

DOCTORAL
SCHOOL

CIVIL AND ENVIRONMENTAL ENGINEERING



EPFL

The doctoral program in civil and environmental engineering (EDCE) at EPFL is a multidisciplinary program designed to tackle the most challenging problem of our time: fostering a vibrant and productive society while ensuring environmental sustainability.

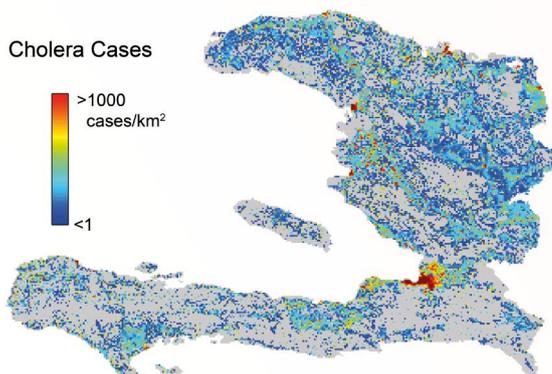
This challenge is being addressed by creative interactions between science and engineering.

The strength of EDCE is that it spans a remarkably broad research spectrum: from rock mechanics to microbiology, from rivers to roads and from the dams to glaciers. EDCE offers the educational model necessary to become a leader in fast-paced, high-tech industries and academia.

Spatial epidemiology of waterborne disease

The Laboratory of Ecohydrology focuses on research at the interface of hydrology, geomorphology and ecology under an integrated framework of analysis with an aim for a general theory. The main effort in the doctoral program is devoted to the development of a new research field across physical and biological sciences: spatial epidemiology of waterborne disease, with significant impacts on science and public health practice. Waterborne diseases are infections that predominantly are transmitted through contact with or consumption of contaminated water. They can strike humans, animals and even plants. Spatially explicit mathematical models of waterborne infections are fast revolutionizing epidemiology as they can provide key insights into the course of an ongoing epidemic,

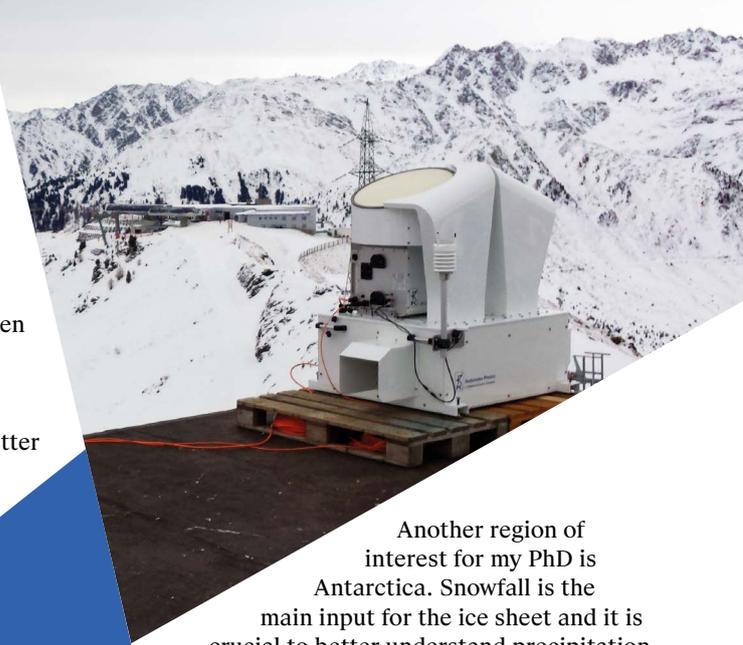
potentially aiding real-time emergency management in allocating resources and anticipating the impact of alternative interventions. We aim at a new generation of spatially explicit multilayer-network models of waterborne epidemics and epizootics. Specifically we study cholera, one of the most important global health hazards, and proliferative kidney disease in salmonids, which has a critical impact on fish stock with major ecological and bio-economic consequences.



Using weather radars to study mountainous and Antarctic snowfall

Snowfall in mountainous regions arise from complex interactions between the large-scale atmospheric flow, the topography and microphysical processes in clouds. This leads to a high spatio-temporal variability of snowfall intensity, which is challenging to forecast.

To better represent these interactions in weather models, we need to better understand the processes involved. To do so we use precipitation and cloud radars to study the dynamics and microphysics of mountainous snowfall. During the first two first years of my PhD, I had the chance to take part in three measurement campaigns. The first one was in Valais in the winter 2016-2017. The second one took place in South-Korea during the PyeongChang 2018 Olympic Winter Games, as part of an international experiment. It was a great opportunity for me to discover a new culture and to compare measurements we did in the Swiss Alps with the Taebaek mountains in Korea.



