

Personal Testimonial

Research Internship Information	
Institute: Institute of Nanotechnology (INT)	
Project: The Synthesis and Characterization of Novel High-Entropy Compounds for Use as Cathodic Active Materials in Lithium-Ion Batteries	
Supervisor: Parvathy Anitha Sukkurji	Duration of stay: January 2020 – August 2020

Contact Details	
Name: Alexandra Marlene Nunn	E-Mail: amnunn@uwaterloo.ca

MINTernship Program 2019/2020

Personal Testimonial

The internship of which I will herein testify is, in fact, not the first internship offered by the KIT of which I have testified; nonetheless, it has been one of invaluable experiences and life-enduring lessons, experiences and lessons of which I owe to the Christian Bürkert Foundation and their extraordinarily generous financial support.

Upon my arrival in Karlsruhe in early January, I was greeted by Franziska Soika, the incredible mentor and KIT student whom I had met during my first internship. As during the first time, she proceeded to guide me to my residence room and later to assist me in registering with the city and opening a bank account. Following these initial tasks and throughout my internship, she made known that she would always be available, were I to require any further assistance.

Shortly after settling into Karlsruhe, I began my internship at the Institute of Nanotechnology, within the group of Dr. Ben Breitung. The overall focus of my internship, from a scientific perspective, was to work under the supervision of PhD candidate, Parvathy Anitha Sukkurji, who later granted me a great degree of independence in a rather extensive project. In short, the project involved (and still currently involves) the synthesis and characterization of novel high-entropy materials with the intent of employing said compounds as cathodic active materials in lithium-ion batteries.

Unfortunately, early on during this internship, COVID-19 struck. This, however, did not prevent me from enjoying my stay, nor from eventually continuing with my work. At this time, I became severely ill and was unable to work for over a month. Despite being urged to return to Canada by the government, my host institution, the University of Waterloo, allowed me to remain and validated my health insurance. Franziska reached out to me at this time, as did Constanze Kreutzer, the MINTernship coordinator, asking if I needed any assistance. I am

I agree that my report and accompanying pictures may be used by KIT in printed materials, presentations, and on websites in order to inform funding organizations, sponsors, and students about the MINTernship program.



Karlsruher Institut für Technologie

truly grateful that the KIT did not urge me to return to Canada, as most of what I had learned and experienced occurred only after I had recovered and is still continuing, to this day.

As a BSc biochemistry major candidate with a focus on organic chemistry, I found myself in the entirely new realm of inorganic chemistry and materials sciences; prior to my stay here, I was not knowledgeable of even the basic functioning of the lithium-ion battery. Now, due to this internship, I have not only learned how the lithium-ion battery functions, but also how high-entropy materials may be synthesized in the laboratory, characterized via a plethora of methods, and subsequently utilized in the varying parts of the battery itself.

As is true with any form of work and life in general, challenges often arise. The challenges that I encountered have actually been some of the most positive aspects of my internship. Without delving into detail, these challenges not only included academic challenges, but also communication challenges and social challenges with other researchers. Throughout this irreplaceable learning process, I have gained a newfound confidence in myself, in my intellectual learning capabilities, and in my ability to boldly ask questions, should I require clarification. I would go so far as to state that, had I not been offered this internship, had I not struggled when I did, I would not have become the growing scientist that I now am, nor would my character have been strengthened as greatly. As much as I love the KIT and Germany, life is not perfect—but I wouldn't have it any other way.

Aside from work, I enjoyed Karlsruhe and travelling. One of my most favourite parts of Karlsruhe is the Schloss, the beautiful palace located very near to the city centre. On Sunday afternoons, I would often go to the Starbucks on the main street, then walk around the Schloss and enjoy the view. Behind the Schloss, I discovered that there are many trails and park-like areas, as well as a botanical garden.

Although Karlsruhe boasts its greatness, and has every reason to, in my mind, it does not even compare to the city of Nuremberg. I often travelled there with my boyfriend, whom I had met the previous time that I had been in Germany, and stayed at his parents' apartment. The city is incredible, with its castle overlooking both the historically rich and modern parts alike. Although I was not aware of this, Nuremberg was actually one of Hitler's favourite cities, due to its industrial prowess and its exudation of power; here is where one can find many remnants of buildings/structures designed during WWII.

One of my most favourite aspects of Nuremberg and, in fact, Germany and Europe in general, is that it differs so much from a typical North American city. Nuremberg's city centre may be crowded with pedestrians, the streets may be lined with shops, and there may be many, many buildings surrounding you...but these streets are cobble-stone streets, these buildings are cathedrals and churches and historically infamous buildings...and, through the centre of it all, runs a beautiful river. Perhaps I am biased when I speak of Nuremberg, but the other cities to which I had travelled—Heidelberg, Rothenberg, etc.—these cities are the same. I simply love the European history and how, through the maintenance of these buildings, etc., the history never leaves but serves as a reminder of how far the German nation has come.

As I mentioned, I love the European culture. Although I find a great number of differences between German and North American culture, I also find a great number of similarities. For example, the language is different; however, many, many people speak English and, not simply speak, but speak well (sometimes more fluently than a native English speaker). Although not taking a language course currently, I plan to do so in the future, especially since *I agree that my report and accompanying pictures may be used by KIT in printed materials, presentations, and on websites in order to inform funding organizations, sponsors, and students about the MINTernship program.*



Karlsruher Institut für Technologie

I have heard that the language courses offered by the KIT are very well done. Additionally, the main modes of transportation include trams, subways, and trains; however, many people still drive cars. Another difference, albeit totally unrelated to what was just discussed, is the inclusion of taxes in the indicated prices of merchandise, such as groceries; I found this to be much more convenient when determining how much I was spending. Also, my phone plan has been substantially cheaper here than in Canada, and, in general, the same is applicable to education.

In conclusion, I would strongly recommend an internship at the KIT to anyone interested. The support offered by the International Students' Office is exemplary (particularly from Franziska and from Constanze, who are both lovely people) and the researchers, generally, tend to be very understanding of novice student researchers. Furthermore, the travel in Europe is superb. Altogether, an internship at the KIT makes for an unforgettable, life-changing experience.

Below, you will find a collage of pictures taken during my stay. 😊

Thank you, once again.

Sincerely,

A handwritten signature in black ink, appearing to read 'Alexandra M. Nunn'.

Alexandra M. Nunn



