

Thank you Keith. Good evening everyone, before I start, I would like to thank Dr. Jeff Rudd, with your generosity I have been able to continue the amazing work I love to do in the Vikesland Research Group on antibiotic resistance (Pause and start a clap for Rudd). Every year, at least 2 million people get an antibiotic resistant infection in the United States alone and at least 23 thousand of those people die. This problem has been with us from the day Alexander Fleming discovered penicillin. In fact, Mr. Fleming even warned the world that this incredibly complex problem would occur when he delivered his Nobel Prize speech. Today antibiotic resistance is getting worse as the days go by in a seemingly endless matrix of complex interactions, which is what my research focuses on in the hopes of understanding more of the problem so someone else can win the Nobel peace Prize by stopping the spread of the problem and saving millions of lives. Specifically, my research questions if there is the potential for the spread of antibiotic resistance through the transport of nanoparticles. We are just at the start of exploring the role of nanoparticles in antibiotic resistance so we're on the cutting edge of this technology. But what is a nanoparticle? Nanoparticles are just very small solids like gold or silver or plastic that are between 1 and 100 nanometers in width. The nanoparticles I work with are about 13 nanometers in diameter and it would take about 6350 nanoparticles to match the diameter of the average hair. These particles are naturally occurring and are also manufactured. I bet everyone in this room has interacted with nanoparticles at some point in their life, whether it was eating the zinc oxide in the stuffing of an oreo, or wearing stain repellent clothes. Nanoparticles are just a small piece of this antibiotic resistance puzzle and something I would never have thought

about if I had not been so lucky to work with Dr. Peter Vikesland. Pete, is the Nick Prillman Professor in the Department of Civil and Environmental Engineering and the Program Coordinator for the Environmental and Water Resources Engineering graduate program here. His research interests are heavily based in nanotechnology, but he also specializes in water quality and public health. When I applied to Tech as an Undergraduate, I applied to be an engineer with my second degree option as undecided. Tech decided to accept me as an undecided major and that's when my mother gave me her best advice. She told me to apply for the Water major because I enjoyed being outside, the degree would lead to travel, and there was engineering in the curriculum. Well, about a year ago I was taking one of Pete's courses, Fundamentals of Public Health Engineering, which happened to be one of these engineering courses my mom mentioned. During lecture one day Pete said "If anyone is interested in antibiotic resistance, come talk to me after class." So that's exactly what I did. Before the end of the semester last spring I was lined up to work in the Virginia Tech Sustainable Nanotechnology Lab where I would interact with masters students, doctoral students, faculty and many other kinds of people through outreach events. I interact with these people on a weekly basis through research meetings and work in the lab. This job has also opened many doors for me as a mentee and a student. Specifically, the job has afforded me the opportunity to go to a Center for the Environmental Impacts of Nanotechnology conference at Duke University where scientists from around the world and myself, presented our research. Receiving guidance from those in the lab and already having some research established also

made me a competitive applicant for the Stephen H. Schoenholtz Undergraduate Research Fund, which is why I'm standing here tonight. As a senior in the Water Degree, specializing in public health and water treatment, my work has been especially important to me as a way to get my hands dirty and immerse myself in the cross sections of public health and water. My lab partner and I are optimistic to attempt getting a co-authored publication in a scientific journal on the work we have done so far, a feat that is generally unheard of for undergraduate students and something that could greatly improve my credentials in the academic world. Gaining experience in the lab and talking to so many people that have been successful in applying to graduate programs has been very helpful to me as I have applied to graduate programs. So far I have received offers for Civil and Environmental Engineering master's programs from UVA, UNC and Johns Hopkins. All three are great options for the aspiring environmental engineer I am, where I plan on focusing on water and sanitation in small communities. I cannot thank those who have made my undergraduate research experience what it is enough. I'd specifically like to thank Pete Vikesland, and Ethan Boeding, my lab partner, and I'd especially like to thank Dr. Jeff Rudd once more for recognizing the impact that undergraduate research can have on one's career. I am truly grateful for your generosity. Thank you.