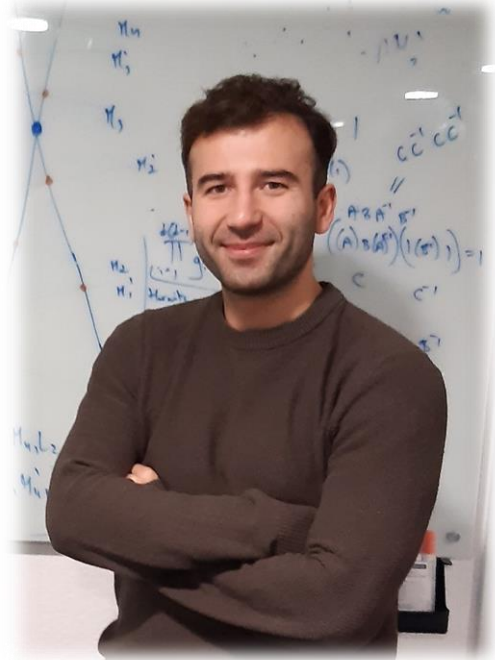


## Widening Country Inspiration Story

“Do not give up and apply more than once if needed!”

**Name of the fellow:** Vladimir Mitankin  
**Country of the host:** Bulgaria  
**Project Acronym:** GIANT  
**Project start and end date:** 1.06.2024 – 31.05.2026  
**Type of MSCA, Horizon Europe:** Postdoctoral Fellowship



### What is your project about?

Which integers are the sum of three integral cubes? This question has been studied for at least 175 years and yet, for positive integers we can only answer it up to a little over 100. At the same time, sums of rational cubes are easier to exhibit. This project utilises the newly developed notion of semi-internality, which interpolates in a controlled way between rationality and integrality, to extract information about solubility of and the structure of solutions to systems of polynomial equations.

### Why is your project important for society?

Diophantine problems and semi-integral points can be explained at an intuitive level. The former concerns easy-to-state (but typically hard-to-solve) questions about polynomials, and the latter can be explained through prime factorisation.

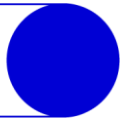
### What communication and public engagement measures have you foreseen?

I plan outreach activities to increase enthusiasm about mathematics in general, and Diophantine geometry in particular, in a broad segment of society. The concept of semi-integral points constitutes an excellent topic to stimulate teachers' curiosity and

interest in arithmetic. I plan to contribute to Mathematical Days events in high schools, to outreach events in youth centres and to the open days of my institute (Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences), which aim to encourage and motivate high school students in pursuing mathematical studies.

### Why did you choose a widening country as a host?

Being born and raised in Bulgaria, I was aware of the problems in the higher education and the lack of interest among young people in science here. During my PhD studies I discussed with fellow mathematicians what measures can be taken, and we started implementing them. After my PhD and a few postdocs abroad, the MSCA Postdoctoral Fellowship perfectly suited my goal to continue working on novel research while taking part in building



the future generations of excellent Bulgarian mathematicians.

**How did you find your host organisation?**

As an undergraduate in Bulgaria, I already had some experience with my host organisation. At the same time, I was not aware of the status of the job openings for young researchers there. I looked into this by speaking to a friend of mine who was already affiliated at the institute.



**What kind of support did you get?**

I had a clear idea about what my project topic would be. At the same time, my first MSCA application was also my first grant application. Following all the requirements in the preparation of the proposal is challenging without guidance. In my case, I contacted a successful applicant and a few senior researchers for advice on how to prepare my application and what should be included there, but in general I worked on the proposal on my own. I had the opportunity to ask for feedback about the impact and implementation parts, which was particularly helpful. My first MSCA application was not successful, but I learned from my

mistakes and my second proposal was funded.

**What tips can you give other researchers who would like to apply for MSCA?**

Firstly, decide carefully on what problems you are going to work on for your project. The methods suggested must be novel and the problems ambitious, but the goals should be optimistic and achievable in the duration of the fellowship. You must have an excellent expertise in the main area of the project, evidence for which must be provided in the proposal. Talk to senior colleagues about your ideas and ask them about their opinion and for suggestions. Do not give up and apply more than once if needed!

More information on the project:



The Marie Skłodowska-Curie Actions (MSCA) support researchers at all stage of their career across all disciplines. The MSCA also support cooperation between industry and academia and provide innovative trainings and career developments.

The MSCA Postdoctoral Fellowships (PF) enable talented researchers to work on project in Europe and beyond. They aim at enhancing the innovative potential of postdoctoral researchers through advanced trainings, international and intersectoral mobility.

The MSCA-NET project is the MSCA NCP project to facilitate the transnational cooperation to achieve a consistent and harmonised level of NCP support. The scientific community can also profit from our project to support their MSCA application.

