

Nachgefragt: Interview mit Dr. Victoria Grushkovskaya



Foto: privat

Victoria Grushkovskaya arbeitet als Mathematikerin an der Universität Klagenfurt. Sie war als Alexander-von Humboldt-Forschungsstipendiatin an der Universität Stuttgart und wechselte dann nach einem Zwischenaufenthalt an der Universität Würzburg nach Klagenfurt. Ihre Forschungsgebiete sind die Mathematische Kontrolltheorie, die Nichtlineare Dynamik und die Stabilitätstheorie.

Your CV is very impressive because at a very young age, you finished your Ph.D. You did a lot of traveling to other countries and cities and received a lot of invitations for conference talks. When did you notice that you have a special interest in mathematics?

Probably already in school. My teacher caught my interest in mathematics. When I went to the mathematical faculty, the very beginning was a bit difficult. But then I got used to the language of mathematics. The final decision to start PhD studies was because of my PhD supervisor, Prof. Alexander Zuyev, who really inspired me. He presented me with mathematically challenging and practically relevant problems from mathematical control theory, and I realized that I wanted to continue scientific research after graduating. So because of him I decided to start with my PhD studies.

Where did you study in the Ukraine?

I studied in Donetsk. This is my hometown and I started at the mathematical faculty of the Donetsk National University. Then I did my PhD at the Institute of Applied Mathematics and Mechanics of the National Academy of Sciences of Ukraine, which at that time was located in Donetsk.

Immediately after finishing your PhD, you became a research fellow at the same institute. Very soon you decided to apply for a Humboldt fellowship. How did you learn about this fellowship? How did you come into contact with your supervisor in Stuttgart?

It was because of my PhD advisor as well. Actually, he played a major role in my development as a scientist. It is an interesting story that, after many years of fruitful research collaboration, we became partners not only in science but also in life, establishing a new family. We are a couple of Humboldtians: Alexander has also received a Humboldt fellowship when he was a postdoc. He told me about the Humboldt fellowship and explained that it provides an irreplaceable opportunity for young researchers to carry out own research project at a German institution of their choice, and on very good conditions. He also helped me to find a host. His fellowship had been in Ilmenau and his host had moved to Stuttgart. He advised me to contact Prof. Frank Allgöwer, the director of the Institute for Systems Theory and Automatic Control and at that time also vice-president of the DFG. I sent an email to Prof. Allgöwer and he was so nice to ask me what I could propose for a research plan. We met in Stuttgart, and he agreed I could apply for the fellowship.

Was your supervisor working on the same subject as you, or was it different from your interests?

We are both working in the mathematical control and stability theory. And we now have many joint papers and still continue to work together on some research topics. But we also have many differences in our research. He goes in one direction and I go in another.

Can you explain to a layman the subject you are working on? What is mathematical control theory?

Many processes from various areas of science and technology can be described by mathematical models represented by systems of ordinary differential equations. Among such processes are, for example, motion of vehicles and robots, manipulators, etc. In most cases, they are rather difficult to study from mathematical point of view because of complicated or even partially or completely unknown system description. One of my research directions is related to the qualitative analysis of such systems, i.e. the goal is to provide a mathematical description of the long-term behavior of the process, whether it is stable with respect to some perturbation, etc. Another direction of my research focuses on controlling such processes, i.e. on developing algorithms which ensure the desired behavior of the process. For example, how to control a robot so that it moves to a prescribed destination, or along a prescribed trajectory, or how to ensure a collision-free motion of a robot in an environment with other static or moving objects? Mathematical control theory can give constructive answers to these questions, and searching for these answers is a challenging, but very interesting process.

If to say more specifically, I am working on motion planning of systems with nonholonomic constraints, such as wheeled vehicles, and on extremum seeking control, which is related to the optimization of the system's performance under very limited information.

You have been to a lot of conferences in different countries all over the world for invited talks. How did this influence your scientific work?

Each time I give a presentation at a conference, I get some feedback, some questions. And this helps to improve my work. This reflects the level of interest in my subject and gives directions for the next step. Furthermore, attending other talks allows me to stay informed about the latest developments and challenges across various research domains, which is a very good source for inspiration. And of course, participation in conferences is not only giving a talk. It is also networking, new contacts, new impressions.

You stayed in Stuttgart for the whole period of two years. Then, you became a postdoctoral researcher at the University of Würzburg. What happened?

Prof. Allgöwer gave me a lot of useful advice on how to proceed in my scientific career. He recommended to apply for a DFG grant. I was already familiar with Prof. Sergey Dashkovskiy who is also working in mathematical control theory, and he agreed to support my application. It was a good strategy to change, because in Germany it is good for young scientists to change the environment

So you were very lucky to succeed with the DFG grant application.

Well, yes. I started in Würzburg and then I got a position in Klagenfurt and continued the project in Klagenfurt.

Was there ever the wish to return to Ukraine?

