

# ABSTRACTS PROGRAMME &

Fanny Seroglou  
Vassilis Koulountzos  
Editors

15th International Conference

15 - 19 JULY 2019, Thessaloniki, Greece

# IHPST

INTERNATIONAL  
HISTORY  
PHILOSOPHY &  
SCIENCE  
TEACHING

RE-  
INTRO  
DUCING SCIENCE

sculpting the image of science  
for education and media  
in its historical and  
philosophical background



## Re-introducing science

Sculpting the image of science for education and media in its historical and philosophical background

IHPST2019 Conference Program & Abstracts

15th International History, Philosophy and Science Teaching Conference

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ATLAS Research Group

Digital Analysis & Educational Design Research Lab

School of Primary Education

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TUESDAY JULY 16, 2019

PARALLEL 2.2  
WORKSHOP 1

16:00 - 17:30

 ROOM G

Make your own version of an instrument from the history of physics

Peter Heering / Europa-Universität Flensburg, Germany

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PARALLEL 2.3

16:00 - 17:30

 ROOM B

Re-contextualizing the science content

PS 23.1

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 23.2

A proposal for scientific literacy in second chance education: The 2CHANCE model

Anna Tzampazi & Fanny Seroglou / Aristotle University of Thessaloniki, Greece

PS 23.3

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

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PARALLEL 2.4

16:00 - 17:30

 ROOM C

NOS and History of Science for young children

PS 24.1

Teaching NOS in preschool through book talks

Lena Hansson, Lotta Leden & Susanne Thulin / Kristianstad University, Sweden

PS 24.2

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 24.3

Exploring History of Science in a Science Curriculum for the Early Grades

Eleni Kolokouri & Katerina Plakitsi / University of Ioannina, Greece

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FRIDAY JULY 19, 2019

PARALLEL 9.3

9:30 - 11:00

 ROOM C

History of science and science teaching

PS 9.3.1

History of Science and experimentation in the study of living beings in the middle school

Tercio Augusto Penteado Barbosa & Silvia Fernanda de Mendonça Figueirôa / State University of Campinas, Brazil

PS 9.3.2

A review of astrophysics and a proposal for secondary education

Nikolaos Dintsios, Artemi Stamatia & Polatoglou Hariton / Aristotle University of Thessaloniki, Greece

PS 9.3.3

Recuperating dead science: the original idea of Gauss' principle

Ricardo Lopes Coelho / University of Lisbon, Portugal

PARALLEL 9.4

9:30 - 11:00

 ROOM D

Contemporary proposals for  
motivating science

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PS 9.4.1

Engineering education among 9-15 years old representing the disadvantaged sample group

Ganime Aydın , Mehpare Saka, Jale Çakıroğlu, Ezgi İbis Ercihan, Yesim Ozansak Topcu & Vildan Saruhan / Canakkale 18 Mart University - Trakya University - Middle East Technical University - Istanbul Aydın University, Turkey

PS 9.4.2

An introduction to bioclimatic and sustainability principles for science education and teacher-training

Alexandra Gkioka & Fanny Seroglou / Aristotle University of Thessaloniki, Greece

PS 9.4.3

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

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

TUESDAY JULY 16, 2019

Re-contextualizing the science content

P.S. 2.3.1

Historical scientific drawings and the "Samba de Coco": teaching botany through the history of science and popular culture

Thailine Lima, Sílvia Figueirôa & Fernando Santiago dos Santos / University of Campinas, Brazil

