

# Annual Report | 15

# Contents

ece<sup>+</sup>to<sup>c</sup>

ECETOC Annual Report 2015

Copyright © ECETOC, February 2016

European Centre for Ecotoxicology and Toxicology of Chemicals

2 Avenue E. Van Nieuwenhuyse (Bte 8), B-1160 Brussels, Belgium

**02 About ECETOC**

- 03 Purpose
- 03 Values
- 03 Vision
- 03 Mission
- 03 Financing
- 03 Structure

**04 Membership**

- 04 Benefits of Membership
- 05 ECETOC Member Companies

**06 Message from the Chairman of the Board****07 ECETOC Board of Administration****08 Report from the Secretary General****10 Science Programme**

- 10 Foreword from the Scientific Committee Chairman

**12 Highlights of 2015**

- 12 New ECETOC Transformational Programmes
- 13 Completed Task Forces
- 14 Task Forces Established
- 15 Workshops
- 19 Symposia and Other Meetings
- 19 Expert Working Groups
- 20 Communicating the Science
- 21 Contributing to International Initiatives
- 24 Science Awards

**26 ECETOC Contribution to Cefic Long-range Research Initiative**

- 27 Human Health and Exposure Monitoring Teams
- 29 Environmental Research Liaison Teams

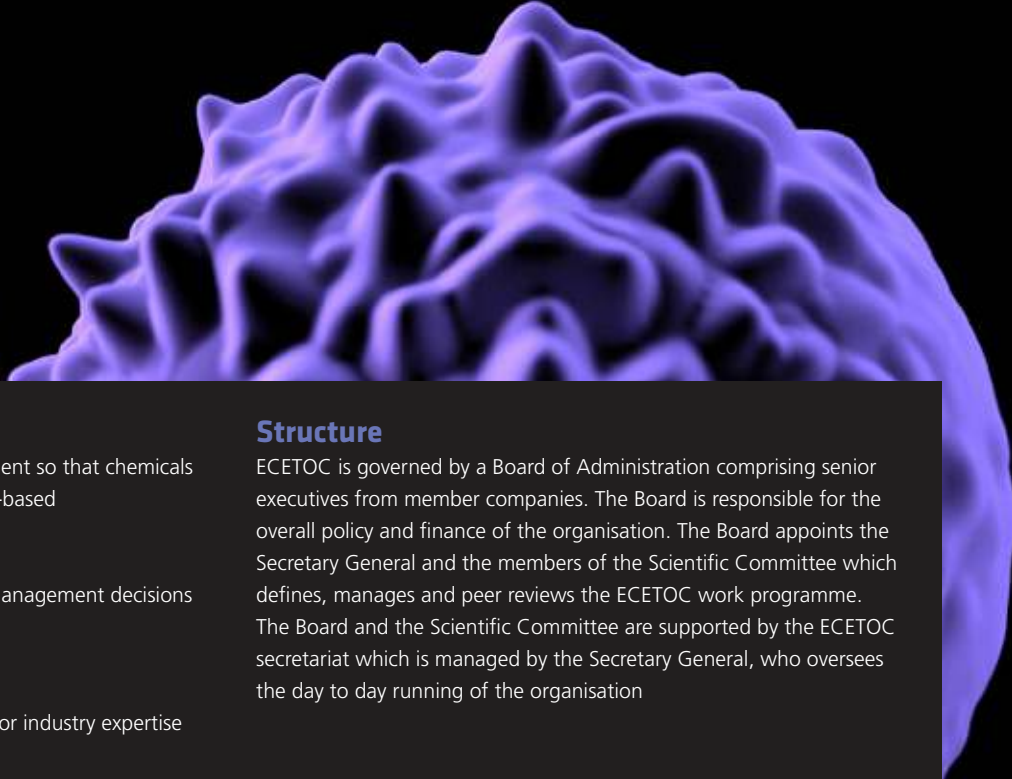
**30 Members of the Scientific Committee****31 Members of the Secretariat****33 Finance****35 Abbreviations**

# About ECETOC

Since 1978 ECETOC, an Industry-funded, scientific, not-for-profit think tank, strives to enhance the quality and reliability of science-based chemical risk assessment

ECETOC at a glance:

- FORUM FOR EXPERT COLLABORATION from world-wide industry, academia and regulatory bodies who work together to develop an agreed understanding on how the State of the Science can be used to improve Risk Assessment by developing novel Tools, Guidance and Frameworks. This is achieved through Task Forces, Expert Meetings and Workshops
- HARNESSSES CROSS-SECTORIAL CHEMICAL INDUSTRY EXPERTISE from the leading companies representing industrial chemicals, agrochemicals, consumer products, biomaterials and pharmaceuticals
- IDENTIFIES RESEARCH NEEDS, selects proposals and monitors progress of research projects for the Cefic Long-range Research Initiative (LRI)
- SHARES KNOWLEDGE through freely available Scientific Publications: Reviews, Articles, Technical Reports and Workshop Reports
- SCIENTIFIC REPRESENTATION for its member companies through presentations at specialist meetings and scientific activities with international agencies, government authorities and professional societies



### **Purpose**

Enhancing the quality of chemicals risk assessment so that chemicals management decisions are reliable and science-based

### **Values**

Providing the best science to help ensure risk management decisions are grounded in science

### **Vision**

ECETOC is recognised as the reference source for industry expertise in regulatory decision making

### **Mission**

Developing and communicating best science practices for risk assessment

### **Financing**

ECETOC is financed by its membership, which is comprised of companies with interests in the manufacture and use of chemicals, biomaterials and pharmaceuticals

### **Structure**

ECETOC is governed by a Board of Administration comprising senior executives from member companies. The Board is responsible for the overall policy and finance of the organisation. The Board appoints the Secretary General and the members of the Scientific Committee which defines, manages and peer reviews the ECETOC work programme. The Board and the Scientific Committee are supported by the ECETOC secretariat which is managed by the Secretary General, who oversees the day to day running of the organisation

# Membership



## Benefits of Membership

- **EXPERTISE:** Join and make the most of the collective expertise of the entire chemical industry
- **SAVINGS:** Reduce costs to individual companies by coordinated effort
- **INFLUENCE:** Shape industry's science agenda
- **LEARNING:** Through participation in ECETOC scientific activities
- **VOICE:** Amplify the voice of science in decision making

Like a health insurance policy, ECETOC covers:

- **Screening & Prevention** – Identifying and reacting to upcoming issues through focused research efforts
- **Diagnosis** – Working with experts from industry, regulatory authorities and academia to understand the problem
- **Intervention** – Translating science data into rational discussion providing solutions to regulatory questions regarding chemical risk assessment
- **Treatment** – Providing practical scientific structures and tools to meet regulatory needs to aid chemical risk assessment
- **Support** – Capacity building and networking

As part of a company's overall insurance costs "science insurance" is affordable and cost effective.

Membership is open to companies who manufacture or use chemicals (see [www.ecetoc.org/membership](http://www.ecetoc.org/membership) for more details).

To apply for membership, Contact the ECETOC Secretary General, Dr Alan Poole:  
Telephone: +32 2 675 3600  
Email: [info@ecetoc.org](mailto:info@ecetoc.org)

Or write to: ECETOC, Avenue E. Van Nieuwenhuysse 2, bte.8, B-1160, Brussels, Belgium

## ECETOC Member Companies

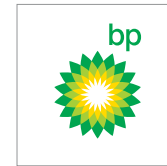
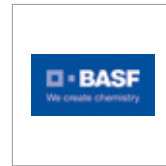
During 2015, the ECETOC Membership comprised the following 31 full Member Companies and 7 Associate Member Companies:



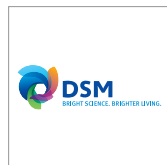
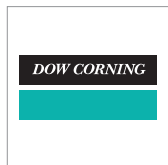
Associate member company



Associate member company



Associate member company



Associate member company



Associate member company



Associate member company



Associate member company



## Message from the

# Chairman of the Board

*"...ECETOC continues to focus on its core membership by engaging in activities that reflect their specific needs and priorities..."*

**For the past couple of years, the membership has been telling ECETOC that they are very happy with the applied work ECETOC produces to address actual and emerging regulatory challenges. However, they would also like to see some forward looking activities addressing scientific topics that will become relevant to the industry in the next 3 to 5 years. ECETOC has responded and introduced Transformational Programmes designed to shape regulatory frameworks and management in the years to come. 3 new Transformational Programmes were initiated in 2015:**

### 1 - Using Molecular Data Wisely

This programme responds to a growing need to understand how to get the best value out of the increasing generation of large volumes of 'omics data.

The Tripartite Transformational Programme is set out as follows:

- Establish a set of principles for data production and storage in a standardised and Good Laboratory Practices (GLP)-like way in order to ensure similar paths and principles are adhered to across multiple laboratories.
- Establish a framework on how to analyse 'omics data, starting with transcriptomics. (Expert Meetings during 2015 have resulted in a draft framework, which will be finalised in 2016)
- Develop weight of evidence to facilitate the incorporation into risk assessment of *in vitro* and *in vivo* 'omics hazard data developing using new methods and tools in a transparent and consistent way.

I am pleased to report that the OECD has already shown interest in this programme championed by ECETOC.

### 2 - Ecological Relevance of Risk Assessment

This activity will address the complexity and variability in risk assessment by improving ecological relevance to enable better risk mitigation and risk management.

### 3 - Globalisation of ECETOC Targeted Risk Assessment (TRA) Tool

Since it was initiated by ECETOC in 2001 and the first TRA exposure model made available in 2004, the TRA tool has continued to evolve and attracts increasing attention from both inside and outside Europe for chemicals regulation. The TRA tool has had major beneficial impact on REACH; more than 80% of the Chemicals Safety Assessments (CSAs) submitted in the first two rounds of REACH registrations have been based on the tool.

With this sustained interest, ECETOC established a TRA Steering Group to define, manage and lead how TRA will be developed globally in the medium to long term.

In addition to these important programmes, we continue to develop frameworks and tools to help both the industry and the regulatory community. We also, as described earlier, provide scientific support to Cefic LRI including:

- Development of topics for research to be considered by the Cefic SIG group (Strategy Implementation Group)

- Drafting of 'requests for proposals' (RfPs)
- Establishing selection teams of industry and external experts to choose the best research proposals in response to the published RfPs and making recommendations to LRI SIG concerning the funding of the proposals
- Establishment of scientific liaisons with the selected institutions and monitoring the scientific quality and progress of the projects.

As always, ECETOC continues to focus on its core membership by engaging in activities that reflect their specific needs and priorities.



**Martin Kayser**  
Chairman of the Board of Administration

**ECETOC Board of**

# Administration

The Board of Administration is empowered by the Annual General Meeting with the management and administration of ECETOC and delegates these tasks on a daily basis to its Secretary General.

The Board is composed of at least six member company representatives. Two Board members are entitled to represent the Associate members. Board members have a two-year mandate and are responsible for the overall policy and finance of the association. The Board is also responsible for appointing the members of the Scientific Committee.

Member companies may propose candidates for the Board; these candidates must have managerial duties within their company and possess scientific and technical experience.

**Election of Board Members at the 2015 Annual General Meeting:**

Dr. Peter Hertl (Syngenta Crop Protection), Dr. Thomas Jostmann (Evonik Industries AG), Dr. Craig Nessel (ExxonMobil Biomedical Services Inc.), Dr. Karen Niven (Shell International B.V.) and Dr. Martin Kayser (BASF) were re-elected to the ECETOC Board.

Mrs. Lorraine Francourt (Dow Europe) and Dr. Carole Langrand-Lerche (Bayer CropScience) were elected as new members to the ECETOC Board; the former now officially Treasurer, taking over from Mr. Steve Rumford who resigned at the end of 2014 when leaving AstraZeneca to take on a new role as Bursar at St Benet's Hall, University of Oxford.

Both re-elections & elections were voted unanimously with no abstentions or votes against.

ECETOC Board Members (December 2015)

<b>Martin Kayser</b> <i>(Chairman)</i>	BASF
<b>Lorraine Francourt</b> <i>(Treasurer)</i>	Dow Europe
<b>Julia Fentem</b>	Unilever
<b>Petra Hanke-Baier</b>	Procter & Gamble
<b>Peter Hertl</b>	Syngenta
<b>Thomas Jostmann</b>	Evonik Industries
<b>Carole Langrand-Lerche</b>	Bayer CropScience
<b>Craig Nessel</b>	ExxonMobil
<b>Karen Niven</b>	Shell
<b>Robert Rickard</b>	DuPont



**Members of the Board with the Scientific Secretary and Secretary General**

Left to right: Lorraine Francourt (Dow Europe), Carole Langrand-Lerche (Bayer CropScience), Ben van Ravenzwaay (BASF and Chair of the Scientific Committee), Petra Hanke-Baier (Procter & Gamble), Alan Poole (ECETOC Secretary General), Martin Kayser (BASF), Thomas Jostmann (Evonik Industries), Peter Hertl (Syngenta), Craig Nessel (ExxonMobil), Julia Fentem (Unilever) and Karen Niven (Shell)  
[Robert Rickard (DuPont) was not present on this occasion]

## Report from the

# Secretary General

*"...When I look at the quality and quantity of output and outcome developed through ECETOC, I am always surprised that such a relatively small organisation with such limited resources can deliver so much..."*

**It is with great pleasure that I again have the privilege of sharing with you ECETOC accomplishments and performance in 2015 and provide a sneak preview of our goals and ambitions for 2016.**

While the overall vision and mission of ECETOC has not changed, I have continued to look at ways to refresh the framework of how ECETOC operates. I particularly want to increase opportunities to take the excellent scientific output from ECETOC and transform it into positive outcomes delivering meaningful and lasting benefits to both our membership and regulatory community.

