IDEA League

TU Delft
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Report on research projects under the IDEA League Student Grant

Personal information				
Full Name:		Hannah Pfeifer		
Field of study:		Ecotoxicology		
Degree pursued:		Master`s degree	**Current year of studies:**	2nd
Home University:		RWTH-Aachen University		
Sponsoring professor at home university	**Name:**	Prof. Dr. Henner Hollert		
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Information about the research stay					
Host University:		EAWAG aquatic research institute of the ETH Zürich			
Sponsoring professor at host university	**Name:**	Prof. Dr. Kristin Schirmer			
	Email address:	Kristin.Schirmer@eawag.ch			
Dates of research stay		**from:**	01.04.2019	**to:**	30.06.2019

Summary of the research project
(200 words max.)

The research project I was involved in aimed to predict biotransformation and bioconcentration of a broad range of organic chemicals in fish. Bioaccumulation is an important criterion in the environmental risk assessment of chemicals. Bioaccumulation is defined as an increase in the organism internal concentration compared to the external chemical concentration in the environment. So far, *in vivo* tests are conducted to determine bioaccumulation in fish to assess the risk of man-made chemicals. In consequence, annually, a high number of fish are sacrificed for toxicological tests. To promote alternatives to the *in vivo* animal testing, in this project chemical uptake and biotransformation was measured by using three different permanent cell-lines from rainbow trout (*Oncorhynchus mykiss*): The liver cell-line, RTL-W1, was selected because the liver presents the major organ of biotransformation; the gill cell-line, RTgill-W1, was chosen as one major side of chemical uptake for water borne chemicals and the gut cell line, RTgutGC, was selected because the intestine is an important uptake site of chemicals ingested with food. The clearance rates obtained from the *in vitro* bioassays were then integrated into a physiologically based toxicokinetic (PBTK) model to predict organism internal chemical concentration and to calculate the bioconcentration factor (BCF). In the end, predicted BCFs were compared with BCFs received from *in vivo* experiments to evaluate the validity of alternative method and the potential to replace the *in vivo* tests.

Experience report
Please tell us about your experience at the host university and give us an evaluation of the benefits of the research stay for the course of your studies

From my first day at EAWAG, I felt very welcome by the whole Department of Environmental Toxicology. The people of this international working group are very friendly, open-minded and helpful in all kind of situations. There is a flat hierarchy and I really liked the open as well as warm-hearted atmosphere which is an important basis to feel comfortable and to also have critical communications. Furthermore, I appreciate that I was fully integrated into the team: I participated in meetings about the biotransformation project for result discussion and further proceeding, I jointed the weekly seminars, I helped out with the supervision of the ETH students of the practical course in Molecular Ecotoxicology and finally I was even invited to the two-days Department retreat. During the latter I got not only the possibility to get to know the people from another perspective, but also gained an insight into strategies of productive problem discussion.
Another advantage was the freedom to make use of the institute`s offers, so that I could participate in presentations of my own interest and I attended an useful Endnote course.
Regarding my supervision I was really grateful that there was a good balance between support and getting responsibility. I got the help and feedback I needed but also the motivation to solve problems by my own.
In retrospect, I could put my theoretical background knowledge into action and gained a broad range of benefits from my research stay. I acquired the useful practical skills in lab work which I had expected, in particular in the work with cells. Inter alia I obtained routine in cell cultivating, passaging and counting and learned the chemical exposure and sampling of cells in special, non-transparent well plates. Beyond this, I attained the competence of coordinating an assay of several days with time-dependent working steps. Moreover, I improved my ability in conducting important calculations which are usually needed for ecotoxicologial bioassays. At least equally useful was my first insight into the Graphpad program to easily create dose-response curves.
Summarising, I am sure that I will profit from all these hard and soft skills I have gained during my research stay: Near-term I feel better prepared to conduct my master thesis which will be also a cell-based project. Long-term these experiences are a plus in my CV and the establishment of contacts is of course also an important and helpful factor to get a job in this research area.

