SocEukMicrobiol 2025 - Keynote talks

Wednesday morning 12.02.2025 keynote

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Unseen Ecological Drivers: The Role of Marine Parasites in Ecosystem Dynamics and their Unexpected Biology

Earth's biodiversity is entering a sixth mass extinction, marked by unprecedented extinction rates. Parasites, which are believed to account for half of all species richness, could represent the unseen majority of species extinctions. While parasites are often viewed through an anthropocentric lens—as biological agents causing diseases in humans, animals, or plants—they play essential ecological roles. They limit species invasions, control the growth of opportunistic species, and mediate biomass transfer between trophic levels. Consequently, their preservation is critical for the resilience of ecosystems.

Although extensively studied as human pathogens and threats to human interests, parasites have largely been overlooked in microbial aquatic ecology, particularly in marine environments. Marine Alveolates (MALVs) were identified as one of the most hyperdiverse lineages in the metabarcoding dataset collected during the Tara Oceans expedition. Despite their diversity, only a few species within the MALV lineage have been formally described. Most are obligate aplastidial parasitoids, intracellular biotrophs, meaning the host remains alive during the infection but eventually kills.

This diverse group encompasses a wide range of specialized parasites, each adapted to infect specific host types. However, collectively, MALVs can infect a broad array of marine hosts, from unicellular organisms like dinoflagellates, ciliates, and radiolarians to larger multicellular animals such as crustaceans and fish. MALVs significantly impact marine ecosystems and industries: some species cause devastating epizootics that affect fisheries and aquaculture, while others drive the collapse of toxic algal blooms, reshaping phytoplankton community dynamics.

In this conference, we will provide an overview of the current knowledge of these lineages from both ecological and biological perspectives, highlight major discoveries made in recent years, and explore what remains to be uncovered, with the aim of inspiring future researchers to investigate these remarkable marine parasites.

Elisabeth Hehenberger

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(Core) Dinoflagellates - Never stop shopping for plastids

Dinoflagellates are a highly diverse, abundant and widespread group of unicellular eukaryotes with several fascinating characteristics, including genomes so gigantic they are packed into permanently condensed, liquid-crystalline chromosomes in a nucleus called dinokaryon. Also, regarding their plastids, dinoflagellates follow an uncommon trajectory –their plastid evolution is likely the most dynamic of all plastid-bearing eukaryotes. Several dinoflagellate lineages have replaced their ancestral dinoflagellate plastid (the "peridinin" plastid) with new permanent plastids from various algal donors but up to now this behavior seems to have been restricted to core dinoflagellates – comprising all dinoflagellates with the typical dinokaryon. Here I will present our microscopic, phylogenomic and transcriptomic analyses of several dinoflagellate lineages newly reported to have replaced their ancestral plastid, including a lineage outside of the core dinoflagellates, and discuss how these results impact our view of plastid evolution.

Yana Eglit

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Exploring unseen cellular and behavioural diversity through cultivation

Much of the novel major lineage discovery over the past 20 years involved cultivation of isolates of interest identified by light microscopy. I have used this approach to characterise several phylogenetically significant lineages of eukaryotes, including a super-group-level clade comprised of Hemimastigophora, *Meteora*, and "Protist X". These novel cultured representatives allow for improved phylogenetic reconstruction and general morphological characterisation; moreover, they can be a source of curious cell biological and behavioural observations -- particularly among eukaryotrophs, or protists that predate upon other protists. I will present a few such organisms, of varying phylogenetic importance, that also exhibit peculiar cellular and/or behavioural phenomena observed (primarily) under light microscopy.
In short, come for the trees, stay for the microbial feasting (or vice versa)!

Friday morning 14.02.2025 keynote

Jens Boenigk

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Stability of microbial food webs in a changing world

Ecosystems are affected by multiple stressors and these stressors often interact in complex, nonlinear ways to impact negatively on biodiversity and ecosystem functions. Therefore, predictions about changes in biodiversity and ecosystem function are difficult, yet critically important. Of particular concern are increasing frequency and intensity of heatwaves driven by climate change, but salinization and other stressors also significantly impact microbial communities and community function. As microbial food webs and in particular the regulation of bacterial density and community composition through protistan grazing stabilize the basis of any food web, they critically contribute to ecosystem stability. The high diversity of microbial communities and a presumably high level of functional redundancy of morphologically similar flagellate taxa can buffer community functions and ecosystem services despite a high species turn-over. This particularly also accounts for grazing interactions between protists and bacteria as structuring element for bacterial communities. The turn–over of differently adapted cryptic species with presumably similar feeding preferences may stabilize microbial ecosystem functions facing environmental change.