February 2020

NORMAN Joint Programme of Activities (JPA 2020)

List of scientific activities organised by the NORMAN network in 2020

The *NORMAN Joint Programme of Activities* (JPA) is defined every year by the Steering Committee, after consultation with the membership (General Assembly meeting and e-mail survey).

The final JPA and the associated budget are approved by the Steering Committee, taking into account the following criteria:

- the level of interest of the members (results of the survey);
- the relevance of the research topic to European environmental policies;
- the balance between different sectors / fields of interest;
- the relative value of the proposed in-kind contribution *vs* amount of resources required.

The Steering Committee has approved a budget of € 219,845 for 2020, based on the expected income from membership fees of the Founding and Ordinary members. These resources will be allocated for scientific and coordination activities (including the NORMAN website), and regular updating and maintenance of the databases.

NOTE: The NORMAN network JPA is financed by the contributions of its members (membership fees and members' in-kind contributions), always with a view to maximising synergies between research teams in the field of contaminants of emerging concern (CECs).

Exceptional income of € 20,000 will be provided by the ICPDR to the NORMAN Association in 2020, in addition to the contribution already provided by ICPDR in 2019 as a contribution in support of NORMAN's participation in the experimental activities of the 4th Joint Danube Survey (JDS4).

The list of approved scientific activities for 2020 is as follows.

Scientific activities

SWB NORMAN Bulletin	**NORMAN Bulletin on Emerging Substances** (7th issue) and collaboration with the journal "Environmental Sciences Europe" (ESEU) (Activity coordinated as in-kind contribution by INERIS valeria.dulio@ineris.fr and CNR-IRSA, Stefano Polesello polesello@irsa.cnr.it, with science notes contributed by various NORMAN members). The NORMAN Bulletin on Emerging Substances addresses various topics, on each of which a NORMAN expert team prepares a note with an overview of the latest scientific findings, gaps and priority research needs. The main objective is to contribute to the maintenance of a "constant scientific watch" and to the wider dissemination of information on recent scientific publications, research projects, etc. in the field of contaminants of emerging concern. The Bulletin is disseminated to environment and health agencies, public authorities managing chemical contaminants, etc., and is made available on the NORMAN website https://www.norman-network.net/?q=NORMAN%20Bulletin . The launch of the call for contributions and publication of the annual issue of the NORMAN Bulletin will take place in March 2020.
NORMAN NDS	**NORMAN Database System** (Activity coordinated by EI, slobodnik@ei.sk) Major activities in 2019 were related to further development, update and curation of the integrated NORMAN Database System (NDS; https://www.norman-network.com/nds/). The NDS consists of 11 modules of which 10 (Suspect List Exchange and SusDat; Chemical Occurrence Data (EMPODAT); Ecotoxicology; Bioassays Monitoring Data; NORMAN MassBank; Digital Sample Freezing Platform (DSFP); Indoor Environment; Passive Sampling; Substance Factsheets; Prioritisation) are already accessible, interlinked and populated with data. The Indoor

	Environment module is currently using only a small test dataset – more datasets will be provided by WG-6 experts in 2020; updated Data Collection Templates were provided by the CWGA-PS in the end of 2019 and will be used for the reprogramming of the Passive Sampling module. Antibiotic Resistance Bacteria/Genes is still under development: the database structure was developed within the H2020 Marie Curie ANSWER project and the first datasets in consolidated DCTs are available for upload. All databases can be searched either individually or starting from the module 'Search All Databases', where the presence of any substance from SusDat in any of the database modules is shown with all existing data.
	
	New datasets were uploaded in 2019 into EMPODAT (Chemical Occurrence Data) Database, Ecotoxicology Database and DSFP, using in the new extended list of NORMAN substances (SusDat, more than 65,000 substances). A major update of the Ecotoxicology database was carried out – ca. 80,000 key studies on 6,000 substances were collected from ecotoxicological databases and literature and uploaded.
	
	In 2018 SusDat contained 40,000 substances; information on the additional 25,000 curated SusDat substances was completed in 2019 with data on Lowest PNECs predicted by QSAR (link to Ecotoxicology Database) and mass spectrometric information (exact masses of adduct ions; predicted/experimental fragments) allowing for direct link with DSFP. NORMAN MassBank was used to extract experimental fragments, which are essential for identification of suspects in DSFP.
	
	The Substance Factsheets module was improved in particular as regards the regular feeding of new data on physico-chemical parameters needed for prioritisation, Product and Use Categories and Chemical Functional Use information from the US EPA Chemical Dashboard (for 25,000 new substances).
	
	Specific exposure and hazard indices were developed by KEMI (Sweden) and they are ready for upload into the database.
	
	It is considered important to pursue this collective effort in gathering data on chemical use categories, classification & labelling (PBT, CMR, ED), Lowest PNECs, hazard properties, exposure indices, etc.
	
	In 2020 upgrade and maintenance of the NORMAN Database System will be pursued with a specific focus on:
	
	- **General:**
	  o Interlinking all NDS modules, in particular as regards integration of DSFP, Retention Time Index and Substance Curation tools into the NORMAN Database System;
	  o Enhancement of visualisation (maps) and data analysis capabilities (customised queries, batch mode queries using e.g. chemical use categories, chemical functional use information etc.) of NDS.
	- **EMPODAT - Chemical Occurrence Data module:**
	  o Maintenance, upgrading and feeding of new data into the database;
	  o Sharing the data with IPCHEM by downloading and sharing the latest update of the EMPODAT Database (annual basis);
	  o Preparation of JDS4 data for upload into the database;
	  o Testing of data mining tools to extract raw data from IPCHEM, ICES database and other database systems and development of a workflow for their processing in the 'NORMAN format';
	  o Testing of automated quality control tools for identification/removal/flagging of outliers in the collected datasets in EMPODAT.
	- **Passive sampling module:**
	  o Finalisation of Passive Sampling module based on the recommendations by CWGA-PS and filling it up with test datasets including new data from the JDS4.
	- **ARBs/ARGs module:**
	  o Finalisation of ARBs/ARGs module using the database structure developed within the H2020 Marie Curie ANSWER project;
	  o Uploading of data generated within the ANSWER project.
	- **Ecotoxicology module:**
	  o Population of the database with new datasets;

