

Professor  
Department of Physics and Astronomy  
University of the Western Cape

## **Report back on the visit to Missouri University of Science and Technology, Rolla campus.**

**Project title:** Nanodiamonds for solar cells applications

**Investigators:**

Principal investigator, UWC: Prof. Sylvain Halindintwali, Department of Physics and Astronomy

Co-investigator, UWC: Prof. CJ Arendse, Department of Physics and Astronomy

Principal investigator, Missouri: Prof. Vadym Mochalin, Department of Chemistry and Department of Materials Science & Engineering, Missouri University of Science and Technology

**Time and duration of the visit:** from the 1st March 2023 to 30th March 2023

**I. What were the objectives of the visit?**

### **II. How will your visit contribute to strengthening and improving your research / teaching at UWC?**

The PI on the Missouri side subsequently visited UWC for two weeks at the end of April – beginning May 2023; the three investigators listed above identified four experiments that will be part of our collaborative research activities in the short term; a copy of a document detailing the four experiments is annexed to this report. The second listed experiment (b)) is already underway.

During his stay at UWC, Prof. V. Mochalin taught a condensed DFT (Density functional theory) modelling course to the MSc students in Nanophysics; he gave also an invited seminar/lecture to staff members and postgraduate students in the departments of Physics & Astronomy as well as of Chemistry, on Nanodiamond and MXenes – Fundamentals and Applications.

The proposed experiments on NDs and on the new class two dimensional MXenes – materials will be pursued and the outcomes will be made known later. On the teaching side, we aim to invite Prof. V. Mochalin for another series of lectures next year.

### **III. What are your future goals, following this mobility?**

**V. How do you locate the value of the UM / UWC Exchange Programme within the goals of your department / faculty and subsequent work?**

Although it was my first time to travel to Missouri, many other colleagues from the department and from the faculty have been there previously and they have established long lasting and sustainable collaboration with the Missouri partners. The UWC co-investigator on this project is a very good example. We will draw from his positive experiences to advance this new project. The first positive outcome is that the PI on the Missouri side has already promised the availability of his characterisation setups for measurement techniques not readily available at UWC.

**VI. What changes and improvements do you recommend?**

As I was traveling for the 1st time to Rolla / Missouri to discuss the feasibility and launch a new project, it would have been more interesting to have some kind of transport in order to explore the beauty of the place in my spare time outside of the university premises. Unfortunately, I found the public transport system limited in the city as well. My