

CLIMATE CHANGE AND MICROBE-DRIVEN SUSTAINABLE SOLUTIONS

PANEL DISCUSSION

Date 24.10.2024
Session Time 17:50 - 18:50
Room Auditorium

Chair(s):

- Nguyen K. Nguyen (United States of America)
- Rino Rappuoli (Italy)
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Session description:

Climate change is unarguably an existential threat to humanity and life on Earth. As the most abundant organisms, microbes are critical players in every geochemical cycle relevant to climate, including carbon, nitrogen, sulphur, and others. Our planet is populated by at least a trillion species of microorganisms and their pangenomes contain sustainable solutions for many of our problems. Indeed, microbes make the planet habitable and sustain every form of life. Historically, there was a lack of collective voices of microbiologists around the world to build awareness and continue to engage with global leaders on this issue and microbes are often forgotten or less accounted for in the biological processes related to climate change.

Recommended reading:

Save the microbes to save the planet. A call to action of the International Union of the Microbiological Societies (IUMS) R Rappuoli, P Young, E Ron, S Pecetta, M Pizza - One Health Outlook, 2023.

Scientists' warning to humanity: microorganisms and climate change - <https://www.nature.com/articles/s41579-019-0222-5>).

Scientists' call to action: Microbes, planetary health, and the Sustainable Development Goals; TW Crowther, R Rappuoli, C Corinaldesi, R Danovaro, TJ Donohue, ...Cell 187 (19), 5195-5216

Microbes and Climate Change – Science, People & Impacts: Report on an American Academy of Microbiology Virtual Colloquium held on November 5, 2021. Washington (DC): American Society for Microbiology; 2022. PMID: 35544665. [10.1128/AAMCol.Nov.2021](https://doi.org/10.1128/AAMCol.Nov.2021)

Topics to be discussed: The panel will report the progress on microbe-driven actionable solutions by a Scientific Advisory Group (SAG) of global experts that has been assembled during the last year by a joint IUMS/ASM initiative to discuss how microbes can contribute to mitigate the challenges that climate change is imposing to the planet. The topics of Health, Biodiversity, Energy, and Greenhouse gases will be discussed.

Panelists:

- Dilfuza Egamberdieva (Uzbekistan)
- Roberto Danovaro (Italy)
- Lisa Y. Stein (Canada)
- Amy Shurtleff (United States of America)

Goals of the panel discussion:

- a) Raise the awareness of the beneficial impact that microbiology can have in addressing the challenges related to climate change.
- b) Present the progress on actionable solutions which are discussed by SAG
- c) Ask comments whether microbiological societies are willing to commit for local (in their country) activities with the scope to raise the awareness of general public and policy makers of the beneficial on the importance of microbiology and the impact that can have.
- d) Discuss the proposed concept of how the microbial societies can work together to take action to address climate change. The concept will provide the foundation to bring the societies, such as IUMS, ASM, FEMS, EAM, AAM, ALAM and all microbiological societies, toward joint actions (possibly to the signature of a joint statement) after the IUMS meeting in Florence.
- e) Propose strong presence/voice/proposals at the next COP and other meetings.

IUMS & ASM PROPOSAL

for Potential Priorities that Microbial Societies can take to Promote MICROBIAL SOLUTIONS TO ADDRESS CLIMATE CHANGE

IUMS and ASM have brought together a group of scientific experts in the past year to identify the microbial solutions that can address climate change. As we make significant progress in identifying those solutions, we begin to consider potential actions that microbial societies can take together to promote this topic. Below is an initial list of the priorities and activities that the microbiological societies can focus on and/or collaborate with each other. We would like to invite feedback and ideas from the broad community these activities to inform our future strategy. Your input will help shape the strategy of the societies in the future.

- Promote actionable microbe-driven solutions to climate change.
- Promote research, development, and industrialization of microbe-driven solutions
 - to **reduce the emission of greenhouse gases**, such as carbon dioxide, methane, nitric oxide and promote their use to produce energy, biofuels, food, and valuable chemical products.
 - to increase food production by increasing the fertility of soil, fixing nitrogen, and by biomanufacturing of food;
 - for equitable health of the global population by discovering and producing pharmaceuticals, vaccines, natural or precision probiotics and by limiting the spread of infectious diseases, promoting the symbiotic collaboration of mosquitos and bacteria such as Wolbachia to limit the spread of viruses such as Dengue and Zika;
 - for the bio-treatment of human waste products, including unused food, wastewater, plastics, and oil spills;
 - to produce **chemicals at life-compatible temperatures and minimal use of energy** to replace the heavy and polluting chemical industry, which requires high input of energy and very high temperatures.
- Develop sustainable practices and champion the U.N. Sustainable Development Goals in publishing books and journals to help inform and inspire sustainability and climate actions.