

Year In Review



Thematic Network on Sustainable Strategies for Waste Removal and Restoration of Arctic Mine Waste Areas (RAMWA)

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RAMWA was approved at the UARctic Assembly in Bodø in June 2024 and is coordinated from the Norwegian University of Life Sciences (NMBU). The network develops innovative and sustainable strategies for removing mine waste and restoring land affected by mining in the Arctic, with a focus on environmental remediation, re-wilding and bioremediation. It integrates Indigenous knowledge with scientific expertise so that solutions respect local cultures and communities. The network brings together 16 experts from 13 institutions in 8 countries (Canada, China, Denmark, Finland, Germany, Norway, Sweden and Australia) and serves as a platform for researchers, decision-makers and Arctic stakeholders. Core activities are joint workshops, publications, joint education and the supervision of Master and PhD students.

Highlights 2025 / 2026

- Network results presented at **four international conferences**, including an invited lecture at the 10th European Chemistry Congress (ECC10, Antwerp).
- Three **Master theses** completed on local pollution sources in Svalbard and PFAS in the Canadian and Norwegian Arctic.
- Preparation of a network **review on Arctic mine-waste handling** and planning of a 2027 **hybrid workshop**.
- Project applications have been submitted, and although they have not been successful, the proposals have consolidated the partnership and will be revised for upcoming calls.
- RAMWA contributes to the EU project **ArcSolution** (*Arctic pollution in a One Health perspective*), in particular to its work on the circular bioeconomy.

Network members have contributed to the following peer-reviewed publications:

- Kallenborn et al. (2026). Organic phosphorus flame retardants and bisphenols in municipal wastewater, runoff and drinking water in a sub-arctic city. DOI: 10.1016/j.envpol.2026.128597
- Kallenborn et al. (2026). Industrial and public infrastructure as local sources of organic contaminants in the Arctic. DOI: 10.1039/d5va00261c
- Xie et al. (2026). Organic chemicals of Arctic concern in Russian coastal seas. DOI: 10.1016/j.scib.2025.12.054
- Min et al. (2025). Evidence for local sources and trophic biomagnification of bisphenols in the Arctic. DOI: 10.1016/j.ese.2025.100627
- Muir et al. (2025). Local sources versus long-range transport of organic contaminants in the Arctic: future developments related to climate change. DOI: 10.1039/D4VA00240G



Air sampling equipment at the Zeppelin Observatory, Ny-Ålesund – long-term monitoring of pollutants in the Arctic. Photo: R. Kallenborn



Ny-Ålesund, Kongsfjorden (Svalbard), a former coal-mining settlement now hosting international research stations. Photo: R. Kallenborn

Education

Three Master theses (60 ECTS) were completed at NMBU.

Collaboration with Prof. Bing Chen, Memorial University of Newfoundland (Canada):

- **Vilde Kolle** — Analysis of legacy and emerging PFAS in environmental samples from the Canadian and Norwegian Arctic (NMBU / Memorial University, 2026).

Collaboration NMBU/UNIS:

- **Thea Louise Tingstad** — Emission profiles of polycyclic aromatic compounds (PACs) from energy production in Longyearbyen, Svalbard (NMBU / UNIS, 2025).
- **Maren Krog** — Advanced quantification of tire wear additives: 6PPD-Q as an example (NMBU / UNIS, 2025).

Conference Presentations

- **10th European Chemistry Congress (ECC10), Antwerp, 2026**
Invited lecture: Application and integration of modern trace analytical methods for remediation and pollution emission control in sewage and drinking water treatment. R. Kallenborn, J.L. Lyche, K. Vorkamp, N.P. Kocatürk Schumacher, M.E. Moges, H. Ratnaweera, J. Lepley.
- **SCAR Open Science Conference, Oslo, 2026** Requirements and scientific needs for coordinated organic pollutant monitoring in both polar regions. R. Kallenborn, S. Bengtson-Nash, R. Rødven, K. Vorkamp, D.C.G. Muir, P. Bohlin Nizzetto.
- **UARctic Congress, Tórshavn, Faroe Islands, 2026** One Health as framework for identifying and monitoring of Chemicals of Emerging Arctic Concern. R. Kallenborn, K. Vorkamp, A. Rautio, L.O. Reiersen.
- **Dioxin 2025, Antalya, Türkiye** Elucidation of local sources for chemicals of emerging Arctic concern (CEACs) – Longyearbyen, Svalbard as an example. R. Kallenborn, T. Drotikova, F. Kryuchkov, T.M. Ciesielski, T.L. Tingstad, M. Krog.

Future Plans

- **Review in preparation:** *Current status and challenges for Arctic mine waste handling – pollution mitigation and risk assessment.*
- **Joint hybrid workshop** Sustainable management of Arctic mine wastes, planned for 2027.
- Renewed funding applications building on the JACE, ORPIC and INTPART proposals, and continued joint supervision of Master and PhD students across the network.

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