



Two seminars for PhD students

Doctorate in Territory Innovation and Sustainability

Waste to Energy: Bioeconomy and Production of Green
Energy from Biowaste Fractions

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Hydrothermal treatment of sewage sludge and other
organic waste for environmental protection

Tuesday, 18th November 2025
(Room A old building)
10.00-12.30

Niccolò Cusano University

Waste to Energy: Bioeconomy and Production of Green Energy from Biowaste Fractions

Tuesday, 18th November 2025 (Room A old building) 10.00-11.00
Niccolò Cusano University
Via don Gnocchi 3 - Rome

Marcin Landrat

Assistant Professor, PhD, Eng.
Silesian University of Technology,
Department of Technologies and Installations for Waste Management
Faculty of Environmental Engineering and Power Engineering
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Marcin Landrat is a researcher focused on environmental engineering and sustainable waste management. His work explores landfill processes, waste methanization and environmentally safe waste treatment methods. He is particularly interested in the energy potential of waste-derived fuels and practical applications of the circular economy concept. Combining experimental research with applied environmental solutions, he contributes to the development of more sustainable resource management practices.

Content of the seminar

The lecture will focus on the role of waste management in the global energy transition and the pursuit of climate neutrality. It will explore how sustainable waste handling and utilization can become an integral part of low-carbon energy systems. Particular attention will be paid to the characteristics of biowaste, including its composition, potential for energy recovery, and challenges related to its collection and treatment. The presentation will discuss innovative biowaste-to-energy conversion technologies that enable the production of renewable fuels and green energy, such as biogas, biohydrogen, and biofuels. The lecture will also address the practical aspects of implementing these technologies, their environmental benefits, and their contribution to circular economy strategies. Finally, it will highlight future trends and innovations that could accelerate the transformation toward a more sustainable and climate-neutral energy system.

To register for the seminar, please, send an email to lidia.lombardi@unicusano.it

Seminario per dottorandi
Dottorato in Territorio Innovazione Sostenibilità
 Seminar for PhD students
Doctorate in Territory Innovation and Sustainability



Hydrothermal treatment of sewage sludge and other organic waste for environmental protection

Tuesday, 18th November 2025 (Room A old building) 11.30-12.30
 Niccolò Cusano University
 Via don Gnocchi 3 - Rome

Małgorzata Wilk

Associate professor of environmental engineering, mining and energy
 Head of Department of Heat Engineering & Environment Protection
 Faculty of Metal Engineering and Industrial Computer Science
 AGH University of Krakow
 Poland
 mwilk@agh.edu.pl



Małgorzata Wilk graduated in chemical engineering in 1997, PhD successfully defended in thermal engineering in 2007 and dedicated the habilitation to pretreatment processes and solid biofuels in energy discipline in 2018. She works as associate professor at AGH University of Krakow since 2019 in the field of engineering and technology and discipline of environmental engineering, mining and energy. She is a recognized researcher in thermal pretreatment processes mainly hydrothermal carbonization, torrefaction, and pyrolysis. She is also interested in combustion processes of alternative fuels (e.g. biomass, sewage sludge and organic waste) and specialise in solid biofuel characteristics. Her research activities is granted by few scientific national awards. She holds 5 patents, including the patent for hydrothermal carbonization of organic waste. Since 2022 she is listed in the World Ranking of Top 2% Scientists published by the Stanford University and Elsevier. She is principal investigator and co-investigator in projects nationally and internationally recognized such as National Science Centre, Erasmus+ or Era-Net Water projects. She is a member of Combustion Institute and Hydrochar Network. Recently, she is supervisor and co-supervisor of 2 PhD students in the field of hydrothermal carbonization.

Content of the seminar

Hydrothermal carbonization (HTC) is an emerging technology for the sustainable management of sewage sludge and other organic wastes, offering both resource recovery and environmental protection benefits. Conducted in water at moderate temperatures (180–250 °C) under self-generated pressure, HTC converts wet organic matter into a carbon-rich solid known as hydrochar. This process not only stabilizes organic pollutants and nutrients but also significantly reduces or eliminates microplastics present in the feedstock through thermal degradation and physical encapsulation within the hydrochar matrix. As a result, HTC provides an efficient route for mitigating microplastic pollution while producing a valuable material for soil improvement, energy generation, or carbon sequestration. Overall, hydrothermal carbonization represents a promising pathway toward circular waste management and reduced environmental contamination.

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