



This is the penultimate newsletter of the present T-MOSAIC project. In this edition, reports from the last workshop and available information for the next one (ASSW2022) are given, and some recent projects, activities and published papers are presented. We look forward to seeing you all shortly in Tromsø for ASSW2022 in March.



SPECIAL ISSUES

Special T-MOSAIC Issue of Arctic Science

The T-MOSAIC special issue of “Arctic Science” is open for submissions until March 31st 2022. Please visit the T-MOSAIC website for updated information or contact the secretariat: <https://www.t-mosaic.com/>



Special Issues on Remote Sensing

Special issue of Remote Sensing: ‘Advanced Technologies in Wetland and Vegetation Ecological Monitoring’ with a deadline of 31 March 2022. Guest Editors: Dr. Sergio Vargas Zesati, and Dr. Jeremy May.



Special issue of JGR Biogeosciences: ‘The Earth in living color: spectroscopic and thermal imaging of the Earth: NASA’s Decadal Survey Surface Biology and Geology Designated Observable’ with a deadline of 31 August 2022. Guest Editors: David S Schimel, Benjamin Poulter, Natasha Stavros, Phil Townsend, Nancy Glenn.



CONFERENCES, WORKSHOPS AND T-MOSAIC RELATED PROJECTS

T-MOSAIC Workshop at ArcticNet

An open online workshop for T-MOSAIC was organized by Université Laval (CEN) and University of Lisbon (IST) and took place during the ArcticNet Annual Science Meeting on 6 December 2021. Updates and future plans were presented by all 12 Working Groups of T-MOSAIC, and the workshop was attended by 55 participants from 9 countries. A summary of presentations is available on the [T-MOSAIC website](#).

T-MOSAIC Workshop at ASSW2022

An open online workshop for T-MOSAIC will be held during the ASSW2022 in Tromsø. The workshop will take place in hybrid format on March 26, 2022 from 9:00 to 13:00h (GMR+1).

In this workshop, opportunities for the future will be discussed. More information will be sent shortly.

A new Project: Polyphasic assessment of diversity of phototrophic microorganisms from cold environments and their bioprospection potential

The main objectives of the collaborative (Czech – India) project are: 1) documenting, enlisting, culturing, taxonomic assessment and long term preservation of cyanobacteria and microalgae from cold environments; 2) screening of industrially important bioactive molecules from the cyanobacterial and microalgal strains; and 3) use of phototrophic microorganisms from cold habitats for the production of biomass and/or high-value compounds connected with wastewater treatment. Field sampling is performed in the lower Himalayas and on Svalbard and new cultures are isolated. For the characterization of the culture we use the polyphasic approach in order to assess their phenotypic and molecular identity. These results are used for following research focused on bioprospecting for application purposes. Selected strains are studied with respect to their potential synthesis of high value compounds produced by different metabolic pathways. Further biotechnological applications of the strains might also include water treatment technology. A closed photobioreactor suitable for the production of biomass and high value compounds is constructed on Svalbard and tested under the harsh conditions of the High Arctic. Selected strains are also cultivated in a semi-industrial open photobioreactor located in Třeboň (Czech Republic). The project should significantly contribute to our understanding of microbial diversity in cold regions that is threatened by the current climate change. Valuable existing/new cyano products and algal products from cold adapted and cold-tolerant cyanobacteria and algae are screened that could serve as a basis for the development of new branch of biotechnology in low temperature based on microalgae and cyanobacteria. This project brings together four research institutions (two in the Czech Republic and two in India) sharing research topics and ideas; their specific research teams can complement their expertise, scientific know-how and competence. The proposed collaboration comes out from two previous postdoctoral projects and several short-term visits established between the Centre for Algology of the Institute of Botany CAS, Třeboň, the Centre for Polar Ecology, Faculty of Science, University of South

Bohemia in České Budějovice and the Laboratory of Microbial Genetics, Department of Botany, Banaras Hindu University. The Department of Civil Engineering, Indian Institute of Technology, Roorkee, is joining the research team. The field sampling is performed by the Czech team on Svalbard and by the Indian team in the lower Himalayas. Both teams are isolating new cultures and further work is divided according to the expertise of the teams. The Indian teams focus on detailed characterization of cyanobacterial strains both from Svalbard and Himalayas and also on the use of cultures for waste water treatment. The Czech teams characterize algal strains from both regions and focus on cultivation of biotechnologically promising strains in a newly developed closed photobioreactor on Svalbard and in a semi- industrial open photobioreactor located in the Czech Republic. Overall, a unique comparison of phototrophic microorganisms from polar and high mountain areas with implications for biotechnology is performed thanks to this international cooperation.