Delivering positive output to resolve problems begins with problem definition, which is often not so simple due to the variety of views within the ECETOC family with its diverse membership and different communities. However, with the help of the Scientific Committee and other ECETOC stakeholders, we continue to develop robust procedures and work processes to focus on topics that hold the attention of the membership and regulatory community.

In science and science organisations such as ECETOC, it is easy to become obsessed with the science and lose touch with the outside world. We are however focused and persistent in addressing those questions important to our members and regulatory community that

enhance the quality of and confidence in chemical risk assessment. This focus can be viewed as taking two forms. The first is to address those immediate must-do activities such as providing input to developing technical guidance on criteria for persistent, bioaccumulative and toxic substances (PBTs), commenting on triggers for adding additional testing in an extended one generation reproductive toxicity test and improving standard test guidelines such as OECD 308.

In addition to these immediate activities ECETOC must retain a broad perspective and keep abreast of developing science. This is reflected in the second Workshop on epigenetics we held in 2015 and the Workshop on non-coding RNAs we will hold in 2016. These Workshops are directed towards dual outcomes. The first is to keep our membership informed about how these developing sciences might impact risk assessment and the second is to identify research opportunities for the CEFIC LRI Programme. While such topics might be viewed as representing new frontiers in science based risk assessment, we also have to address other frontiers which a few years ago were also considered new but are now seen in more familiar contexts. For example, for a number of years there have been many discussions on how 'omic-type tools and technologies are ready to help deliver a more comprehensive understanding of toxicological effects and promote movement away from simply collecting information from a prescribed set of (usually animal) studies,

to more informed, knowledge based decision making. To a large extent this has not happened and there are a number of reasons for this. One important reason is that, in order move down this path, it is essential that decision makers have confidence in what these technologies are telling. To help promote confidence in the application of such data, ECETOC has set itself the task of developing a framework mapping best science practices on how 'omic-data should be collected, analysed and applied in regulatory decision making. While not promoting full GLP practices, there is a need for standardised GLP-like practices to ensure correct documentation, transparency and science rigor. To strengthen the relationships between output and outcome, we have already had contact with OECD on how the framework, or parts of it, might be developed further through the OECD.

Another area where ECETOC scientific output is driving practical, applicable outcomes is nanotechnology-enabled products. Over the past few years, with the large number of nanomaterials entering the market, it has become apparent that a hazard and risk assessment of each and every variant is impracticable both from resource point of view and the requirement to reduce animal testing. To provide a possible way of addressing this problem, ECETOC established a Nano Task Force to set about developing a decision making framework for grouping and testing nanomaterials which aimed to group materials by their specific modes of action. The framework has proved accurate

in case studies of 24 materials and we are now in the process of developing an application tool to help guide interested parties through the framework to help with the grouping process and decision making such as the need for further investigations.

In the area of environmental toxicology, ECETOC has helped develop a tool to aid decision making regarding species sensitivity distribution. ECETOC has also been instrumental in identifying limitations in the OECD water sediment test (OECD 308) and it is hoped the ECETOC input will help develop a better strategy for assessing persistence in sediment and surface water.

We also continue to support and enhance the ECETOC Targeted Risk Assessment (TRA) tool that is used in more than 80% of REACH dossiers and which is getting more global attention as other geographies develop their own REACH-like legislation. For example, in 2015 the Japanese government (Ministry of Health, Labour and Welfare) prepared ministry ordinance and guidance documents and in these documents recommend ECETOC-TRA as a risk assessment tool. The TRA Tool Technical Reports have also been translated into Japanese by the Japan Chemical Industry Ecology-Toxicology & Information Centre (JETOC). The ECETOC TRA Leadership Team continues to explore other opportunities to leverage the applicability of the TRA Tool in other geographies helping to harmonise Tier 1 exposure assessments.

Of course, some work ECETOC undertakes does not have instant impact and can be viewed as being more visionary. For example, in October 2015, ECETOC sponsored a Workshop to define the role of chemical activity in environmental risk assessment. It envisioned

that using chemical activity in the interpretation of effects data can help address questions about multiple stressors in the environment and risks associated with exposures to complex mixtures. Similarly, a team in ECETOC is looking to transform how current environmental risk assessments are performed, particularly addressing complexity and variability in the risk assessment process, by improving ecological relevance to enable better risk mitigation and risk management. This transformational programme builds on the work ECETOC has done in the area of ecosystem services.

These examples demonstrate how ECETOC science output can bring about useful and timely applicable outcomes that benefit everyone. This work will continue throughout 2016 with various Workshops and meetings including use of 'omics data in regulatory decision making, improving ecological relevance in environmental risk assessment and the presentation of the TRA Tool at Eurotox 2016 and at the International Society of Exposure Science meeting in Utrecht.

In 2015 we also started redesigning the ECETOC website with the goal of making it easier to navigate and find information. We also produced a number of video clips with invited experts providing a two minute description of the science issue and how ECETOC is helping to address it. The refreshed website including the clips will be launched in 2016 and at that time we will begin the process of improving the member website.

When I look at the quality and quantity of output and outcome developed through ECETOC, I am always surprised that such a relatively small organisation with such limited resources can deliver so much. The secret of course is that, like all organisations, ECETOC harnesses

the qualities of intuition, experience, creativity and cooperation to face difficult questions and deliver on goals. These qualities are found in the ECETOC staff, academic and regulatory scientists we work with, but most of all from our Membership. For this I thank all of our Members for supporting ECETOC and, with this continued support, ECETOC will remain a vibrant and dynamic organisation delivering high value outputs and outcomes to the benefit of all stakeholders.



**Alan Poole**  
Secretary General

# Science Programme

## Foreword from the Scientific Committee Chairman

For the past 12 months, the ECETOC Scientific Committee has been evaluating areas where we should commit long term effort to bring about transformations in the way we currently develop and use data in risk assessment. In 2015, we initiated work in 2 strategic areas with the expectation that they will require input and commitment for the next 3 to 5 years. For the ECETOC clock, this sounds quite a long time to focus on 2 projects; however, if successful, ECETOC can catalyse changes that will have a lasting footprint.



The model for this type of approach is found in the continuous work and effort put into the ECETOC Targeted Risk Assessment (TRA) Tool. While the ECETOC TRA steering group continues to work with ECHA on opportunities to improve the quality of the TRA tool (current technical input revolves around dermal exposures in occupational work settings), we are also looking at opportunities to expand the use of the tool beyond Europe, thus helping to harmonise how risk assessment is done in other geographies. Currently, more than 80% of the dossiers submitted under REACH have used the TRA and our vision is for the global use of this tool.

The first of 2 new long term transformational projects that ECETOC started in 2015 is called *"Using data from developing technologies wisely"*. This project is divided into 3 separate, if not mutually exclusive work streams, the first of which is directed towards providing guidance on how to implement GLP-like data development and storage for 'omics technologies. Without GLP, the data can still be valuable; world-wide acceptance in a regulatory context however would be difficult to achieve. Obtaining and storing data according to standardised

*“...Our success should be determined not only on our scientific output as ECETOC reports and publications in the scientific literature, but also by the impact that we make in driving science-based regulations, the interpretation thereof and the process of risk assessment...”*

protocols is one thing, the interpretation quite another. We have seen how the large data sets produced with 'omics tools and technologies can be interpreted differently depending on the analytical process and statistical package applied to the data. Jointly with the Cefic Long-range Research Initiative (LRI), we are using the availability of a large amount of genomics data to explore the influence of several factors that have an impact on interpretation of results and to look at best science practices for analysing large data sets. Our goal is to provide guidance on how to do this in a consistent way. The successful completion of the first two work streams is essential for the last one focused on increasing the use and acceptance of such data in a regulatory decision making.

In the area of environmental toxicity and risk assessment, it was decided to build on the work ECETOC has recently completed on ecosystem services and focus effort on the second transformational project. This has the title *“Ecological relevance of toxicity assessment schemes”*. While the title might be rather prosaic, the goals and ambitions of the project are quite the reverse with the ambition to include a more realistic scenario of the environment in our risk assessment procedures. In a tiered approach, more information can be included in the risk assessment equations to allow for a more realistic assessment of environmental risk.

In last year's message, I stated that our success should be determined not only on our scientific output as ECETOC reports and publications in the scientific literature, but also by the impact that we make in driving science-based regulations, the interpretation thereof and the process of risk assessment. I would propose that we have indeed made steps in the right direction. Although still early in the process, it appears that we are about to witness what ECETOC can achieve in driving science based regulations. The Task Force *“Grouping of nano-materials”*, which started in 2014, has produced within just over a year

3 publications, providing a concept for grouping of nanomaterials as well as showing with a number of case studies how the concept works well. The Task Force has received praise from several sources for the contribution it has made in nano regulations and it is possible they will have made a significant contribution to the, soon to be released, regulatory framework for nanomaterials.

So let's take a look at the ingredients for success. Before the Task Force started, there was a preparatory meeting in which ideas and concepts were discussed and a clear and aligned strategy developed. Thus, at the time when the Task Force started their work, there was agreement of purpose and an understanding and acceptance of roles and responsibilities. There was active participation of all Task Force members supplemented by strong and clear leadership. There was also a sense of urgency shared not only in individual Task Force members, but also in the companies supporting their work. The combination of having an agreed common goal, active participation and facilitative leadership resulted in all time lines being met and with 2 of the 3 publications being accepted without revisions. This latter accomplishment demonstrates that the in-house review procedure in ECETOC is of high quality. And last, but certainly not least, the Task Force delivered a product which was needed and consequently welcomed by regulatory authorities. It is rare that all of these factors come together in one single Task Force. Looking back at more than 15 years of work in the ECETOC Scientific Committee, I am inclined to think that such a unique mixture of positive elements was found only in the Targeted Risk Assessment (TRA) Task Force. Let's hope that the concept of nanomaterials grouping will be similarly successful as the TRA, and let's keep in mind the elements contributing to success for all Task Forces to come. As with the ECETOC TRA Tool, should the Nanomaterial Grouping concept find its way into regulation, ECETOC will provide guidance to companies

dealing with nanomaterials on how to use this approach. We are also considering developing a web based tool to ensure alignment of those who are interested in using this approach.

ECETOC's role as a science organisation is increasing. For the third time in a row we have organised Sessions at the Eurotox Annual Meetings. With more than 200 people attending we had the opportunity to report on our activities to the scientific and regulatory communities. Knowing that we will again be present at Eurotox 2016, and have submitted proposals for sessions in 2017, I am sure that our presence is noted and that we add to our credibility as a science organisation. For similar reasons, I am also very pleased that we continue our relationship with WHO. During a presentation of WHO at one of our Scientific Committee meetings we noted that there were several science programs to which we can contribute. Providing a platform to discuss the potential hazards of new technologies and how to address risk assessment was the topic of our session at the 2015 meeting of the European Environmental Mutagen Society. In a series of presentations by academia, regulatory authorities and industry, we discussed the risk assessment of the use of non-coding DNA.

Staying at the forefront of new developments in exposure, toxicology and ecotoxicology will remain a key factor to contribute to science based risk assessment for ECETOC. At the same time, we should remain alert to the immediate necessities of our membership. It is with this in mind that we have embarked on a new road for our organisation – with the help of all of you, I am convinced that we will remain a unique and successful organisation.

**Bennard van Ravenzwaay**  
Chairman of the Scientific Committee

# Highlights of 2015

## **New ECETOC Transformational Programmes**

As part of the ECETOC Board decision to spend part of its resources on Thought Leadership, a set of Transformational Programmes addressing topics of longer term scientific relevance have been established aimed at producing transformational change in chemicals management. These are in general horizontal themes to be completed over 3-5 years. 3 programmes were initiated during 2015:

### **Using Molecular Data Wisely**

The Programme: *Using Molecular Data Wisely* responds to a growing need to understand how to get the best value out of the increasing generation of large volumes of 'omics data. Currently, there is no guidance on how to produce, store or interpret 'omics data in the regulatory context. Principles for a common path forward should be established so regulators can have confidence in using 'omics data for better decision-making and standard operating procedures based on best practice for each technology will ensure consistent application in laboratories. With this in mind, ECETOC has established a tripartite Transformational Programme:

- 1** - Establish a set of principles for data production and storage in a standardized and GLP-like way in order to ensure similar paths and principles are adhered to across multiple laboratories.
- 2** - Establish a framework on how to analyse omics data, starting with transcriptomics. Expert Meetings during 2015 have resulted in a draft framework, which will be finalised in 2016.

