

# ENVIRONMENTAL SCIENCES AND ENGINEERING

MASTER



**EPFL**



This MSc educates students to address complex challenges within built and natural environments with a multidisciplinary approach of environmental engineering problems. Thanks to this project-based curriculum, they can contribute to the development of sustainable solutions in various fields such as water and soil resources, air quality or natural hazards.

# Bacterial communities value in aquatic ecosystems

Coralie Chappelier under the supervision of Prof. Kohn

My project focuses on the bacteria in the lake of Geneva. I was able to take samples and measure different parameters from the Lexplore platform off Pully. The goal is to characterize the bacterial communities found in the lake and to understand how they change according to depth, temperature and seasons by applying different methods. Eventually, it is interesting to know how these bacteria will evolve with climate change, and in particular their development can poison animals like dogs. This project really motivated me because it allowed me to make field measurements, collect samples and analyze them in the laboratory. However, I did not have all the results when I wrote my thesis report, but fortunately I was able to present the latest investigations during my defense.

*Elise Moatti:  
« Travailler dans un domaine qui est en accord avec mes valeurs et œuvrer pour le déploiement des énergies renouvelables me motive vraiment ».*

*Guillaume Crosset Perrotin:  
« On prend des mesures utiles pour la société et on constate des améliorations comme la diminution de certains polluants, c'est très stimulant ».*

# Guaranteeing access to drinking water is vital for the development of humanity

Alexis Baron under the supervision of Prof. von Gunten

As part of my studies, I specialized in water and wastewater treatment and I wanted to implement this knowledge during my graduation work. For my master project, I had the opportunity to go to Palestine for three months with an Italian NGO in order to study drinking water filters in villages south of Hebron. On site, I went to meet people to take water samples that then analyzed them in the laboratory. It is a rich and intense region, which is motivating to develop a project on water quality.



# The ice floe is changing rapidly and impacting the global climate

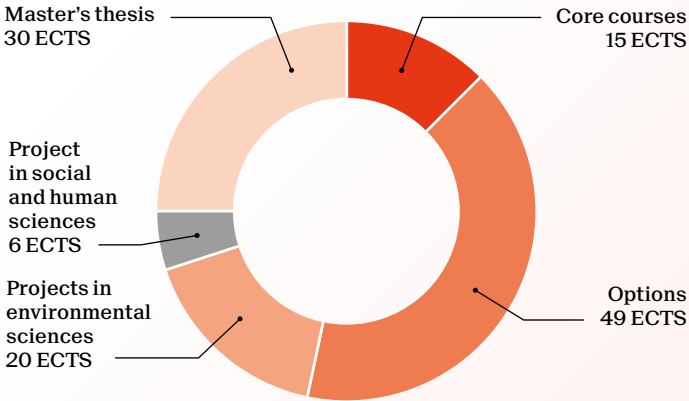
Océane Hames under the supervision of Prof. Lehning

I carried my master's thesis in Davos at the SLF (Institute for Snow and Avalanche Research) and studied the ice floe in collaboration with a PhD student who participated in a ship mission in the Arctic. The goal of this project is to study the distribution of snow on the pack ice which is subject to strong winds. These snow movements modify the energy balance in this region and impact the formation of the ice pack. These changes in the polar zones have an impact on the global climate. By modeling them accurately, we hope to better understand what might change in the future. This allowed me to learn how to use a new model. Polar environments are changing much faster than we think and we need to act now for the future.



# Master of Science in ENVIRONMENTAL SCIENCES AND ENGINEERING

2-year program - 120 ECTS



The program includes a compulsory 8-week internship which can be extended to 6 months and combined with the Master's thesis.

## Several specializations available

D: Water resources and management (WRM)  
E: Climate change anticipation and adaptation (CCAA)  
F: Environmental sensing and computation (ESC)  
G: Biological and chemical processes in environmental engineering (BCP)

## Students may choose a minor (30 ECTS), e.g.:

- Data science
- Energy
- Engineering for sustainability
- Integrated design, architecture and sustainability
- Transforming territories under climate change

## Career prospects

Graduates' expertise, scientific skills and versatility enables them to access a wide variety of activities in the industry, consultancy firms and environmental engineering companies. Their multidisciplinary approach allows them to successfully collaborate with civil engineers, urban planners, geologists and various experts involved in land, mobility and resource management. They therefore have the opportunity to work in public administrations (sanitation, energy, mobility, spatial planning) and in environmental organizations (scientific cooperation). In order to satisfy their scientific curiosity, they may also decide to embark on a doctoral thesis.

School of Architecture, Civil and Environmental Engineering  
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	Specialization				Credits
	D	E	F	G	
<b>Core courses</b>					<b>15</b>
Atmospheric processes: from cloud to global scales		E			5
Sensing and spatial modeling for earth observation			F		5
Water and wastewater treatment				G	5
Water resources engineering	D				5

<b>Options</b>					<b>49</b>
Advanced satellite positioning			F		4
Air pollution		E	F		5
Applied data analysis			F		8
Applied ecology		E			4
Applied wastewater engineering	D			G	3
Bio-ingénierie des cours d'eau et milieux naturels	D				2
Climate and water sensitive urban design	D	E			4
Development engineering				G	4
Distributed information systems			F		6
Distributed intelligent systems			F		5
Éco-morphologie fluviale	D	E			3
Ecotoxicology				G	4
Energy conversion and renewable energy		E			4
Environmental transport phenomena			F		5
Etudes d'impact		E			3
Exploratory data analysis in environmental health		E	F		4
Fate and behaviour of environmental contaminants	D			G	4
Global change ecology and fluvial ecosystems	D			G	4
Groundwater and soil remediation	D			G	4
Hydraulique fluviale et aménagement de cours d'eau	D				3
Hydrogeophysics	D			G	3
Hydrologie urbaine	D	E		G	4
Image processing for earth observation	D	E	F		4
Image processing I			F		3
Image processing II			F		3
Indoor air quality and ventilation			F		4
Irrigation and drainage engineering	D				4
Limnology	D			G	5
Material and energy flow analysis				G	4
Multivariate statistics in R			F		4
Occupational and environmental health				G	3
Physics and hydrology of snow	D	E			4
Recycling of materials				G	2
Risques hydrologiques et aménagements	D	E			3
Sanitary engineering in developing countries	D			G	3
Science of climate change		E			4
Sensor orientation			F		4
Solid waste engineering				G	4
Sustainability assessment of urban systems		E			3
Systèmes de management environnementaux		E			2
Urban Green&Blue infrastructure and global warming		E			3
Water resources management	D				3
Biomining: from nature to application					4
Droit: contrats et responsabilité professionnelle					3
Environmental economics					4
Gestion foncière et droit foncier					3
Projet ENAC					4
Summer Workshop					4

<b>Semester projects</b>					<b>20</b>
Design project					10
SIE Project					10