2019 GSRAC Visit Summary, NSF’s ChemMatCARS

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Focus: Learning advanced crystallography methods
Goal: Atomic-scale approach to metallurgical research

My name is Abhishek Ravada. I am a master’s degree student pursuing the prestigious international Master in Material Science Exploring Large-scale Facilities (MaMaSELF), an Erasmus Mundus programme offering coursework in five leading European universities. I am currently finishing my first year, specialising in applied physics at the University of Rennes 1, France. I am interning at NSF’s ChemMatCARS as a research intern in the GSRAC program under the supervision of Dr. Yu-Sheng Chen.

I found out about this internship at the Advanced Photon Source through Dr. Chen when he visited my home university to give a lecture as part of a seminar on synchrotron scattering techniques for solid chemistry and material science. I found an opportunity to talk with him about advanced crystallography techniques, which Prof. Chen is an expert in, and he was very welcoming.

This was my first visit to the Advanced Photon Source and Argonne National Laboratory, and needless to say this lab is a great place to work for any prospective materials science researcher. My internship at ChemMatCARS was between June 15, 2019, and August 15, 2019. I have been interning under the supervision of Dr. Chen and with other members of the beamline team: Dr. Suyin Grass Wang (beamline scientist), Dr. Binhua Lin (executive director), Dr. Mingjian Zhang (post-doctoral researcher), and Mr. Damola Shuaib (also a GSRAC intern).

For the duration of my internship, I have been working on advanced crystallography techniques, such as cryo-crystallography, in situ crystallography, and high-pressure crystallography. My objective as a master’s student and as an intern was to understand how single-crystal diffraction is done in practice and to understand how data are collected, how errors are identified and corrected, and how the final results are interpreted.

From my working experience as a research intern so far, I have learned that research is not the consequence of a single individual’s curiosity; it is rather a collective, consistent effort put forth by people who have the prerequisite skills and are fuelled by constant motivation. I believe it all comes down to how I am approaching a question/problem—solving the problem comes later—with the available characterization tools during research and communicating the same with Dr. Chen. And along those lines, I can confidently say that I have thoroughly enjoyed the whole learning process at ChemMatCARS.

I also had the opportunity to interact briefly with Dr. Mrinal Bera and Dr. Wei Bu, as well as Dr. Lin, on scattering techniques and their research in their area of expertise. They were very welcoming and ready to answer questions I had regarding the subject matter.

Just as much as I enjoyed it, professionally I believe this internship will help me progress towards achieving my goal of becoming an established lifelong researcher in the fields of metallurgy and materials science.