Graduating senior, Nick Matteucci, has garnered many accolades during his four years at Washington University. In fact, he was recently chosen to be part of the Thank You, #WashU20 postcards of appreciation campaign, for his leadership on both the cross country and track and field teams. Matteucci is a nine-time NCAA All-American and set a school record in the 1,500-meter run in outdoor track and field.

In addition to his contributions on the field, Nick has been an outstanding student majoring in chemical engineering at the McKelvey School of Engineering. He also has the distinction of being the only Washington University student who spent two consecutive summers as an InCEES intern. Before embarking on the next phase of his life – studying for a PhD in chemical engineering at Massachusetts Institute of Technology – Nick took a moment to reflect on how his two-year internship with InCEES prepared him for his future.

Tell us about your two-year, summer internship with InCEES. You worked in two different labs, but which professors did you work with? Did the lab research change much from summer to summer?

My summer experiences were quite different in 2018 and 2019, but both were closely related to the goals and vision of InCEES. In 2018, I worked with Dr. John Fortner (former InCEES Career Development Associate Professor) to investigate using carbon nanomaterials for improving water filtration technologies. Roughly one in ten people on earth don’t have access
an improved water supply, which drastically impacts their livelihoods and risk for diseases. Additionally, as global climates shift, environmental experts predict that many areas will suffer further water scarcity. Our group worked toward utilizing the great developments in nanotechnology toward improving the performances, lifetime, and effectiveness of membranes used for filtration and reverse osmosis to help address these issues. My project focused on the synthesis and characterization of Graphene Oxide Quantum Dots to incorporate into an anti-fouling membrane.

When Dr. Fortner left Washington University, I decided to try out a completely different area of research: electrochemical energy storage. I had just finished taking Dr. Peng Bai’s Material Science course, and he offered me a position in the lab. In the summer of 2019, I worked on designing experiments and models to characterize Aluminum Ion batteries. Due to the abundance of the electrode and electrolyte materials, the ultrafast charging and discharging, and the wide temperature stability, these Aluminum Ion Batteries seemed to be an interesting candidate for large scale storage of wind and solar energy. The work was very interesting, and I learned a lot about the field and helped find and understand some fairly intriguing results.

What were some highlights that you won’t forget about the internship?

There were a lot of memorable moments, both invigorating and challenging, that made the experience rewarding and one of growth. Getting to work along side graduate students, discuss various hypotheses and ideas, designing experimental setups, and pouring through the literature to figure out why things didn’t work as expected are just a few of the incredible experiences gained from any funded research opportunity. However, InCEES also provided the opportunity to network and connect with those outside of the lab who shared the same problem focus and goals. This provided valuable insight and perspective to a broader picture of what we were trying to accomplish in the lab. Getting to travel to the Tyson Research Center was additionally rewarding, and the visit highlighted ways that the university is already moving to address issues related to energy, the environment, and sustainability.

How did the InCEES internship prepare you for the next phase of your academic life?

The InCEES summer research internships taught me how to conduct research. From the successful experiments and models to the complete failures, my summer internships and work that followed during the semester provided a fairly holistic picture of what research looked like at an academic level. I found the experiences so rewarding and enjoyable that I decided to pursue a PhD. Through these opportunities and great support from the faculty that worked with me, I was fortunate enough to have been accepted to some top research institutions. Additionally I received a generous fellowship from the National Science Foundation, that will support me throughout my PhD. I am humbled and honored to have
been this fortunate in the graduate application process, and I know that it would not have been possible without the opportunities I had while a funded intern with InCEES.

What are your plans post-virtual-commencement?

I accepted an offer to do my PhD in Chemical Engineering at MIT. Continuing along the same line of work I conducted last summer, I plan to continue to work on electrochemical energy systems. I am incredibly grateful for the opportunity to work at such an amazing university, and while saying goodbye to WashU and St. Louis will be tough, it is very exciting to move on to what the past few years have trained me for.

Finally, any new running goals you want to set in 2020-2021?

With all NCAA sports cancelled, there is a lot up in the air with track competitions. Last June, with tons of support and help, I was able to run 4:03 in the mile at a meet here in St. Louis called the Festival of Miles. I was hoping to go for a sub-4 minute mile attempt this summer, but it is unlikely that Festival of Miles will still happen as planned. In the meantime, however, I am just enjoying getting to train and get out of the house to run, and hopefully there will be more opportunities to race competitively and go for a personal record in the mile later this year and next year.

#WashU20  chemical engineering  graduating senior  InCEES interns  McKelvey School of Engineering

Thank You