

Winter School on

Contaminants of Emerging Concern (CECs) and Disinfection By-Products (DBPs):

Occurrence, Impact and Elimination



Scope and objectives

Water is critical in both agriculture and food processing, as well as in nutrition and human health. Industrialization, agricultural activities, and climate change are reducing the quality of water sources. The Drinking Water Directive was revised in 2020 and new rules entered into force across the EU in January 2021. The revised Directive guarantees safer access to water for all **Europeans and ensures the highest standards in the world for drinking water, in line with** the zero-pollution ambition announced in the European Green Deal. The new rules also respond to the first-ever successful European Citizens' Initiative, "Right2Water", which gathered 1.6 million signatures in support of improving access to safe drinking water for all Europeans. The Directive aims to protect EU citizens' health by setting strict quality standards. Member States had to transpose this Directive into national laws by 12 January 2023. Work is ongoing on further methodologies and guidelines required by the Drinking Water Directive, including on how to measure disinfection byproducts (DBPs), micro-plastics and per- and polyfluoroalkyl substances (PFASs) in drinking water. Moreover, the Commission adopted **new minimum hygiene standards for materials and products that come into contact with drinking water**. They will apply as of 31 December 2026 to materials and products used in new installations, or when older installations are renovated or repaired. These standards will prevent microbial growth and reduce the risk of harmful substances leaching into drinking water.

Treated wastewater can provide a continuous source of high-quality water with the potential to help meet future water needs, especially for agricultural purposes. However, if not treated properly, wastewater reuse can pose risks to public health and the environment, given the potential presence of toxic chemicals and pathogenic microorganisms. To ensure the safe reuse of wastewater for crop irrigation, the European Union (EU) has adopted the EU Regulation on minimum requirements for water reuse (REGULATION (EU) 2020/741). Furthermore, the EU has proposed a new Urban Wastewater Treatment Directive (Brussels, 26.10.2022 COM(2022) 541 final 2022/0345 (COD)) targeting new standards and limit values, and obligations for large wastewater treatment plants (WWTPs) to reduce by 80% a specified set of contaminants of emerging concern (CECs).

The **Winter School** event thus aims to present an overview of the current state of knowledge and the latest advances regarding the occurrence, impact, and elimination of Disinfection By-Products (DBPs), Contaminants of Emerging Concern (CECs), and microbial contamination to provide solutions face to risks in providing safe drinking water and alternative water sources for crops production.

The Winter School is organized under the scope of four European projects,

- **BlueWWater project**, *Control, treatment and reduction of microplastics and contaminants of emerging concern in urban wastewater and the transboundary coastal environment (Control, tratamiento y reducción de microplásticos y contaminantes emergentes en aguas residuales urbanas y en el medio costero transfronterizo)* (www.bluewwater.eu)

BlueWWater is an POCTEP-funded project that aims to improve the quality of river, transitional and coastal water bodies by controlling, monitoring and evaluating emissions of microplastics and contaminants of emerging concern into the aquatic environment, through the study of the efficiency of urban wastewater treatment plants (WWTP) in both regions and the environmental risk of these pollutants, thus ensuring a sustainable use of water resources and contributing to the implementation of community regulations. BlueWWater has a budget of 1.4 million Euros and a three-years duration. It started on 1st September 2023 and includes a multidisciplinary and multi-stakeholder consortium from Portugal and Spain, including leading scientists from 11 partners.

- **H2OforAll Project**, *Innovative integrated tools and technologies to protect and treat drinking water from Disinfection By products (DBPs)* (<https://h2oforall.eu/>)

The H2OforAll project, entitled, is an ambitious Horizon Europe-funded project that aims to assess main Disinfection By products (DBPs) sources through the development of fast, cost-effective and accurate sensor monitoring devices and by modelling their spread through drinking water distribution systems. DBPs toxicity and environmental impact will be studied and measures will be proposed to protect drinking water chain. Breakthrough water treatments to remove DBPs or avoid their formation during water disinfection processes will be developed, paying attention to their life cycle analysis, costs and risks. A Central Knowledge Base with reliable data on the occurrence of DBPs in the EU and their effects will be created to increase awareness and engagement of society and governmental organizations about these drinking water contaminants and favour new policy responses and guidance. H2OforAll has a budget of 3.5 million Euros over three years. It started on 1st November 2022 and includes a multidisciplinary and multi-stakeholder consortium, including leading scientists from 10 European countries.