Picture
Please provide a picture of you at the guest university

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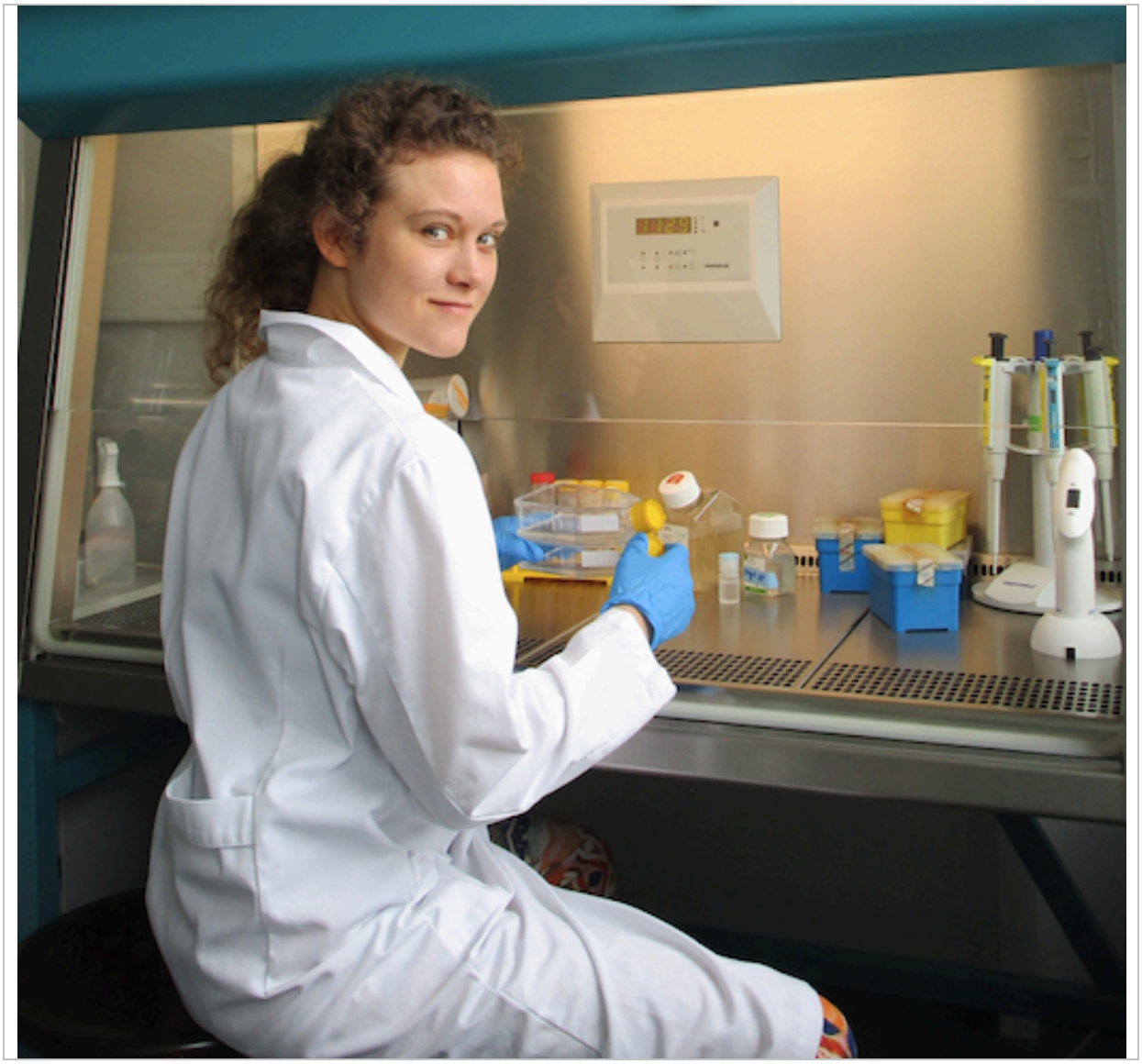

The report should be signed by both professors involved. (The signatures will be deleted when the template is published on the IDEA League web page.)

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Students Name	Sending Professor	Host Professor