	○ Further upgrade of the functionalities of the database (e.g. Statistics and Export functions; new option of saving derived PNECs by individual experts as a unique PDF file usable for official presentation at the national scale). - **NORMAN Suspect List Exchange (SLE):** ○ Continuous addition of new lists with archiving on Zenodo to obtain DOIs and connections to the CompTox Chemicals Dashboard and PubChem, potentially including metadata import. ○ Record of substance sources being contributed to SusDat (*c*. 80,000 new substances in the pipeline); ○ Enhanced functionality in non-target methods (e.g. via MetFrag). - **SusDat:** ○ Continuous upgrade and maintenance of SusDat (c. 80,000 new substances in the pipeline); ○ Continuous upgrade of all Data Collection Templates (DCT) for an extended list of NORMAN substances (SusDat), drop-down lists and definitions of obligatory parameters. - **Substance Factsheets:** ○ Upgrade of Substance Factsheets module – pursue collection of all data needed for the implementation of the NORMAN prioritisation framework. ○ Automated calculation of exposure, hazard and risk score based on the information available in NDS. - **Prioritisation module:** ○ Implementation/ programming of automated 'Prioritisation module' based on the newly developed prioritisation scheme by WG-1 combining information available on target and non-target screening (semi-quantified) substances (see Prioritisation WG-1); ○ Update of the Prioritisation results module – visualisation of the results from prioritisation case studies (e.g. update of the Watch List 2019) applying the NORMAN prioritisation scheme as a reference. - **Digital Sample Freezing Platform (DSFP):** ○ Continuous maintenance and upgrading of DSFP; ○ Upload of new data, including those from the JDS4; ○ Further development and testing of the semi-quantification module; ○ Development and testing of the GC-HR-MS (EI and APCI) modules with new datasets from the JDS4. - **Implementation of GDPR requirements in NDS.**
NORMAN MassBank and RMassBank	**NORMAN MassBank and RMassBank (**Activity coordinated by UFZ tobias.schulze@ufz.de and LCSB - Luxembourg emma.schymanski@uni.lu**)** The NORMAN MassBank / RMassBank is part of the NDS and fully interlinked with the other modules, under the supervision of UFZ and LCSB and in consultation with IPB Halle (Germany). In 2020 the continuous development and upgrade of NORMAN MassBank and RMassBank will be pursued with a focus on: - Uploading mass spectra to MassBank (UFZ, Eawag, LCSB and all NORMAN members willing to contribute) - Further development and curation of RMassBank and related products (e.g. Shinyscreen) - Further development of MassBank server platform (e.g. database and applications programming interface, curation of records, import and export of records, standardisation of curation rules) - Fostering integration of MassBank with other mass spectral and metadata platforms (e.g. MoNA, ChemSpider, StoffIdent, US EPA CompTox, NORMAN SusDat, PubChem) - Fostering discussion with vendors for better integration of vendors' software with MassBank - Improving usability of MassBank in vendors' software (e.g. via NIST libraries) - Establishment of a chemicals exchange platform to share neat standards for creation of MassBank records and confirmation of identified compounds - Integration of RTI records from RTI tool developed by UoA - Making MassBank FAIR.

NormanSchemas – controlled NORMAN vocabulary	**NormanSchemas – controlled NORMAN vocabulary** (Leader: UFZ tobias.schulze@ufz.de) The goal of this action is to provide a general NORMAN ontology and to harmonise the NORMAN vocabulary with existing schemas in order to improve interoperability with other service providers. This action could be the starting point of a modernised data submission scheme beyond spreadsheets (e.g. XML or JSON format etc.). In modern data science, the controlled vocabulary for the generation of data fields is provided in so called schemas or ontologies. In life sciences, many ontologies do already exist, while in environmental sciences they are lacking. Actions in 2020 and beyond: - Organisation of a 1-day workshop on ontologies in mid-2020; - Harmonisation of NORMAN metadata vocabulary with existing controlled schemas and ontologies in life sciences and regulation (e.g. EBI ontology, Inspire) - Development of a NORMAN ontology / schema based on up-to-date ontology / schemas formats and implementation in NORMAN databases.
WG-1 Prioritisation of emerging substances	**Working Group N°1: Prioritisation of emerging substances** (Activity coordinated by INERIS valeria.dulio@ineris.fr in collaboration with EI slobodnik@ei.sk, alygizakis@ei.sk and UBA peter.vonderohe@uba.de). **Task 1: Support the prioritisation work of DG ENV / JRC (surface water) at European level:** Participation in WG Chemicals meetings and preparation of comments / proposals on behalf of NORMAN WG-1 as part of the prioritisation activities of DG ENV / JRC (e.g. update of the Watch List in 2020, review of the list of Priority Substances) (permanent task). **Task 2: Collection and compilation of compound-specific information in support of prioritisation:** Pursue retrieval of ecotox raw data (REACH portal, UBA's ETOX database, etc.) and existing PNEC /EQS from regulatory sources in support of prioritisation of substances in SusDat. Thanks to the in-silico toxicity model predictions (ToxTrAMS developed by UoA), the full list of substances currently available in SusDat is accompanied by predicted PNECs. For each compound a PNEC value is derived for freshwater, sediment, marine water and biota, using the equilibrium partitioning equation and BCF data. As part of this task, in 2020 eco-toxicological raw data will be compiled and uploaded for about 30 pesticides identified as potential priority substances in small agricultural streams as well as from a number of substance dossiers related to River Basin-Specific Pollutants in Switzerland. **Task 3: Improvement of predicted and experimental data to derive P evaluation:** running of the Janus model (from PROMETEUS project; Pizzo et al., Environmental Research, 151 (2016) 478–492) for all SusDat compounds and derivation of the P criterion for evaluation of the PBMT score. **Task 4**: **Ecotoxicology Database:** promoting and coordinating participation of Ecotox Expert Group to approve Lowest PNEC values for substances of the SusDat list. **Task 5: Finalise the review of the prioritisation methodology including use of NTS data for prioritisation:** a) validation of Identification Proof score and semi-quantification approach already presented in WG-1 meeting 2019; b) organisation of one WG-1 meeting; c) Implementation in DSFP and in NORMAN Prioritisation methodology document; d) Start programming of prioritisation algorithm using target (EMPODAT) and suspect / non-target screening data (DSFP). **Task 6: Testing the prioritisation system in 5 case studies**: a) EU WL; b) Danube RBSP using wide-scope target and suspect screening on JDS4 data; c) Black Sea specific pollutants using EMBLAS data in DSFP; CECs in top predators and their prey on APEX project data; prioritisation of SusDat chemicals for acquisition of standards and MS/(MS) information. It is planned to organise one meeting of the Prioritisation WG-1 in spring 2020.

WG-2 Bioassays	**Working Group N°2: The value of bioassays and biomarkers in water quality monitoring programmes** (Activity coordinated by Goethe University Frankfurt Hollert@bio.uni-frankfurt.de). **Task 1: Needs and Requirements for a NORMAN Bioactivity Database** (Leader: KWR Water Research Institute Milou.Dingemans@kwrwater.nl and VU timo.hamers@vu.nl). Mixture toxicity modelling can be used to assess the contribution of detected chemicals to the observed effect (Hamers et al. 2018; Neale et al. 2017). In many cases, however, the lack of effect data for the detected micropollutants in the different assays is a major limitation and more data is needed for a significant improvement of mixture modelling. The objective of this activity is the development of a NORMAN bioactivity database for individual water-relevant chemicals to support the interpretation of effect-based monitoring data and potentially reveal CEC-induced bioassay activity that cannot be explained by measured concentrations of known individual chemicals. The bioactivity database will be developed as a new module of the existing NORMAN Database System linked with the Bioassays Monitoring Database (https://www.norman-network.com/nds/bioassay/) in which effect-based water quality monitoring data is collected. Activities in 2020: 1) Development of questionnaire for NORMAN members and in particular WG-2 and WG-3 experts; 2) Establishing database needs and requirements; 3) Design of a proof-of-concept database, populated with a critical amount of existing data (e.g. P. Neale et al. 2017). As regards the design of the database, EI will provide the necessary IT support for the development of this module; 5) Brief project outcome report and planning of next steps. **Task 2: Development of *in vivo* workflows to support explorative EDA studies - solving bottlenecks using *Danio rerio* embryos** (Leader: Goethe University Frankfurt Hollert@bio.uni-frankfurt.de and UFZ riccardo.massei@ufz.de). *Background*: In recent years, several studies have confirmed an increasing interest in enhancing the application of *in vivo* tools for EDA studies. As a matter of fact, *in vivo* tools have higher ecological relevance than *in vitro* assays, which makes them crucial for effective environmental monitoring. However, high-throughput screening, low sample consumption and high sensitivity for a specific toxicological endpoint are characteristics that are not met by the majority of existing *in vivo* tools. In this context, the fish embryo toxicity test (FET) with *Danio rerio* may be considered an important bioassay and a promising organism for improving the EDA *in vivo* approach (Legler J. et al., 2011, doi: 10.1021/es201099s. Epub 2011 Sep 12; Fetter E. et al., 2014, doi: 10.1016/j.aquatox.2014.05.016. Epub 2014 May 19; Di Paolo C. et al., Environmental Sciences Europe 2015; 27: 8.). In fact, the standard FET assay with *Danio rerio* proposed in the OECD 236 standard can be easily modified according to the scientific needs without losing its environmental relevance. Moreover, the FET assay with *Danio rerio* can reveal in one single experiment acute and sub-lethal effects as well as chronic and delayed toxicity. *Objectives*: The objective of this activity is to improve the application of *in vivo* bioassays in EDA studies for effective environmental monitoring. It is in the interest of the NORMAN network and NORMAN WGs to improve the identification and prioritisation of CECs in the freshwater environment. In this context, the task will aim to develop innovative tools and improve existing biotesting workflows using *Danio rerio* embryos for the analysis of environmental samples. The work will be performed as part of the research project of two master students. Experiments will be performed with chemical standards to test the efficiency of the workflow for specific modes of action (i.e. neurotoxicity, teratogenicity, cardiotoxicity) and, potentially, an explorative EDA study will be conducted as a proof of concept. The study is planned as a proof-of-concept and as a basis for further discussions on this topic within the entire WG-2 / WG-3. During a joint workshop (see below) the strategy will be presented and optimised on the basis of feedback from WG-2 / WG-3. Outcomes expected in 2020: - Concrete improvements of the existing *in vivo* EDA workflows for the prioritisation and identification of emerging compounds in different environmental matrices. In particular, effort will be made to fine-tune different steps such as sample preparation, exposure conditions and final volume of the exposure media for *in vivo* biotesting using standard chemicals;

