

XXV Congresso AIOL – Plenary lectures

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Plenary lecture

Do phytoplankton dream of environmental change, or monster copepods?

The relative importance of abiotic and biotic controls in driving community dynamics is of central interest in Ecology. This is particularly relevant for plankton communities, which regulate essential aquatic ecosystem processes and services. The ecology of plankton is characterised by fast growth rates and significant temporal fluctuations in biotic and abiotic conditions, at both short and long time scales, implying non-equilibrium and nonlinear dynamics, which challenge our ability to understand mechanisms and predict community change. I will briefly review the state of the art and present some work done in our group to understand and forecast biodiversity change in phytoplankton communities, including algal blooms. I will focus particularly on ongoing work that aims at the relative importance of abiotic and biotic controls on phytoplankton dynamics using data from Swiss lakes at different scales of space and time, and on new tools to test assumptions and theories in plankton community ecology using in situ automated data and machine learning.

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<https://www.eawag.ch/en/department/eco/main-focus/phytoplankton-ecology/>
<https://aquascope.ch/>

Biosketch

I am a senior research scientist at Eawag and a lecturer at ETH-Zurich. I graduated at the University of Milan (Italy) in Ecology and obtained a PhD in Microbiology at the University of New South Wales (UNSW, Sydney, Australia). After graduation, I have been a Postdoc at University of Insubria (Italy), a vice Chancellor's Research Fellow at UNSW, a Marie-Curie Fellow and a Postdoc at Eawag, before obtaining tenure as a group leader in the Eawag department of Aquatic Ecology. I have worked on the molecular and ecological basis for the production of cyanobacterial toxins, the environmental risk assessment of water-borne micropollutants, and the environmental controls and consequences of lake phytoplankton dynamics. I have broad interests in microbial community ecology and evolution. I aim at understanding the effects of (human-induced) environmental change on plankton biodiversity, and the consequences of biodiversity change for aquatic ecosystem processes. I approach community ecology from a trait-based perspective to link individual and population responses to community and ecosystem level interactions. To achieve the above goals, I apply or develop new tools for studying microbial communities in their natural environment.

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Selected publications

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- Thomas, M.K., Fontana, S., Reyes, M., Kehoe, M. & Pomati, F. (2018). The predictability of a lake phytoplankton community, over time-scales of hours to years. *Ecol. Lett.*, 21, 619–628.
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