



Miniature laboratory: Elizaveta Bobkova uses a device like this one to create minuscule drops and then research the biochemical reactions that take place inside the drops.

80

Max Planck researchers collaborate with partners in more than 120 countries. In this article, they write about their personal experiences and impressions. Elizaveta Bobkova from the Max Planck Institute for Terrestrial Microbiology in Marburg spent three months in Bordeaux as part of the German–French exchange program Salto. She mastered complicated lab technologies, served as a juror for a synthetic biology competition, and practiced her favorite sport: figure skating.

I discovered my first passion when I was four years old. My parents gave me a pair of ice skates. From that point on, I practiced jumps and pirouettes several times a week. Later, when I was a student in Heidelberg, I was a member of the figure skating club. My second passion emerged during my high school years: I became increasingly interested in the

sciences and had a lot of fun participating in biology competitions.

After I graduated from high school, I enrolled in a degree course in biosciences and later focused on biophysics. One highlight for me was participating in the annual competition “International Genetically Engineered Machine” (iGEM). In that competition, teams of young scientists from around the world present their developments in the field of synthetic biology. You look through the microscope and see something you’ve created yourself and nobody else has ever seen before – how cool is that?

One day I attended a talk by Tobias Erb. He and his team at the Max Planck Institute for Terrestrial Microbiology in Marburg succeeded in developing an artificial metabolic pathway and coupling it to chloroplasts. That makes it possible to bind carbon dioxide and convert it into new compounds. Ide-

ally, these kinds of synthetic reaction cycles could be used in the future to extract greenhouse gas from the atmosphere and use it to create chemical substances in an environmentally friendly manner. I was fascinated by this vision of being able to fight climate change with biotechnological techniques. That’s what I wanted to research!

I introduced myself to Tobias Erb and received a position as a doctoral researcher. In my doctoral research, I am looking for a way to selectively transport molecules through synthetic membranes. My goal is to make the artificial reaction cycles even more efficient by spatially separating the subprocesses. To accomplish this, I use microfluidics – a technique that can be used to examine biochemical reactions in minute spaces. The first place I went to study this technique in depth was the laboratory run by Jean-Christophe Baret in Bordeaux.

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## BORDEAUX

Baret is an expert in this field and has been working with our research group for many years. The German–French exchange program Salto, a collaboration between the French research organization Centre national de la recherche scientifique (CNRS) and the Max Planck Society, made it possible for me to go there.

Microfluidics is an extremely versatile technology. I essentially use drops of liquid as minuscule test vessels. To create these vessels, I guide three fluids through extremely fine channels. Two of the fluids, each containing different components of the reaction, intermix. They then form a drop within the third fluid, which is immiscible with the first two and serves as a “vessel.” The reaction begins as soon as the reactive components meet inside of this vessel. It’s an ingenious technique, but handling the extremely small cannulas and syringe pumps takes a steady hand and some getting

used to. I learned an incredible amount in Bordeaux, especially from Thomas Beneyton, the postdoctoral researcher who supervised me there.

The time I spent in France was a great success in another regard: since this year’s iGEM competition was being held in Paris at the same time, I took the opportunity to make a stop in Disneyland on my way to Paris. Unlike in the past, I was a jury member and not a participant in the competition. The excellent projects and exchanges with so many creative people were inspiring and a lot of fun. And as if that weren’t enough, I got to ice skate in France for the first time in ages. The nearest rink in Marburg is so far away that I have had to put my favorite sport on hold for the time being. In Bordeaux, however, it was just around the corner, so I could pursue my old passion again after work. The best thing about it was that I could still do jumps and figures!



PHOTO: PERSONAL

Elizaveta Bobkova

28 years old, she is the spokesperson for PhDnet, the Germany-wide network of Max Planck doctoral researchers, and a board member of N<sup>2</sup>, a networking platform for the doctoral candidates of the Max Planck Society, Leibniz Association, and Helmholtz Association. While working on her doctorate at the Max Planck Institute for Terrestrial Microbiology, she also taught herself how to draw. Most of all, she enjoys illustrating scientific publications.