	- Provide suggestions and guidelines for high-throughput *in vivo* screening in the context of an explorative EDA study; - Development of new biotesting strategies which may also be applied to other model organisms, beyond *Danio rerio* embryos; - An active collaboration and exchange of ideas among WG-2 and WG-3 with a view to streamlining traditional *in vivo* assays with novel EDA techniques, for high-throughput chemical and bioanalytical analysis of chemical toxicity; - Important contribution towards the integration of EBMs into the monitoring of the WFD and high visibility of the NORMAN network to the International Commission for the Protection of the Danube River (ICPDR) and strengthening the network; - Reporting the developed strategy and data evaluation to WG-2 meeting and NORMAN 2020 General Assembly meeting; - Final results and common paper are expected by the end of 2020. **Task 3: Support the work of the Commission (EBM – CIS WFD Activity)** (Leader: Goethe University Frankfurt Hollert@bio.uni-frankfurt.de) The final version of the Commission report (Proposal for Effect-Based Monitoring and Assessment in the Water Framework Directive) was approved by the SCG (Strategic Coordination Group) of the WFD. The report gives clear recommendations for the possible use of EBMs in different contexts and scenarios, and a chapter is dedicated to the battery of bioassays proposed by NORMAN and developed in collaboration with the SOLUTIONS project. Further to the outcomes of the EBM workshop "Effect-based monitoring under the WFD, Opportunities, Challenges and Needs" (14–15 November 2019, Utrecht, The Netherlands) the development of assessment criteria for bioassays and the drafting of guidance for the derivation of trigger values for application of bioassays were identified as short-term priority actions. Members of the WG Chemicals were invited to provide concrete suggestions to the Commission on follow-up actions, including the preparation of a TGD (Technical Guidance Document) on establishing trigger values. In this context the work carried out within NORMAN and SOLUTIONS (B. Escher et al., Sci Total Environ. 2018 Jul 1; 628-629:748-765. doi: 10.1016/j.scitotenv.2018.01.340) is highly relevant. In 2020 NORMAN WG-2 will continue its activities in support of the EBM – CIS WFD Activity with a particular focus on the aspects related to the derivation of trigger values to support implementation of effect-based methods in the WFD (TGD drafting, according to the plans of the Commission). **Task 4: Follow-up of activities started in 2019** The work of WG-2 Bioassays in 2020 will also cover the following actions already started in 2019: - Finalise report (NORMAN internal use) about the CT on **Bioassays for the evaluation of neuroactive and neurotoxic emerging pollutants** and write a joint manuscript on the results of the ILS, with a view to the integration of neurotoxicity as an emerging mode of action (MOA) in a battery of EBMs relevant for water quality monitoring (Leader: Goethe University Frankfurt Hollert@bio.uni-frankfurt.de) - Peer-reviewed publication on the results of the **NORMAN Genotoxicity ILS** (Leader: KWR Water Research Institute Milou.Dingemans@kwrwater.nl) It is planned that Goethe University Frankfurt will organise a wide-scope WG-2 meeting to discuss the outcomes of the last JPAs in a broader context, the status of the implementation of EBMs into the WFD, emerging topics related to EBMs and the future strategy and activities of WG-2. Most likely the meeting will take place in Frankfurt, back-to-back to the workshop to be organised by UFZ and VU on "integrated chemical and bioanalytical approaches to identify toxicity drivers in multiple media".
WG-3 Effect-directed analysis	**Working Group N°3: Effect-directed analysis for hazardous pollutant identification** (Activity coordinated by UFZ werner.brack@ufz.de and VU marja.lamoree@vu.nl).

	Task 1: Workshop on integrated chemical and bioanalytical approaches to identify toxicity drivers in multiple media (Activity coordinated by UFZ werner.brack@ufz.de and VU marja.lamoree@vu.nl) Monitoring, assessment and prioritisation of emerging pollutants and mixtures thereof rely heavily on smart combinations of chemical and bioanalytical tools which are relevant for many NORMAN working groups, including WG1, WG2, WG5 and WG6 as well as Cross-Working Groups on passive sampling and non-target screening. All these WGs are very powerful in their specific domain. However, we believe that further interaction and the development of common strategies for toxicity driver identification in different matrices from water and reused water to house dust, and the consideration of the results in prioritisation, could further strengthen the work and consistency in the NORMAN WGs and in the whole network. The objective is to organise a workshop on toxicity driver identification and compound/mixture prioritisation in different matrices involving all relevant WGs and the cross-WGs on passive sampling and NTS. Contributions from these WGs will be particularly welcome, complemented by a few external speakers. These contributions should focus on classical EDA approaches, multivariate statistical tools to identify candidate drivers (virtual EDA) and mass balance approaches (e.g. TU). In addition to these presentations, the workshop will have at least half a day of group discussions for identification of knowledge gaps and defining cross-WG future activities to fill these gaps. The workshop is planned to take place in October 2020 (date to be defined) in Frankfurt, Germany. Expected outcomes: - Cross-WG workshop (autumn 2020, expected 50 to 60 participants) enhancing mutual understanding of requirements, achievements and ongoing activities - List of planned cross-WG JPAs as an input for NORMAN GA 2021 - Common position paper to be published in 2021.
WG-4 Nano- and micro-scale particulate contaminants	**Working Group N°4: Nano- and micro-scale particulate contaminants** (Activity coordinated by Eawag – Ralf.Kaegi@eawag.ch and NIVA Bert.vanBavel@niva.no **Task 1: Microplastics analytical development exercises** (Leader: QUASIMEME www.quasimeme.org; wim.cofino@wur.nl and NIVA Bert.vanBavel@niva.no Vrije Universiteit Amsterdam heather.leslie@vu.nl) In the framework of the collaboration between NORMAN, QUASIMEME, the Vrije Universiteit Amsterdam and NIVA, the second round of the ILS on microplastics, a 2nd round of the ILS (including exercises with analysis of microplastics in more complex environmental samples as well as in tablets). Round 1 of the ILS consisted of a development exercise with a set of 12 different test samples sent to 34 registered participant laboratories for microplastics analysis. The first round was successfully completed with a final report in November 2019. One of the aims of the 2nd round is a further strengthening of the analytical capacity of laboratories tackling microplastics, answering the need of laboratories working on analytical quality control of their microplastics analyses. This initiative is dedicated to the development and collaborative improvement of microplastic analytical proficiencies, involving a large number of laboratories worldwide working towards common analytical goals. More info: https://science.vu.nl/en/research/environment-and-health/projects/microplastics-ws-and-ils/index.aspx
WG-5 Water reuse and policy support	**Working Group N°5: Water reuse and policy support** (Activity coordinated by DERAC, France genevieve.deviller@derac.eu in collaboration with LTU, Sweden lian.lundy@ltu.se). In 2020 the chair and co-chair of Working Group 5 will be taken over by DERAC, France (Geneviève Deviller) and LTU, Sweden (Lian Lundy). Directly building on the success of the original WG-5, the work will focus on risk assessment of contaminants in reused water.

