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Università Degli Studi di Palermo
Corso di Laurea Magistrale in *Biotechnologie Industriali Biomolecolari*
Dipartimento di Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche

Avviso di seminario giorno 17 Ottobre 2024, ore 14,30, presso l'aula Vittorelli, Dip. STEBICEF-
Università degli Studi di Palermo, Viale delle Scienze, Ed. 16, Palermo

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**“Insights into Drinking Water Microbiology: from new applications to the fight
against *Legionella* spp.”**

Abstract

Drinking water has driven many of the discoveries in the field of microbiology, and the concept of clean water has become important, with new strategies to mitigate the presence of dangerous bacteria being continuously implemented. Despite the conservativeness of the field that has, for a long time, lagged behind in the implementation of advanced technologies, in recent years new applications have reshaped research and generated new questions and hypotheses. In the first part of the presentation, I will describe some of the new methods developed and research performed in our group over the years, with a focus on the flow-cytometric count of drinking water bacteria, the impact of plastic material in contact with water on the microbial ecology and the use of sequencing technologies. An important focus in the field is given to waterborne pathogens, and especially on how to detect their presence and achieve their removal. A notable example is represented by the genus *Legionella*, causative agent of Legionnaires' disease, a condition with increasing incidence worldwide (7.71 cases per 100'000 population in Switzerland in 2021, compared to 3.54 in 2014). In the second part of the presentation, I will discuss our latest research on *Legionella*, focusing on: 1) the ecology of *Legionella* spp. as members of drinking water microbial communities using droplet digital PCR and sequencing technologies; 2) the diversity within the genus *Legionella* through bioinformatic analysis and dedicated laboratory experiments; 3) the antagonistic interactions between *Legionella* spp. and other aquatic bacteria, which may pave the way towards for probiotic approach in engineered aquatic ecosystems.

Dr Alessio Cavallaro Short CV

- **Oct 2014–Oct 2017, BSc Biotechnology** (University of Palermo), **BSc thesis at University of Palermo** (Thesis on biocatalysis using bacterial enzymes, Molecular Microbiology and Microbial Biotechnology Laboratory, Prof. Anna Maria Puglia, Prof. Giuseppe Gallo, Prof. Francesca D'Anna).
- **Oct 2017–Oct 2019, MSc Biotechnology for Industry and Scientific Research** (University of Palermo), **MSc thesis at FHNW in Basel** (Thesis on antibiotic resistance, DNA and RNA diagnostics group, Prof. Eric Kübler).
- **Nov 2019 – Apr 2020, Scientific collaborator at FHNW in Basel** (Project on microbial fingerprints, DNA and RNA diagnostics group, Prof. Eric Kübler).
- **May 2020 – Jun 2024 PhD in Microbiology at ETH Zurich and Eawag, Swiss Federal Institute of Aquatic Science and Technology** (Thesis on the ecology of *Legionella* spp., Drinking Water Microbiology group, Dr. Frederik Hammes).
- **Aug 2024 – Present Postdoctoral Researcher at Eawag, Swiss Federal Institute of Aquatic Science and Technology** (Project on *Legionella* probiotics, Drinking Water Microbiology group, Dr. Frederik Hammes).

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