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*'Microbial mats as windows  
into Earth's ancient past'*

**Tuesd, 13th Sept 2022 @ 11h**

on site: Site DOUA, Amphi Fontannes

online: <https://univ-lyon1.webex.com/univ-lyon1-en/j.php?MTID=m881ebd359305135075c32e801fe25454>

Life was solely microbial for most of Earth's history and microorganisms drove Earth's redox evolution towards our modern oxygen-rich planet. Many gaps remain concerning the dynamics of global sinks and sources of oxygen and their impact on Earth's oxygenation pattern. Among plausible ancient photosynthetic ecosystems, microbial mats likely played a key role driving the net release of oxygen into the atmosphere. While these laminated microbial structures are nowadays only found in extreme environments, they likely covered most of Earth's coasts for most of its history, representing hotspots of primary production. Yet, little is known about how they would have interacted with Earth's bio-, geo- and atmosphere. In this talk, I would like to share some insights about the control of oxygen export from modern analogues of Proterozoic mats. Feedbacks between external chemistry and mat oxygen release will be discussed in the context of mass transfer limitation in mats, and viewed through the microbial lens of metabolic regulation, behavior and community interaction. Finally, I will highlight the importance of microscale diel process dynamics for global transitions, and challenge some paradigms of the control of early photosynthesis by sulfide and arsenic.