In principle yes, because Ukraine is my homeland. But I do not plan to do that in a near future. Even not talking about the war condition, which makes everything much more complicated, the research environment and the support of researchers of the European Community, especially Germany or Austria, provide much more attracting conditions.

And if you compare the university system in the Ukraine and in Germany or in Austria, what are some differences or similarities you observed?

I was working at the institute which belongs to the National Academy of Sciences of Ukraine. Therefore, it is hard to comment on differences in the university system in both countries because of my limited knowledge in this respect.

The main difference for scientists in Ukraine is that, in terms of career, it is very straightforward. You complete your PhD and, in most cases, immediately get a position as junior researcher. Typically, you stay at the same institute throughout your whole career. This is quite a normal picture for most of the scientists. It is this kind of stability that you know that you get your working place, there is no fixed term, you don't have to fight for a new position every time, or apply for several positions. But of course, the financial support of science is certainly not comparable with Germany or Austria. There are several new programs in Ukraine for scientists, especially for young scientists, like grants for establishing research labs, but still the funding is not so good.

How does this compare to Germany?

On the one hand, in Germany, there's a very good research environment. You have access to all infrastructure, like labs with various technical equipment, including robotic models, libraries, free access to many journals. As a mathematician, I don't need to have too many resources. I need a computer and a pen. In Germany, it is not a problem to get access to licensed computer algebra systems like Maple or Matlab, which is usually very expensive. And of course, salary here is much better. Also, you have the opportunity to participate in many, many scientific events worldwide, like workshops, conferences, congresses. In Ukrainian it's not so easy to get enough funding for attending international conferences.

On the other hand, there are not so many permanent positions in Germany. You always have to search where to apply next. Also, when I was a younger researcher, it was not a big problem for me to move from one city to another or from one country to another. But now I have a child and it makes this more complicated.

To what extent?

Now I need to think about my son, the language he speaks and the kindergarten he goes to, and even just in terms of changing apartments and the whole environment. This is why I appreciate

the opportunities like tenure track positions. Such programs and positions exist in Germany, but there are still not enough. And they are, of course, very competitive.

I agree, the situation in Germany is quite difficult at the moment and a lot of scientists do not get a permanent position. this really is a problem. Do you now have a permanent position in Austria?

I have a tenure track position. I was lucky to get this position in Austria. Whether it becomes permanent or not depends mostly on me. I have signed a qualification agreement and need to fulfill certain requirements during the next four years. If I successfully fulfill these conditions, I might get a permanent position as an associate professor.

I hope this works out for you. You already mentioned that you became a mother just during the corona pandemic. A more personal question: How did you manage all this, living in a foreign country? I can imagine that it was very difficult for you, you might have been anxious and worried about the well-being of your baby.

It's actually a very difficult subject for me. When everything was prepared for signing the contract in Klagenfurt, I realized that I was pregnant and I was thinking, how can I sign the contract and start the work in four months? I thought that this is not fair. I discussed the issue with the head of the institute and the head of the group. They were very nice and said "just sign the contract, it is ok". They were very supportive.

So, I came to Klagenfurt and shortly after, corona times and my maternity leave started. During those two years I lived in Germany because my husband works and lives there. It was not so easy, because we had to learn how to be parents and had yet to cope with pandemic restrictions. One example is that our parents, relatives and friends were not able to visit and support us because of closed borders. And we have no relatives in Germany. But still, it was a very good time because we were living together. Last year I came back to Austria together with our son, but my husband is still living in Germany. And this is the next challenge. Alexander is working at the Max Planck Institute in Magdeburg. So, there are like 900km between us. This is very difficult to handle. He comes as often as he can and, of course, we are looking for an opportunity to live and work as scientists in the same city, or, at least, in the same country. Unfortunately, as I have already mentioned, it's not so easy for scientists to find a position with long-term perspectives, and this is at least twice more difficult for two scientists to get offers at the same university. But we do hope to find a nice solution for our "two-body problem". By the way, it would be great if the Alexander von Humboldt Foundation had a program to support dual careers in the cases like ours.

If you don't mind, I would like to ask you about the situation in Ukraine and what this means to you personally. What is the situation for your parents and how do you keep contact with them?

It's a sad situation because the last time I met my parents was in 2021. Our son was one year old when we visited Ukraine last time. But now it's too dangerous to go there. Now I have to think about my child and not only about me. The trip would be not only dangerous, but also with quite a long travelling time, because there are no flight or train connections to our places. It's difficult because my child is still small, I can't take him with me. And for my parents it is also very difficult because they are not so young and, regretfully, not so healthy anymore. So, we communicate via

WhatsApp and other messengers. But I'm really happy that we have internet and such technologies, which allow us to stay in contact even if we cannot meet in person.

*Die Fragen stellte Paul Winkler, Sprecher der Regionalgruppe Rhein-Main.
Die Antworten von Viktoria Grushkovskaya wurden von einer Audionachricht transkribiert.*