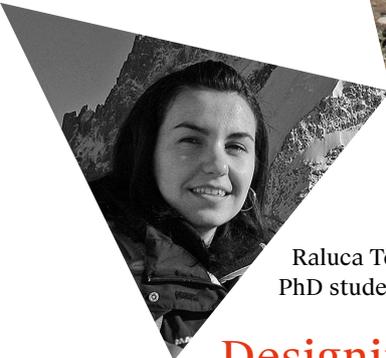
Another region of interest for my PhD is Antarctica. Snowfall is the main input for the ice sheet and it is crucial to better understand precipitation processes in Antarctica to monitor and forecast changes due to global warming. The third field campaign of my PhD took place in Davis station in East Antarctica. We are interested in particular effects which take place at the coast of Antarctica, such as snowfall sublimation by the dry katabatic winds that are blowing from the interior of the continent towards the coast. This was a great opportunity to work in a scientific research station in Antarctica and collaborate in an international project. Now that I collected so many data from different parts of the world, my work focuses on the analysis of those. In particular I am investigating which meteorological conditions lead to intense snowfall and how they affect the growth of ice crystals in clouds. My PhD is very enriching because of the variety of the work: from field campaigns to data analysis and presentation at international conferences, it is definitely the project I was looking for!



Josué
Gehring,
PhD student



Raluca Tereza Constantin,
PhD student



Designing earthquake resistant buildings

Currently I am a PhD student in my 3rd year in the Earthquake Engineering and Structural Dynamics Laboratory. My research focuses on developing the seismic design guidelines for reinforced concrete core walls. What attracted me very much to this topic and to EPFL was the practical nature of the research topic as well as the opportunity to perform large-scale testing.

Moreover, the project is quite comprehensive, involving numerical, analytical, as well as experimental tasks. No time to get bored... I have profited from a very high level of research and education at EPFL. Of course, such high standards require a lot of work, but it is deeply satisfying.

People here are very passionate about their work, and at the same time supportive and helpful with yours. The university environment is really collaborative and international.



Application deadlines

The applications to the doctoral program in civil and environmental engineering (EDCE) can be received by January 15th, April 30th and September 15th. Your complete application material must be received by the doctoral program at EPFL prior to the deadline at which you wish your application to be considered.

Research opportunities

More than 40 labs, mainly from the School of Architecture, Civil and Environmental Engineering, but also from the School of Basic Sciences and the School of Engineering, are offering PhD research opportunities along 4 main streams:

- Structural Engineering
- Systems Engineering
- Environmental Resources Engineering
- Chemical & Biological Processes

Job market

Some of our PhD graduates have joined the faculty of good universities around the world. To facilitate the access to the academic market, EDCE is encouraging the mobility of its students through “mobility awards” to increase their visibility and, therefore, their competitiveness on this market. Many other PhD graduates have been hired by companies or consultants offices, or have established their own start-up based on the tools and skills developed during their PhD thesis. To foster this line, EDCE encourages participation in research projects with the industry by providing sufficient flexibility to allow the students to accomplish the requirements of the program in this context, while not compromising on the quality of their research.

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Lab	Structural Eng.	Systems Eng.	Environmental Resources Eng.	Chemical & Biological Processes
Interdisciplinary Laboratory of Performance-Integrated Design	•			
Applied Computing and Mechanics Laboratory	•	•		
Chair of Timber Construction	•			
Composite Construction Laboratory	•			
Computational Solid Mechanics Laboratory	•			
Earthquake Engineering and Structural Dynamics Laboratory	•			
Environmental Hydraulics Laboratory			•	
Soil Mechanics Laboratory - Chair “gaz naturel” Petrosvibri	•		•	
Solar Energy and Building Physics Laboratory			•	
Steel Structures Laboratory	•			
Structural Concrete Laboratory	•			
Structural Maintenance and Safety Laboratory	•			
Construction Materials Laboratory	•			
Economics and Environmental Management Laboratory			•	
Transportation and Mobility Laboratory		•		
Urban Transport Systems Laboratory		•		
Atmospheric Particle Research Laboratory				•
Distributed Intelligent Systems and Algorithms Laboratory		•		
Ecological Engineering Laboratory			•	•
Environmental Chemistry Laboratory				•
Environmental Microbiology Laboratory				•
Environmental Remote Sensing Laboratory			•	
Geodetic Engineering Laboratory		•	•	
Geographic Information Systems Laboratory		•		
Solid Waste Engineering		•	•	
Laboratory for Biological Geochemistry				•
Laboratory for Environmental Biotechnology				•
Laboratory for Water Quality and Treatment				•
Laboratory of Cryospheric Sciences				•
Laboratory of Ecohydrology			•	
Laboratory of Environmental Toxicology				•
Laboratory for Human-Environment Relations in Urban Systems		•		
Physics of Aquatic Systems Laboratory - Margaretha Kamprad Chair				•
Prof. Hering Group in Environmental Chemistry				•
Wind Engineering and Renewable Energy Laboratory			•	
Laboratory of Experimental Rock Mechanics	•			
Geo-energy Laboratory - Gaznat Chair on Geo-energy			•	
Stream Biofilm and Ecosystem Research Laboratory			•	•
Structural Exploration Laboratory	•			
Urban Sociology Laboratory		•		
Thermal Engineering for the Built Environment Laboratory	•	•		
Human-Oriented Built Environment Lab			•	•
Visual Intelligence for Transportation			•	
Urban and Regional Planning Community	•			
Snow Avalanche Simulation Laboratory			•	
Laboratory of atmospheric processes and their impacts				•