June 27, 2021

Harnessing the Hologenome for our Sustainable Future – A World Microbiome Day Event

Updated: Jan 2, 2024

From ecological questions to industrial applications, harnessing the power of microbiomes is becoming increasingly recognized for its potential in solving the world's most challenging problems. In keeping with this year's World Microbiome Day theme of *sustainability*, four UCPH-led holo-projects bring highlight how research of both the microbiome and host animal, insect or plant can be used to explain the world around us from a unique perspective.

Four leading researchers presented their research tackling these challenges and explaining the contributions of microbiomes.

Hosted by the Centre for Evolutionary Hologenomics and co-organised by HoloFish, HoloFood, EHI & FindingPheno. The publicly accessible webinar was held on 24 June 2021 with talks archived on YouTube:

- The role of the hologenome in defining group-identity in social insects, Yehuda Ben-Shahar, Professor of Biology at Washington University, USA

  My webinar will discuss recent findings about the role of the gut microbiome in regulating the chemosensory signalling pathways that regulate nestmate recognition in colonies of social insects. Based on recent findings in the honey bee, I will offer a somewhat new perspective on how symbiotic bacteria may have shaped the evolution of insect eusociality.

- Omics in aquaculture: exploiting metagenomics and metatranscriptomics to improve seaweed domestication, Melisa Osborne and Kelly Deweese, PhD Candidates, University of Southern California , USA

  Seaweeds (macroalgae) have global economic significance to several industries, importantly to cosmetics, food, and biofuels. As marine aquaculture of macroalgae expands, biologists are working to domesticate macroalgae species by applying techniques tested in agriculture to wild macroalgae species. "Omics" techniques have been employed with huge success in the improvement of agricultural crops, including metabolomics, which has been used to study metabolites and pathways that influence agriculturally relevant traits in crops, and metagenomics, which has improved understanding of host–symbiont interactions and the potential for microbial organisms to improve crop outcomes. We will discuss how the

investigation of macroalgae metabolomes and metagenomes through a "holo-omics" lens will allow for rapid domestication with informed crossing schemes and genomic improvement strategies.

- Trials and tribulations of the avian gut microbiota in the urban mosaic, Marta Szulkin, Associate Professor, Wild Urban Evolution & Ecology Lab, Poland

  How anthropogenic and urban change impacts the gut microbiota of wild animals is still largely unknown. I will here (i) demonstrate that how the urban space is defined can affect the outcomes of studies investigating animal-microbe symbiosis. I will further (ii) report how distinct environmental dimensions of the urban space covary with the community composition of avian early-life microbiota. Finally, I will (iii) outline further work that would strengthen our understanding of gut microbiome variation in the urban space.

Written by Shelley Edmunds
Updated by Marie Sorivelle