

Proposals for NORMAN Joint Programme of Activities 2026

Title	Persistence Directed Testing of Discharged Chemicals
Type of activity	Collaborative research including complementary HRMS analysis at NORMAN partners
Leader	Philipp Mayer (Technical University of Denmark, philm@dtu.dk)
Topic / activities	<p>Background / Justification for the proposed activity:</p> <p>Persistence is becoming increasingly important within the environmental risk assessments and management of chemicals. Persistent chemicals (1) can remain in the environment for extended periods of times, (2) can be prone to long range transport, (3) have time to distribute and contaminate other media including groundwater if mobile and (4) are notoriously difficult to clean-up. Persistence is thus one of the most important criteria to prioritise organic pollutants as well as identify hazardous chemicals of emerging concern.</p> <p>Biodegradation and persistence are traditionally assessed in standardised single substance tests. However, several NORMAN partners are conducting biodegradation and persistence research where multiple chemicals are tested simultaneously in mixtures. In general, we foresee significant new research opportunities in the cross-field between persistence research of chemicals in mixtures and HRMS analysis. Specifically, a novel Persistence Directed Testing approach was recently introduced, using produced water from Oil Platforms as case study (Møller, 2025; DOI:10.1021/acs.est.5c08802). Biodegradation tests were here aligned SPME-GC-MS and SPE-LC-HRMS to reveal the persistence of numerous chemicals in complex discharges. The approach can (1) shed light on discharges of "Unidentified Persistent Chemicals", (2) focus the identification effort on the persistent molecules and (3) inform water treatment, substitution & regulation.</p> <p>Description of the proposed activity and expected outcomes for 2026:</p> <p>Applying Persistence Directed Testing on one WWTP discharge and combine with a range of HRMS analytics. The plan is to focus the analytical efforts to the polar range by combining Reverse Phase Liquid Chromatography with 1-2 dedicated methods for ionic and more mobile chemicals (IC, SFC or HILIC). The analytical methods will include (1) Targeted analysis (determine persistence of known chemicals), (2) suspect screening (determine persistence within suspect list of chemicals) and (3) NTA (Number and fraction of persistent chemicals, Tentative Annotations, New groups of persistent chemicals, unidentified persistent chemical). This activity will possibly include dedicated efforts on semi-quantification and the determinations of persistent metabolites.</p> <p>Time plan: Test conduct at DTU in June/July, Analytics and Data treatment at NORMAN partners in August – December and Data integration and Manuscript Drafting 2027.</p> <p>Added value / Link with other NORMAN activities and / or other projects</p> <p>This activity will bring the novel Persistence Directed Testing approach into action within NORMAN. The results from the targeted analysis can inform the Working Group 1 on Prioritization, whereas the Suspect Screening and NTA screening are in synergy with the Non-target Screening Cross-Working Group Activity (CWG-NTS). This research can directly benefit from the substantial expertise and capabilities within HRMS analysis within NORMAN.</p>
Participants	DTU (Philipp Mayer, Pia Kronsbein, Heidi Birch & Martin Hansen) EAWAG (Juliane Hollender) UFZ (Qiuguo Fu & Martin Krauss) IDAEA-CSIC (Miren López de Alda) IRSA-CNR (Sara Valsecchi) VU (Frederic Béen) UBA (Peter von der Ohe) INERIS (Valeria Dulio) Joining of additional partners might still be feasible.
Proposed in-kind contribution	Considerable in-kind contributions: PhD scholarship of Pia Kronsbein (DTU) and considerable analytical efforts at participants laboratories.
Contribution needed from NORMAN Association¹	10 k€ in 2026, 10 k€ in 2027 Contribution to DTU for covering costs on Logistics, Experiments & Travel.

¹ Please, provide here a transparent justification of the requested resources and of the in-kind contribution, thereby distinguishing between the costs associated with "person-months" for the organisation, the "travelling costs" for invited speakers and the costs for the logistics (e.g. meals, room rental etc.)