



Settled in her field of research and at Eawag in Dübendorf: Barbora Trubenová. (Photo: ETH Zurich, Melinda Thulin)

## From mathematical models to parasitic worms: Introducing Barbora Trubenová

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**Barbora Trubenová has been newly appointed as a Group Leader in the Eco department and Assistant Professor of Pathogen Evolution at ETH Zurich. She is interested in the resistance of bacteria, fungi and parasitic worms to drugs. How do these organisms adapt in order to survive?**

### For those who don't know you yet: Who is Barbora Trubenová?

I studied Physics and Biology in Slovakia. Then I went to the University of Manchester in the UK to do my PhD, studying the evolution of social behaviours. Later, I got a post-doctoral position in Vienna and stayed five years as a post-doctoral fellow, with a Marie Skłodowska Curie fellowship. I came to ETH in the middle of the pandemic to study the evolution of drug resistance, again as a postdoc. I really liked this topic, so I applied for an SNF fellowship that I was lucky to get. Since September 2024, I have been an Assistant Professor and Group Leader of Pathogen Evolution at Eawag and in the Department of Environmental Systems Science (D-USYS) of ETH Zurich.

### What is your research area?

My research focuses on the mathematical modelling of how drug resistance evolves and spreads in various pathogens. Bacteria, parasitic worms and fungi all evolve resistance to drugs we use to treat them. We are using mathematical modelling to determine the speed of this process and how it is

influenced by factors such as drug dosing, how many sets of different chromosomes these organisms have or how they live or reproduce. Some clone, some reproduce sexually. Some live as a biofilm, some freely. By studying these aspects, we can gain insights into drug resistance evolution in these pathogens.

### What is your research plan?

Our idea is to develop one general model that we can alter using different kinds of modules that we plug together. Then, we can model different organisms depending on what we put together. These organisms differ significantly, so a one-size-fits-all model would not work. But we can have one general model that can be adapted as needed. This model will enable us to model different types of bacteria – or something completely different, for example parasitic worms. In order to parameterize these models, we are collecting a lot of data from the internet. This information is very difficult to find. So we are trying to build a database encompassing as much data as possible. We also want to create some very specific predictions that can be tested experimentally with our collaborators from other universities.

### Related Links

Research Group Pathogen Evolution

Barbora Trubenová appointed assistant professor at ETH Zurich

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