- **MAR2PROTECT Project**, *Innovative managed aquifer recharge to prevent groundwater contamination* (<https://mar2protect.eu/>)

MAR2PROTECT is a Horizon Europe-funded project that will provide a holistic approach to prevent groundwater contamination from the impacts of global change and climate change based on a new-generation Managed Aquifer Recharge. The core of this innovative Managed Aquifer Recharge is M-AI-R Decision Support System that will incorporate technological and societal engagement information using an Artificial Intelligence-based approach to improve groundwater quality and quantity. To ensure a high replication potential, M-AI-R Decision Support System will collect information from 5 demos sites in 4 European countries (Portugal, Italy, Spain, Netherlands) and 2 in non-European countries (Tunisia, South Africa) which were carefully chosen by their degree of maturity from previous successful projects and a wide range of settings in terms of climatic conditions, water sources, type of pollution, Managed Aquifer Recharge scheme and political/societal context. All technologies will be tested and validated until Technology Readiness Level 5 and societal activities will be implemented until Societal Readiness Level 6. Besides, MAR2PROTECT will ensure a strong engagement of national and European policy makers that, in collaboration with a Community of Practice, will strengthen the European policy framework in the field of prevention of groundwater contamination. MAR2PROTECT has a budget of 4.1 million Euros over three years. It started on 1st December 2022 and includes a multidisciplinary and multi-stakeholder consortium, including leading scientists from 9 from 6 different European countries (including Switzerland) and 2 international partners (Tunisia, South Africa).

- **ALERT-PFAS Project**, *Transnational strategy for the detection and prevention of water pollution by PFAS*

ALERT-PFAS project in an INTERREG V SUDOE-funded project that will design and implement a transnational strategy to detect and prevent PFAS pollution in SUDOE natural spaces (Portugal, Spain and France), as well as to mitigate its effects on ecosystem biodiversity and climate change. ALERT-PFAS project offers an innovative solution to detect and monitor PFAS in real time and prevent them from becoming part of the water cycle, contaminating the air, soil and water. The pilot actions will be carried out in natural parks or protected areas in Portugal, Spain and France, affected by the recent fires. ALERT-PFAS also aims to train and sensitize all the stakeholders in the value chain, including the general public. ALERT-PFAS partnership is made up of 10 beneficiaries and 9 associates from the 3 SUDOE countries, who will contribute their complementary skills. ALERT-PFAS will apply innovative technologies such as optical sensors, adsorption and degradation processes, polymeric materials, nanotechnology and artificial intelligence. The solution, which can be transferred to all the regions in the SUDOE area, is aimed at public authorities, natural park managers, water managers, firefighting organizations, civil protection and others.

And the support of:

- **Rede NOR-WATER** - <http://nor-water.eu/>

The NOR-WATER Network was created under the NOR-WATER project funded by the POCTEP 2014-2017, to provide a forum for multidisciplinary public-private collaboration on the subject of contaminants of emerging concern, with the operational and proactive capacity to facilitate collaboration between its users and act as a driving force and promoter of initiatives in this field.

- **ZeroPollution4Water Cluster** (European Union) - <https://zeropollution4water.eu>

The ZeroPollution4Water Cluster is an initiative originated from the coalition of seven different projects funded from two Horizon Europe 2022 calls aiming at: i) preventing groundwater contamination and protecting its quality against harmful impacts of global and climate change; ii) securing drinking water quality by protecting water sources against pollution, providing innovative monitoring and treatment solutions, and ensuring safe distribution.