For more information, please contact Josef Elster at: josef.elster@ibot.cas.cz



ACTION GROUP ACTIVITIES

Arctic Infrastructure –RATIC AG

Community Meeting at ASSW 2022 - Tromsø & online

The Arctic Infrastructure Action Group is hosting a community meeting at ASSW 2022 titled, Cross-Disciplinary Approaches to Advancing Sustainable Arctic Infrastructure, on Saturday, 26 March from 14:00-18:00 local time in Norway (For Greenwich Mean Time, subtract one hour).

The community meeting will feature presentations and dialog exploring cross-disciplinary approaches to understanding the impacts of infrastructure and climate change in the Arctic. This half-day hybrid meeting will focus on topics prioritized at past RATIC events: 1) Approaches and recent progress in Arctic infrastructure mapping and monitoring; 2) Community and Indigenous perspectives on Arctic infrastructure research and policy needs; and 3) Updates from national and international research initiatives addressing Arctic change, resilience and adaptation in natural, built and social systems. Online attendance will be available via Zoom.



Arctic Infrastructure Science Talk series - 3rd Thursday Online

Our monthly online science talk series continues on Thursday, February 17 @ 18:00 GMT with a talk by Chandi Witharana of the University of Connecticut on efforts to develop a pan-Arctic map of infrastructure in sub-meter resolution. The Zoom login is <https://alaska.zoom.us/j/84495598534> (meeting ID: 844 9559 8534). The next science talks will be on April 15 and May 20 (one hour earlier, following the change to Daylight Savings Time in the USA and Europe) and can be accessed with the same Zoom link. Find slides and links from past talks on the RATIC website



Join the RATIC Mailing List to Stay in Touch

The Arctic Infrastructure Action Group will continue through the Rapid Arctic Transitions due to Infrastructure and Climate (RATIC) initiative after T-MOSAiC comes to an end. RATIC has been providing a forum for scientists to share knowledge across disciplines on topics related to Arctic infrastructure and climate change since 2014. In 2019, the RATIC initiative served as the nucleus of the T-MOSAiC Arctic Infrastructure Action Group. To keep up with opportunities for cross-disciplinary dialog and collaboration related to Arctic infrastructure, join the RATIC mailing list.

ARTICLES RELEVANT TO T-MOSAiC THEMES

-  Ivan Alekseev and Evgeny Abakumov. 2022. Soil organic carbon stocks and stability of organic matter in permafrost-affected soils of Yamal region, Russian Arctic. *Geoderma regional*, Volume 28, March 2022, e00454. <https://doi.org/10.1016/j.geodrs.2021.e00454>
-  Marie-Amélie Blais, Lovejoy, C. and Vincent, W.F. 2022. Size-fractionated microbiome structure in subarctic rivers and a coastal plume. *Frontiers in Microbiology* 12:760282. <https://www.frontiersin.org/articles/10.3389/fmicb.2021.760282/full>
-  Adrien Vigneron, Perrine Cruaud, Lovejoy, C. and Vincent, W.F. 2022. Genomic evidence for functional diversity in DPANN Archaea, from oxic species to anoxic vampiristic consortia. *ISME Communications*, 2:4. <https://www.nature.com/articles/s43705-022-00088-6>

Julia Boike, Sarah Chadburn, Martin, J., Zwieback, S., Althuisen, I.H., Anselm, N., Cai, L.,
 Coulombe, S., Lee, H., Liljedahl, A.K. and Schneebeli, M., 2021. Standardized monitoring of
 permafrost thaw: a user-friendly, multiparameter protocol. *Arctic Science*, 8.
<https://cdnsiencepub.com/doi/full/10.1139/as-2021-0007>

