



Project acronym: INMAR

Project title: Insect microbiome diversity and dynamics in the High Arctic

Project leader: Piotr Lukasik, Jagiellonian University, Poland

Discipline: Life Sciences & Biotech: Other - Life Sciences & Biotech

Station(s): Zackenberg Research Station (Greenland/Denmark)

Symbiotic microorganisms play critical roles in insects' ecology and evolution, including their adaptation to environmental challenges such as thermal stress. My Symbiosis Evolution Research Group aims to comprehensively describe the microbiome abundance, diversity, and distribution across insect taxonomy and environmental gradients, and characterize symbiont transmission among species. With their relatively low species diversity, High Arctic ecosystems make it plausible to characterize microbiomes within a multi-species community and track them over time as insects respond and adapt to the changing climate.

I propose to conduct comprehensive sampling for microbiome research within Zackenberg Valley, a High Arctic site where insect diversity is understood particularly well. I apply for TA access to Zackenberg Research Station for two researchers (28 person-days in June-July 2021). During that time, we will comprehensively sample arthropods across the valley, spanning the range of habitat types. We will also collect and preserve plant material, soil, and samples of decaying organic matter. In my laboratory in Poland, we will use custom amplicon sequencing-based techniques to characterize the microbiomes in thousands of these samples and historical insect specimens collected within Zackenberg Valley since 2009 by a collaborating team led by Prof. Tomas Roslin. These efforts will provide a detailed and virtually unprecedented picture of the microbiome diversity within a complete natural community, and of its temporal dynamics. They will also provide a unique insight into microbial symbionts' roles in insect adaptation to climate change. The resulting reference database will enable future comparisons with the past, into the future, and across space.