Conference Program

The Winter School includes: (i) a section specifically devoted to PhD students (“**Floor to Students**”) where they will have the chance to present a **poster communication**, as well as to meet experts from the School; (ii) a **workshop on Publishing Perspectives**; (iii) **workshop on European Directives on Drinking Water, Water Reuse and Urban Wastewater Treatment**; (iv) **lectures on Complementary Skills** related to high-throughput methodologies for the determination of DBPs, CECs, PFASs, microplastics, ARB and ARGs, environmental and health impacts and prevention measures and, technologies for control of DBPs, CECs, PFASs, microplastics, ARB and ARGs; (v) **workshop on Wastewater Treatment and Reuse**; and (vi) a **co-creation workshop on Future Challenges in Drinking Water Sector - public engagement, communication and raising awareness**; (vii) **networking Opportunities and Exhibition of water treatment related products and services**.

The **workshop on publishing perspectives** will be given by the Executive Publisher of Elsevier for Chemical and Environmental Engineering, and Executive Editors of the Journal Environmental and Chemical Engineering (Elsevier) and will feature a coffee break sponsored by Elsevier. A range of topics will be covered concerning the publication of scientific articles starting from their preparation, going through the review process, and then ending with the editorial decision and possible transfers of rejected manuscripts to alternative journals. The publisher’s, editor’s, and author’s points of view will be discussed, and the workshop will conclude with a roundtable during which questions will be taken from the audience. Questions can be either sent before the workshop (to vilar@fe.up.pt) or asked during the roundtable. Master and PhD students and junior researchers are encouraged to interact with editors and publishers.

The **workshop on European Directives on Drinking Water, Water Reuse and Urban Wastewater Treatment**, with the participation of Water Europe, National Laboratory of Civil Engineering (LNEC) and Water and Waste Services Regulation Authority (ERSAR), will present the news and challenges regarding drinking water, wastewater treatment and reuse. An overall situation of Poly- or Perfluoroalkyl substances (PFASs) will be also addressed.

Lectures on complementary skills will be given by senior researchers, professors and professionals, with high expertise in the topics of: i) high-throughput methodologies for the determination of DBPs, CECs, PFASs, microplastics, ARB and ARGs, ii) environmental and health impacts and prevention measures and, iii) technologies for control of DBPs, CECs, PFASs, microplastics, ARB and ARGs (e.g., ozonation, advanced oxidation processes, membrane filtration, adsorption, biological oxidation, nature-based solutions), as other topics such as CFD simulation, LCA/LCC and water digitalization.

The **workshop on Wastewater Treatment and Reuse** will include several invited talks from i) coordinators of European projects funded by Life, INTERREG, WaterJPI, and Horizon Europe programs, as well as Portuguese Recovery and Resilience Plan, presenting the project goals and main results, ii) water utilities (Águas do Tejo e Atlântico) and companies (Xylem, USP Technologies, ADVENTECH, Aqualia, Arrow Lake AB and Air Liquide), showing case studies and real applications; iii) round table discussion addressing current industry trends, challenges, or innovations.

The **co-creation workshop on Future Challenges in Drinking Water Sector - public engagement, communication and raising awareness** will include i) goals and challenges of ZeroPollution4Water Cluster, H2OforAll, IntoDBP and SafeCREW Horizon Europe projects, Portuguese scenario regarding DBPs, Australia and USA scenarios on DBPs, and ii) opportunity to participate in a round table discussion in the following topics: DBPs technologies for drinking water treatment; Analytical techniques; Public engagement; Legislation; Preventive measures; How to increase the acceptance of tap water. The workshop includes also invited talks from companies (De Nora Water Technologies Italy S.r.l., Air Liquide).

Invited Lectures are typically of 10-20 min, including questions.

