

Seminar Series

PLASTICS, EMERGING CONTAMINANTS, CLIMATE IMPACTS IN THE URBAN WATER CYCLE AND HUMAN EXPOSURE TO TOXIC POLLUTANTS

This seminar series explores emerging environmental challenges. It addresses the fate and removal of microplastics and nanoparticles in water resource recovery facilities, highlighting their impacts on treatment efficiency and their role as vectors for contaminants of emerging concern. The series also examines human exposure to plastic additives in textiles and consumer products, with a focus on potential health implications and regulatory relevance. Finally, it investigates greenhouse gas emissions from wastewater treatment using radiocarbon analysis, revealing the contribution of fossil carbon and implications for emission accounting and carbon management.

Seminar 1: Greenhouse gas emissions from wastewater treatment: Using radiocarbon analysis to study the fate of fossil carbon

The 2006 IPCC Guidelines assumed that all CO₂ emissions from water resource recovery facilities (WRRFs) were modern and therefore excluded them from greenhouse gas calculations. However, radiocarbon analysis shows that wastewater contains a fraction of fossil carbon, which is distributed across different treatment processes and leads to fossil CO₂ emissions. Including fossil carbon increases greenhouse gas estimates compared to the 2006 IPCC Guidelines, with differences depending on the presence of on-site energy recovery systems.

Seminar 2: Exposure to plastic additives in clothes and fabrics

Every day, humans are exposed to hazardous chemicals through consumer products used for prolonged periods of time, including fabrics, hygiene products, and personal care items that are often in direct contact with skin or mucous membranes. These areas may have chemical absorption rates higher than dermal absorption. Plastic additives were extracted from more than 30 fabric samples, including natural, semi-synthetic, synthetic, and mixed materials. Some of the detected chemicals are known sensitizers, reproductive toxins, endocrine disruptors, or carcinogens. Results show that recycled synthetic fabrics contain the highest levels of chemicals, followed by mixed, virgin synthetic, and natural fabrics, with similar concentrations in organic and conventional natural materials.

Seminar 3: Microplastics: removal and implications in wastewater treatment

Water resource recovery facilities (WRRFs) are complex engineered aquatic environments where nanoparticles (NPs) and microplastics (MPs) occur, and their quantity and size depend on operating conditions, influent quality, and environmental factors. Particles in the NP size range represent a significant energy burden on water filtration processes and may negatively affect water reclamation. Microplastics, defined as plastic particles smaller than 5 mm, are persistent in aquatic environments and may act as vectors for contaminants of emerging concern (CECs) due to sorption processes. This seminar investigates the interaction of CECs with different plastics at macro- and micro-scales and reviews WRRF performance worldwide to understand and predict MP removal based on operating parameters.

SPEAKER:

Prof. LINDA TSENG, UNIBAS
VISITING PROFESSOR
City College of New York – USA

MODERATOR:

Prof. Donatella Caniani
University of Basilicata,
DiSS – Italy

DATE & TIME

1° Seminar: January 20, 2026

2° Seminar: January 27, 2026

3° Seminar: January 29, 2026

10:30 a.m.

VENUE

1° Seminar: Room Gropius

2° Seminar: Room Le Corbusier

3° Seminar: Room Seminari, IV
floor

University of Basilicata, Potenza

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 Organized by:

DiSS and DiING – University of Basilicata, Italy

Contact: donatella.caniani@unibas.it