Innovative approach and design for environmental protection from arising threats

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This editorial is an introduction to a Special Issue (SI) of the *Environmental Science and Pollution Research* journal, highlighting selected papers presented at the Seventh International Conference on Environmental Management, Engineering, Planning and Economics and SECOTOX Conference (CEMEPE2019) that was held in Thessaloniki, Greece, in May 2019. This conference is aimed at encouraging the exchange of ideas and knowledge among different research groups working on current issues in environmental science, engineering, and management. Professionals, researchers, environmentalists, and policy makers are always invited and encouraged to present their work in topics such as smart monitoring systems, environmental impact assessment, eco-design, and environmental performance—to name a few. Though this list is not exhaustive, as guest editors, we chose to concentrate on these topics, which are highlighted by the manuscripts included in the special issue. A need for developing novel, integrated, and universal environmental indicators of processes and products, coupled with reliable,

meaningful, and applicable monitoring, is the approach that will be able to give answers to current and imminent environmental problems.

After the conference, as in the past editions of CEMEPE (Kungolos et al. 2018), some authors are regularly invited to submit papers to a Special Issue.

This time, the SI included 5 manuscripts representing just a glimpse of the studies and applications that were talked about in CEMEPE2019. At the same time, these selected manuscripts demonstrate the breadth of research conducted globally.

Aquatic pollution may be monitored with the routine use of local bioindicators; however, other interfering factors should also be considered. This caveat is presented in detail in the work of Patoucheas et al. (2021), for the case study of Saronikos Gulf in Greece, near hydrothermal vents. The complex geo-biochemical conditions significantly affected phytoplankton community structure, and the association with water temperature and nutrient content was evident.

From aquatic environments to water distribution networks, monitoring should also be performed with caution; the placement of detection points in a water distribution network are seldom assessed, even though they are a crucial aspect for the implementation of Water Safety Plans. Santonastaso et al. (2020) in their research apply three different approaches for their positioning, based on empiricism, optimization, and topology, and they critically compare their effectiveness, simplicity, and reliability.

From drinkable water quality to effluent treatment efficiency, the effectiveness of online sensors was assessed, in an intermittently aerated and fed membrane bioreactor (IAF-MBR) system. As such, ammonia oxidation and nitrate reduction were effectively recorded, in the study of Azis et al. (2020), via the use of pH and oxidation-reduction potential (ORP) sensors, placed in situ.

Moving on from water to energy, district heating systems were assessed based on their environmental performance in the study of Ravina et al. (2020). The objective of this study

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was the energetic and environmental assessment of district heating networks of different sizes and operating configurations, to define relevant environmental performance indicators. These indicators should be taken into account when designing these systems.

Finally, application of eco-design standards in electrical transformers' insulators was the subject of Chronis et al. (2020) review. The authors assessed the environmental impact of vegetable-based insulating oils, considering various environmental impact assessment criteria, for two product groups of transformers.

As already stated, these manuscripts mirror the broad and multidisciplinary research presented in our conference. This joint effort was fruitful because of both the authors' dedication and the ESPR journal team's professionalism. We are looking forward to meeting you in the next CEMEPE congress this year to get to know about contemporary research in environmental management and environmental protection.

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Armando Di Nardo works at Department of Engineering of University of Campania “Luigi Vanvitelli” and associate researcher at Institute of Complex Systems of Italian National Research Council. He is an engineer and expert in smart water network, optimization of water resources management and remediation, decision support system, and hydroinformatic and hydraulic infrastructures. Prof. Armando Di Nardo is the coordinator of a European Action Group of EIP

(European Innovation Partnership) on Water, titled CTRL+SWAN (Cloud Technologies & Real time monitoring + Smart Water Network) and a cofounder of the academic spinoff Environmental Technologies srl and MedHydro srl. He is the author of 180 papers in national and international journals and conferences, with above 90 SCI papers, 3 book and 15 book chapters. The major research fields include water resources management, water network partitioning, groundwater remediation carried out with innovative approaches based on heuristic optimization techniques, complex network theory, spectral theory, etc. Prof. Armando Di Nardo is the creator and developer of the registered software SWANP (Smart Water Network Partitioning and Protection), cofounder of three academic spinoff companies (Med.Hydro, ARTEMA, and Environmental Technologies), and company advisor in the fundraising and development of research projects. He is also a social innovator; cofounder of the foundation no profit IISE and of the startup incubator HUB spa experimenting coworking, crowdsourcing, crowdfunding, and startup acceleration in South of Italy; jury member in startup and company competitions; copywriter; blogger; and writer for blogs and newspapers.