Monday, November 25 th		Tuesday, November 26 th	November, 27 th - 29 th
07h30 – 08h00	Registration		<p>EA3G2024 International Conference on Ozone and Advanced Oxidation</p> <p>Organizer: International Ozone Association (IOA)</p> <p>WINTER SCHOOL PARTICIPANTS HAVE A REDUCED FEE, EQUIVALENT TO IOA MEMBERS, IN EA3G2024 CONFERENCE</p>
08h00 – 08h30			
08h30 – 09h00	Opening Ceremony	Workshop on Wastewater Treatment and Reuse - Part I	
09h00 – 10h30	Workshop on Publishing Perspectives: Q&A in Chemical and Environmental Engineering Publishing		
10h30 – 11h00	Poster Session & Coffee Break & Exhibition	Poster Session & Coffee Break & Exhibition	
11h00 – 12h30	Workshop on European Directives on Drinking Water, Water Reuse and Urban Wastewater Treatment	Workshop on Wastewater Treatment and Reuse - Part II	
12h30	Winter School Official Photo		
12h30 – 14h00	Lunch Break	Lunch Break	
Sunday, November 24th			
Social Event 1 Walking Tour through Historic Places of Vila Nova de Gaia and Porto			
Meeting point: World of Wine Central Square			
Departure time: 13 h Return time: 17 h			
14h00 – 15h15	High-Throughput Methodologies for the Determination of DBPs, CECs, PFASs, Microplastics, ARB and ARGs	Co-creation Workshop: Future Challenges in Drinking Water Sector - Public Engagement, Communication and Raising Awareness - Part I	
15h15 – 16h00	Environmental and Health Impacts and Prevention Measures		
16h00 – 16h30	Poster Session & Coffee Break & Exhibition	Poster Session & Coffee Break & Exhibition	
16h30 – 18h00	Technologies for Control of DBPs, CECs, PFASs, Microplastics, ARB and ARGs	Co-creation Workshop: Future Challenges in Drinking Water Sector - Public Engagement, Communication and Raising Awareness - Part II	
18h00 – 19h00	CFD, LCA/LCC and Digitalization	Final Remarks and Awards Ceremony	
		Social Event 2 Visit to Ferreira Wine Cellars	
		Social Event 3 Dinner at Sancho Panza & Drink at Galerias de Paris	

Sunday, November 24, 2024

13h00 - 17h00 Walking Tour through Historic Places of Vila Nova de Gaia and Porto, Social Event 1

or

14h00 - 17h00 Visit to one of the World of Wine Museums, Social Event 1

In the case of bad weather conditions (Rainy day)

Meeting Point: World of Wine Central Square

Monday, November 25, 2024

07h30 – 08h30 Registration

LOBBY

08h30 – 09h00 Opening Ceremony

ROOM NASONI

Vítor Vilar, Host and Chair, Faculty of Engineering of the University of Porto, Portugal

Rui Martins, Host and Chair, University of Coimbra, Portugal

Luísa Durães, Host and Chair, University of Coimbra, Portugal

Susana Seabra, Host and Chair, Sociedade Portuguesa de Inovação, Portugal

Ana Pereiro, Host and Chair, NOVA University Lisbon, Portugal

João Araújo, Host and Chair, NOVA University Lisbon, Portugal

Arminda Alves, Director of ALICE, Faculty of Engineering of the University of Porto, Portugal

Joaquim Faria, Director of LSRE-LCM, Faculty of Engineering of the University of Porto, Portugal

Margarida Quina, Director of CERES, University of Coimbra, Portugal

09h00 – 10h30 Workshop on Publishing Perspectives: Q&A in Chemical and Environmental Engineering
Publishing

ROOM NASONI

Chaired by **Suresh Pillai**, Atlantic Technological University, Ireland

09h00 – 09h20 - How to Become a Successful and Responsible Author: Editor Perspectives

Despo Fatta-Kassinou

University of Cyprus, Cyprus

09h20 – 09h45 - The Publishing Landscape

Deirdre Dunne

Elsevier, Netherlands

09h45 – 10h00 - Elsevier's Article Transfer Service and Its Impact on Environmental and Chemical Engineering Journals

Giovanni Palmisano

Khalifa University, United Arab Emirates

10h00 – 10h30 - RoundTable Discussion

Live Q&A Polls

10h30 – 11h00 POSTER SESSION & COFFEE BREAK (SPONSORED BY ELSEVIER) & EXHIBITION

LOBBY

11h00 – 12h30 Workshop on European Directives on Drinking Water, Water Reuse and Urban Wastewater Treatment

