

ECRICE 2024

16 European Conference on Research in Chemical Education

NOVA SCHOOL OF SCIENCE AND TECHNOLOGY • CAMPUS DA CAPARICA, LISBON

September 05 - 07, 2024

Book of Abstracts

EuChemS
European Chemical Society

SOCIEDADE PORTUGUESA DE QUÍMICA

NOVA
NOVA SCHOOL OF SCIENCE & TECHNOLOGY

Book of Abstracts of ECRICE 2024, the 16 European Conference on Research in Chemical Education

Editors: A. Jorge Parola, Isabel Ribau

Caparica, Portugal, 2024

CONTENTS

CONTENTS *3*
COMMITTEES *4*
FOREWORD *6*
INSTITUTIONAL SUPPORT *7*
SPONSORS *7*
DETAILED PROGRAMME *8*
SYMPOSIA *17*
WORKSHOPS *54*
PLENARY LECTURES *75*
KEYNOTES *77*
ORAL PRESENTATIONS *85*
POSTERS *199*
PARTICIPANTS LIST *246*

COMMITTEES

Local Organising Committee

Isabel Ribau, FCT NOVA, NOVA University of Lisbon, *Chair*

A. Jorge Parola, FCT NOVA, NOVA University of Lisbon, Co-chair

Joaquim Faria, FE, Porto University, Co-chair

Adelino Galvão, IST, Lisbon University

António Domingos, FCT NOVA, NOVA University of Lisbon

Carla Morais, FC, Porto University, Portugal

Helena Rocha, FCT NOVA, NOVA University of Lisbon

Isabel Menezes, CIIE, Porto University

João Paulo Leal, IST, Lisbon University

Marta Corvo, FCT NOVA, NOVA University of Lisbon

Pedro Góis, FF, Lisbon University

Pedro Reis, IE, Lisbon University

Tânia Coelho, SPQ (Portuguese Chemical Society)

Teresa Santos Silva, FCT NOVA, NOVA University of Lisbon

International Scientific Committee (EuChemS)

Andrea Petz, Hungary

Anja Lembens, Austria

Antonella Rossi, Italy

Aureli Caamaño Ros, Catalonia, Spain

Dragica Trivić, Serbia

Fina Guitart, Catalania

Gabriel Pinto, Spain

Hana Ctrnáctová, Czech Republic

Ilka Parchmann, Germany

Isabel Ribau Coutinho, Portugal

Iwona Maciejowska, Poland

Iztok Devetak, Slovenia

Jan Apotheker, Netherlands

Jan Reguli, Slovakia

Jens Josephsen, Denmark

Karolina Broman, Sweden

Klemens Koch, Switzerland

Lemonia Antonoglou, Greece

Luca Szalay, Hungary

Luis Morenos, Spain

Marian Holmberg, Finland

Marina Stojanovska, North Macedonia

Martin Rusek, Czech Republic

May Britt Stjerna, Norway

Miia Rannikmae, Estonia

Mustafa Sözbilir, Turkey

Natasa Brouwer-Zupancic, Netherlands

Nenad Judas, Croatia

Niki Kaiser, UK

Nineta Hrastelj, Slovenia, Secretary General at the EuChemS

Odilla Finlayson, Ireland

Pascal Mimero, France

Peter Childs, Ireland

Rachel Mamlok-Naaman, Israel

Robert Zakrzewski, Poland

Ron Bonder, Isarel

Sarah Hayes, Ireland

Silvija Markić, Germany

Susanne Wiedmer, Finland

Vesna Ferk Savec, Slovenia

Vesna Milanovic, Serbia

FOREWORD

Dear Colleagues,

We are happy to welcome you to the ECRICE 2024, the 16 European Conference on Research in Chemical Education, to be held at NOVA School of Science and Technology, Campus da Caparica, Lisbon, September 5-7, 2024.

This conference on research in chemical education, recognised by EuChemS, is an important event to disseminate new research and developments. It is important to know how learners acquire knowledge, how to facilitate this acquisition and trigger it. It is relevant to examine different learning environments, new educational tools, and new ways in which neuroeducation, technology and artificial intelligence, can be integrated into chemical education, and promote the engagement of students in the learning process. But nowadays this is not enough. It is necessary to do this through the lens of sustainability, having in mind the 17 SDGs. Therefore, ECRICE 24's theme is "Chemical Education for Sustainable Development: Empowering Education Communities"

The ECRICE24 Committees of this International conference invite all chemistry education researchers and teachers to come to the conference and challenge them to showcase presentations, submit abstracts, and present work, regarding new developments in Chemical Education, through the lens of sustainable goals, and participate in the ECRICE 2024 meeting.

We are looking forward to welcoming you in Lisbon.

Enjoy the conference!

Sincerely,

On behalf of the Scientific and Organizing Committee,

Isabel Ribau, ECRICE24 conference chair
A. Jorge Parola, Secretary General of the Portuguese Chemical Society
Joaquim Luís Faria, President of the Portuguese Chemical Society

Caparica, September 2024

OP35 – To do or not to do practical activities: Turkish chemistry teachers' experiences and views on practical activities and green chemistry reported on IUPAC global survey

*Sevil Akaygun** [a)], *Mustafa Sözbilir* [b)]
a) Bogazici University, Faculty of Education, Department of Mathematics and Science Education, Istanbul, Turkey
b) Atatürk University, Faculty of Education, Department of Mathematics and Science Education, Erzurım Turkey
*Corresponding author: sevil.akaygun@bogazici.edu.tr

Keywords: Green and sustainable chemistry, Practical activities, In-service chemistry teachers

Practical activities as conveying the macroscopic level representations, are a fundamental aspect of chemistry, besides symbolic and sub-microscopic representations (Johnstone, 1991). They have been found to be effective in developing science process skills (Giddings, Hofstein & Lunetta, 1991), creating meaningful learning (Hofstein & Lunetta, 2004), improving problem solving skills (Gunstone, 1991) and developing positive attitudes towards chemistry (Shibley & Zimmaro, 2002). However, it is still questionable how well they are implemented in high school chemistry classes in Türkiye. This is due to potential limitations such as a lack of physical space, materials, and resources and inadequate teacher training. As the world increasingly adopts a green and sustainable approach in chemistry, it is important to investigate chemistry teachers' views and experiences with the green chemistry. As part of a chemistry education project funded by IUPAC, a global survey was developed to assess teachers' implementation of practical activities relevant to green and sustainable chemistry in different countries. The Turkish adaptation of the survey and implemented to the 120 high school chemistry teachers working at different geographical regions and types of schools in Türkiye. Additionally, five focus group interviews were conducted by the voluntary teachers to better understand the teachers' experiences and views. The analysis revealed the different perspectives, methods and views of chemistry teachers in implementing practical activities, both in general and specifically related to green and sustainable chemistry.

References:

Giddings, G.J., Hofstein, A., & Lunetta, V. N. (1991). Assessment and evaluation in the science laboratory. In B. E. Woolnough, (Ed.)., Practical Science, (pp. 167-178). Milton Keynes: Open University Press.

Gunstone, R.F. (1991). Reconstructing theory from practical experience. In B. E. Woolnough, (Ed.), Practical Science, (pp. 67-77). Milton Keynes: Open University Press.