- 3** - Develop a weight of evidence approach that assesses transparency, consistency and vulnerability to bias to aid risk assessors make scientific judgements on how to apply 'omics data to risk assessment. Achieving our goals would set quality criteria to ensure data quality, reproducibility and confidence in decision making. It could help facilitate regulatory acceptance of data from new technologies whilst protecting against interpretation of poor data, developed lacking the quality standards.

### **ECETOC Activity: Ecological Relevance of Risk Assessment**

This activity will address the complexity and variability in Risk Assessment (RA) by improving ecological relevance to enable better risk mitigation and risk management.

The programme comprises 3 key elements:

#### **1 - Assessing the effects of chemicals in ecological communities**

*Strategic objectives:*

- Drive development of spatially explicit effect assessment approaches for higher tier risk assessment
- Develop effect assessment approaches accounting for temporal variation in population dynamics and community composition
- Develop proposals on how the effects of chemical mixtures on ecological communities could be assessed

#### **2 - Exposure science for higher tier risk assessment**

*Strategic objectives:*

- Assess the state of the science in exposure science and developments needed to refine higher tier risk assessment
- Develop models to generate exposure profiles accounting for spatial and temporal variation

#### **3 - Ecosystem service-based approaches for landscape scale risk assessment and risk management**

*Strategic objectives:*

- Evaluate the use of an ecosystem services approach to setting protection goals to inform chemical risk assessment
- Facilitate engagement of the chemical industry, academia and regulators to advance the practical implementation of the ecosystem service approach in chemical risk assessment and risk management

#### **Globalisation of ECETOC Targeted Risk Assessment (TRA) Tool**

TRA exposure model was made available in 2004. Since then the TRA tool has continued to evolve and attract attention both inside and outside Europe for chemicals regulation.

The TRA Tool has had a major beneficial impact on REACH (Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals) since there was no other way chemical safety assessments (CSAs) could be compiled. More than 80% of the CSAs submitted in the first two rounds of REACH registrations have been based on the TRA and,

according to the most recent communications from ECHA, the worker part of the TRA has been applied in >90% of instances where CSAs are required as part of REACH registrations.

With this continued interest, ECETOC has established a TRA Steering Group to define, manage and lead how the TRA will be developed into the medium to long term. The purpose of this group is to scope options (which may entail targeted consultation with key interest groups); consult with stakeholders (including potentially those outside Europe); and finally to develop and execute a plan to expand the use and applicability of the TRA Tool beyond Europe and REACH.

## Completed Task Forces

### Chemical risk assessment – ecosystem services

Ecosystem goods and services are the benefits we (humans) get from nature. They include provisioning services, e.g. from crops that provide food and fibre, regulating services, e.g. the plants growing in river basins that retain water and thereby reduce flooding, supporting services, e.g. the microbial communities involved in nutrient cycling and soil formation and cultural services, e.g. the aspects of ecosystems that provide spiritual, recreational and educational benefits.

Environmental landscapes are multifunctional but the range of services they provide is largely dependent on how they are managed. Managing for some services limits the delivery of others, e.g. draining land to increase agricultural yields increases food production but reduces flood alleviation. Understanding how ecosystems provide services and the trade-offs between them helps authorities decide where and how the ecosystem services needed to benefit society can be provisioned.

In addition to helping manage landscapes and communicate the benefits people gain from the environment, the ecosystem services concept also has relevance for how we assess the potential impacts of commercial chemicals that are released into the environment. It means that we can focus our assessments of potential impacts on the types of plants and animals providing the services in each type of habitat. For example, the most important species to protect in agricultural land

used to grow crops would include the crop species themselves, species that control pests and diseases, microbes that breakdown organic matter to form soil or recycle nutrients, and so on. A different list of key species would come from woodlands where, although trees may be harvested for timber, they are also important in regulating water, air quality and climate. Insects, birds and mammals involved in pollination, seed dispersal and pest and disease control are all important in maintaining a thriving woodland. In principle, these spatial differences in service-providing species means we could change our basis for making chemical risk assessments from protecting all species everywhere at all times, which is the most common approach in current chemical regulation, to a more environmentally representative assessment based on types of land and water body use.

Recently, the European Food Safety Authority (EFSA) developed a framework to identify ecosystem services potentially affected by (agro) chemicals, such as pesticides, for setting specific protection goals and guiding environmental risk assessment. An ECETOC Task Force has investigated the applicability of the EFSA framework for developing habitat-specific protection goals for a wide range of other chemicals using four case studies spanning a range of different emission scenarios and habitats. The selected case studies were: i) oil refinery wastewater exposure in estuarine environments; (ii) oil dispersant exposure in marine environments; (iii) chemicals in consumer products (home and personal care and pharmaceuticals) discharged via sewers to expose a wide range of ecosystems (terrestrial and aquatic); (iv) persistent organic pollutant exposure in remote (pristine) environments. The case studies demonstrated that, with some modifications and development, the EFSA framework could be used to identify and prioritise ecosystems and services that are most at risk from a broad range of chemical exposure scenarios. Prioritised habitats with their associated plants and animals could then form the focus for further risk assessment and/or investigation to assess if control measures are adequate.

The findings of the Task Force are published as ECETOC Technical Report no. 125: Chemical Risk Assessment – Ecosystem Services. Two Papers are also being prepared.

### Grouping of Nanomaterials

Nanoparticles are up to 100 nanometres (nm) large - or better: small. One million nm make up one single millimetre. At this extremely small size, particles obtain many new exciting properties: Using nanoparticles, sunscreen lotions become 'invisible', car varnishing - scratch resistant, glass - dirt repellent, construction materials - stronger and lighter at the same time, and car tyres - wear resistant – to name only a few. Nanotechnology is the industry sector making use of nanoparticles and nanomaterials. Due to the new exciting properties of nanomaterials, more and more nanotechnology-enabled products are becoming available every year.

Clearly, nanomaterials and nanotechnology-enabled products have to be safe. It is imperative that they may not harm humans or the environment. Traditionally, the hazard of substances is being tested in animals. However, animal testing is undesirable for ethical reasons. Further, the number of nanomaterials and the multitude of different applications would require vast numbers of tests. This was the incentive of the *ECETOC Task Force on Nanomaterials* (ECETOC Nano TF): To make sure that our society may benefit from safe nanotechnology-enabled products and to make sure that animal testing is restricted to an absolute minimum.

In the ECETOC Nano TF, experts from the ECETOC members joined forces to successfully meet this tremendous task. The experts identified the so-called 'grouping' of substances as the tool to ensure that nanomaterials are safe and that testing is efficient and avoids the use of animals: Science-based grouping allows the prediction of a substance's toxicity by comparing it to similar substances. However, the properties of nanomaterials and their interactions with biological systems may be very complex. Therefore, a comprehensive grouping concept for nanomaterials has not yet been available.

To help close this gap for hazard assessment, the ECETOC Nano TF developed a *Decision-making framework for the grouping and testing of nanomaterials (DF4nanoGrouping)* that also took into account relevant output from earlier ECETOC Workshops and activities. In three

tiers, DF4nanoGrouping takes into consideration all relevant properties of nanomaterials. Step-by-step, potential hazards are ruled out. Hazardous nanomaterials are identified using non-animal tests, such as cell culture methods. Animal tests are only performed if hazards cannot be ruled out in the non-animal tests. Also then, special animal tests are selected that use fewer animals and are less distressful than the traditional tests.

Case studies confirmed the usefulness of DF4nanoGrouping. All materials that may be hazardous in animals or humans were

recognized in the non-animal tiers of the DF4nanoGrouping. Consequently, DF4nanoGrouping provides a sound scientific basis for hazard assessment.

The ECETOC Nano TF has published the outcome of its work in three widely respected articles that were printed in a renowned international journal. Further, its members are dedicated to establishing the DF4nanoGrouping in the scientific community, for instance by presenting it at numerous scientific congresses and Workshops.

**Arts J, Irfan MA, Keene AM, Kreiling R, Lyon D, Maier M, Michel K, Neubauer N, Petry T, Sauer UG, Warheit D, Wiench K, Wohlleben W, Landsiedel R. 2015.**

Case studies putting the decision-making framework for the grouping and testing of nanomaterials (DF4nanoGrouping) into practice  
*Regulatory Toxicology and Pharmacology* - In Press, Corrected Proof, Available online 10 December 2015 DOI:10.1016/j.yrtph.2015.11.020 (Open Access)

**Arts J, Hadi M, Irfan MA, Keene AM, Kreiling R, Lyon D, Maier M, Michel K, Petry T, Sauer UG, Warheit D, Wiench K, Wohlleben W, Landsiedel R. 2015.**

A decision-making framework for the grouping and testing of nanomaterials (DF4nanoGrouping).  
*Regulatory Toxicology and Pharmacology* 71(2):S1-S27 (Open Access) Doi:10.1016/j.yrtph.2015.03.007

**Arts J, Hadi M, Keene A, Kreiling R, Lyon D, Maier M, Michel K, Petry T, Sauer U, Warheit D, Wiench K, Landsiedel R. 2014.**

A Critical Appraisal of Existing Concepts for the Grouping of Nanomaterials.  
*Regulatory Toxicology and Pharmacology* 70(2):492-506 (Open Access) Doi: 10.1016/j.yrtph.2014.07.025

## Task Forces Established

### Adverse Outcome Pathways (AOPs) focusing on endocrine active chemicals

There are many global activities directed towards using the framework of adverse outcome pathways (AOPs) to understand and describe the biological pathway describing the key events linking the molecular initiating event, (initial chemical interaction between a chemical and cellular molecules), with adverse (eco/toxicological) outcomes. The ultimate desire is to eventually use measurement of the molecular initiating or key events, preferably in *in vitro* test systems, to predict adverse outcome at the whole animal or population level. This will enable high throughput assessment of chemicals and dramatically reduce animal use. The Task Force will examine how AOPs for endocrine active substances might be constructed and assess the data required to come to sound conclusions that might have regulatory applications. The Task Force, which first met on March 4th 2015, will produce a report providing guidance and a structured framework on how AOP methodology can be applied to provide a better understanding of how endocrine disruption can lead to an eco/toxicological outcome.

### Exploring community-based environmental hazard assessments of mixtures based on mode-of-action based approaches

There is an increasing awareness of the need to complement single substance assessments with the assessment of mixtures. Mode of action considerations have been proposed to derive environmental thresholds for substances with the same mode of action. This implies that for mixtures of substances which act according to the same mode of action, there is one threshold, i.e. a concentration below which no impact on the environment is expected. Finally, there is an acknowledged need to increase ecological realism of environmental assessments by considering communities rather than single species to represent whole communities. These three developments in the field of risk assessment in the aquatic environment are to be tied together in the work of the Task Force. Its objective is to draft a provisional ecological risk assessment approach based on a review of the current state of science in the areas of mode of action, mixtures and community assessment. Secondly, the knowledge



gaps for actual implementation of the provisional assessment approach are to be identified.

**Freshwater Ecotoxicity as an environmental impact category to guide the selection of chemical-based products**

This Task Force, which held its kick-off meeting on 19th August 2015, is addressing freshwater ecotoxicity as an environmental impact category by establishing the scientific relevance of USEtox and developing guidance for its interpretation in the context of chemical impact assessment and selection of chemical-based products.

**Aquatic toxicity and bioaccumulation of sparingly soluble manufactured particulate substances**

In 1996 ECETOC published Monograph No. 26 which reviewed the difficulties of sparingly soluble substances in aquatic toxicity assays. This work helped establish the current paradigm in aquatic

environmental assessment, accepted by authorities globally, that the dissolved molecule represents the most relevant exposure condition for aquatic toxicity testing and that testing above the solubility limit does not help to inform environmental risk. The increasing focus on nanomaterials and microplastics in the environment over the last decade is challenging this paradigm and has inspired debate regarding the adequacy of existing aquatic testing frameworks for substances, which are now realised to have potential for emission and transmission in the aquatic environment in varied undissolved / particulate states. The majority of published research that has investigated the potential ecotoxicity of nanomaterials has employed procedures involving exposure to substances above the solubility limit and in the presence of undissolved substance. Relatively little attention is given to defining the physical states associated with known or expected exposure pathways, and the distinction between intrinsic toxicity and physical effects associated with those relevant physical states. The latter is a fundamental requirement in regulatory aquatic toxicology studies.

