

Widening Country Success Story

“Maintaining a balance between the proposal’s uniqueness and quality is crucial.”

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Country of the host: Czech Republic
Project Acronym: 3D-AM-TERA
Project start and end date: 1.02.2022 – 31.01.2024
Type of MSCA, Horizon 2020: Individual Fellowship

What is your project about and why is the topic important for science advancement?

Terahertz (THz) technology is used for investigating nanomaterials, with applications in medical imaging, security checks, quality control, and atmospheric chemistry. Current detector technology lacks sensitivity, speed, spectral range, and room temperature operation. Synergistic work focuses on developing engineered materials and structures, from 2D MXene to 3D graphene, which represents a new way to build materials with novel properties, particularly in the THz electromagnetic wave range.

Why is your project important for society?

Terahertz technology is crucial for spectroscopy, imaging, and wireless communications due to its low photon energy. This project developed materials and structures using MXene sheets and graphene aerogels to promote THz light absorption/ modulation properties. A low-cost technique created an MXene THz photodetector with precise detectivity and fast photoswitching response. A straintronic modulator based on 3D graphene can modulate THz radiation absorption and reflection in real-time over a broad range of 0.1–3 THz. These findings open up a world of hitherto undiscovered physical phenomena with



enormous promise for radar, electromagnetic, and THz imaging applications.

Why did you choose a widening country as a host?

The Czech Republic is among my favorite countries. During the course of my PhD, I attended a conference in Prague. I enjoy the scholarly atmosphere there, particularly in the fields of optics and laser spectroscopy. My goals were to improve my knowledge and abilities as well as to provide my own country with new perspectives, research concepts, and chances for cooperation.

How did you find your host organisation?

To see what research facilities were available that might be relevant to my research topic, I browsed the websites of different research groups. I was able to locate possible research labs and supervisors by doing this, and I made direct contact with them. The first person to accept my request was Prof. Kuzel, who also gave me all the information I needed regarding the research facilities at the Institute of Physics of the Czech Academy of Sciences (FZU) in Prague.

What kind of support did you get?

I spoke with my former supervisor and a few other colleagues, and they provided me with helpful guidance on how to present my idea in this application. In addition, I took part in seminars about various European programmes in addition to the particular call. The Institute of Physics' Research Office provided me with complete assistance in preparing my proposal.

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

It is ideal to build a research network on the foundation of pre-existing research relationships and by leveraging the capabilities of many partner universities. In terms of their research the institutions should ideally complement one another. This way, they may collaborate to provide students with training and an expanded research perspective that spans the whole sub-discipline that the network aims to cover. The most crucial component of any grant application, as with many others, is to have an intriguing, creative, and, if feasible, multidisciplinary research topic. Maintaining a balance between the proposal's uniqueness and quality is crucial.

More information on the project:



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

The MSCA Individual Fellowships (IF) provide opportunities to researchers of any nationality to acquire and transfer new knowledge and to work on research and innovation in Europe and beyond.

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.

