

Testimonial Pertaining to my Internship at KIT

My name is Daisy Agrawal, and I am currently a third-year engineering student, enrolled in the Nanotechnology Engineering program at the University of Waterloo in Ontario, Canada. I secured an internship with the Karlsruhe Institute of Technology (KIT) and worked at the Institute of Nanotechnology (INT) for a duration of 8 months. I was hired by a former PhD candidate (now a doctorate degree holder, Dr. Gabriel Marques) and throughout my time here, I was placed under the supervision of a PhD candidate, Surya Abhishek Singaraju. My internship was sponsored through a scholarship presented by the Christian Bürkert Foundation. I am extremely appreciative and grateful to the Christian Bürkert Foundation for financially supporting my stay in Germany and for providing me with all the resources and guidance I required, to adjust to life in Germany. This was an excellent opportunity for me to advance my knowledge, attain more professional experience in research and academia, obtain experience with lab machinery and equipment, get accustomed to life in a foreign country in addition to learning more about the culture, food and people, and this was made possible by the Christian Bürkert Foundation. I would also like to thank Gabriel Marques for giving me this opportunity, and Surya Abhishek Singaraju for overseeing my work, in addition to all my colleagues (including PhD candidates, and post-doctoral fellows) for creating an inclusive atmosphere, and a light-hearted, friendly environment that made it feel like home. I would also like to extend my sincerest gratitude towards the hardworking staff at the International Student's Office at KIT for providing myself and the other students with living arrangements, taking care of the required paperwork, making sure that we are comfortable, offering support and for being approachable, welcoming and kind. Due to the COVID-19 crisis, both the Christian Bürkert Foundation and the International Student's Office were so generous and offered to extend my compensation as well as my room rental, since I was unable to fly back home as scheduled. Unfortunately due to meeting with an accident on April 1, needing a lot of surgery and hospital care, I was not able to go in to work as much, but securing the room for the month of May was extremely helpful.

First and foremost, I was able to accomplish many tasks while working at INT. I was able to work in the Printed Electronics Group to develop fully-printed, scalable transistors, to be used for many potential applications. I worked on trying to build stable devices and optimize the dimensions to increase the I_{on}/I_{off} ratio and improve other device characteristics. For this purpose, I was able to gain wet-lab experience to make the inks required, and then peruse the inkjet printer (for

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electronic ink printing) to create my devices, while frequently experimenting with their composition to observe results. I also frequently used the Sonoplotter (another type of printing device that is more mechanical as opposed to digital) and the testing equipment and software to electronically verify the devices. I frequently used furnaces and the optical microscope to investigate defects and cracks in the ink, and to measure the devices. Tying in to this project, I also took up a machine-learning project in a collaboration with another PhD candidate, which was intended to be used to understand neural networks. This was a good fit due to my pre-existing printing knowledge. This is where I was able to gain more experience with Computer Aided-Design (CAD) software and design layouts to be lasered, in order to be printed upon. That area of my work was really exciting. Besides that, I was able to work on small, side projects with other fellows, which included the spincoating to create a thinner film to be used in lithium ion battery fabrication. This was more of a fun task, where I got to experiment with a lot of different solvents based on their properties and compile my results. Overall, this was a fun process, where the work was ever-changing and ever-present.

Moreover, through being in Germany, I was able to travel to 10 different countries (due to COVID-19, I had to cancel visits to 3 countries and could not plan more travels), including France, Italy, Switzerland, Austria, Belgium, Netherlands, the UK, Czechia, Hungary, Slovakia, and several other beautiful parts/cities of Germany such as the Black Forest, Cologne, Dortmund, Munich, etc. I was able to experience the festivities during Christmas time at the many Christmas markets I went to, and celebrated with different cuisines and fun outings with my colleagues and friends at work. I have attached some pictures of my travels down below for your reference.

Overall, my experience at KIT and in Germany was one that I will never forget. It helped me become stronger, well-versed, more in-touch with culture and I gained many valuable lessons as well as a solid academic experience with a wide variety of skills. It taught me how to deal with hardships, improved my problem-solving skills and helped me become more resourceful and adaptive to my surroundings. I would strongly recommend any other prospective student to acquire an internship at the KIT.

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1) In Budapest, Hungary!



2) In Hallstatt/Salzburg, Austria!

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3) In Pisa, Italy!