The need for guidance on when and how to test particulates in aquatic toxicity tests has re-emerged because of the apparent bioavailability of some nanomaterials. Several current activities at the OECD are focused on developing guidance for aquatic hazard and bioaccumulation testing of nanomaterials. Industry is sparsely represented in these fora and there is a risk that this guidance will be inconsistent with currently accepted procedures for “conventional” substances. This inconsistency can have major consequences for the chemical industry because there is no single regulatory definition of a nanomaterial, distinguishing it from a conventional particulate substance, which is globally accepted. In Europe, the EC has issued a risk-neutral definition of nanomaterial of such a wide scope that it could encompass most solid particulate substances, regardless of manufacturing intent. If the OECD adopts new test strategies and recommendations for aquatic tests with nanomaterials, there is a risk that existing studies for poorly soluble substances, deemed nanomaterials by some subsequently applied definition, may be considered insufficient for characterising exposure and risk; and new studies following nanomaterial testing recommendations would be requested.



Jose Tarazona, Head of Pesticides Unit at EFSA, speaking on the scientific needs for improving environmental risk assessment of chemicals from the EFSA point of view

**Workshops**

**2015 ECETOC Environment and LRI progress review**  
12-13 February 2015, Brussels, Belgium

The first day of this annual event provides ECETOC Member Companies, along with invited guests from academia and regulatory bodies, with an update on current and recently completed ECETOC activities and ECETOC-managed Cefic Long-range Research initiative (LRI) projects. 2015 saw a record attendance of 55 scientists, including representatives from regulatory authorities such as Cefas, the European Commission, ECHA, EFSA, OECD and UBA.

The second day, for ECETOC Member Companies only, was a brainstorming session to identify new ideas for ECETOC and LRI activities.

The following activities were identified from the discussions – prospective new ECETOC activities were then presented to the ECETOC Scientific Committee for approval while projects for the Cefic LRI were presented to the Cefic LRI SIG:

#### Task Forces:

- Develop strategies and guidance to better assess and interpret transformation / degradation products in persistence (P) and bioaccumulation (B) assessment
- Review, prioritise and modernise exposure models and provide guidance on their use in a regulatory settings
- Use experience with enhanced and modified biodegradation assays to refine and expand the default half-lives assigned to results from biodegradation screening tests
- Development frameworks and guidance to assess anaerobic biodegradation potential in sediments, sludges, etc.
- TF to look at use of mapping techniques to help define scenarios for spatially explicit risk assessment

#### Workshops:

- Developing a strategy to improve the hazard and risk assessment of complex substances
- Bringing together experts from human health, environment and exposure sciences
- MoA – Workshop on how to use to inform RA
- SEA – valuation of ecosystem services?

#### RfPs (Requests for Proposals) for Cefic LRI projects:

- Develop testing approaches / strategies to provide relevant abiotic and biotic half-lives and confidence
- Fate and effects of biodegradable poorly water soluble substances
- Review of experience and available data for assessing hydrophobic compounds and dietary exposure / secondary poisoning
- Extension of passive sampling / activity-based measurements to other media beyond sediments
- Rapid assessment for bioaccumulation / biotransformation pathways using multiple lines of *in vitro* evidence

#### Workshop on the improvement of the OECD 306 screening test 17-18 February 2015, Cefas laboratories, Lowestoft (UK)



Recent ECETOC Workshops have recommended a series of modifications and enhancements to existing OECD biodegradation screening tests to deliver more robust methods for assessing persistence. Specific enhancements investigated included enhanced test durations and investigating the impact of biomass density and diversity on the probability of observing biodegradability. These proposed steps were designed to minimise the high variability and poor reliability previously reported in OECD biodegradation screening tests, such as the OECD 306 marine biodegradation test, whilst increasing the ecological relevance of such studies.

The Cefic-LRI funded Eco11 investigated and validated these enhancements, producing a framework for selecting the most suitable inocula cell concentration method for activated sludge (c.f. OECD 301) and marine tests (c.f. OECD 306). As a follow up during February 2015, ECETOC and the UK Centre for Environment, Fisheries and Aquaculture Science (Cefas) organised an international Workshop on the OECD 306 test in Lowestoft which was convened to:

- Initiate discussions regarding the current applications and use of the OECD 306 test;
- Discuss current limitations and sources of variability of the test;
- Provide an overview of the relevant findings and recommendations of the Eco 11 project;
- Discuss potential improvements and provide hands-on lab-based training of procedures used to concentrate inocula from seawater;
- Make recommendations for selection of test chemical and scope of a future ring test.

The Workshop agreed that there was too much variability in existing marine biodegradation screening tests and that there was a need, which was supported by both regulators and industry, to develop a revised method and initiate a ring test of an improved OECD 306 test.

The goal is to improve the current OECD 306 marine biodegradability test to enable this to provide a more robust and effective prioritisation screen for marine persistency of chemicals used offshore or likely to enter the marine environment.

A summary of the Workshop discussions together with the key features of the improved test and status of the OECD 306 ring test will be presented. The OSPAR Harmonised Mandatory Control System (HMCS), which forms the basis of the UK regulatory framework for the control of the use and discharge of offshore chemicals, relies heavily on the OECD 306 test for the determination of biodegradability. The OSPAR Offshore Industry Committee (OIC) agreed to the setting up of a ring test for an improved version of the OECD 306 test, which had been developed as part of the Cefic LRI programme. The improved test is considered to offer the potential to overcome the difficulties associated with the 1992 protocol, and the UK Department of Energy & Climate Change (DECC), as the UK offshore regulator and representing the UK as a Contracting Party to OSPAR, has confirmed its full support for the ring test of this method, and has authorised Cefas to participate in the ring test on its behalf. The ring test began in January 2016.

A number of Posters and presentations of the Workshop have since been made (see “Presentations and Posters” on page 23)

A practical demonstration of a cell concentration method for aqueous inocula (e.g. an enhanced OECD 306 test) is available at <http://bit.ly/oecd306screeningtest>



### 2015 Annual Technical Meeting explored opportunities to agree on Science Approaches in Risk Assessment

03 March 2015, Brussels, Belgium

58 participants representing Member Companies, Academia and Regulatory Authorities gathered in Brussels for the Annual Technical Meeting held on 3rd March. Within the theme of “Opportunities to agree on Science Approaches in Risk Assessment”, speakers presented the Regulatory and ECETOC approaches to Ecosystem Services and Read Across in Risk Assessment.

The morning session on Ecosystem Services began with an overview by Lorraine Maltby of the University of Sheffield. Jose Tarazona, Head of Pesticides Unit at EFSA, then presented the Regulatory Approach to Ecosystem Services. The ECETOC Approach was presented by Stuart Marshall of Unilever who introduced the work of the ongoing ECETOC Task Force on Chemical Risk Assessment – Ecosystem Services.

The afternoon session on Read Across in Risk Assessment kicked-off with a presentation by Karel de Raat of ECHA on read-across under REACH. René Hunziker of Dow Europe then spoke on understanding ECETOC approaches to Read Across in Risk Assessment. He said that a crucial contribution by ECETOC in the context of read across is the framework put forward by the Nano Task Force that helps to categorise nano materials and makes recommendations on the relevant testing. Kees van Leeuwen (KVR Watercycle Research Institute) looked at areas with opportunities to agree on read across in risk assessment, reviewing the past 10 years, the current status and the way forward.

Wrapping up the meeting, Professor Jim Bridges of the University of Surrey provided an analysis and Review of the Science Approaches presented during the day.



Top: Ben van Ravenzwaay (Scientific Committee Chair) described the ECETOC consultative process  
Bottom left: Karel de Raat of ECHA speaking on read-across under REACH  
Bottom right: Jim Bridges (University of Surrey) wound up the meeting by reviewing the Science Approaches presented during the day

### Workshop on identifying limitations of the OECD water-sediment test (OECD 308) and developing suitable alternatives to assess persistence

6 October 2015, Dübendorf (Switzerland)



The OECD guideline 308 describes a laboratory test method to assess aerobic and anaerobic transformation of organic chemicals in aquatic sediment systems and is an integral part of tiered testing strategies in different legislative frameworks for the environmental risk assessment of chemicals. Over the years, several shortcomings of the OECD guideline 308 have been identified and its usefulness for persistence and exposure assessment has been questioned.

The objectives of the 3-year project “LRI ECO18 – Improved strategy to assess chemical persistence at the water-sediment interface” were two-fold: (i) to better understand the value and information content of the existing OECD 308 protocol, and (ii) to develop an improved test strategy for assessing persistence in sediment and surface water in a consistent and robust manner.

The goal of this final stakeholder Workshop on October 6, 2015, was to summarise stakeholder perspectives on the status quo of both OECD guidelines 308 and 309, and to complement this with a dissemination of the findings of the project LRI ECO18. The main focus of the Workshop was on whether and how persistence and half-life information can be obtained from OECD 308 and 309 data.



Group photo of the Workshop participants



**Defining the role of chemical activity in environmental risk assessment within the context of mode of action: Practical guidance and advice**  
29-30 October 2015, Snowbird, Utah, USA

Society is facing a variety of challenges in environmental risk assessment (ERA): growing concerns about the effects of multiple stressors (both chemical and non-chemical); risks associated with exposure to complex mixtures; and demands to quantify local site-specific risks. At the same time, risk assessors are seeking to provide a more efficient framework on which to address these emerging problems and questions in a manner that reduces the cost and the use of animals and also makes Risk Assessment easier.

Jointly organised by ECETOC and RIFM (Research Institute for Fragrance Materials), this 2 day meeting was held prior to the SETAC North America meeting in Salt Lake City. 36 participants from industry, academia and regulatory bodies assessed the applicability of using chemical activity in the interpretation of effects data. Recent studies have demonstrated the utility of the concept with respect to acute baseline toxicity, consequently the emphasis of this workgroup was on expanding the concept to chronic baseline toxicity and providing guidance regarding the handling of acute effects for non-narcotic chemicals.

The Workshop was a recommendation of ECETOC Technical Report no. 120 and follows the work of Cefic LRI ECO16. The results from this

meeting will be published shortly with recommendations for further research and model development.

A presentation and 2 posters were developed immediately after the meeting and presented at the SETAC North America meeting in Salt Lake City and a special series of papers are also in the pipeline.

**LRI** **The Role of Epigenetics in Reproductive Toxicity**  
12-13 November 2015, Brussels, Belgium

Building on the success of an earlier ECETOC Workshop in December 2011: Epigenetics and Chemical Safety, this 2-day follow-on Workshop, explored further the current state of the science on epigenetics and its role in reproductive toxicity. Experts from a range of scientific disciplines met over two-days to share knowledge and brainstorm research needs in the field.

Day 1, attended by 47 participants from industry, academia and regulatory bodies, was a capacity-building activity consisting of a series of talks and case studies with room for questions, focussing on:

- (i) Defining epigenetics and understanding its potential value for reproductive toxicology
- (ii) Understanding the relationship between epigenetic change and adverse end points.

Day 2, open to 34 invited experts only, was a brainstorming activity consisting of break-out groups in which work started on developing a roadmap for the practical use of epigenetic foundational studies to underpin regulatory applications, and a prioritised research agenda to help answer key questions on the role and value of epigenetics in toxicology and chemicals risk assessment.

By the end of the Workshop, participants had outlined a roadmap for the practical use of epigenetic investigations in the regulatory context. Three concrete research proposals, including possible model systems,



John Greally, Albert Einstein College of Medicine, Yeshuva Univ, USA



Jun Kanno, NIHS, Japan



Peter Aleström, Norwegian University of Life Sciences, Oslo, Norway



Richard Meehan, Medical Research Council, UK



Tim Gant, CRCE, UK

were outlined for future action. These will be developed further and the top proposals will be put forward for Cefic LRI-funded research in 2016. A Workshop Report will be published and it is also anticipated to publish the Workshop findings in an open access, peer-reviewed journal.

## Symposia and Other Meetings



**RSC second expert Workshop on low-dose endocrine disrupter effects**  
09 April 2015, London, UK

The purpose of this second expert Workshop on low-dose endocrine disrupter effects was to build on the outputs of the previous Workshop held on 4th June 2014 and to develop a practical research protocol to investigate low dose non-monotonic (LDNM) endocrine disrupter effects. The intention is that this protocol will then be used by several laboratories to produce reproducible results needed to fill the gaps in current knowledge and to inform regulatory policy. The first Workshop (report available at <http://rsc.li/ed-low-dose-effects>) was itself a follow-up to the ECETOC Expert Panel to Better Understand Endocrine Disrupter Low Doses Effects held on 22- 23 April 2013 – see ECETOC Workshop Report No. 27).

At this meeting, under the auspices of the Royal Society of Chemistry (RSC) in the UK, a protocol has been developed to define a thorough and detailed experimental design to address the existence of low dose and non-monotonic dose response effect on endocrine disrupters. Several international organisations are interested in funding this research programme.

