

Summary

The **Department of Environment & Health (E&H)** is embedded within the Faculty of Science of Vrije Universiteit Amsterdam. It was established in 2017, after a merger between the section Chemistry and Biology (C&B) of the Institute for Environmental Studies (IVM) and the section Health and Life Sciences (Gezondheid en Leven, G&L) of the Department ATHENA. The merger led to the creation of a department with a well-balanced research/teaching portfolio. We have successfully invested in personal development for staff to move towards the dual nature of academic tenured positions involving both teaching and research at top level.

Research of E&H is focused on a **better understanding of the impact of environmental contaminants on human health and the environment**. We investigate the occurrence and fate of pollutants, such as chemicals and (micro)plastics, unravel their toxicological mode of action and link these to human health outcomes. The department covers three disciplines, i.e. analytical chemistry, toxicology and epidemiology, which form a unique combination in the Netherlands. Currently, the department is organised into two sections: Chemistry for Environment and Health (CEH, chaired by Prof. Leonards and Prof. Lamoree) and Environmental Health and Toxicology (EHT, chaired by Prof. van Duursen). Our strength lies, however, in the integration of these three disciplines in our research, education, training of PhD candidates and societal outreach. For this, E&H provides an open academic setting in which people are free to share their ideas and thoughts.

Over the last years, research funding was successfully obtained from various sources, which led to a steady increase of mainly PhD candidates and technical support staff. Our laboratory is well-equipped with first-class analytical facilities. E&H analytical chemists are renowned for their **accurate and precise, high-quality analyses**, often setting the trend and opening up new research directions, e.g. on PFAS and (micro)plastics. In the last seven years, considerable investments were made on advanced laboratory equipment that enabled the development of **non-target analyses and fast-screening methods** of pollutants in various matrices. The department has developed and optimised many **bioassays**, including zebrafish embryotoxicity model, for screening of individual compounds and monitoring of complex mixtures in environmental and human samples or studying toxicological mechanisms. We focus on **non-animal test models** and implement high-content readouts, such as **metabolomics** approaches and effect-directed analyses, where possible. Lastly, we link exposure and toxicity profiles to actual human health outcomes, such as **cognitive problems and ADHD-like behaviour** in children.

Over the past seven years, E&H has expanded its research focus from predominantly environmentally-related research to cover human-health oriented research as well. Obviously, environment and human health are closely interrelated and cannot be seen as two independent silos. E&H has acquired a strong position by operating at this nexus of environment and human health. Our research projects cover a broad field and focus on **microplastics** (e.g. LimnoPlast, CleanSea), **endocrine disrupting chemicals** (FREIA, ATHENA, ENDpoiNTs), **PFAS** (PERFORCE3, PFOSLO, TIPTOP), **(bio)monitoring** in water (HT-EDA, RoutinEDA) and human samples (HBM4EU, DENAMIC). Our research is published in high-impact journals and is highly cited. The success of E&H to acquire large research collaborative research grants is also reflected in the increasing number of **collaborative publications and PhD candidates** with projects rooted in (inter)national collaborations, e.g. CSC, EU projects, Marie-Curie (ITN), and NWO. Our PhD candidates come from all over the world and about 50% is female. We train our PhD candidates to apply their fundamental understanding of the chemical contamination, toxicological effects and health aspects to find solutions to global health issues. Half of the graduated E&H PhD candidates continues his/her career in academia, 10% percent works for governmental institutes, 10% in consultancy and 20% in a commercial setting, clearly demonstrating the versatility we offer our PhD candidates.

Facts do not tell stories on their own, so there is a lot of importance for open science and getting the story out that goes with the laboratory data. For this, **E&H has a very strong societal presence** and reaches out to regulatory bodies, chemical manufacturing industry, non-governmental and charitable organisations, educational organisations, civil society and the general public. Our research is used in/for some high impact reports used by policy-makers. We discovered the release of substantial volumes of the GenX, which is used to replace banned PFAS substances, from a Teflon factory in Dordrecht. This led to a cascade of governmental actions at national and European level. We are leading experts in the international (micro)plastics field and one of the world's first laboratories with the ability to demonstrate internal human exposure to plastic particles. This is an important break-through, which will greatly affect microplastics research and impact society as a whole. We participate in various national and international expert panels to improve identification of endocrine disrupting chemicals (EDCs) and frequently appear in the media to explain health issues of EDCs.

The need for scientific evidence to solve contemporary and future societal problems has never been as pressing as today. It is estimated that the sales of chemicals will double over the next twelve years, which is clearly a potential threat for the environment and human health, but also stresses the need to better address exposure and hazard of chemicals. **Our future strategy is geared towards this need and train the next generation scientists to meet tomorrows challenges today.**