	A WG meeting will be organised as a satellite meeting at EU SETAC conference (Dublin, 3–7 May 2020) to update the mandate of the WG, establish the list of participants and agree on the priority collaborative activities to be promoted by the Working Group. Outline suggestions include: - Identification and prioritisation of contaminants in waters intended for reuse including antibiotic resistance determinants, transformation products and nano / micro scale particulate contaminants; - Removal performance of treatment technologies (including natural-based solutions); - Conducting studies on the contaminants fate and behaviour in soil including degradation, uptake by crops and bioaccumulation through the terrestrial trophic chains; - Conducting studies on contaminant toxicity in soil, including mixtures present in reused waters; - Developing human and environmental exposure scenarios for water reuses to model the concentration of contaminants in soil resulting from this use; - Assessing available data sets against relevance and reliability criteria established for use within chemical and water regulatory frameworks; - Developing best-practice advice / scientific development updates in a format that is useful and usable by practitioners and their dissemination to decision-makers. Links with all the other WGs and in particular the newly set up Terrestrial environment WG and the Prioritisation WG are envisaged.
WG-6 **Emerging contaminants in the indoor environment**	**Working Group N°6: Emerging contaminants in the indoor environment** (Activity coordinated by NILU Pernilla.Bohlin.Nizzetto@nilu.no in collaboration with VU pim.leonards@vu.nl and University of Antwerp adrian.covaci@uantwerpen.be). **Task 1: 2nd NORMAN collaborative trial on "Non-target and suspect screening methods for organic substances in European indoor dust"** (Leader: Umeå University peter.haglund@chem.umu.se) This Collaborative Trial is organised by Umeå University in collaboration with NILU (Norway), Antwerp University (Belgium), Vrije Universiteit Amsterdam (The Netherlands) and Environmental Institute (Slovakia). The aim of this 2nd NTS CT in European indoor dust is to draw from the experiences gained and the database generated in the 1st round to improve the performance of European laboratories in performing exhaustive and reliable non-target and suspect screening on indoor dust, using the GC-MS and LC-HR-MS(MS) methodologies available in participating laboratories. The sampling operations started in 2019. The activities in 2020 will focus on: - Organisation of a preparatory meeting / training workshop (which will take place at Free University, Amsterdam 31 March – 1 April 2020); - Harmonisation of non-target and suspect screening methods for organic substances in indoor dust; - Reporting and preliminary data evaluation (overview of the results presented at the NORMAN General Assembly meeting: end of 2020); - Production of the final report and joint manuscript – planned for 2021. **Task 2: Geographical distribution of organic substances in European indoor dust** (Leader: Umeå University peter.haglund@chem.umu.se) The collaborative trial on non-target and suspect screening methods for organic substances in European indoor dust will lead to the collection of indoor dust samples from residential and public locations in 19 countries in Europe. Each country will cover about five to ten locations; in total about 100–200 samples are expected. One portion of each sample will be taken for the pooled sample to be used in the CT (see Task 1) while the remains of a selection of the individual samples will be used for target/suspect analysis in order to gather information about the geographical distribution of organic substances in European indoor dust.

	- The individual samples will be analysed at volunteering WG-6 laboratories in 2020–2021 (UmU, NILU, VU, UoA etc); - Metadata of individual samples will be collected using the Indoor Data Collection Template (DCT) of the NORMAN Indoor Environment Database; - Data will be stored in the database together with appropriate metadata (UmU and NILU in collaboration with EI); - Data will be evaluated (UmU and NILU in collaboration with EI, UoA and VU); - Preparation of scientific publication(s) – UmU and NILU in close collaboration with participant laboratories. Added value: Interest at Commission level (ECHA, WHO etc.) **Task 3: Follow-up of activities started in 2019** The work of WG-6 Indoor Environment in 2020 will also cover the following actions: - Continue testing of the indoor DCT (including data from passive sampling) by collection and uploading of indoor data in the NORMAN Indoor Environment Database; a part of the second WG-6 meeting in 2020 will be dedicated to joint uploading of indoor data in the database. - Finalise the comparison study of dust sampling methods for CECs (first planned in JPA 2018). Two WG-6 meetings are planned for 2020. The first one will be held in connection with the training workshop for Task 1 at Free University in Amsterdam, April 1st after lunch. The second meeting will be held in the autumn 2020, date and place to be decided at the first meeting.
Non-target screening Cross-Working Group Activity (CWG-NTS)	**CWG-NTS: Cross-Working Group Activity on Non-target screening** (Activity coordinated by Eawag juliane.hollender@eawag.ch in collaboration with EI slobodnik@ei.sk, University of Athens Nikolaos Thomaidis, ntho@chem.uoa.gr, LCSB - Luxembourg emma.schymanski@uni.lu , UFZ tobias.schulze@ufz.de and NIVA kevin.thomas@niva.no). The following actions will be carried out as part of the CWG-NTS Activity in 2020: - NORMAN Suspect Lists Exchange and associated "SusDat" database: Database development and maintenance (EI, UoA and LCSB,) (see "Suspect List Exchange and SusDat"); - 2nd round of the NORMAN network Early Warning System initiative (NormaNEWS2) (NIVA, UoA) (see "NormaNEWS2"); - NORMAN MassBank - Continuous development and upgrade (UFZ, LCSB and IPB Halle) (see "NORMAN MassBank"); - Digital Sample Freezing Platform (EI) (see "Databases – NORMAN DSFP"); - NORMAN Non-target screening guidance paper (UFZ) (see "NTS Guidance document"); - Collaborative trial on (semi-)quantitative non-targeted analysis with LC/ESI/HRMS (Stockholm University and UoA) (see "CT NTS semi-quantification"); - Open chemical data to extend the amount of available information for relevant substances in SusDat, especially as regards MS/MS spectra (see "Open Chemical data"); - Explore the current application domain of NTS methodologies, aiming to specifically address the existing gaps on highly hydrophilic contaminants and hydrophobic compounds (see "Expanding and validating the chemical domain of current NTS methodologies"); - Target / suspect screening of indoor dust samples to investigate the geographical distribution of organic substances in European indoor dust (see "WG-6 Task 2"); - ILS on Impact of deconvolution and library search algorithms for non-target analysis based on a passive sampling approach for non-target analysis screening of polar substances (NIVA) (see "ILS NTS on Impact of deconvolution for NTS"); - ILS on suspect screening in biota: application of a wide-scope suspect screening to compare sample preparation techniques for suspect screening workflows (SLU) (see "ILS NTS biota"); - ILS on non-target screening and suspect screening methods for organic substances in European indoor dust (Umea University) (see "ILS-NTS Dust"); - NTS of CECs in polar regions (EI and UBA) (see "CECs in polar regions"); first four samples from Antarctica were already obtained and analysed in 2019, a list of additional 16 samples