### Emerging Issues: the use and safety assessment of small RNA molecules

24 August 2015, Prague, Czech Republic

Chaired by Achim Aigner (University of Leipzig) and Bennard van Ravenzwaay (BASF), this ECETOC sponsored Workshop at European Environmental Mutagenesis and Genomics Society (EEMGS) 44th Annual Meeting looked at the significance of small RNAs (the Dlk1-Dio3 imprinted gene cluster noncoding RNAs are novel candidate biomarkers for liver tumour promotion), employing RNA-mediated gene regulation in crop technology, the risk assessment of RNAi-based GM plants, investigating the role of miRNAs as biomarkers of effect, and small RNAs as biomarkers of effect.

Further information can be found on the EEMGS website:  
<http://eemgsmeeting2015.eu/>

### The Importance of data quality to enhance the impact of 'omics sciences

Eurotox 2015, 13-16 September 2015, Porto, Portugal

Big data has been part of the landscape of toxicology for nearly two decades and has contributed much to our undertaking of modes and mechanisms of toxicity. Despite extensive use in the understanding of toxicity, 'omic technologies have yet to be fully utilised in regulatory applications for toxicity testing. No framework of best practice to be applied to the primary analysis of data to the point of the generation of a gene list for subsequent interpretations exists. This talk, by Prof. Timothy Gant of Public Health Europe outlined this issue and presented the initial thoughts from the ECETOC Transcriptomics Analysis Expert Team. This work will have potential application in OECD test guidance.

### Expert Working Groups



**Expert Meeting: AOP/MoA of Reproductive Health Ontology**

23-24 April 2015, Brussels, Belgium

There is no single source of information providing a comprehensive ontology of developmental toxicity linked to the molecular initiating events (MIEs) and adverse outcome pathways (AOPs) responsible for these effects. Yet there are burgeoning amounts of data increasingly available that inform us about molecular pathogenesis leading to human developmental toxicity.

The time has come to organise the field of toxicology in a different way. Responding to this need, an ECETOC Expert Team, funded by the Cefic LRI and made up of regulatory, academic and industry experts, met in Brussels this spring to progress its drafting of a state of science on building prenatal developmental toxicity ontology for publication in peer reviewed, open access literature. The document, due to be

published in 2016, will first identify the challenges and approaches – and then propose the necessary steps – to build a prenatal mode of action (MoA) ontology framework. The report scoping process enabled the expert team to identify scientific research priorities, which they translated into request for proposals (RfP) for Cefic-funded research. This RfP was published in June 2015. The winning applicant was selected and work will start in January 2016.

Such an ontology will help link molecular data to traditional toxicology; elucidate whether existing high throughput or high content approaches are sufficiently inclusive of MoA and serve as an organizing structure for constructing AOPs. In this way, it will contribute to integrated approaches to testing and assessment (IATA), increase efficiency and help reduce animal testing, whilst providing the knowledge base for industrial and regulatory scientists to use in risk assessment and decision making.



**State of the Science: Non coding RNAs within Toxicology and Safety Assessment of Chemicals**  
08 June 2015, Brussels, Belgium

Noncoding RNAs (ncRNAs) are an intensely studied and rapidly moving field of research. ncRNAs are now known to be involved in post transcriptional gene silencing, epigenetic regulation and mediation of physical and chemical environmental signals. However, although knowledge of how chemical stressors can influence the functionality of ncRNAs is growing, the potential role of ncRNAs in chemicals risk assessment is unclear. There is a need to understand to what extent ncRNA data are important for risk assessment and establish best practice on how these data are structured (developed, collected, interpreted, used). In this context ECETOC set up a dedicated expert team, funded by the Cefic LRI and made up of experts in the field from academia and industry to organise a state of the science Workshop on ncRNAs (March 2016) and discuss how industry-funded research could contribute to the field. The 2016 workshop intends to reach a common understanding on the current and potential future role of

ncRNAs in toxicology and risk assessment – and develop a prioritised research agenda over the next 2-3 years in this regard. It will build from previous events such as:

- 2011 ECETOC Workshop “Epigenetics and Chemical Safety” – science has moved on rapidly since this workshop which stated “*it is a matter of debate if these (ncRNA) should be included under the term ‘epigenetic’*” so it is timely to review the state of current science.
- 2012 EEMS Epigenetics Symposium.
- 2013 ECETOC Workshop “Omics and Risk Assessment Science” which recommended the need to “*understand the role and function of ncRNA as biomarkers and to connect to transcriptomic and proteomic datasets*”.



### Transcriptomics Analysis Framework

June 2015, Brussels, Belgium



Group photo of the ECETOC Transcriptomics Analysis Expert Team

‘Big data’ has become a common term to describe the large data sets that are often collected and analysed in many areas of biological and medical science. This is particularly true in molecular work where a data explosion is occurring. For toxicological science the quantity, quality and complexity of molecular variation data collected outstrips our ability to analyse or interpret in a consistent manner and this has hindered its application in the toxicological risk assessment of chemicals.

A particular challenge is in the consistent bioinformatic analysis of the data where its magnitude allows many approaches to be taken. There are many ways by which the data can be ‘sliced and diced’ that can lead to different outcomes – but no assessment as to which approach is more appropriate. Amongst many methods, all of which could be argued to be correct, the key question for regulatory purposes is: Which is most appropriate? This challenge has limited the use of high throughput molecular data in the regulatory arena.

The ECETOC Transcriptomics Analysis Expert Team, funded by the Cefic LRI and with participants from academia, industry and the regulatory community started collaborating on the development of a Framework for best practice to ensure the univariate analysis of molecular variation data is meaningful and reliable. This framework, due to be finalised in 2016, could feed into the review of OECD test guidelines and help industry develop data that regulators have confidence in assessing within risk assessment dossiers.

## Communicating the Science

### Publications

ECETOC’s primary outputs are state-of-the-science reports that are compiled as a result of the scientific partnerships formed in the framework of ad-hoc issues-based Task Forces. These take the form of both ECETOC’s own published reports and articles published in the open scientific literature.

Technical Reports address specific aspects of the science used in evaluating the hazards and risks of chemicals to human health and the environment. (Note: Since 2009, ‘Monographs’, which were comprehensive reviews of generic topics or issues fundamental to the application of good science in evaluating the hazards and risks of chemicals, and ‘Documents’, which were scientific briefing papers addressing emerging issues, are also published as Technical Reports.

Workshop Reports are summaries of the discussions and conclusions derived from ECETOC sponsored scientific workshops.

Scientific Articles are publications in peer-reviewed journals.

JACC Reports (Joint Assessment of Commodity Chemicals) are comprehensive reviews of all available toxicological and ecotoxicological data on specific chemical substances, predominantly those having widespread and multiple uses. Each report presents a hazard assessment and identifies gaps in knowledge. The standard format may be extended in support of EU or other international risk assessment, or setting of an occupational exposure limit value.

Special Reports are compilations of data targeted to specific regulatory issues/demands.

Please note that, as part of our continuing drive for efficiency and environmental care, all ECETOC publications are now distributed exclusively in electronic format. All reports can be freely downloaded from <http://www.ecetoc.org/publications>

### Reports Published by ECETOC during 2015

TR 125: Chemical Risk Assessment – Ecosystem Services

### Articles Published in the Open Scientific Literature during 2015

Whaley P, Halsall C, Ågerstrand M, Aiassa E, Benford D, Bilotta G, Coggon D, Collins C, Dempsey C, Duarte-Davidson R, FitzGerald R, Galay-Burgos M, Gee D, Hoffmann S, Lam J, Lasserson T, Levy L, Lipworth S, Mackenzie Ross S, Martin O, Meads C, Meyer-Baron M, Miller J, Pease C, Rooney A, Sapiets A, Stewart G, Taylor D. 2015.

### **Implementing systematic review techniques in chemical risk assessment: Challenges, opportunities and recommendations.**

*Environment International* - In Press, Corrected Proof, Available online 11 December 2015 DOI:10.1016/j.envint.2015.11.002 (Open Access)

Arts J, Irfan MA, Keene AM, Kreiling R, Lyon D, Maier M, Michel K, Neubauer N, Petry T, Sauer UG, Warheit D, Wiench K, Wohlleben W, Landsiedel R. 2015.

**Case studies putting the decision-making framework for the grouping and testing of nanomaterials (DF4nanoGrouping) into practice**

*Regulatory Toxicology and Pharmacology* - In Press, Accepted Manuscript, Available online 10 December 2015  
DOI:10.1016/j.yrtph.2015.11.020 (Open Access)

Thomas P, Dawick J, Lampi M, Lemaire P, Presow S, van Egmond R, Arnot JA, Mackay D, Mayer P, Galay Burgos M. 2015

**Application of the Activity Framework for Assessing Aquatic Ecotoxicology Data for Organic Chemicals**

*Environmental Science & Technology* 49(20):12289-12296 (Open Access) DOI: 10.1021/acs.est.5b02873

Ortega-Calvo JJ, Harmsen J, Parsons JR, Semple KT, Aitken MD, Ajao C, Eadsforth C, Galay Burgos M, Naidu R, Oliver R, Peijnenburg WJ, Römbke J, Streck G, Versonnen B. 2015.

**From Bioavailability Science to Regulation of Organic Chemicals.**

*Environmental Science & Technology* 49(17):10255-10264 (Open Access) DOI: 10.1021/acs.est.5b02412

Cochrane SA, Arts JHE, Ehnes C, Hindle S, Hollnagel HM, Poole A, Suto H, Kimber I. 2015.

**Thresholds in chemical respiratory sensitisation.**

*Toxicology* 333:179-194 Doi 10.1016/j.tox.2015.04.010 (Open Access)

Arts J, Hadi M, Irfan MA, Keene AM, Kreiling R, Lyon D, Maier M, Michel K, Petry T, Sauer UG, Warheit D, Wiench K, Wohlleben W, Landsiedel R. 2015.

**A decision-making framework for the grouping and testing of nanomaterials (DF4nanoGrouping).**

*Regulatory Toxicology and Pharmacology* 71(2):S1-S27 Doi:10.1016/j.yrtph.2015.03.007 (Open Access)

**Contributing to International Initiatives  
Representation, Presentations and Posters at Specific Meetings**

Environmental Engineering Seminar Series, Newcastle University  
20 March 2015, Newcastle-upon-Tyne, UK

“Putting the ‘bio’ back into biodegradation testing: Enhanced regulatory assessments” presented by Timothy Martin (Newcastle University), member of the ECETOC/Cefas/Cefic LRI Workshop on the improvement of the OECD 306 screening test held 17-18 February 2015 at Cefas laboratories, Lowestoft (UK)]

(US) Society of Toxicology (SOT) 54th Annual Meeting and Tox Expo  
22-26 March 2015, San Diego, CA, USA  
Participation by Alan Poole (ECETOC)

SETAC Pellston Workshop: Simplifying environmental mixtures -  
An aquatic exposure-based approach via exposure scenarios  
22-27 March 2015, Valencia, Spain

Participation and Member of Steering Committee: Malyka Galay Burgos (ECETOC)

The main goal of this meeting was to address the need for testable frameworks that simplify the complexities of assigning causality and provide tools that can be used for forecasting risks based on potential exposure scenarios. About 40 invited scientists and decision makers from around the world addressed the scientific underpinnings of mixture toxicity and helped refine and simplify these per exposure scenario. It is expected that retrospective methods can be used to test the veracity of these decision criteria and then be flipped to forecast the potential effects of chemical mixtures. A key output from the Workshop would then be guidance on how generalised decision trees could be used in forecasting where chemical exposure may represent a potential concern. A series of posters were presented at the SETAC Europe 25th Annual Meeting and a Special Series of Papers are being prepared for publication.

