**Session Proposal**

# Session Title

Diversity and Function of Soil Viromes

# Session Organizers

Jianming Xu, College of Environmental and Resource Sciences, Zhejiang University, Hangzhou, 310058, China, jmxu@zju.edu.cn

Jizheng He, University of Melbourne, Melbourne, Australia, jizheng.he@unimelb.edu.au

Bin Ma, College of Environmental and Resource Sciences, Zhejiang University, Hangzhou, 310058, China, bma@zju.edu.cn

# Session Description

The symposium will provide a platform to highlight the emerging significance of viruses in soil ecosystems, where they are estimated to occur at an abundance of 10³¹ particles globally. As obligate parasites entirely reliant on microbial hosts for reproduction, soil viruses are increasingly recognized as influential drivers of microbial diversity, metabolic activity, and biogeochemical processes. Discussions will focus on the multifaceted roles of soil viruses in shaping soil biodiversity, nutrient cycling, carbon dynamics, and plant health. Despite their ubiquity, research on soil viruses remains in its infancy, and even fundamental ecological aspects such as viral abundance, diversity, distribution, life strategies, and functional roles are only beginning to be understood. This symposium will offer a comprehensive overview of the current knowledge on soil viral ecology and outline the potential of viruses as key regulators of microbial mortality and ecosystem function across spatial and temporal scales. Emphasis will be placed on virus-host interaction networks, abiotic interactions in the soil matrix, and the implications of viral processes for nutrient turnover and carbon fluxes. The event aims to foster interdisciplinary dialogue and collaboration to address critical knowledge gaps, paving the way for future research directions. Ultimately, a more holistic understanding of soil viruses in the context of a changing climate will support improved management of soil health and sustainability of ecosystem services.

# Format

Oral presentations, Poster Session, Questions and Answers (Q&A) session

# Proposed Speakers

Joanne Emerson, University of California, Davis, emerson@ucdavis.edu, a leading expert in the field of soil and rhizosphere viral ecology, viral and microbial metagenomics, viruses of plant pathogens, biogeochemistry and geomicrobiology.

Matthew B. Sullivan, The Ohio State University, sullivan.948@osu.edu, a leading expert in the field of phage and host genome evolution and the role of viruses in global biogeochemical cycling.

Ashish Malik, The University of Edinburgh, ashish.malik@ed.ac.uk, a leading expert in the field of soil virus-driven carbon biogeochemical cycling.

Simon Roux, DOE Joint Genome Institute, sroux@lbl.gov, a leading expert in the field of soiol microbial and viral ecology, viral metagenomics and virus evolution.

Karthik Anantharaman, University of Wisconsin, karthik@bact.wisc.edu, a leading expert in the field of computational biology, bioinformatics and soil viral ecology.

Jillian F. Banfield, University of California, jbanfield@berkeley.edu, a leading expert in the field of bacteria, archaea, and phage/viruse ecology and evolution.

Linxing Chen, University of Science and Technology of China, linxingchen@ustc.edu.cn, a leading expert in the field of bioinformatic tool development and archaea viruse sequence identification.