ROOM NASONI

Chaired by **Loïc Charpentier** (Water Europe, Belgium) and **Susana Rodrigues** (ERSAR, Portugal)

11h00 – 11h15 - EU Directive on Drinking Water: News and Challenges

Susana Rodrigues

Entidade Reguladora dos Serviços de Águas e Resíduos (ERSAR)

11h15 – 11h30 - Water Reuse in EU: Regulation on Minimum Requirements and JRC Guidelines on Risk Management Plan
Loïc Charpentier
Water Europe, Belgium

11h30 – 11h45 - EU Directive on Urban Wastewater Treatment: News and Challenges
Maria João Rosa
Laboratório Nacional de Engenharia Civil, Portugal

11h45 – 12h00 - On the Overall situation of Poly- or Perfluoroalkyl substances (PFASs) including Fluoropolymers
Bruno Ameduri
Institute Charles Gerhardt (CNRS), France

12h00 – 12h30 - RoundTable Discussion
Live Q&A Polls

12h30 – Winter School Official Photo
WOW MAIN SQUARE

12h30 – 14h00 **LUNCH BREAK**
LOBBY ATKINSON

14h00 – 15h15 High-Throughput Methodologies for the Determination of DBPs, CECs, PFAS, Microplastics, ARB and ARGs
ROOM NASONI

Chaired by **Félix Hernández**, University Jaume I, Spain

14h00 – 14h15 - Targeted and Non-targeted Analysis of Disinfection Byproducts in Drinking Water
Maria José Farré
Catalan Institute for Water Research, Spain

14h15 – 14h30 - Analytical Methodologies for Contaminants of Emerging Concern (CECs), including Per-/poly-FluoroAlkylated Substances (PFASs)
José Benito Quintana
Universidade de Santiago de Compostela, Spain

14h30 – 14h45 - Challenges and Methodologies for Sampling and Determination of Microplastics in Wastewaters, Inland Surface Waters, and Marine Waters
Maria Augusta de Sousa/Juan Santos Echeandía
Águas e Energia do Porto, Portugal/Spanish Institute of Oceanography, Spain

14h45 – 15h00 - Methodologies for the Determination of Antibiotic-Resistant Bacteria (ARB) and Antibiotic-Resistance Genes (ARGs) in Environmental Samples
Olga Nunes
Faculty of Engineering of the University of Porto, Portugal

15h00 – 15h15 - Real-Time Monitoring
Rogério Nunes Nogueira
Instituto de Telecomunicações, Portugal

15h15 – 16h00 Environmental and Health Impacts and Prevention Measures

ROOM NASONI

Chaired by **Paola Verlicchi**, University of Ferrara, Italy

15h15 – 15h30 - Ecotoxicology of Contaminants of Emerging Concern: Key Challenges and Approaches

Miguel Santos

Interdisciplinary Centre of Marine and Environmental Research, Portugal

15h30 – 15h45 - Understanding DBPs: Ranking, Environmental Impacts and Associated Health Risks

Daniela Meilmann

DHVMED, Israel

15h45 – 16h00 - Back to Basics: Key Principles and Approaches in Environmental Risk Assessment

Vera Homem

Faculty of Engineering of the University of Porto, Portugal

16h00 – 16h30 **COFFEE BREAK & POSTERS & EXHIBITION**

LOBBY

16h30 – 18h00 Technologies for Control of DBPs, CECs, PFAs, Microplastics, ARB and ARGs

ROOM NASONI

Chaired by **Salomé Soares**, Faculty of Engineering of the University of Porto,

16h30 – 16h45 - Ozone Processes for Emerging Water Threats

Chedly Tizaoui

Swansea University, United Kingdom

16h45 – 17h00 - AOPs: From their Highly Advanced and Competitive Research to Their Use in Water Treatment!