SETAC Europe 25th Annual Meeting: *Environmental Protection in a multi-stressed world: challenges for science, industry and regulators*  
03-07 May 2015: Barcelona, Spain

Member of the Organising Committee: Malyka Galay Burgos (ECETOC)

‘Aquatic exposures to chemical mixtures in urban environments’ presented by Malyka Galay Burgos (ECETOC) on behalf of the ECETOC Task Force on Adapting Simple Treat for simulating behaviour of chemical substances

‘Sufficiency of aquatic hazard information for Environmental Risk Assessment’ presented by Michiel Claessens (Chemours (DuPont)), Christopher Hughes (Shell) and Malyka Galay Burgos (ECETOC), members of the ECETOC Task Force of the same name

‘Use of ecosystem services potentially affected by chemicals for setting protection goals and the needs of risk assessment’ presented by Lorraine Maltby (University of Sheffield) and Stuart Marshall (Unilever), Co-Chairs of the ECETOC Task Force on Chemical risk assessment - ecosystem services

‘Assessing the persistence of chemicals in the environment: future research priorities’. Poster by members of the Organising Committee of the ECETOC Workshop on Assessing Environmental Persistence, held 06-07 November 2012, at Les Salons France-Amérique, Paris, France

‘Shortcomings in ecotoxicity data to provide a testset for an ECETOC project’ presented by Paul Thomas, Chair of the ECETOC Task Force on Activity-Based Relationships for Aquatic Ecotoxicology Data: Use of the Activity Approach to Strengthen MoA Predictions (published ECETOC Technical Report no. 120, December 2013)

ICCA-LRI and US EPA Workshop: “What Will Work? Applications of New Approaches for Chemical Safety Assessment”  
16-17 June 2015: New Orleans, LA, USA  
Participation by Alan Poole (ECETOC)

OECD 8th Meeting of the Extended Advisory Group on Molecular Screening and Toxicogenomics (EAGMST)

18 June 2015, Paris, France

'Towards Building an AOP prenatal Developmental Toxicity Ontology' presented by Richard Currie (Syngenta) [member of the ECETOC Expert Team on the development of an AOP/MoA Ontology for Prenatal Developmental Toxicity]

'ECETOC Task Force on Adverse Outcome Pathways (AOPs) focusing on endocrine active chemicals' presented by Christine Palermo (ExxonMobil) [ECETOC Task Force of the same name]

SETAC Pellston Workshop: Improving the usability of ecotoxicology in regulatory decision making

30 August-04 September 2015, Shepherdstown, West Virginia, USA  
Malyka Galay Burgos (ECETOC) participated as expert

51st Congress of the European Societies of Toxicology (Eurotox)

13-16 September 2015, Porto, Portugal

Participation by Alan Poole (ECETOC)

'The importance of data quality to enhance the impact of the 'omics sciences' presented by Timothy Gant (Public Health England) [ECETOC Transcriptomics Analysis Expert Team]

EFSA / ECHA Topical Scientific Workshop on Soil Risk Assessment

07-08 October 2015, Helsinki, Finland

'Performing soil risk assessments using aquatic hazard information only: how well can it capture all the risks?' presented by Michiel Claessens (Chemours (DuPont), member of the ECETOC Task Force on the Sufficiency of aquatic hazard information for environmental risk assessment. The presentation addressed the extent to which the equilibrium partitioning (EqP) methodology can be used to assess the risks of chemicals for the soil compartment. This methodology can be applied to derive the toxicity of a chemical to soil (or sediment) organisms from its aquatic toxicity in case experimental data for the former are lacking. As within REACH registrations the ecotoxicological datasets are often limited to aquatic data, it is therefore of great

interest to ECHA in which cases the EqP method can be applied reliably, and in which cases it cannot.

ECHA ASO Workshop

09 October 2015: Brussels, Belgium

Participation by Alan Poole (ECETOC)

Chem Academy Conference on Endocrine Disruptors

12 October 2015, Berlin, Germany

'Overview of ECETOC Scientific Initiatives on Endocrine Disruptors' presented by Remi Bars (Bayer CropScience), Lennart Weltje (BASF) and James Wheeler (Dow), members of the ECETOC Task Force on 'Adverse Outcome Pathways (AOPs) focusing on endocrine active chemicals']

SETAC North America 36th Annual Meeting

1-5 November 2015, Salt Lake City, UT, USA

Participation by Malyka Galay Burgos (ECETOC)

'Aquatic exposures to chemical mixtures: urban typology' presented by Malyka Galay Burgos (ECETOC) and Derek Muir (Environment Canada) on behalf of the ECETOC Task Force on Adapting Simple Treat for simulating behaviour of chemical substances.

'Proposed modifications to the OECD 306 seawater biodegradation screening tests' presented by Timothy Martin (Newcastle University), on behalf of the Organising Committee of the ECETOC/Cefas/ LRI Workshop on the improvement of the OECD 306 screening test, held 17-18 February 2015 at Cefas laboratories, Lowestoft (UK).

'Challenges and potential limitations to the application of the chemical activity concept for ecological risk assessment. Physical-chemical properties & partitioning' presented by Todd Gouin (Unilever), Chair of the Organising Committee of the ECETOC Workshop on 'Defining the role of chemical activity in environmental risk assessment within the context of mode of action: Practical guidance and advice', held 29-30 October 2015, Snowbird, Utah, USA. A poster by the same Organising Committee on the same subject was also presented.

'Classification of chemicals according to MoA and chemical activity or other dose metrics for chemicals with specific mode of action' presented by Joop Hermens (University of Utrecht), member of the Organising Committee for the ECETOC Workshop on 'Defining the role of chemical activity in environmental risk assessment within the context of mode of action: Practical guidance and advice', held 29-30 October 2015, Snowbird, Utah, USA.

RSC 14th Meeting on Chemistry in the Oil Industry: Challenges and Responsibilities

02-04 November 2015, Manchester, United Kingdom

'Latest developments in PBT testing approaches for the Regulatory Assessment of Offshore Chemicals'. Poster and presentation by Bob Rowles (Cefas) on behalf of the Organising Committee of the ECETOC/Cefas/Cefic LRI Workshop on the improvement of the OECD 306 screening test held 17-18 February 2015 at Cefas laboratories, Lowestoft (UK).

6th International Fresenius Conference 'Endocrine Disruptors'

10-11 November 2015, Cologne, Germany

'Adverse Outcome Pathways (AOPs) focusing on endocrine active chemicals' presented by James Wheeler (Dow AgroSciences) on behalf of the ECETOC Task Force of the same name.

AstraZeneca Global Environment Symposium

December 2015, Alderley Park, UK

'Putting the 'bio' back into biodegradation testing: Enhanced regulatory assessments' presented by Timothy Martin (Newcastle University) on behalf of the Organising Committee of the ECETOC/Cefas/Cefic LRI Workshop on the improvement of the OECD 306 screening test held 17-18 February 2015 at Cefas laboratories, Lowestoft (UK).

## Input to Specific Projects and Reports

6th Framework Programme Co-ordination Action Project "Norman"  
Participation in Advisory Board on behalf of ECETOC by Stuart Marshall (Unilever)

### 7th Framework Programme Co-ordination Action Project "EUROECOTOX"

The EUROECOTOX, EU-FP7 funded project and network promotes cooperation between research centres, industry and other stakeholders in Europe devoted to the R&D and application of Alternative Testing Strategies in Ecotoxicology. Since December 2012 the network has been coordinated by Dr Malyka Galay Burgos of ECETOC, one of the EUROECOTOX partners.

ECHA Endocrine Disruptor Expert Group  
Participation on behalf of ECETOC by Remi Bars (Bayer)

ECHA Guidance on Information Requirements and Chemical Safety Assessment (IR&CSA), Chapter R.7a, Section R.7.6 (reproductive toxicity)  
Participation on behalf of ECETOC by Christine Palermo (ExxonMobil)

ECHA Guidance on Information Requirements and Chemical Safety Assessment (IR&CSA), Chapter R.7b, (Sediment Compartment)  
Participation on behalf of ECETOC by Gordon Sanders (Givaudan)

ECHA Guidance on Information Requirements and Chemical Safety Assessment (IR&CSA), Chapter R.7.2, (Irritation / Corrosion)  
Participation on behalf of ECETOC by Pauline McNamee (P&G)

ECHA Guidance on Information Requirements and Chemical Safety Assessment (IR&CSA), Chapter R.12 (use descriptor system)  
Participation on behalf of ECETOC by Manon Loos (Albemarle)

ECHA Guidance on Information Requirements and Chemical Safety Assessment (IR&CSA), Chapter R.14: Occupational exposure estimation and Part D: Exposure scenario building  
PEG R14: Michael Haack, Wacker Chemie

ECHA Guidance on Information Requirements and Chemical Safety Assessment (IR&CSA), Chapter R.15: Consumer exposure estimation  
PEG R15: Carlos Rodriguez, P&G

ECHA Guidance on Information Requirements and Chemical Safety Assessment (IR&CSA), Chapter R.16: Environmental exposure estimation  
PRG R16: Johannes Tolls, Henkel

ECHA Update of the "Guidance on Labelling and Packaging in accordance with regulation (EC) No. 1272/2008"  
Participation on behalf of ECETOC by Gerd-Uwe Spiegel (Dupont)

ECHA Nanomaterials Working Group  
Participation on behalf of ECETOC by Karin Wiench (BASF)

ECHA Partner Expert Group: "Introductory Guidance on the CLP Regulation"  
Participation on behalf of ECETOC by Ingolf Kühn (BASF)

ECHA PBT Partner Expert Group  
Participation on behalf of ECETOC by Michiel Claessens (DuPont)

ECHA PBT Expert Group  
The Expert Group advising ECHA on PBT issues has regularly met since May 2013. Participation on behalf of ECETOC by Sylvia Jacobi (Albemarle)

ECHA Risk Assessment Committee (RAC)  
Participation as an observer on behalf of ECETOC by Alan Poole

ECVAM Stakeholder Forum (ESTAF)  
Participation on behalf of ECETOC by Remi Bars (Bayer)

Endocrine Disruptor Expert Advisory Group to the EU Commission (ED EAG)  
Participation on behalf of ECETOC by Remi Bars (Bayer) and James Wheeler (Syngenta, now at Dow)

Klimisch Update for Environmental Risk Assessment  
The ring test has been evaluated and commented with input from scientists in the ECETOC membership. The outcome of this exercise was presented at a special Workshop at SETAC Glasgow 2013. Several publications, including a peer reviewed paper, a book and several reports are expected to be published in 2015. For more information contact Malyka Galay Burgos at ECETOC.

OECD Extended Advisory Group on Molecular Screening and Toxicogenomics (EAG MST)  
Participation on behalf of ECETOC by Remi Bars (Bayer)

OECD Endocrine Disruptors Testing and Assessment (EDTA) Advisory Group  
Participation on behalf of ECETOC by Remi Bars (Bayer)

SETAC Europe 2015 Scientific Committee and 25th Annual Meeting  
Member: Malyka Galay Burgos (ECETOC)

STFC / NERC Bioinformatics and Environmental 'Omics Network  
The overarching objective of the network is to build bridges between scientific communities in bioinformatics and environmental 'omics. The network will be co-aligned with the establishment of the new UK National Environmental Research Council (NERC) Environmental 'Omics Synthesis Centre (EOS), which has the remit of exploring emerging areas of bioinformatics and environmental 'omics and their application to environmental problems. ECETOC is represented by Malyka Galay Burgos

WHO/IPCS Chemical Risk Assessment Network  
Participation on behalf of ECETOC by Alan Poole (ECETOC)

# Science Awards

Since 2003, ECETOC has been recognising talented young scientists by sponsoring annual Science Awards to outstanding works of science. ECETOC sponsored the following awards during 2015:





**Environmental science related award**  
**SETAC Europe 25th Annual Meeting:**  
**Young Scientist Awards (YSA)**  
 03-07 May 2015 Barcelona, Spain

The ECETOC Best Platform Award honours the early career scientist with the best platform presentation at the SETAC Europe 25th Annual Meeting. The award winner receives a monetary prize and free registration to the next SETAC Europe Annual Meeting.

Daniela Batista of the University of Minho, Braga, Portugal (Centre of Molecular and Environmental Biology) won the 2015 award for her presentation 'Pollution induced community tolerance of microbial decomposers to silver nanoparticles' - Daniela Batista, Ahmed Tlili, Mark O. Gessner, Cláudia Pascoal, and Fernanda Cássio.

For more information:  
[http://barcelona.setac.eu/awards\\_programme/young\\_scientist\\_award](http://barcelona.setac.eu/awards_programme/young_scientist_award)



Daniela Batista receiving flowers and a formal certificate from Carlos Barata of the Spanish National Research Council (CSIC) at the closing ceremony of SETAC Barcelona on 7 May 2015



**Human health science related award**  
**Eurotox 2015: ECETOC Christa Hennes Young Scientist Award**  
 13-16 September 2015, Porto, Portugal

In 2014, this Best Poster Award for toxicological research into mechanisms and risk assessment was renamed in memory of the late Dr Christa Hennes, former ECETOC Human Health Sciences Manager, who was instrumental in its organisation. This is a Best Poster Award for toxicological research into mechanisms and risk assessment, selected by a panel in which ECETOC participates – (in 2015, ECETOC was represented by Alan Poole). The winner receives a monetary prize and a free invitation to the following year's Eurotox meeting.

The 2015 winner was Eiki Kimura of the University of Tokyo, Tokyo, Japan (Department of Medicine) for the poster on 'AhR activation and TCDD exposure impair dendritic morphology in the developing olfactory bulb'.

Eurotox 2015 website: <http://www.eurotox2015.com/>



Eiki Kimura of the University of Tokyo receives his award from Aristides Tsatsakis, President of EUROTOX

ECETOC Contribution to

# Cefic Long-range Research Initiative



Since 1996, the Long-range Research Initiative (LRI) Programme of Cefic, the European Chemical Industry Council, has been providing proactive scientific data on which the entire industry and regulatory bodies can draw to address societal concerns on a reliable basis.



