



## Proposals for NORMAN Joint Programme of Activities 2026

Title	JPA for harmonizing the NORMAN bioassay battery for the use on different compartments and WG2 activities for bioassays
Type of activity	Workshop and joint publication
Leader / participants	Goethe University Frankfurt (Lead: Henner Hollert, Francisco Sylvester, Sarah Johann, Sabrina Schiwy, Lingling Wu, Wunmi Fred-Ahmadu & Francisco Sylvester) with UFZ (Werner Brack, Beate Escher, Saskia Finckh), UBA (Jan Koschorreck), Fraunhofer-IME (Sebastian Eilebrecht, Bernd Göckener), RWTH (Pedro Inostroza), and many others
Topic / activities	<p><b>Two-day Workshop on harmonizing the NORMAN bioassay battery for the use on different compartments.</b> In November 2025 a hybrid WG2 Meeting was held and future directions of the WG2 have been discussed. There and on the NORMAN GA 2025, it was agreed that a two-day workshop on discussing joint activities of WG2 and on harmonizing the NORMAN bioassay battery for the use in different working groups within NORMAN (such as WG3, WG5, WG6, WG7, WG8) and on different compartments should be held in spring 2026. It will be discussed on how further endpoints (e.g., Neurotoxicity and for PFAS compounds) may be included and how Effect-based trigger (EBT) values could be implemented. <b>Based on the workshop a policy paper will be developed, presenting the harmonized effect-based method (EBM) battery and the updated EBT evaluation concept.</b></p> <p>Additionally, a <b>broad range of other topics will be discussed at the planned Workshop</b>, including further contributions of WG2 to the bioactivity database, the recent developments in the field of AI, links of bioassays in joint programming activities (JPAs) of WG3 effect-directed analysis (EDA), innovative behavioural assays, eDNA- and eRNA-based methods, including transcriptomics, adverse outcome pathways, as well as the further implementation of effect-based methods in European chemical regulations. Also, future activities in the field of -omics will be discussed including the need for a foundation of a subgroup on -omics.</p> <p><b>Finalization and publication of the JPA on linking EBMs and EDA of temporal trends in suspended particulate matter as a joint activity of WG2 and PARC.</b> Since 2005, suspended particulate matter (SPM) samples are systematically collected from major German rivers, including Rhine, Elbe and Danube for the German Environmental Specimen Bank (ESB) (<a href="https://umweltprobenbank.de/en/">https://umweltprobenbank.de/en/</a>, Zizka et al 2022, ESEU, <a href="https://doi.org/10.1186/s12302-022-00618-y">https://doi.org/10.1186/s12302-022-00618-y</a> and Fliedner et al. 2022, STOTEN, <a href="http://dx.doi.org/10.1016/j.scitotenv.2022.158430">http://dx.doi.org/10.1016/j.scitotenv.2022.158430</a>). The samples have been analysed for a range of inorganic and organic pollutants with target, cumulative and Non-Target Screening methods. In addition, DNA metabarcoding data from the SPM samples are available for fish and macrozoobenthos communities. Additionally, fish and in a JPA 2024/25 also SPM from the Environmental Specimen Bank were also analyzed using effect-based methods and transcriptomics in early life stages of <i>Danio rerio</i>. The JPA 2024/25 and a PARC activity from ORU, UBA and SLU could identify severe temporal differences in the effect-patterns of the SPM. In 2025, also a joint workshop of NORMAN and PARC was held at the Fraunhofer IME in Schmallenberg. In the JPA 2025 a <b>joint investigation of suspended particulate matter from the environmental specimen bank using a broad battery of effect-based methods has started to establish a strong cooperation between NORMAN WG2 and PARC</b> in order to deepen the understanding of temporal trends of effects of SPM from the Environmental Specimen Bank. Selected effect-based methods of the NORMAN/Solutions biotest battery (Brack et al.2019, ESEU, <a href="https://doi.org/10.1186/s12302-019-0192-2">https://doi.org/10.1186/s12302-019-0192-2</a>, e.g., PFAS, ER, p53, antiAR-CALUX, <u>microEROD</u>, <u>FET</u>, <u>Ames</u>) will be carried out on the extracted suspended matter samples. In order to identify the drivers of toxicity EBM, data will be compared to the already existing chemical exposure and EDA data of the SPM and the transcriptome data of the investigated fish from the environmental specimen bank using mass balance calculations and also AI-based methods. In 2025 a set of 5 bioassays was applied at the GU in order to identify promising samples for an interlab-comparison study. In 2026 the SPM extracts will be distributed to the NORMAN partners in order to obtain a comprehensive toxicological profiling. The results will be discussed back-to-back with the GA workshop in 2026. <b>No additional funding is needed for this JPA, only the transport costs for the samples has to be covered.</b></p> <p><b>Added value / Link with other NORMAN activities and/or other projects</b></p> <p><b>The Two-day Workshop on harmonizing the NORMAN bioassay battery for the use on different compartments:</b> Since EBMs are getting more important because of the revision of the EU water package and the revisions of the EU WFD, GWD and UWTD and the water resilience strategy, NORMAN should inform stakeholders and the working group on chemicals of the EU on the use of EBMs. Here we have a strong added value to the other working groups in NORMAN since a harmonized battery of EBMs will stimulate the cross WG interaction and improve the acceptance of the NORMAN position.</p> <p><b>Added value of the JPA on EBMs for the use in the ESB:</b> This JPA is for the first time able to couple extensive profiling of time series from environmental specimen banks with a broad battery of EBMs and allows comparison with available eDNA-based biodiversity data, chemical expression data from SPM and transcriptome data from fish, thus making an important contribution to the temporal understanding of the link between chemical pollution and biodiversity loss and contributing to the establishment of effect-based early warning systems. It thus allows the establishment of links between the NORMAN and the biodiversity</p>