Gilles Mailhot

Université Clermont Auvergne, France

17h00 – 17h15 - Hybrid Adsorption/Membrane Processes for Controlling Organic Contaminants of Emerging Concern in Urban Water Treatment

Maria João Rosa

Laboratório Nacional de Engenharia Civil, Portugal

17h15 – 17h30 - Adsorption Processes for the Removal of Contaminants of Emerging Concern and Disinfection By-Products

Dario Frascari

University of Bologna, Italy

17h30 – 17h45 - Biological Removal and Recovery of Micro/plastics

Maria Reis

NOVA School of Science & Technology, Portugal

17h45 – 18h00 - Nature-Based Solutions - Natural and Constructed Wetlands to Remove Pollutants and Potentiate Water Reuse

Marisa Almeida

Interdisciplinary Centre of Marine and Environmental Research, Portugal

18h00 – 19h00 CFD, LCA/LCC and Digitalization

ROOM NASONI

Chaired by **Susana Gonzalez Blanco** (Cetaqua) and **Domenico Santoro** (USP Technologies)

18h00 – 18h15 - Seeing the Light, the Microbes, and the Dead Zones: Computational Fluid Dynamics (CFD) for Advanced Disinfection and Oxidation Process Analysis

Domenico Santoro

USP Technologies, Canada

18h15 – 18h30 - Life Cycle Thinking Applied to Drinking Water Treatment

Rafael Laurenti

IVL Swedish Environmental Research Institute, Sweden

18h30 – 18h45 - Digitalization in the Water Sector: Development of a Reliable Real-Time Virtual Trihalomethane Sensor Solution for Drinking Water Facilities

Susana Gonzalez Blanco

CETAQUA, Spain

18h45 – 19h00 - Digitalization in the Water Sector

Lydia Vamvakeridou-Lyroudia

University of Exeter, United Kingdom

Tuesday, November 26, 2024

08h00 – 10h30 Workshop on Wastewater Treatment and Reuse - Part I

ROOM NASONI

Chaired by **Maria João Rosa** (LNEC, Portugal) and **Célia Manaia** (Escola Superior de Biotecnologia, Portugal)

08h00 – 08h20 - Water Reuse Strategies in Portugal

Nuno Brôco

Águas do Tejo e Atlântico, Portugal

08h20 – 08h30 - Status Implementation of EU Reuse Regulation 2020/741 in Germany - Wastewater Reuse for Agriculture and Urban Irrigation

Achiem Ried

Xylem, Germany

08h30 – 08h40 - The Reuse of Reclaimed Water in Italy: Polishing Treatments, Destination, Risk Assessment

Paola Verlicchi

University of Ferrara, Italy

08h40 – 08h50 - Challenges Associated with Wastewater Treatment and Reuse in Brazil

Camila Amorim

Federal University of Minas Gerais, Brazil

08h50 – 09h00 - Overview of the EU-India Collaboration on Water Treatment Technologies

Suresh Pillai

Atlantic Technological University, Ireland

09h00 – 09h10 - Reclaimed Water Distribution: Chlorine Decay Modelling and Case Study Application

B-WaterSmart - H2020

Rui Viegas

Laboratório Nacional de Engenharia Civil, Portugal

09h10 – 09h20 - Innovative Strategies for Industrial Wastewater Reuse: A Case Study and Practical Approaches

Sérgio Silva

ADVENTECH, Portugal

09h20 – 09h30 - An Overview of Project GIATEX - Intelligent Water Management in the Textile and Clothing Industry

GIATEX - PRR

Fernando Pereira

Faculty of Engineering of the University of Porto, Portugal

09h30 – 09h40 - Closed-Loop Water Systems in Textile Industrial Districts: Orchestrated Removal of Emerging Pollutants from Textile Wastewater

CASCADE - Life

Beatrice Cantoni

Politecnico di Milano, Italy

09h40 – 09h50 - AWARE - Aquaponics from Wastewater Reclamation

AWARE - Horizon Europe

Célia M. Manaia

Universidade Católica Portuguesa, Portugal

09h50 – 10h00 - Advancing Water Purification: PANIWATER's Innovations in Tackling Contaminants of Emerging Concern for Safe Irrigation and Drinking Water

