## HUMBOLDT FOUNDATION

Dr. Edward Gildersleeve, who is conducting research as a postdoc at the Institute of Energy and Climate Research: Materials Synthesis and Processing (IEK-1) at Forschungszentrum Jülich as a Humboldt fellow, talks about his time in Jülich.

# "MY ABILITIES AS A RESEARCHER AND EXPERIMENTALIST HAVE IMPROVED!"



Coating of a component with the thermal spray process

#### How did you get the idea of applying for a Humboldt fellowship and coming to Jülich?

**Dr. Edward Gildersleeve:** Toward the end of my PhD at Stony Brook University on Long Island, New York, I began looking for a postdoc position to continue my career in academia. I was already aware of the Forschungszentrum Jülich from reviewing the literature throughout my dissertation; as a result I came to know of Prof. Dr. Robert Vassen's High Temperature Coatings Group from IEK-1. Then, I met Robert personally at the Materials Science and Technology (MS&T) conference in Portland, Oregon, where I also gave a presentation on some of my PhD research. So, when it came time to search for potential postdoc openings, my advisor at Stony Brook and I reached out to Robert and asked him about possible sources of funding. Robert recommended looking into the Humboldt Foundation. After submitting a research proposal and going through a rigorous review process, I was accepted and have been in Jülich now for one and a half years.



#### What is your field of research?

Dr. Edward Gildersleeve: I did my PhD in materials engineering. My field of study is centered on understanding the thermal spray deposition process of multifunctional ceramic coatings. One application example is gas turbines, which are used for both aircraft propulsion and power plants. In a gas turbine, a mixture of air and fuel is heated so there is combustion. The exiting hot gas (> 1200 °C) causes the turbine blades to spin, which either creates thrust or moves a power generator. Since this combustion process produces extremely high temperatures, the rotating components need thermal protection. That is the function of the coating. The better the coating, the higher the temperatures that the turbine blades can withstand. Hotter firing temperatures mean higher turbine operating efficiencies. So, my research is about making turbines more energy-efficient for the environment. The coating deposition process itself can be compared to painting. In our case, we take solid materials, melt them, and basically use sophisticated flamethrowers to create layers on the component. Stony Brook University is a unique environment, as the Center for Thermal Spray Research combines research and industrial-sized sample production facilities. As in the university setting it is difficult to hire dedicated processing technicians, PhD and Masters students at the Center have to learn the thermal spray deposition process on their own. Inevitably as I became more entrained in the thermal spray community, I came across the Forschungszentrum Jülich; they, like Stony Brook, are one of the few facilities worldwide that also combines materials research and large-scale industrial-style sample production. Teaching myself the thermal spray processes during my PhD gave me a unique skill set.

#### So how was your experience at Jülich?

**Dr. Edward Gildersleeve:** I got exposed to impressive individuals and different ways of thinking. I also made some nice friends. One advantage for me was that I came to Jülich knowing how to do the spray processing, which is not a requirement here. At Jülich, there are technicians who can support the scientists. My prior knowledge allowed me to work cohesively between both technicians and scientists. This allowed us as a group to conduct some unique research – for instance we were able to fundamentally characterize some of the coating processes that are most critical in modern turbine engines. Additionally together we were able to enhance our functionality testing capabilities. Essentially, we worked together to more coherently combine fundamental with applied research during my stay in Jülich.

#### Now coming abroad for an extended period of time can be a challenge. How was your start in Germany?

**Dr. Edward Gildersleeve:** Sometimes it was tough but I had a good support system in the institute. I was able to stay in Jülich itself during my time here, which was comfortable. One challenge was having to repeat the test for my driver's licence since my New York State licence is not accepted here in Germany for prolonged stays. From the day I got my residency permit, I had six months to get my driver's licence. I took one driving lesson every day of the week to finish as quickly as possible. It was a challenge to balance the timing of the administrative offices with the deadline to pass the driving test. In the end, I succeeded and bought a car here. Another thing I had to get used to was shops not being open on Sundays. But I was able to adapt to this over time.



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#### What did you do on Sundays?

**Dr. Edward Gildersleeve:** I started exploring how to cook more intricate things than traditional meals back home. Back home, on Sundays I would go bowling, so I found places where I could do the same thing here. Eventually, I found a group of people with a shared interest in the sport. These days I meet with them weekly and give private bowling lessons to help them improve.

# What advice would you give to a person in your situation? Someone who is new to Germany and starts as a postdoc?

**Dr. Edward Gildersleeve:** Keep an open mind and be prepared to step out of your comfort zone. People will challenge you; and you have to be able to adapt. It is a good experience to learn how to manage your expectations. This makes you stronger as a researcher. In America, we are known to have a certain way of doing things – fast and aggressive. That approach does not always work the same way in Germany. To adapt, I had to change my way of organizing my efforts. At home, I would have waited to have the one thing done before proceeding to the next. Here, I learned how to parallel-process to bridge the waiting period(s) for other things to get done.

## What are your plans for the future?

**Dr. Edward Gildersleeve:** I will start a new job at the General Electric Global Research Center (GE-GRC) in Niskayuna, New York, next year. The role is a research scientist position in aerospace coatings and materials.

#### Can you give a conclusion on your stay in Jülich?

**Dr. Edward Gildersleeve:** It was a worthwhile learning experience. I was exposed to people who think differently, which allowed me the opportunity to expand my own mind. As a result, I learned how to be flexible and conduct research in innovative and unique ways. I tried to proactively answer questions through experimental design that people might ask about the work I was doing. This could only have been made possible from the unique and alternative perspectives I was exposed to at my time at the Forschungszentrum. I feel that my abilities as a researcher and experimentalist have improved thanks to my time spent here in Jülich.

The interview was conducted by Kristin Mosch.



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