	from both Arctic areas and Antarctica was compiled and their analysis is expected to be completed by April – May 2020; - Investigate the aspects associated with the presence of CECs in aquatic plants (non-target and target screening of plant tissues, full plants such as Lemna sp., etc. and/or plant organs such as P. Australis) with focus on sample and extracts preparation, as an additional topic to be considered within the scope of CWG-NTS (links with on-going research activities on the use of surface-flow wetlands for treated wastewater and stormwater) (University of Lorraine Marie-Noelle.Pons@univ-lorraine.fr).
Passive Sampling Cross-Working Group Activity (CWG-PS)	**CWG-PS - Passive Sampling Cross-Working Group Activity** (Activity coordinated by NIVA Ian.Allan@niva.no and INRAE cecile.miege@inrae.fr). **Task 1: Passive Sampling – Biota Workshop** The application of PS alongside biota monitoring has demonstrated how PS can be used to further our understanding of bioaccumulation. However, this information has not fully reached authorities in charge of monitoring programmes in Europe. The aim is to organise a PS-Biota workshop back-to-back to one of the meetings to be organised as part of the activities of the CIS WFD WG Chemicals/DG Environment. A CIS WFD workshop is planned to take place in Romania in 2020. The proposal of CWG-PS is to organise a session, as part of this workshop, to address the following points: - Proposal on how to implement passive sampling into WFD monitoring; - Presentations of case studies of passive sampling and biota monitoring conducted alongside; - Presentations from members of the WG chemicals. It is also planned to put together data from the PS-biota studies identified above in a position paper to be published late 2020–2021 (publication of a viewpoint). **Task 2: Follow-up of activities started in 2019** The work of PS CWG Indoor Environment in 2020 will also cover the following actions: - Finalisation of the **Analytical and bioanalytical assessments of organic micropollutants in the Danube River using a combination of passive sampling, bioassays and non-target screening**: Demonstrating the NORMAN methodology for monitoring purposes in Joint Danube Survey JDS4 (Leader: RECETOX vrana@recetox.muni.cz) (see Proof-of-concept passive sampling JDS4); - Finalisation of **ILS on Impact of deconvolution and library search algorithms for non-target analysis based on a passive sampling approach for non-target screening of polar substances** (Leader: NIVA, saer.samanipour@niva.no and ian.allan@niva.no) (see ILS – NTS data treatment). Continuation of the CT already started under JPA 2019 on NTS analysis of PS exposed at a drinking water treatment plant area. Passive sampling for polar substances was undertaken prior to (river water) and post treatment (before distribution). Extracts from two exposure times were distributed to the participants. Data will be ready early 2020. In 2020 two workshops will be organised in order to bring participants of three working groups to meet and discuss progress with data interpretation. The three working groups will focus on (i) identification of chemicals/features before and after drinking water treatment, (ii) the most effective suspect screening workflow and (iii) the usefulness of passive sampling coupled with NTS for the water monitoring. One of the 2 meetings will be organised during the SETAC Europe conference in Dublin in May 2020. The second one will take place during Autumn 2020 (timing dependent on progress with the data).
CWG-NTS: NORMAN Suspect List	**NORMAN Suspect List Exchange** (Leader: LCSB, Luxembourg emma.schymanski@uni.lu) and **SusDat** (Leader: EI slobodnik@ei.sk and Nikiforos Alygizakis alygizakis@ei.sk in collaboration with UoA Nikolaos Thomaidis ntho@chem.uoa.gr and Reza Aalizadeh raalizadeh@chem.uoa.gr)

Exchange and SusDat	**Suspect List Exchange (**LCSB, Luxembourg emma.schymanski@uni.lu) The Suspect Lists Exchange initiative and the compiled Suspect List "SusDat" represent today the cornerstone/data basis for all NORMAN databases and prioritisation efforts in NORMAN. The Suspect List Exchange activity will be pursued without additional resources being requested at this stage, so that efforts can be concentrated on developing a sustainable SusDat. In 2020, efforts for continuous development and upgrade of SLE will be pursued with a focus on: - Addition of new lists when they become available; - Progressive registration of prioritised compounds in lists not present in the CompTox Dashboard - Import of NORMAN-SLE into PubChem (https://pubchem.ncbi.nlm.nih.gov/source/23819) being automated; continued discussions on import of additional metadata; - Development of new strategies to deal with UVCBs; - Further development of strategies to deal with tentative/unknown/related structures; - Publication(s) on methods and software behind Suspect Lists Exchange; - Archiving of all datasets on Zenodo (https://zenodo.org/communities/norman-sle); - Open software/packages/approaches for curation/merging once appropriate. **Suspect List Exchange Database - SusDat** (EI slobodnik@ei.sk and alygizakis@ei.sk) In 2019 additional contributions to the Suspect List Exchange (https://www.norman-network.com/nds/SLE/) were integrated into SusDat (https://www.norman-network.com/nds/susdat/) which today contains more than 65,000 substances. SusDat is now fully integrated in the NORMAN Database System (https://www.norman-network.com/nds/). The primary function of SusDat is to provide unique identifiers for substances and their transformation products throughout the various NDS modules and provide information for suspect screening in HR-MS chromatograms uploaded into the NORMAN Digital Sample Freezing Platform (DSFP). Assigning correct names, CAS No., InChIKeys, SMILES etc. was performed in close cooperation with the US EPA CompTox Chemicals Dashboard team (https://comptox.epa.gov/dashboard) and later on in 2019 with PubChem. In order to facilitate use of SusDat in DSFP, a Retention Time Index (RTI) was assigned to all substances by UoA, and mass spectrometric information (exact mass of adduct ions and fragments) was added by EI. Experimentally-obtained fragments by NORMAN MassBank (http://massbank.eu/MassBank/) were used as the primary information. More than 80,000 substances are on the waiting list to be curated and uploaded into the Suspect List Exchange and SusDat. Additional support in 2020 will be essential to further develop the Suspect Lists Exchange and SusDat in a way that will support all the NORMAN efforts. In particular the following tasks are planned for 2020: - Suspect List Exchange website maintenance and update; - Addition of new lists in Suspect List Exchange website when they become available; - Update of SusDat with combined list of all suspects with MS-ready forms from individual lists; - Further development of SusDat functionalities (e.g. batch mode queries based on chemical use categories, chemical functional use etc.); - Implementation of auto-curation tool developed by UoA and testing ability for users to add their own lists; Publication(s) on methods and software behind Suspect List Exchange and SusDat.
CWG-NTS – NormaNEWS2 and retrospective screening	**NormaNEWS and retrospective screening** (Leader: NIVA kevin.thomas@niva.no; saer.samanipour@niva.no in collaboration with EI Nikiforos Alygizakis alygizakis@ei.sk and UoA, Nikolaos Thomaidis ntho@chem.uoa.gr) (continuation of activity started in 2019). The concept of NormaNEWS is that when one group identifies a new contaminant of emerging concern, identification criteria are sent to other members of the group who use retrospective analysis techniques to check their own samples. This way it is possible to rapidly establish the occurrence of newly identified compounds of emerging concern across Europe and beyond (thereby contributing to identification of future priority contaminants).