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The "Samba de Coco" [Coconut Samba] is a musical rhythm and traditional cultural manifestation of the Northeastern Brazilian region that establishes a close dialogue with the environment, especially with the plants (especially the coconut). That confluence of ideas linking the "Samba de Coco" to botany allows this rhythm to be used within a lively proposal aiming at the incorporation of the history of sciences and scientific botanical drawings in the teaching of botany. This paper intends to explore the connections between botany, its history and the socio-historical and cultural context of the "Samba de Coco," to present educational activities that ultimately intend to allow students to recognize the value of plants in the daily life and to learn botany. In many countries, the teaching of science and biology still occurs predominantly in abstract and expository form, distant from students' daily lives. In the case of Botany, names, definitions, and classifications are emphasized to be memorized for the sole purpose of providing school assessments. Based on the assumption that learning is a construction of knowledge, methodologies based on memorization confronts some principles of human learning. On the contrary, teaching should provide students with the construction of scientific concepts so that they can use them in their lives, in permanent dialogue with the knowledge of their culture. The incorporation of the history of science as a support for teaching is a path that has been going on for many years to account for a contextualized, critical and reflective teaching. Moreover, the use of images in teaching helps to incorporate the historical approach to plants since the historical, scientific drawings are the product of surveys and investigations linked to the practices of natural history. Indeed, history and the philosophy of sciences have, in the last decades, turned their attention to consider science as a visual practice, analyzing images and their roles in the construction and communication of scientific ideas. Aiming to offer other methodologies to promote active learning other than a repetition of ready concepts, the use of music as a teaching and learning tool also can help the development of botanical content during science and biology classes, being a mediating language for the approach to contents. In choosing "Samba de Coco" as a musical rhythm to address the social, historical and scientific aspects of botany, one has not only a methodological resource but also a way of valuing Brazilian popular knowledge and culture. Our proposal uses: (i) the cultural history of coconut samba as a means to approach botanical and historical concepts; (ii) historical scientific drawings of plants cited in the lyrics of the Sambas as support to the teaching of botany; (iii) music as a form of mobilization and creativity. The didactic proposals were presented to biological sciences undergraduates of the São Paulo Federal Institute, Campus São Roque.

FRIDAY JULY 19, 2019

History of science and science teaching

P.S. 9.3.1

History of Science and experimentation in the study of living beings in the middle school

Tercio Augusto Penteado Barbosa & Silvia Fernanda de Mendonça Figueirôa / State University of Campinas,  
Brazil

Science is a social process of building knowledge. When one studies only the results of scientific discoveries, without understanding the processes of research, one has an inadequate vision about what science would be, or rather, ignore intrinsic aspects to scientific doing, which are conventionally called Nature of Science. In this sense, it is important that students understand these processes and this includes experimental activities. By structuring experimental activities as more open probes, without the direction imposed by a strongly structured script, students can experience science processes in their classroom. In this perspective, contents of History and Philosophy of Science can be an important didactic strategy for the teacher in the classroom, being able to promote among students a more critical vision regarding science and the construction of scientific knowledge. Furthermore, it can enable the very realization and understanding of historical experiments that have played a crucial role in the evolution of science.

This paper presents some results of a research that intends to investigate potential contributions of the History of Science as a didactic strategy in experimental activities in the study of living beings in public middle schools in a city in Sao Paulo state, Brazil, through some didactic sequences developed in the classroom. These didactic sequences address two fundamental concepts of life: Cells and DNA, which permeate the entire science curriculum from elementary to high school. These concepts are often considered to be too abstract and complex to the middle school students, as documented by researches in science teaching. Prior to the development of the activities, a sociodemographic questionnaire was applied to the students, seeking to better understand their profile. In this questionnaire the great majority of them affirmed that among different activities carried throughout the year, experimental activities in the school laboratory are by far their favorite ones. After the questionnaires, we elaborated some preliminary questions that deal with the history of the Cell and DNA, aiming to identify the previous connections of the students on this subject, and starting from their own implicit ideas it can allow them to understand what will be approached in the experimental activities elaborated with the students. These activities are the core of the didactic sequences carried through the school semester, and seek to contextualize the experiments. They do not intend to exhaust the discussion about these topics, but to create an innovative approach by altering the traditional order in which the contents are approached.

Although using History of Science in the classroom is not a simple task, it is hoped that this research will highlight its importance associated with experimental activities, and may be a strategy to elicit a broader view of the nature of scientific knowledge. The results from this research can also provide support for a reflection among educational institutions that wish to implement History of Science and experimentation in their curricular proposals.