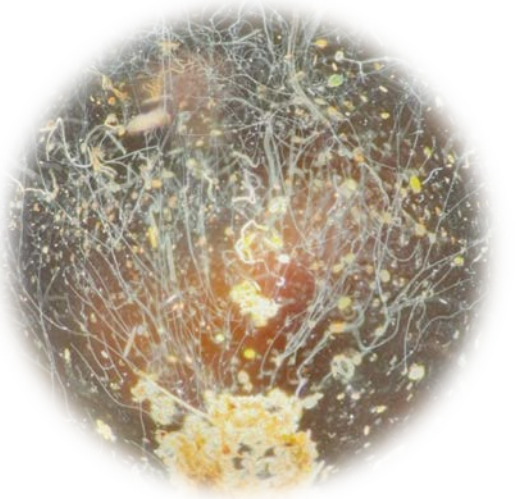
Highlights 2022

CEM CENTER FOR ELECTROMICROBIOLOGY

When cable bacteria use nitrate

Cable bacteria use internal wires to bring electrons up through sediments to oxygen or nitrate at the surface. Electric fields are thereby generated and a study from CEM found, that the fields reached same depth and strengths with oxygen and nitrate and cable bacteria could account for half of the sediment's nitrate turnover. Changes in gene expression revealed a suit of enzymes for conversion of nitrate to nitrite in the outmost interspace of cable bacteria where the wires are running. This aligns with previous studies on oxygen showing that electrons are simply flared off in the upper cells while harvest of energy via membrane-bound enzymes is located in cells in the other end, where electrons are derived from combustion of sulfide. An evolutionary analysis showed that the genes encoding nitrate conversion enzymes curiously enough were derived from horizontal gene transfer from co-occurring bacteria of different origin. Evidence supports that cable bacteria can convert nitrite further to ammonium, thereby recirculating nitrogen as a nutrient. The present history is one out of many on cable bacteria being dominant organisms influencing minerals, nutrients, and greenhouse gasses.



Cable bacteria researchers finally reunited

The 6th International Cable Bacteria Workshop was the 2022 peak event where fellow cable bacteria researchers, with the exception of the partners in China, finally gathered after Covid19. This time in a Belgian monastery and arranged by the group of Filip Meysman. With 60 participants from multiple countries, the workshop confirmed the continuous growth of the field and for newly entered groups and junior scientists in particular, it was a stimulating and motivating to meet others engaged in the very same questions as themselves. In a confident and social atmosphere, new results, plans, and ideas were shared and deals made on collaboration, exchanges, and common publications. In spite of the expansion and long-term separation, the seniors retain the same, common understanding of keeping the inevitable competition on a friendly level, where coordination and openness ensure the most productive, satisfying, and influential research. Next time, the CEM team will be the host for the third time in Denmark.