	Further to the 1st round of NormaNEWS in 2016 a 2nd NormaNEWS exercise was launched in 2019 (postponed, initially planned to take place in 2018), including a broader range of matrices, and significantly increase temporal and spatial coverage. The exercise is currently under way, (submission of raw data and results is open until end of February 2020.
CWG-NTS – NTS Guidance document	**NORMAN Non-target screening guidance paper** (Leader: UFZ, martin.krauss@ufz.de) (continuation of activity started in 2019) *Background:* Non-target screening (NTS) using LC-HRMS for the monitoring of aquatic environments within the research community has seen rapid development over the last decade. A considerable number of different analytical and instrumental approaches and data processing workflows have been developed. Its high potential has raised the interest of authorities at different levels in applying NTS in monitoring, prioritisation of compounds and assessment of treatment technologies within regulatory frameworks. To address this interest NORMAN organised a workshop in 2018 specifically addressed to stakeholders: "Non-target screening for regulators: How can non-target screening techniques support environmental monitoring and chemicals management?". Various regulatory bodies repeatedly expressed the need for guidance on a "best practice" document for setting up and running NTS, and harmonisation of approaches as a condition to apply them on a routine basis within their respective frameworks. *Objective:* The overall goal of this action is to provide a guidance document on NTS with a focus on the needs of regulators and policy-makers. The final document should be ready by the end of 2020, with a publication in an open-access and peer-reviewed journal. Further to agreement on the outline and distribution of tasks during 2020, the guidance document should be written by the partners and finalised by the next GA. If necessary, a 2-day workshop among the lead authors will be organised to harmonise and discuss critical issues.
CWG NTS - Open chemical data	**CWG NTS - Open chemical data** (Leader: NORMAN Steering Committee members: Eawag, UBA, INERIS, NILU, NIVA, EI/WRI, ALTERRA /Wageningen) Further to the workshop on NTS for regulators organised by NORMAN in October 2018, NORMAN members expressed the need to extend the amount of available information for relevant substances in SusDat, especially as regards MS/MS spectra. To meet these requirements, the following tasks will be launched in 2020: - Prioritisation of SusDat Chemicals (e.g. 50) for which more information will be gathered (standards or MS(MS) information); - Contacts with NORMAN members, commercial vendors, and the chemical industry to obtain analytical information or standards from industry for the prioritised chemicals; - Acquisition of available MS/MS spectra or standards of prioritised chemicals and uploading to MassBank; - Contact with ECHA, other stakeholders in the EU, and the chemical industry to seek ways to make analytical information in general more easily accessible for monitoring purposes; - Set-up of an exchange platform for standards among NORMAN members (pinboard or other solutions will be discussed).
CWG-NTS – CT NTS semi-quantification	**CWG NTS - Collaborative trial on (semi-)quantitative non-targeted analysis with LC/ESI/HRMS** (Leader: Stockholm University, Anneli Kruve anneli.kruve@su.se ; University of Athens, Nikolaos Thomaidis ntho@chem.uoa.gr) New methods for (semi-)quantification of the tentatively identified compounds are emerging both inside and outside NORMAN non-targeted community. However, the validity of the methods remains ambiguous. A possibility to overcome and speed up the development of (semi-) quantification approaches is to provide a common ground for testing the developed approaches via a collaborative trial. The aim of this collaborative trial is to compare the existing strategies for semi-quantification. In order to reach these goal, 5 steps will be taken: - Preparing a guideline of existing semi-quantification methods and holding a webinar to introduce and train labs about these methods (Jan.-Mar. 2020). - Preparation of the samples. Blank water extracts will be prepared and spiked with 60 compounds of diverse chemical properties. The following samples will be distributed: blank

	water extract, spiked water extract (~60 compounds), and a standard mixture of ~30 compounds. Together with the samples, we will distribute the list of the compounds present in the samples and for which the quantitative results are expected to be submitted (end of May 2020) - Analysis of the samples (until end of October 2020) - Analysis of the results of the interlaboratory comparison (Winter 2020 – 2021) - Based on the measurement results from the CT, compile a freely available electronically frozen dataset that can be used for benchmarking of the algorithms emerging after the CT. The results will be published in a peer-reviewed journal. (Spring 2021).
CWG NTS - Expanding and validating the chemical domain of NTS methodologies	**CWG NTS - Expanding and validating the chemical domain of current non-target screening methodologies** (Leader: University of Athens, Nikolaos Thomaidis ntho@chem.uoa.gr and UFZ, Martin Krauss, martin.krauss@ufz.de) *Background*: There are no systematic approaches to describe the chemical domain covered by a particular NTS workflow or method. This activity aims to explore the current application domain of NTS, aiming to specifically address the existing gaps on highly hydrophilic contaminants and hydrophobic compounds not covered by RPLC-ESI, through HILIC and GC-APCI separations coupled to HRMS, respectively. The assignment of compound (property) domains for individual method steps and whole workflows is a new and urgently needed concept to judge the coverage of different NTS methods. Based on the evaluation of extraction efficiency, chromatographic separation and ionisation type of known compounds in the existing methods, the applicability domain of each technique will be demonstrated for the detection of "known" unknown compounds with specific physico-chemical properties. *Actions in 2020* will address: - Development of a guideline to address the analytical gaps for various chemical classes; - Development of a scheme with possible correlation of physico-chemical properties of compounds and preferable analytical platform.
WG on Modelling	**Set-up of a new WG on Modelling – Understanding the Drivers – Pressures – State chain for large groups of emerging chemicals** (Activity coordinated by Deltares Jos.vanGils@deltares.nl) Proposal for setting up of a new Working Group with a focus on exchanging and analysing data that could help unravel the DPS chain. Water quality data are typically only used for water quality objective compliance checks or prioritisation exercises (using toxicity data and models). Linking concentrations to emissions, and tracing emissions back to economic activities, is possible but hampered by relatively large inaccuracies. Questions to be addressed include: - How do concentrations measured in specific compartments (WWTP influents and effluents, urban storm water, shallow ground water) relate to concentrations in receiving waters? Is this picture consistent across seasons and sites? - Can we link that to information available about use types (qualitatively) and use volumes (quantitatively) for larger groups of substances on one hand, and substance properties on the other hand? - Can we derive algorithms and data sources that allow extrapolation to large numbers of substances ("big data")? In terms of outcome, the three bullets above need to be tackled sequentially, and each one of them would take at least a year. Proposal 2020: The outcome for 2020 would ideally be an answer to the first question, compiled in a manuscript. This should be achieved by a short meeting in early 2020 by a core group of interested parties (3–4) to shape the activity, back-to-back to another NORMAN event or back-to-back to SETAC. This would then enable a dedicated workshop that we envision organising in Delft under the umbrella of the International Delft Software Days (in November 2020).
WG on CECs in the terrestrial environment	**NORMAN Cross-Working Group on Contaminants of Emerging Concern (CECs) in the terrestrial environment** (Activity coordinated by NILU Dorte Herzke dhe@nilu.no and Wageningen University and Research winnie.vanvark@wur.nl ; Ivo Roessink ivo.roessink@wur.nl)

