Matthew Campbell

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Brief Summary

Microbial mats and microbialites in Shark Bay, Western Australia are microbial ecosystems representative of ancient life forms preserved in rocks for up to 3.5 billion years. Shark Bay is a World Heritage site for microbial ecosystems living in a range of physiochemical factors such as pH, temperature, salinity etc. These ecosystems thrive on carbon, sulfur and oxygen transformations and are the quintessential systems to investigate coupled carbon and sulfur cycling as up to 70% of the carbon can be respired using sulfur compounds. The potential constraints of organics on the mineralisation of sulfide are yet to be established and the $\delta^{34}S$ of microbial metabolites along with the expression of certain genes may help identify the major pathways of sulfur transformation. In general, mat morphologies are linked to the interplay of different microbial consortia and their metabolic pathways that influences mat geochemistry & lithification. Additionally, Extracellular Polymeric Substances (EPS) play a major part in the lithification process and the effect of physicochemical factors on EPS formation along with their contribution to the rock record is not fully understood.

Education: Curtin University

Research interests: Microbial ecology, sulfur cycle, lipidomics, isotope geochemistry, metatranscriptomics, Extracellular Polymeric Substances

Thesis title: Sulfur Cycling in Modern Microbial Systems and Advancing the Interpretations of Early Life with Modern Analogues

Supervisors: Prof. Kliti Grice and Assoc. Prof. Marco Coolen

Conferences: 2016-07 Astrobiology Australasia Meeting (Incorporation of Sulfur into Extant Microbialites with Ancient Geological Analogues), 2016-12 19th Australian Organic Geochemistry Conference and 2017-09 28th International Meeting on Organic Geochemistry (Occurrence of microbially mediated black sludge and cobble formations after a cyclonic event in Shark Bay, Western Australia)