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	community, PARC, e.g. task 8.2. early warning) and the Green Deal.
<b>Participants</b>	<p><b>Workshop:</b> Workshop of WG2 with participation from members of several other WGs (e.g., WG1, WG3, WG3, WG6, WG7, WG8). Participants, e.g. from GUF (Henner Hollert, Francisco Sylvester, Lingling Wu, Sabrina Schiwy), UBA (Jan Koschorreck), INERIS (Valeria Dulio), ETH/EAWAG, BfG, RWTH, KWR, CNRS, UFZ, FhG IME, ORU, ACS Stockholm, NIVA, VU, DCU, OVAM, Recetox...</p> <p><b>Research Project:</b> GUF, UBA, FhG-IME, BfG, UFZ, SLU, Örebro and others</p>
<b>Proposed in-kind contribution</b>	<p><b>Workshop:</b> Meeting place, an experienced team capable of organizing the workshop and time availability for it. The open WG-2 workshop and the cross-WG meeting on EBMs will be held at the Goethe University in Frankfurt. The organization will be carried out in-kind by the GUF. Only 5 k€ are requested for invitation of a keynote speaker and catering.</p> <p><b>Publication:</b> Article writing and processing charge (APC) of the Open Access publication as in-kind contribution of GU (2.8 k€)</p> <p><b>Research Project:</b> In the research project, the samples from the environmental specimen bank are provided by UBA and F-IME as an in-kind contribution, and the processing and extraction of the suspended matter are carried out in-kind at GUF. EBM investigations of the samples are carried out as an in-kind contribution of GUF. In addition to the GU, the F-IME, Örebro, the BfG and the UFZ, other interested parties are also supporting the implementation of EBMs as an in-kind contribution. 2 k€ will be requested for costs of parcel service to send the samples for the interlab-comparison study.</p>
<b>Contribution needed from NORMAN Association<sup>1</sup></b>	<p><b>WG2 Workshop:</b> 5 k€ to be used for catering and invitation of speakers.</p> <p><b>Publication:</b> -</p> <p><b>Research Project:</b> 2 k€ will be requested for transport of the samples.</p>

<sup>1</sup> 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.)