Dr. Rita Colwell is a renowned microbiologist and infectious disease expert as well as a Purdue Alumna. She served as the 11th director of the National Science Foundation (NSF) from 1998 to 2004. Currently, she serves as the President and CEO of CosmosID and is a Distinguished Professor at both the University of Maryland and Johns Hopkins University School of Public Health.

You received a Bachelor of Science degree in bacteriology and a Master of Science degree in genetics at Purdue. Did you do any research as an undergraduate? What was your experience like?

For the most part, undergraduates weren’t very involved in research during the 50s. There were no NSF Research Experiences for Undergraduates (REU) or other research programs for students. It was even more rare for women to be engaged in undergraduate research. However, I did take a course as an undergraduate in Neurospora genetics taught by Dr. Harold Garner, an expert in the field. The course project involved dissecting asci of the Neurospora and separating each of the individual spores. The overall project required very careful genetic analysis. The second undergraduate research experience that had the greatest influence on my future career decisions was a course in bacteriology taught by Dorothy Powelson. Dr. Powelson was one of the very few women at Purdue in the sciences. Our class had roughly 6 students and was very lab intensive. Dr. Powelson inspired most of the women in the class to go on and pursue Ph.D. or M.D. degrees.

You’ve had an active lab at the University of Maryland focused on both environmental and molecular genetics of pathogenic agents. Have you had any undergraduate researchers in your lab?

I have had between 50-100 undergraduate researchers over time in my lab. I’ve never regretted the decision. I absolutely love the undergraduates I’ve had, as they asked very good questions that came from outside the box. They may not have as much course experience as a graduate student but they are very willing to work hard. Many of the students were able to individualize their projects and contribute significantly to the overall work of the lab. I currently have 3 undergraduate students working in my lab.

What would be your advice to faculty to support undergraduate research?

I hope faculty realize the opportunities of supporting undergraduate research. Funding is an important factor of running a lab and by supporting undergraduates, faculty have an opportunity to receive increased funding. A study asked which factors influenced success from scientists who had major research programs and/or had won prestigious research awards. The study cited undergraduate research experience as the most significant factor for success. Students not only can learn
How did you end up at the NSF? Did you prioritize undergraduate research during your time there?

I was very humbled to serve as the 11th director of the NSF. However, the career path was never on my radar screen. When I was at the University of Maryland, my research lab expanded to about 30-35 students. I had founded the very first marine program at the university and served as its director in 1980. At the time, I was asked by the president of the university to serve as the provost. I later went on to found the Maryland Biotech Institute. It was at the height of my success that I was asked to serve as the provost. I remember a few weeks after the interview, my secretary walked in and told me the vice president was on the line. I asked, “The vice president of a university?” She responded, “Of the United States.” Vice President Gore called and asked if I would be interested in being the director of the NSF. I gladly accepted and became the 11th director of the organization. During my time, I supported undergraduate research and worked on enhancing the effort. I implemented a program that allows researchers with funded NSF grants to add an undergraduate minority or woman by simply writing a letter to the program manager. The idea of providing funds incentivized many researchers across the country to allow undergraduates in their research labs.

Could you talk about your research focus, recent appointment as a Science Envoy by President Obama, and your long-term goals?

I’ve been involved in global health and infectious diseases for decades, thus this appointment aligned well with my interests. I’ve been particularly involved in cholera, a devastating disease in developing nations that is transmitted by tainted water or food. On a 2003 trip to Bangladesh, I took my knowledge of cholera and the culture of Bangladesh to develop a way to reduce the incidence of cholera by 48-65% in villages. The method was using a folded sari cloth to filter particulate matter, especially plankton, from drinking water. This alternative to filtration was very cheap as everybody could afford a sari. Furthermore, the technique was engaging the women who are known to collect water for the family. In 2008, I returned to Bangladesh to see if they were still using the practice. To my surprise, not only was the practice still in use, but also a significant group of women had begun using it that were never trained through my study. I learned that the population who were originally trained became teachers of the technique to others. It caught on very fast. I was happy to learn this technique was sustainable even after 5 years.

In September 2010, I was named a Science Envoy alongside Purdue professor Dr. Gebisa Ejeta. We were appointed by President Obama in order to help build international partnerships through scientific exchange. I took my first U.S. Science Envoy trip in July 2011 to Malaysia. I was very honored by the appointment and it allows me a platform to work on issues that are near and dear to me. My long-term goal would be to have an international center on infectious diseases, water, and health that includes colleagues working in Sweden, Norway, Japan, India, and Bangladesh.

What would be your advice in general to young Purdue students? How would you advise them to find undergraduate research opportunities?

I would recommend they get involved in as many activities as possible and to find things they enjoy. Undergraduate research is a unique opportunity that can help them shape career directions. It also helps make individuals into stronger candidates for graduate school. In terms of finding opportunities, students need to be inquisitive and exploratory. Ultimately, it’s yourself you have to depend on to know what you want to do and who you want to do it with. You need initiative but you can also find people to help guide you. I recommend asking fellow students, academic advisors, or professors you have in class about undergraduate research opportunities.

Purdue is a wonderful place and I am forever grateful for the education I got there that has helped shape my career directions and success.