PANIWATER - India-EU H2020

Despo Fatta-Kassinou

University of Cyprus, Cyprus

10h00 – 10h10 - Anaerobic Processes Combined with Membranes to Ensure Water Reuse and Net Energy Production

Zouhayr Arbib

Aqualia, Marroco

10h10 – 10h30 - Round Table Discussion

Live Q&A Polls

10h30 – 11h00 **POSTER SESSION & COFFEE BREAK & EXHIBITION**

LOBBY

11h00 – 12h30 Workshop on Wastewater Treatment and Reuse - Part II

ROOM NASONI

Chaired by **Nuno Brôco**, Águas do Tejo e Atlântico, Portugal

11h00 – 11h10 - Wastewater Regeneration by the Solar Photo-Fenton Process: From the Lab to the Plant. LIFE ULISES & LIFE PHOENIX projects

ULISES & PHOENIX - LIFE

José Luis Casas

University of Almería, Spain

11h10 – 11h20 - Demonstrating the Control of Pharmaceutical Compounds in Large Activated Sludge Wastewater Treatment Plants

Fitting - LIFE

Catarina Silva

Laboratório Nacional de Engenharia Civil, Portugal

11h20 – 11h30 - Potential of Decentralized Wastewater Treatment for Preventing the Spread of Antibiotic Resistance, Organic Micropollutants, Pathogens and Viruses

PRESAGE - WaterJPI

Francisco Omil

University of Santiago de Compostela, Spain

11h30 – 11h40 - The BlueWWater Project: Assessment, Monitoring and Removal of Microplastics and Contaminants of Emerging Concern in Urban Wastewater and in the Masses of the Galicia-North Portugal Transboundary Region

BlueWWater and Rede NOR-WATER – INTERREG POCTEP

Raquel Diez

CETMAR, Spain

11h40 – 11h50 - Transnational Strategy for the Detection and Prevention of Water Pollution by PFAS
ALERT-PFAS – INTERREG SUDOESTE

João M. M. Araújo

NOVA School of Science and Technology, Portugal

11h50 – 12h00 - Advancing Municipal Wastewater Disinfection with Novel Disinfectants and Advanced Process Control Strategies

Domenico Santoro

USP Technologies, Canada

12h00 – 12h10 - Effluent Ozonation in Urban Wastewater Treatment Plants – A Growing Opportunity To Exploit Synergies in the Activated Sludge Process

Jan Mante

Air Liquide, Germany

12h10 – 12h20 - The Issues of Using Oxygen from Electrolysis for Ozone Generation

Arnaldo Oliveira Araújo

Air Liquide, Portugal

12h20 – 12h30 - Preserving Fresh Produce Quality: The Crucial Role of Process Water

Camilla Khrulova

Arrow Lake AB, Sweden

12h30 – 14h00 **LUNCH BREAK**

LOBBY ATKINSON

14h00 – 16h00 Co-Creation Workshop: Future Challenges in Drinking Water Sector - Public Engagement, Communication and Raising Awareness - Part I

ROOM NASONI

Chaired by **Rui Martins** (University of Coimbra, Portugal) and **Maria José Farré** (ICRA, Spain)

14h00 – 14h10 - ZeroPollution4Water Cluster – Goals and Challenges

Loïc Charpentier

Water Europe, Belgium

14h10 – 14h20 - H2OforAll: Innovative Integrated Tools and Technologies to Protect and Treat Drinking Water from Disinfection ByProducts (DBPs)

Rui Martins

University of Coimbra, Portugal

14h20 – 14h30 - IntoDBP: Innovative Tools to Control Organic Matter and Disinfection ByProducts in Drinking Water

Maria José Farré

Catalan Institute for Water Research, Spain

14h30 – 14h40 - SafeCREW: Climate-Resilient Management for Safe Disinfected and Non-Disinfected Water Supply Systems

Beatrice Cantoni

Politecnico di Milano, Italy

14h40 – 14h55 - The Regulatory Approach to Disinfection By-Products

Luís Simas

ERSAR, Portugal

14h55 – 15h05 - Upgrading Water Treatment Plants to Comply with the DBPs Standards Introduced by the Directive (EU) 2020/2184

