

Conference Report

Nontarget2026

Nontarget Screening of Organic Chemicals in the Environment

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The international conference Nontarget2026 organized by Heinz Singer from Eawag, Emma Schymanski from the University of Luxembourg, Lee Ferguson from Duke University, USA, and Juliane Hollender from Eawag/ETHZ took place at the ETH conference Center Monte Verità in Ascona, Switzerland in April 2026 (Fig. 1). About 115 participants from 21 countries worldwide including 26 PhD students discussed non-target screening of organic chemicals in the environment. Although most participants came from universities and research institutes, participants from industry and regulatory bodies contributed also with presentations and posters at the conference. We are thankful to our sponsors the Swiss Chemical Society, the Congressi Stefano Francini, Eawag, Waters, ThermoFisher, and Sciex, for making this conference possible.

Thousands of chemicals are produced and used by modern society, leading to potentially harmful exposures of ecosystems and humans. In contrast, current routine target monitoring approaches with gas and liquid chromatography coupled to mass spectrometry are capable of detecting only a small set of these chemicals (e.g. tens to hundreds) and are often defined by monitoring requirements related to regulatory frameworks. The introduction of high-resolution mass spectrometry (HRMS) has changed the situation fundamentally. It allows the extremely accurate measurement of the mass of a molecule (<5 ppm) and with high mass resolution (>40,000).^[1] While the instrumentation is now available in many institutes, data evaluation is still very challenging. A single chromatogram of a complex environmental

sample may contain many thousands of signals, so that prioritization is needed to concentrate the efforts on the identification of the most relevant peaks. Relevance can be defined by occurrence frequency, intensity, persistence, bioaccumulation potential, or toxicity making the field very interdisciplinary.

Throughout the week, the recent developments in the nontarget screening field were discussed along the five main topics starting with the analytical technology on Monday to applications in chemical management on Friday:

(<https://www.eawag.ch/nontarget2026>)

Topic 1: Analytical Frontiers

This topic covered the latest analytical developments in HRMS coupled to gas and liquid chromatography including different ionization techniques and multi-dimensional separation such as ion mobility. **Dr. Selina Tisler** from the University of Copenhagen gave a great keynote talk on the analysis of persistent mobile chemicals using various chromatographic separations including supercritical fluid chromatography

Topic 2: Computational Tools

In this session, new data science methods such as mass spectral prediction, quantification without standards, retention time prediction, and toxicity prediction, which have emerged or developed further in recent years were discussed. **Dr. Louis-Félix Nothias** from the University Côte d'Azur, France showed how AI frameworks can facilitate non-targeted screening.

Topic 3: Transformation Products and Persistent and Mobile Substances

Identification of potentially harmful transformation products in systems like biological or chemical water treatment or during recycling of products are of high relevance. The discussion focused especially on persistent and mobile compounds such as PFAS which can reach groundwater used for drinking water production. **Dr. Daniel Zahn** from the UFZ in Leipzig, Germany



Fig. 1. Group picture at Monte Verità, Ascona. Photo credit Heinz Singer.

provided an overview of the challenges involved in screening transformation products.

Topic 4: Non-target Screening and Hazard Assessment

In this topic, links between NTS and hazard assessment *e.g.* through bioassays, effect-directed analysis, or *in silico* approaches were discussed. A broad range of topics was covered entailing research but also regulatory monitoring studies. **Prof. Dr. Anneli Krueve** from Stockholm University, Sweden presented the state-of-the-art of quantification in HRMS without standards.

Topic 5: Application in Chemical Management

In this session, successful examples of NTS in practice by authorities, regulators and industry were presented. Especially impressive was the work involving the implementation of non-targeted screening in regulatory drinking water monitoring at the waterworks Langenau, Germany, presented by **Dr. Tobias Bader**.

Next to keynote presentations at the beginning of the sessions, further leaders in the field gave overview plenary talks before the dinner. Special mentions are, the story of the identification of 6PPD quinone, an oxidation product of a tire-wear chemical that causes salmon deaths. It took the team around **Prof. Dr. Ed Kolodziej** from the University of Washington, USA years to identify the compounds using effect-directed analysis.^[2] **Prof. Dr. Timo Niedermeyer** from the Free University Berlin, Germany, presented another long-term study on the identification of cyanotoxins that killed eagles in the US.^[3]

The whole Monday afternoon was dedicated to poster sessions and further discussions at the posters took place throughout the whole week. Two of the 20 posters by PhD students (altogether more than 50 posters), received awards (Fig. 2), as did the best oral presentation by the PhD student Parviel Chirsir from the University of Luxembourg on persistent substructures of transformation products in fish embryos.

Six interactive workshops to discuss more intensively specific topics such as structure elucidation or prioritization approaches took place on two afternoons and were organized by teams of the

participants. The excursion to the Valle Verzasca on Wednesday afternoon was a great break during the intense week although discussions on science continued during the hike.

The overwhelmingly positive feedback from the participants, including a strong preference expressed in the post-conference survey for continuing this format, clearly highlights the value of the conference on non-target screening for the community. We therefore look forward to building on this momentum and exploring opportunities for a follow-up conference in the coming years that will further strengthen scientific exchange and collaboration in the field.

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Fig. 2. PhD student Fanshu Geng (left) from Cornell University, USA received the poster award from Juliane Hollender.
Photo credit Heinz Singer