	Background: In the light of the missions of the NORMAN network and the need to ensure a more holistic view of emerging risks associated with chemicals in the environment, the topic of CECs in soils and in the terrestrial environment in general is of high interest to NORMAN and is currently insufficiently studied. At the GA meeting in November 2019 it was therefore proposed to create a new WG to extend NORMAN's activities to soil and terrestrial compartments. Although initiated independently of NORMAN and this working group, there are two on-going actions which fit well into this initiative: a) the ILS on "Determination of Pesticides in Agricultural Soil 2019" (PT – PAS – 1), conducted by the Central Institute for Supervising and Testing in Agriculture in Brno and b) the ILS of PFAS in soils, organised by WEPAL/Quasimeme, Wageningen University and Research. Both studies will be conducted in the first half of 2020 regardless of the plan of actions of this new WG, but the results would help to shape further actions within this new NORMAN WG. In addition, the new WG may benefit from the ongoing ILS on microplastics that is currently being conducted together with NORMAN (see ILS microplastics, WG-4 Task 1). Monitoring studies on a broad range of pollutants, including bioaccumulative and CECs in the terrestrial environment, are in place in some countries (for example, the national programme on "Environmental pollutants in the terrestrial and urban environment" has been in place in Norway since 2013). But significant gaps still remain, when looking at state-of-the-art monitoring programmes in the aquatic environment. To reduce knowledge gaps, common actions are needed. *Actions in 2020:* In order to support the establishment of the WG as a long-term activity, a workshop is planned in the second half of 2020 (date and place to be decided). The workshop will review the results of the above-mentioned ILS studies, discuss the implications for soil management, consider other CECs that should be investigated as a priority in the terrestrial environment, and transform the findings of the discussions into an outline of the programme of next steps to be taken in connection with on-going projects. The activities under the scope of this new WG could include (to be discussed at the workshop): - Investigate levels of CECs in soil ecosystem, i.e. soil, plants, insects, primary and secondary predators; - Investigate biomagnification and risk potential for CECs, including microplastics; - Investigate potential local sources for regulated contaminants and CECs in densely populated areas; - Evaluate and select best, and preferably non-invasive, sampling strategies (already identified for birds); - Select and potentially develop sampling techniques for passive and active air samplers for CECs; - Assess whether the occurrence levels have any potential effects on environmental and human health (PNEC or QS, as an estimate for risk characterisation, are not available for most terrestrial species); - Recommendations for remediation and prevention actions.
AW-1 Workshop Integrated chemical and bioanalytical approaches	**Workshop on integrated chemical and bioanalytical approaches to identify toxicity drivers in multiple media** (Leader: UFZ werner.brack@ufz.de and VU marja.lamoree@vu.nl) The objective is to organise a workshop on toxicity driver identification and compound/mixture prioritisation in different matrices involving all relevant WGs and the Cross-WGs on passive sampling and NTS. Contributions from these WGs will be particularly welcome, complemented by a few external speakers. These contributions should focus on classical EDA approaches, multivariate statistical tools to identify candidate drivers (virtual EDA) and mass balance approaches (e.g. TU). In addition to these presentations, the workshop will have at least half a day of group discussions for identification of knowledge gaps and defining future cross-WG activities to fill these gaps. The workshop is planned to take place in October 2020 (date to be defined) in Frankfurt, Germany. Expected outcomes: - Cross-WG workshop (autumn 2020, expected 50 to 60 participants) enhancing mutual understanding of requirements, achievements and ongoing activities; - List of planned cross-WG JPAs as an input for NORMAN GA 2021. Common position paper to be published in 2021.

AW-2 Workshop Passive Sampling - Biota	**Passive Sampling – Biota Workshop** (Leader: NIVA Ian.Allan@niva.no and INRAE cecile.miege@inrae.fr) The application of PS alongside biota monitoring has demonstrated how PS can be used to further our understanding of bioaccumulation. However, this information has not fully reached authorities in charge of monitoring programmes in Europe. The aim is to organise a PS-Biota workshop back-to-back to one of the meetings to be organised as part of the activities of the CIS WFD WG Chemicals/DG Environment. A CIS WFD workshop is planned to take place in Romania on 10-11 June 2020. The proposal of CWG-PS is to organise a session, as part of this workshop, to address the following points: - Proposal on how to introduce passive sampling into WFD monitoring; - Presentations of case studies of passive sampling and biota monitoring conducted alongside; - Presentations from members of the WG chemicals. It is also planned to put together data from the PS-biota studies identified above into a position paper to be published late 2020–2021 (publication of a viewpoint).
AW-3 Workshop NTS - Analytical fundamentals – Data analysis – Implementation	**Non-target screening Analytical fundamentals – Data analysis – Implementation** (Leader: University of Copenhagen, Giorgio Tomasi gito@plen.ku.dk and Majbrit Delacruz analyticalchemistry@plen.ku.dk). Organisation of a 2-3 day workshop in Nov 2020 at the University of Copenhagen with invited lectures, oral presentations and poster sessions. Joint activity between Norman network members and partners in Danish Innovation Fund Grand Solutions Projects GANDALF and VANDALF. The workshop will be divided in three sessions. The first one will be dedicated to next generation analytical platforms for NTS, e.g.: HILIC, SFC, ion mobility, 2D GC-MS and 2D LC-MS. The second will focus on data analysis, i.e. workflows for signal processing, chemo-informatics and identification and the challenges related to their high-throughput implementation in an industrial context and at a regulatory level. The third will display examples of implementation in regulation and industry with emphasis on successes and obstacles related to scale and outside-academia operationalisation. E.g. What can commercial products do today? How do regulatory bodies and industrial providers (plan to) prioritise CECs? How do they (plan to) use the information from the chemical fingerprints?
AW-4 Workshop on Ontologies	**Workshop on Ontologies** (Leader: UFZ tobias.schulze@ufz.de**)** Organisation of a 1-day workshop on Ontologies, planned to take place in Leipzig, Germany in mid-2020. The workshop is organised as part of the action “NormanSchemas – controlled NORMAN vocabulary” whose aim is the development of a NORMAN ontology / schema based on up-to-date ontology / schemas formats with a view to harmonisation of the NORMAN vocabulary with existing schemas in order to improve interoperability with other service providers. The final goal of this action is to determine how to improve the features of the NORMAN databases to make them compatible for open data / open source and FAIR principles.
EG-1 Expert Group meeting NTS and eDNA	**Expert Group meeting on NTS and eDNA** (Leader: EI, slobodnik@ei.sk) A large amount of data is generated by NTS and eDNA approaches. The possibility of combining them and searching for a correlation between chemical pollution and biological response was identified as of high interest for many members of the NORMAN network. NTS and eDNA (for benthic invertebrates, fish and diatoms) approaches were systematically tested within the JDS4 in 2019 and unique datasets will become available for further evaluation. The aim is to organise a meeting of interested NORMAN network and DNAquaNet COST Action experts; possibly back-to-back with the DNAquaNet meeting in autumn 2020 to define a programme for evaluation of results from JDS4. Additional NTS&eDNA datasets from the Joint Black Sea Surveys in 2017 and 2019 will be discussed as well.
NTS-CWG: **ILS-NTS biota**	**ILS on suspect screening in biota: Application of wide-scope suspect screening to compare sample preparation techniques for suspect screening workflows** (Leader: SLU,

