sofoklis Sotiriou
Ellinogermaniki Agogi
Greece

ps 9.2.3

**Learning Science Through Slowmation**
Fanny Seroglou, Vassilis Koulountzos & Anna Letsi
Aristotle University of Thessaloniki
Greece
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<tr>
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<td>9:30 – 11:00</td>
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<td>ps 9.3.1</td>
<td>History of Science and experimentation in the study of living beings in the middle school</td>
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<td>Tercio Augusto Penteado Barbosa &amp; Silvia Fernanda de Mendonça Figueirôa</td>
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<td>Brazil</td>
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<td>ps 9.3.2</td>
<td>A review of astrophysics and a proposal for secondary education</td>
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<td>Nikolaos Dintsios, Artemi Stamatia &amp; Polatoglou Hariton</td>
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<td>Aristotle University of Thessaloniki</td>
<td>Greece</td>
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<td>ps 9.3.3</td>
<td>Recuperating dead science: the original idea of Gauss’ principle</td>
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<td>Ricardo Lopes Coelho</td>
<td>University of Lisbon</td>
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<td>PARALLEL 9.4</td>
<td>9:30 – 11:00</td>
<td>Contemporary proposals for motivating science</td>
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<td>ps 9.4.1</td>
<td>Engineering education among 9-15 years old representing the disadvantaged sample group</td>
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<td>Ganime Aydın, Mehpare Saka, Jale Çakiroğlu, Ezgi Ibis Erçihan, Yesim Ozansak Topcu &amp; Vildan Saruhan</td>
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<td>ps 9.4.2</td>
<td>Design and evaluation of a teaching strategy in the framework of science education: Introduction to bioclimatic and sustainability principles</td>
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<td>Alexandra Gkioka &amp; Fanny Seroglou</td>
<td>Aristotle University of Thessaloniki</td>
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<td>ps 9.4.3</td>
<td>Students as science communicators: an analysis of multimodal designs in a Biology classroom</td>
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<td>Cecilia Molinari de Rennie &amp; Victoria Auyanet</td>
<td>Universidad de la República</td>
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FRIDAY JULY 19, 2019

PARALLEL 9.5 9:30 – 11:00
NOS and the appreciation of science

ps 9.5.1
A Fleckian View about the Genesis and Development of Quantum Mysticism and its Contributions to Science Teaching
Saito, Marcia Tiemi & Gurgel, Ivã
University of Sao Paulo - Federal Institute of Parana
Brazil

ps 9.5.2
Student's ideas about models in modelling Young's double slit experiment
Juliana Machado
Centro Federal de Educação Tecnológica Celso Suckow da Fonseca
Brazil

ps 9.5.3
Investigating Students’ View of Nature of Science Activities as Reflecting Authentic Science
Jerrid Kruse, Kinsey Zacharski, Isaiah Kent-Schneider & Molly Rockefeller
Drake University
USA

COFFEE BREAK 11:00 – 11:30

CLOSING SESSION 11:30 – 13:00

Visit to Archeological and Byzantine Museums
The Archaeological Museum of Thessaloniki is one of the largest museums in Greece and the central museum of northern Greece. All visitors are welcome to experience its unique collections of ancient artifacts as well as its rich and extrovert cultural activities.
In the Byzantine Museum the visitor can visit the 11 galleries of the permanent exhibition and can travel back to the world of Byzantium through thematic sections concerning the daily private and public life, worship and the burial customs, architecture and art, the commercial and business activity. Visitors can discover the continuity and the relationship between past and present.