Paolo Roccaro

University of Catania, Italy

15h05 – 15h25 - DBPs - A Showcase from Around the World: Prevention Measures and Practices

Daniela Meilmann

DHVMED, Israel

15h25 – 16h00 - Unravelling Consumers' Awareness and Engagement with Residential Water Quality: The Case of Disinfection By Products (DBPs)

Evangelos Pournaras

University of Leeds, UK

16h00 – 16h30 **POSTER SESSION & COFFEE BREAK & EXHIBITION**

LOBBY

16h30 – 17h30 Co-Creation Workshop: Future Challenges in Drinking Water Sector - Public Engagement, Communication and Raising Awareness - Part II

ROOM NASONI

Chaired by **Rui Martins** (University of Coimbra, Portugal) and **Maria José Farré** (ICRA, Spain)

16h30 – 17h00 - RoundTable Discussion

Topics to be Discussed: Technologies for DPBs; Analytical Techniques; Public Engagement; Legislation; Preventive Measures; How to Increase the Acceptance of Tap Water

Discussion Facilitators: **Rui Martins; Evangelos Pournaras; Luísa Durães; Luís Simas; Loïc Charpentier; Maria José Farré; Beatrice Cantoni; Paolo Roccaro**

17h00 – 17h10 - Conclusions on the Round Table (Answers to the Question: How to Better Communicate and Develop Materials Geared Towards this Issue Amongst the General Public?)

Rui Martins and **Maria José Farré**

17h10 – 17h20 - Ozone Strong Water, an Innovative Side-Stream Injection Technology for Ozone Applications as Micropollutant Abatement and Disinfection

Jan Mante

Air Liquide, Germany

17h20 – 17h30 - O₃+BAF (Biological Activated Filter) to make Fewer Disinfection Byproducts

Cristian Carboni

De Nora Water Technologies Italy S.r.l., Italy

17h30 – 17h50 Final Remarks and Awards Ceremony

Vítor Vilar, Host and Chair, Faculty of Engineering of the University of Porto, Portugal

Rui Martins, Host and Chair, University of Coimbra, Portugal

Luísa Durães, Host and Chair, University of Coimbra, Portugal

Susana Seabra, Host and Chair, Sociedade Portuguesa de Inovação, Portugal

Ana Pereiro, Host and Chair, NOVA University Lisbon, Portugal

João Araújo, Host and Chair, NOVA University Lisbon, Portugal

18h00 – 20h00 Visit to Ferreira Wine Cellars, Social Event 2

Meeting Point: ROOM NASONI

20h00 – 02h00 Dinner at Sancho Panza (Cais de Gaia) & Drink at Galerias (Porto), Social Event 3

Meeting Point: Ferreira Wine Cellars or WOW MAIN SQUARE

Conference Organizers

Chairs



Ana Belén Pereiro Estévez

NOVA University Lisbon, Portugal



João Miguel Mendes de Araújo

NOVA University Lisbon, Portugal



Luísa Maria Rocha Durães

University of Coimbra, Portugal



Rui Carlos Cardoso Martins

University of Coimbra, Portugal



Susana Seabra

Sociedade Portuguesa de Inovação, Portugal



Vítor Jorge Pais Vilar

Faculty of Engineering of the University of Porto, Portugal

Local Organizing Committee

Faculty of Engineering of the University of Porto, Portugal

Adrián Manuel Tavares da Silva
Ana Alexandra da Silva Pereira
Ana Margarida Gorito Gonçalves
Ana Isabel de Emílio Gomes
Ana Rita Lado Ribeiro
André Tiago Torres Pinto
Carla Alexandra Orge Fonseca
Carmen Susana de Deus Rodrigues
Cátia Alexandra Leça Graça
Catarina da Rocha Cruzeiro
Cláudia Gomes da Silva
Inês Bezerra Gomes
Joaquim Luís Bernardes Martins de Faria
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