### ECETOC Core Teams



### CEFIC LRI



As a fundamental basis for a sustainable chemical industry and a complement to Responsible Care, LRI presents a research programme that is forward-looking and ambitious, but also realistic and coherent. LRI invests in long-term research and delivers transparent, quality-assured scientific data, open to the broad public.

As the scientific partner to Cefic LRI, ECETOC provides scientific support to the LRI and input into the Research Programme by managing the scientific evaluation of applications for funding, recommending the best research proposals and monitoring the progress of selected LRI projects. In particular ECETOC is responsible for the:

- Development of topics for research to be considered by the LRI Strategy Implementation Group (SIG). (A core team may organise a Workshop with academic, government and industry scientists for this purpose.)
- Drafting of 'requests for proposals' (RfPs) based on ideas submitted by Cefic and ECETOC stakeholders in the LRI process.
- Setting up selection teams of industry and external experts to choose the best research proposals in response to published RfPs and making recommendations to LRI SIG concerning the funding of the proposals.
- Establishment of scientific liaison with the selected institutions and monitoring the scientific quality and progress of the projects.

### Human Health and Exposure Monitoring Teams

6 new human health and exposure projects secured funding and were initiated in 2015 with the support of the monitoring teams (marked below with \*). The current research projects are:

**AIMT2:** Mechanism-based characterisation of systemic toxicity for RepDose database substances employing *in vitro* toxicogenomics (Completed in 2015)

**Principal investigator:** Dr. Rob H Stierum, Netherland Organisation for Applied Scientific Research (TNO), The Netherlands

**AIMT3:** Data-integration for endpoints, cheminformatics and 'omics (Completed in 2015)

**Principal investigator:** Dr. Joost van Delft, Maastricht University, The Netherlands

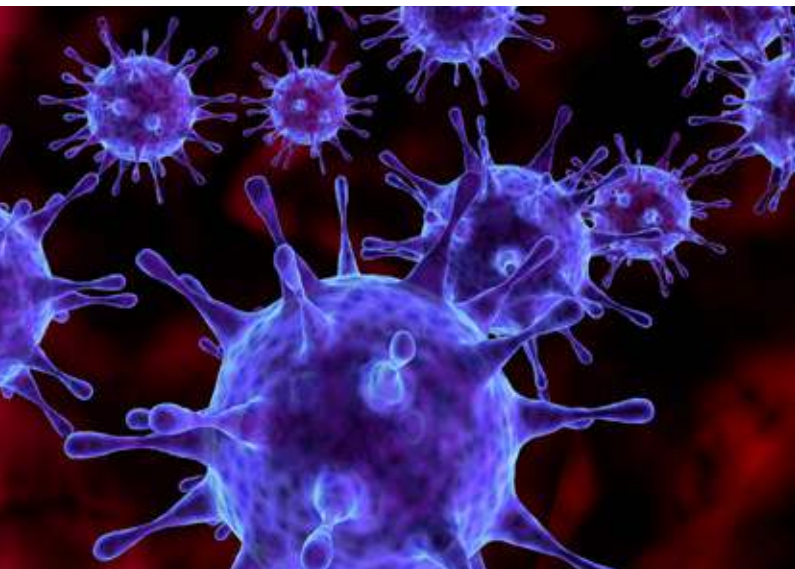
**AIMT4:** Moving from DECO towards OECD

**Principal investigator:** Dr Danyel Jennen, Maastricht University (UM), Maastricht, The Netherlands

**AIMT5\*:** Building a Prenatal Developmental Toxicity Ontology, integrating existing biological, chemical, *in silico* models and *in vitro* methods and data, aiming at an alternative integrated AOP/ MoA framework for mechanistic hazard and risk assessment in developmental toxicology

*Scoping meetings held October 2014 and April 2015 to draft RfP, Selection Team meeting held October 2015.*

**Principal investigator:** Prof Dr Aldert Piersma, RIVM, National Institute for Public Health and the Environment, The Netherlands



**AIMT6:** CON4EI: CONsortium for *in vitro* Eye Irritation testing strategy  
Principal investigator: Dr An Van Rompay, Flemish Institute for Technological Research (VITO), Belgium

**AIMT7:** *In vitro* to *in vivo* Exposure Predictor Model  
Scoping meeting held March 2015

**B6:** A toxicogenomic approach to enhance the specificity and predictive value of the murine local lymph node assay (*Completed in 2015*)  
Principal investigator: Dr. Darrell Boverhof, Dow, Midland, MI, USA

**B9:** Characterising the nature of dermal exposure from consumer products and articles (*Completed in 2015*)  
Principal investigator: Ir. Rudi Torfs, VITO (Flemish Institute for Technological Research), Mol, Belgium

**B11:** Integrated external and internal exposure modelling platform (Extension)  
Principal investigator: Assoc. Prof. Dimosthenis Sarigiannis, Centre for Research and Technology Hellas, Thessaloniki, Greece

**B12:** Assessing the relevance of the dust contribution to substances from consumer products and articles  
Principal investigator: Dr. Natalie von Götz, ETH, Safety and Environmental Technology Group, Zürich, Switzerland

**B13:** Development of a mechanistic *in silico* multi-scale framework to assess dermal absorption of chemicals  
Principal investigator: Prof. Gerald Kasting – University of Cincinnati, OH, USA

**B14:** Skin Sensitisation – Chemical Applicability Domain of the Local Lymph Node Assay (LLNA) (*Completed in 2015*)  
Principal investigator: A-M Api – RIFM, NJ, USA

**B15:** Developing a robust method of allocating efficiency measures to regulatory instruments in the chemicals industry  
Principal investigator: L Levy – Cranfield University, UK

**B16\*:** External validation of Tier-1 workers dermal exposure estimates in ECETOC TRA.  
Principal investigator: Dr Jodi Schinkel, Netherlands Organisation for Applied Scientific Research (TNO)

**B17\*:** Human exposure to emerging chemicals present in the indoor environment  
*Request for Proposals (RfP) advertised in 2015. Selection Team meeting held in October 2015*

**B18\*:** Database on Carcinogen Dose-response, including Information on DNA reactivity, for TTC and beyond  
*Request for Proposals (RfP) advertised in 2015. Selection Team meeting held in October 2015*

**C3:** A comprehensive Epigenomic profile of liver tissue from Rat and Mouse  
Principal investigator: Prof. Richard Meehan, University of Edinburgh, UK

**C4:** Foetal origins of adult disease (Epigenetics in Reprotoxicity)  
*Scoping meeting held in July 2015 to draft RfP. Workshop held 12-13 November 2015 (see more details under Workshops)*

**EMSG56.2:** Developing a Transcriptomics Analysis Framework  
*Scoping meeting held in July 2015 to draft RfP*

**EMSG57:** Endocrine disruptors and obesity, diabetes and heart disease: State of the science and biological plausibility  
Principal investigator: Dr. Judy LaKind, LaKind Associates, Catonsville, MD, USA

**EMSG58:** Human adverse health effects of endocrine active substances: assessment of the quality of individual epidemiological studies and of the overall mechanistic and epidemiologic evidence  
Principal investigator: Prof. Carlo La Vecchia, IRCCS - Istituto di Ricerche Farmacologiche Mario Negri (IRFMN), Milan, Italy

**HBM4:** Understanding inter- and intra-individual variability in HBM spot samples (*Completed in 2015*)  
Principal investigator: Dr. Ir. Roel Smolders, VITO Flemish Institute for Technological Research, Belgium

**HBM5\*:** (ESAP) Human Exposure to chemical mixtures present in indoor environments  
Principal investigator: G. Schoeters, VITO Flemish Institute for Technological Research, Belgium

**N1:** Tiered approach to testing and assessment of nanomaterial safety to human health (*Completed in 2015*)  
Principal investigator: Dr. Otto Creutzenberg, Fraunhofer Institute of Toxicology and Experimental Medicine, Hannover, Germany

**N3:** Towards standardized testing guidelines (reproductive toxicity) relevant to nanomaterials (*Completed in 2015*)  
Principal investigator: Dr. J.J.M (Han) Van de Sandt, TNO, AJ Zeist, The Netherlands

**N4:** Science-based grouping of nanoparticles for industrial application of safe-by-design (*Completed in 2015*)  
Principal investigator: Dr. ir. Hans Bouwmeester, RIKILT- Wageningen University and Research Center, Wageningen, The Netherlands

**N5\*:** Biokinetics and long-term effects of inhaled nanoparticles  
Principal investigator: PhD, Dipl. ACVP Dirk Schaudien, Fraunhofer Institute for Toxicology and Experimental Medicine, Hannover, Germany

## Environmental Research Liaison Teams

5 new environmental projects secured funding and were initiated in 2015 with the support of the research liaison teams (marked below with \*) and 4 projects were extended. The current research projects are:

**ECO8.3:** Fish cell line and embryo assays: follow up to the CELLsens ECO8/8.2 project (completed in 2015): In collaboration with the NC3Rs, a Round-Robin test of the RTgill-W1 cell line assay  
**Principal investigator:** Prof. Kristin Schirmer, Eawag, Switzerland.

**ECO11:** Influence of microbial biomass and diversity on biotransformation (Extension)  
**Principal investigator:** Dr. Russell Davenport, University of Newcastle, UK (The ECO 11 project has led to a Workshop on the improvement of the OECD 306 screening test, held 17-18 February 2015 at Cefas Laboratories, Lowestoft, UK. Further to this, a ring test of these techniques is being organised.)

**ECO18:** Identifying limitations of the OECD water-sediment test (OECD 308) and developing suitable alternatives to assess persistence (Completed in 2015)  
**Principal investigator:** Dr Kathrin Fenner, Eawag, Department of Environmental Chemistry, Switzerland

**ECO19:** Towards more ecologically realistic assessment of chemicals in the environment  
**Principal investigator:** Dr. Frederik De Laender, Ghent University, Belgium

**ECO20:** Development of an alternative testing strategy for the fish early life-stage (FELS) test (OECD 210) (Extension)  
**Principal investigator:** Prof. Dr. Dries Knapen, University of Antwerp, Belgium

**ECO21:** Mechanistic Bioaccumulation Model(s) for Ionogenic Organic Substances in Fish (Extension)  
**Principal investigator:** Dr. Jon Arnot, ARC Arnot Research & Consulting Inc, Canada

**ECO22:** Advancing the use of passive sampling in risk assessment and management of contaminated sediments: an inter-laboratory comparison study on measurements of freely dissolved (bioavailable) concentrations using different passive sampling formats (Extension).  
**Principal investigator:** Dr Michiel Jonker, University of Utrecht, The Netherlands

**ECO23:** Time-Integrative Passive sampling combined with Toxicity Profiling (TIPTOP): an effect-based strategy for cost-effective chemical water quality assessment  
**Principal investigator:** Timo Hamers Phd, IVM, VU University, Amsterdam, The Netherlands

**ECO24:** Computer based prediction of the formation of Non-Extractable Residues (NER) of xenobiotics and their metabolites in soils and sediments with regard to their environmental hazard  
**Principal investigator:** Dr Gerrit Schüürmann, Helmholtz Centre for Environmental Research (UFZ), Leipzig, Germany

**ECO25:** Development of Soup Tests for the Risk assessment of NER in Soil  
**Principal investigator:** Joop Harmsen, Alterra Wageningen UR, The Netherlands

**ECO26:** Adapt SimpleTreat for simulating behaviour of chemical substances during industrial sewage treatment  
**Principal investigator:** Prof. Dik van de Meent, Radboud University, The Netherlands

**ECO27:** Chemicals: Assessment of Risks to Ecosystem Services (CARES).  
**Principal investigator:** Dr Lorraine Maltby, University of Sheffield, UK.

**ECO28\*:** Modelling approaches for a scenario based assessment of chemically induced impacts on aquatic macroinvertebrate communities (MACROMOD)  
**Principal investigator:** Dr Monika Hammers-Wirtz, Research Institute for Ecosystem Analysis and Assessment, (gaiac), Germany

**ECO29:** Application of chemostat systems to include adaptation of microbial communities in persistency testing.  
**Principal investigator:** Dr John Parsons, University of Amsterdam (UvA), The Netherlands.