Enrico Creaco, Ph.D., Associate Professor, obtained his Ph.D. in Hydraulic Engineering in 2006 and has researched topics pertinent to water and environmental systems for over 15 years. His career began at the Universities of Catania and then Ferrara, Italy. From May 2014 to June 2015, he took up a Research Fellow post at the University of Exeter and became an Assistant Professor at the University of Pavia in September 2015. He has been an Associate Professor at the University of

Pavia since September 2018. He has been Honorary Senior Research Fellow at the University of Exeter and Adjunct Senior Lecturer at the University of Adelaide. In September 2018, he obtained the Full Professor Qualification in the Hydraulics, Hydrology, and Hydraulic Infrastructure Sector. He has been a lecturer on hydraulic infrastructures at both undergraduate and postgraduate levels and has published more than 100 Scopus indexed papers, most of which are in international ISI indexed journals. He is the Associate Editor of the Journal of Water Resources Planning and Management—ASCE and participated in/

coordinated various national and international research projects. His research interests include the following: design and management of water distribution systems, sewer and irrigation systems, numerical modeling of shallow waters and sediment transport, demand analysis, and protection of water distribution systems from contamination.

Vasiliki Manakou is a research associate in the School of Civil Engineering, AUTH, Greece. She has received her Bachelor's degree in Forestry and Natural Environment from AUTH, her M.Sc. in Protection and Restoration of the Environment from University of Edinburgh, Scotland, and her Ph.D. in Water Resources Management from University of Thessaly (UTH), Greece. She has published 8 papers in peer-reviewed journals and has taken part in more than

30 research projects in AUTH, UTH, University of West Macedonia and National Technical University of Athens. Her research interests include environmental management and water resources management.

Dino Musmarra is a full professor of Chemical Plants at the Department of Engineering of the University of Campania "Luigi Vanvitelli." He obtained his Ph.D. in Chemical Engineering in 1989. His main research interests include flue gas desulfurization; micro-pollutant removal from waste incinerator exhaust gas; heat transfer in fluidized bed reactors; industrial waste water treatment; water body quality analysis; protection of groundwaters by means of permeable

adsorbing barriers; and waste water treatment using AOP, innovative approaches for the production of renewable fuel, microalgal biomass growth and bio-transformation for valuable by-product production and extraction, deposition and characterization techniques of shape memory

alloy based metallic coatings, pressurized anaerobic digestion, and production of bio-polymers from organic wastes.

In his research career, he has coordinated over 16 projects. He has published more than 180 papers in international peer-reviewed journals and more than 200 papers in international conferences. His papers have been cited more than 4000 times in journal publications (H-index=39). He is a cofounder and vice-president of the Academic Spin-Off "Environmental Technologies s.r.l." of Università degli Studi della Campania "Luigi Vanvitelli."

Michele Prevost is a full professor at the Department of Civil Engineering of Polytechnique Montreal and founded the CREDEAU laboratory, a unique water technology platform. She has more than 25 years of experience in research and technology in the areas of drinking water treatment and distribution and holds an Industrial Chair on Drinking Water of the Natural Sciences and Engineering Council of Canada (NSERC).

Prof. Prevost has completed applied R&D on source protection (discharge characterization, detection of emerging contaminants, risk assessment), water treatment (disinfection, biological treatment, high rate filtration, nitrification, oxidation of emerging contaminants such as toxins, hormones and pharmaceuticals, etc.), and various aspects of distribution systems (biostability, pathogen regrowth, integrity and intrusion, Legionella control, hydraulic and quality modeling). Recently, she has directed large Canadian initiatives such as the program to reduce lead at the tap through a suite of laboratory, field, and epidemiological studies. Since 2009, she has led the Canadian-based cooperative research on cyanobacteria and toxin treatment with utilities and established strong links with Australian experts on cyanobacteria detection and treatment (UNSW and AWQC). With extensive industrial experience in consulting and technology development with manufacturers, Prof. Prevost has also been active in numerous technical advisory committees to utilities and international organizations. She is the 2016 recipient of the A. P. BLACK award of the American Water Works Association (AWWA) for outstanding research contributions to water science and water supply rendered over an appreciable period of time.