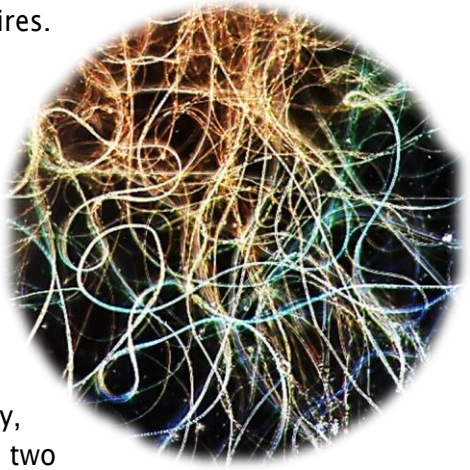
Skeletons of cable bacteria make oxygen

In biology only photosynthesis was known to generate oxygen from water, but in 2023, CEM could publish experiments showing that skeletons of cable bacteria can do it without light. That makes sense for a form of life relying on electric currents through internal electric wires.



Cable bacteria typically live in the bottom of lakes and seas where they gain energy from bringing electrons from deep layers with abundant food and no oxygen to upper layers with oxygen and no food. The centimeter-long conductive network in a cable bacterium can be extracted as a coherent skeleton. When a skeleton was connected to a wire with negative potential, it appeared to reduce oxygen to water with the same, high effectivity as when a living cable bacterium have one end up in contact with oxygen. This electrocatalysis was reversible as water was turned into oxygen when the potential was positive. This, in a biological context unheard capacity, was further confirmed as a difference in oxygen concentration between two ends of a skeleton was sufficient to cause an electric current. Biologically this indicates that a cable bacterium may produce oxygen at low concentrations in its lower cells for own consumption or for other microbes around. Technologically it is also interesting, as good catalysts for extraction of electrons from water are requested. Work to identify and characterize the catalyst and the biological importance continues at CEM.

Digel et al. 2023: Cable Bacteria Skeletons as Catalytically Active Electrodes. Angewandte Chemie. https://doi.org/10.1002/anie.202312647

The International Electromicrobiology Conference

For the third time CEM brought together the international electromicrobiology community for a 3 day conference in Aarhus (EM-23). At EM-23 the participants represented 14 countries and each participant presented their research at the conference in the form of either an oral or poster presentation.

As a new initiative in 2023 we wanted specifically to cater for the Early Career Scientist (ECS) and therefore organized a 2-day workshop preceding the main conference. At the workshop the ECSs received hands-on experience in selected techniques in electromicrobiology, combining field, laboratory, and theoretical exercises. Participants also had ample time to present and discuss their own research project and to have conversations on career paths with the invited speakers, all in the informal environment of Aarhus University's Marine Biological Station.