**ECO30:** Expanding the applicability domain of the chemical activity approach for hazard and risk assessment  
**Principal investigator:** Jon Arnot and James M. Armitage, ARC Arnot Research & Consulting Inc., Toronto, Canada

**ECO31\*:** Identifying strategies that will provide greater confidence in estimating the degradation rates of organic chemicals in water, soil, and sediment  
**Principal investigator:** Damian Helbling, Cornell University, USA (Rfp advertised in 2015. Selection Team meeting held 14 October 2015)

**ECO32\*:** Environmental risk assessment of poorly soluble substances: Improved tools for assessing biodegradation, (de)sorption, and modelling  
**Principal investigator:** Andreas Schäffer, Aachen University, Germany (Rfp advertised in 2015. Selection Team meeting held 02 October 2015)

**ECO34\*:** A tiered testing strategy for rapid estimation of bioaccumulation by a combined modelling - *in vitro* testing approach  
**Principal investigator:** Kristin Schirmer, Eawag, Switzerland (Rfp advertised in 2015. Selection Team meeting held 01 October 2015)

**ECO35\*:** Interference of hepatotoxicity with endocrine activity in fish  
**Principal investigator:** Thomas Braunbeck, University of Heidelberg, Germany (Rfp advertised in 2015. Selection Team meeting held 30 September 2015)

**EEM9.3:** Linking IUCLID and AMBIT (Completed in 2015)  
**Principal investigator:** Nina Jeliakova Institute of Parallel Processing, Bulgarian Academy of Sciences, Sofia, Bulgaria

Members of the

# Scientific Committee

**The Scientific Committee is responsible for the definition, management and peer review of the ECETOC work programme. Appointed by the Board, the members are selected on the basis of their scientific expertise. 2015 saw the departure from the Scientific Committee (SC) of the following Members who the SC and Secretariat would like to thank for their contribution to ECETOC during their time in the SC: RENÉ HUNZIKER (moved from Dow to Olin Corporation), LESLEY RUSHTON (Imperial College London) and JASON SNAPE AstraZeneca).**

During 2015, the Scientific Committee consisted of the following members:

<b>Ben van Ravenzwaay</b> <i>(Chairman)</i>	BASF
<b>Rémi Bars</b>	Bayer CropScience
<b>Peter Boogaard</b>	Shell
<b>Andreas Flückiger</b>	F. Hoffmann-La Roche
<b>Helmut Greim</b>	Technical University Munich
<b>René Hunziker*</b>	Dow Europe
<b>Fraser Lewis</b>	Syngenta
<b>Guiseppe Malinverno</b>	Solvay
<b>Lorraine Maltby</b>	University of Sheffield
<b>Stuart Marshall</b>	Unilever
<b>Marie-Louise Meisters</b>	DuPont
<b>Mark Pemberton</b>	Systox Limited (Formerly of Lucite)
<b>Carlos Rodriguez</b>	Procter & Gamble
<b>Dan Salvito</b>	RIFM on behalf of IFF
<b>Jason Snape*</b>	AstraZeneca
<b>Johannes Tolls</b>	Henkel
<b>Saskia van der Vies</b>	VU University Medical Center
<b>Kees van Leeuwen</b>	KWR Watercycle Research Institute
<b>Rosemary Zaleski</b>	ExxonMobil Biomedical Services

\*Resigned during 2015

Members of the

# Secretariat

The ECETOC Secretariat is responsible for the co-ordination and management of the scientific work programme, ensuring that the tasks assigned by the Scientific Committee are accomplished in a timely fashion. The continued success of ECETOC relies greatly on its Secretariat. This team of dedicated professionals supports the scientists engaged in the work of the ECETOC programme in meeting the objectives set by the Scientific Committee.

During 2015, the Secretariat comprised the following members:



**Alan Poole**  
Secretary General



**Malyka Galay Burgos**  
Environmental Sciences Manager



**Madeleine Laffont**  
Human Health Scientist



**Geneviève Gérêts**  
Office Manager



**Ian Cummings**  
Communications, Media and Web Manager



**Christine Yannakas**  
Administrative Assistant

An additional member of the Secretariat during 2015 was Diana Buksa who joined on a temporary basis as Administrative Assistant from April 2015 until January 2016. We wish her well in her future career. Her role was taken over by Agnieszka Harris in January 2016.

> FINANCE

# Finance



**INCOME ACTUAL 2015 IN EURO****Subscription**

31 Full Members	1.069.500
7 Associate A Members	70.000

**Total Subscription Income****1.139.500**

Bank Interest	7.880
Investment income	0
Project-related	309.148

**Total****1.456.528****EXPENDITURE ACTUAL 2015 IN EURO**

Salaries (and related expenses)	813.841
Office Running Expenses	207.756
Travel Expenses on Missions	5.907
Meetings and Consultants	357.216
Professional Services	22.132
Bank Charges	4.012
Capital Expenditure	15.547
Publications	4.864
Miscellaneous	18.287
Website	13.807

**Total****1.463.369****BALANCE SHEET AND RESERVES ACTUAL 2015 IN EURO****Balance Sheet**

Income	1.456.528
Expenditure	1.463.369
Operating Margin	-6.841

**Reserves\***

Opening	2.077.517
Operating Margin	-6.841

**Closing Reserve****2.070.676**

\*Estimated Reserve Required: 315.000

# Abbreviations



**AOP:** Adverse outcome pathways

**B:** Bioaccumulation

**Cefas:** Centre for Environment, Fisheries and Aquaculture Science

**Cefic:** European Chemical Industry Council

**CLP:** Classification, Labelling and Packaging

**CSA:** Chemicals Safety Assessment

**CSIC:** Spanish National Research Council

**DECC:** UK Department of Energy & Climate Change

**EAG MST:** (OECD) Extended Advisory Group on Molecular Screening and Toxicogenomics

**EC:** European Commission

**ECETOC:** European Centre for Ecotoxicology and Toxicology of Chemicals

**ECHA:** European Chemicals Agency

**ED EAG:** Endocrine Disrupter Expert Advisory Group to the EU Commission

**EDTA:** (OECD) Endocrine Disrupters Testing and Assessment Advisory Group

**EEMGS:** European Environmental Mutagenesis and Genomics Society

**EEMS:** European Environmental Mutagen Society

**EFSA:** European Food Safety Authority

**EOS:** (NERC) Environmental 'Omics Synthesis Centre

**EPA:** (US) Environmental Protection Agency

**EqP:** Equilibrium partitioning

**ERA:** Environmental risk assessment

**ESTAF:** ECVAM Stakeholder Forum

**EU:** European Union

**EUROECOTOX:** European Network for Alternative Testing Strategies in Ecotoxicology

**Eurotox:** Association of European Toxicologists and European Societies of Toxicology

**FELS:** Fish early life-stage

**GLP:** Good Laboratory Practice

**GM:** Genetically Modified

**HBM:** Human biomonitoring

**HMCS:** (OSPAR) Harmonised Mandatory Control System

**IATA:** Integrated approaches to testing and assessment

**ICCA:** International Council of Chemical Associations

**IPCS:** International Programme on Chemical Safety

**IR&CSA:** (ECHA Guidance on) Information Requirements and Chemical Safety Assessment)

**JACC:** Joint assessment of commodity chemicals

**JETOC:** Japan Chemical Industry Ecology-Toxicology & Information Centre

**LDNM:** Low dose non-monotonic

**LRI:** Cefic's Long-range Research Initiative

**MIE:** Molecular initiating event

**miRNA:** micro RNA

**MoA:** Mode of action

**MSC:** (ECHA) Member State Committee

**NC3Rs:** National Centre for the Replacement, Refinement and Reduction of Animals in Research

**ncRNA:** Noncoding RNA

**NER:** Non-extractable residue

**NERC:** (UK) National Environmental Research Council

**NORMAN:** Network of reference laboratories, research centres and related organisations for monitoring of emerging environmental substances

**OECD:** Organisation for Economic Co-operation and Development

**OIC:** (OSPAR) Offshore Industry Committee (OIC)

**OSPAR:** Convention for the Protection of the Marine Environment of the North-East Atlantic

**P:** Persistence

**PBT:** Persistent, bioaccumulative toxic

**PEG:** (ECHA) Partner Expert Group

**RA:** Risk Assessment

**RAC:** (ECHA) Risk Assessment Committee

**REACH:** EU regulatory framework for the registration, evaluation and authorisation of chemicals

**RepDose:** Database for the analysis of relationship between chemical function groups/categories and target organs in repeated dose studies

**RfP:** Request for proposal

**RNA:** Ribonucleic acid

**RNAi:** Ribonucleic acid interference

**RSC:** (UK) Royal Society of Chemistry

**SC:** (ECETOC) Scientific Committee

**SEA:** Socio-economic analysis

**SETAC:** Society of Environmental Toxicology and Chemistry

**SIG:** (Cefic Long range Research Initiative) strategy implementation group

**SOT:** (US) Society of Toxicology

**STFC:** Science and Technology Facilities Council, UK

**TRA:** Targeted risk assessment

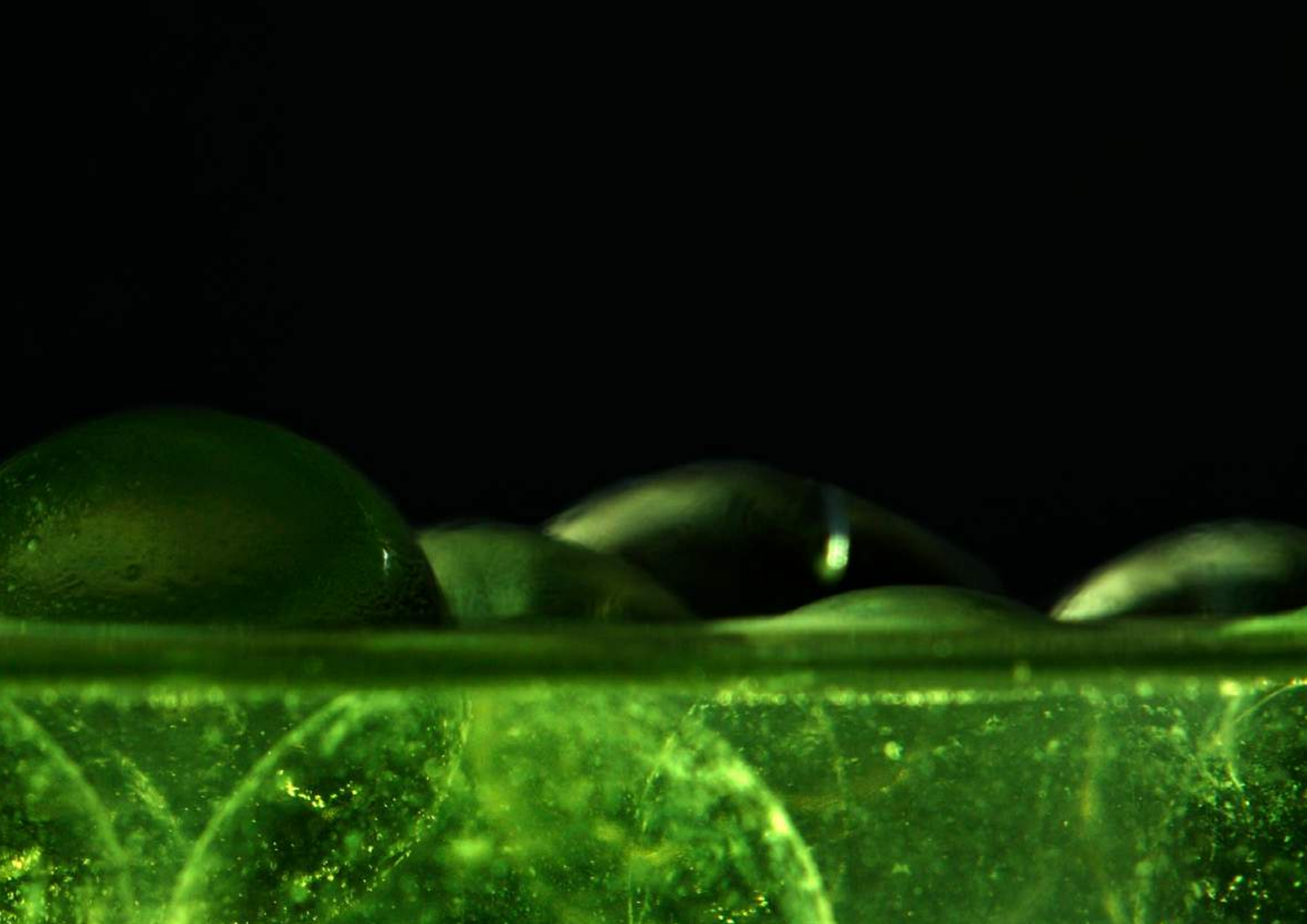
**UBA:** Umweltbundesamt (Environment Agency Austria)

**UNEP:** United Nations Environment Programme

**USEtox:** USEtox is a scientific consensus model endorsed by the UNEP/SETAC Life Cycle Initiative for characterizing human and ecotoxicological impacts of chemicals.

**WHO:** World Health Organisation





**ECETOC AISBL**

Av. E. Van Nieuwenhuysse 2 (Bte 8), B-1160 Brussels, Belgium  
Tel: (32) 2 675 3600 - Fax: (32) 2 675 3625

Email: [info@ecetoc.org](mailto:info@ecetoc.org)

VAT: BE 0418344469

**Copyright © ECETOC, February 2016**

Since 1978 ECETOC, an Industry-funded, scientific, not-for-profit think tank, strives to enhance the quality and reliability of science-based chemical risk assessment