	lutz.ahrens@slu.se, wiebke.durig@slu.se in collaboration with Stockholm University, jon.benskin@aces.su.se, Umeå University peter.haglund@chem.umu.se, EI alygizakis@ei.sk and University of Athens, Nikolaos Thomaidis ntho@chem.uoa.gr (continuation from JPA 2019) Suspect and non-target investigation of biota samples collected by Environmental Specimen Banks (ESBs) is a topic of growing interest. Within the non-target screening cross-working group (NTS-CWG), Swedish university of Agricultural Sciences (SLU), Stockholm University, Umeå University and Environmental Institute (EI) and University of Athens (UoA) have organised a workshop in 2018 (Uppsala, Sweden) and a collaborative trial (CT) has started in 2019 on suspect and NTS screening workflow approaches in biota. The aims of this CT are to: i) develop harmonised sample preparation protocols in biota, ii) compare results from target, suspect screening, non-target suspect screening workflows, and iii) assess the range of chemicals detectable in fish tissue. The following samples will be studied in this CT: - GC-HRMS: i) Freeze-dried biota from reference and contaminated site, ii) sample extract from reference (non-spiked), reference (spiked) and contaminated site, iii) GC standard-mixture, iv) RI mixture; - LC-HRMS: i) Freeze-dried biota from reference and contaminated site, ii) sample extract from reference (non-spiked), reference (spiked) and contaminated site, iii) GC standard-mixture, iv) RTI mixture. Sample preparation, including homogenisation, spiking of samples, and testing of homogeneity of the samples started in 2019 and the following tasks will be performed in 2020: - February 2020: Preparation of LC extracts (SLU) and GC extracts (UoA) for the CT of biota samples; - March 2020: Send out samples to participants for the CT on biota; - June 2020: Deadline for reporting data; - July-Nov 2020: Data evaluation by SLU, Stockholm University, Umeå University, EI; - Nov 2020: Presentation of CT on biota at NORMAN GA meeting; - April 2021: Workshop on CT on biota (preliminary date). The publication on the results of the CT is expected in 2021.
NTS-CWG and PS CWG: ILS on Impact of deconvolution and library search algorithms for NTS	**ILS on Impact of deconvolution and library search algorithms for non-target analysis based on a passive sampling approach for non-target screening of polar substances** (Leader: NIVA, saer.samanipour@niva.no and Ian.Allan@niva.no) (continuation from JPA 2019) NORMAN has already organised several interlaboratory studies to assess the quality/confidence in the identification of small organic molecules in different matrices (e.g. NormaNEWS). However, one of the steps that has yet to be evaluated is the deconvolution and library search algorithms. The aim of this ILS is to evaluate the effect of each step during the data processing on the outcome of NTS. This project is also focused on streamlining the use of passive sampling in the NTS workflow by demonstrating the advantages to the NTS of using this sampling strategy. The activities in this project is therefore be divided into two parts: passive sampling and NTS. The work has started in 2019. Passive sampling for polar substances was undertaken prior to (river water) and post treatment (before distribution). Extracts from two exposure times were distributed to the participants. Data will be ready early 2020. In 2020 two workshops will be organised in order to bring participants of three working groups to meet and discuss progress with data interpretation. The three working groups will focus on (i) identification of chemicals/features before and after drinking water treatment, (ii) the most effective suspect screening workflow and (iii) the usefulness of passive sampling coupled with NTS for the water monitoring. One of the 2 meetings will be organised during the SETAC Europe conference in Dublin in May 2020. The second one will take place during Autumn 2020 (timing dependent on progress with the data).
NTS-CWG and WG-6 Indoor env:	**ILS on Non-target and suspect screening methods for organic substances in European indoor dust** (Leader: Umeå University peter.haglund@chem.umu.se, NILU Pawel Rostkowski;

ILS NTS Dust	Pernilla Bohlin-Nizzetto; Antwerp University Adrian Covaci; VU Pim Leonards; EI Nikiforos Alygizakis and Peter Oswald) (continuation from JPA 2019) The aim of this 2nd NTS CT on European indoor dust is to draw from the experiences gained and the database generated in the 1st round to improve the performance of European laboratories in performing exhaustive and reliable non-target and suspect screening on indoor dust, using the GC-MS and LC-HR-MS(MS) methodologies available in participating laboratories. The sampling operations started in 2019. The announcement is published on the NORMAN website https://www.norman-network.net/?q=node/27 (registration deadline: 28 February 2020). The activities in 2020 will focus on: - Organisation of a preparatory meeting/ training workshop (which will take place at Free University, Amsterdam 31 March – 1 April 2020); - Harmonisation of non-target and suspect screening methods for organic substances in indoor dust; - Reporting and preliminary data evaluation (overview of the results presented at the NORMAN General Assembly meeting: end of 2020); - The final report and joint manuscript are planned for 2021.
ILS CECs in DW	**Interlaboratory studies on alkylphenols, bisphenol-A, and selected perfluorinated carboxylic and sulfonic acids in drinking water** (Leader: IWW as full in-kind contribution, David Schwesig d.schwesig@iww-online.de) Together with AQS BW, IWW Water Centre will organise interlaboratory studies on these compounds in drinking water, as follows: - An ILS on nonylphenol, octylphenol and bisphenol A is scheduled for spring 2020; - An ILS on selected perfluorinated acids is scheduled for autumn 2020. Parameters will be: perfluorobutanic acid, perfluoropentanic acid, perfluorohexanoic acid, perfluoroheptanoic acid, perfluorooctanoic acid, perfluorononanoic acid, perfluorodecanoic acid, perfluorobutanesulfonic acid, perfluorohexanesulfonic acid, perfluorooctanesulfonic acid. The studies will combine proficiency testing of laboratories and evaluation of the suitability of methods used (NORMAN Validation level: V3 – routine). Dissemination of information about the ILS (announcement / invitation, registration form etc.) through the NORMAN website and other dissemination channels. For more technical details and the dispatch dates www.iswa.uni-stuttgart.de/ch/aqs/index.en.html
CECs in polar regions	**CECs in polar regions: Collection of samples and their analysis** (Leader: EI slobodnik@ei.sk and UBA jan.koschorreck@uba.de) NTS of biota samples is becoming an important issue in NORMAN activities. Pollutants present in biota are highly probably bio-accumulative (B) and persistent (P), and thus fulfilling two out of three PBT criteria considered under REACH legislation. Up to now, most of the efforts of research groups worldwide were focused on analysis of target substances in biota. In 2019, NORMAN has supported LIFE APEX project 'Systematic use of contaminant data from apex predators and their prey in chemicals management', which will run till 2022. A part of the project deals with development of standardised methodologies for sample collection, preparation and analysis, including wide-scope target, suspect and non-target screening. As a means of prioritising the most ubiquitous pollutants at the global scale there is a need to look at their occurrence in remote areas, including the Arctic region and Antarctica. NORMAN members have access to samples from these regions. It is expected that with the global warming the polar areas will become more accessible and, thus, more polluted from anthropogenic activities. A baseline of pollution by several target substances has already been developed within the AMAP project. However, we are not aware of studies systematically setting up such a baseline by NTS approaches. First four samples from Antarctica were already analysed using wide-scope target screening and suspect screening approaches. The following activities will be carried out in 2020: - Collection of additional ca. 16 samples representing various trophic levels (e.g. sea stars, fish, apex predators) available in Environmental Specimen Banks or provided by NORMAN partners covering Antarctica and Arctic region and their analysis by a wide-scope target, suspect and non-target screening approach developed within the APEX project.

	Coordination of the developed workflow with the ILS-NTS biota activity (see “ILS-NTS biota”); - Testing amenability of LC-HRMS and GC-HRMS methodologies for NTS of matrices not included in the APEX project (e.g. blood, eggs, etc.). - Organisation of a workshop discussing the obtained results with a possibility of launching larger scale project at the EU level. Expected outcomes for 2020: All data obtained from analyses of samples from the polar regions uploaded in the NORMAN Database System (EMPODAT and DSFP). Demonstration of the use of DSFP for retrospective screening of selected suspected persistent and bio-accumulative substances.

The proposed budget for this JPA may be revised by the Steering Committee in May 2020. All approved scientific activities will be implemented, independently of the revision of the budget.