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**Keynote Address:**

*“Research in Progress: Honest Results from a Life in Science”*

I'm going like to start this talk with a question. "What do you want to be when you grow up?" It is a simple, clichéd, and often-annoying question. I bet most of you still hear some variation of it from your family or friends or even yourself, especially with graduation forthcoming. Post-graduation, how many of you have something arranged that directly relates to your studies here at WJU or your long-term career goals, for example medical/graduate school, a research internship, or a job? For those with their hands up...congratulations. I really hope you find success. What you have lined up could be the start of your career or just one branch in the winding journey of life. If you don't have a plan yet, don't worry. Once you figure out what you want to do, opportunities will present themselves.

For me, the answer to the question through high school was a comic book artist. The reality is that I can barely draw a straight line and did not exercise the patience to try and improve my talents. On the other hand, I found research challenging and fascinating enough to put some effort into, and now it consumes most of my time. I believe my success is a mix of hard work and luck, and I am proud of what I have accomplished. However, my story may not be a great blueprint for your success. A frustrating aspect of a career in science is that there is no "protocol" to get you exactly where you want to go. No one will hand you a step-by-step guide saying "complete X training to get Y job." For example, I started here at WJU studying general biology with an interest in aquatic sciences, which was highlighted by a summer internship in Texas with snails and my failed Research Symposium work with zebrafish. I then earned a Masters in marine biology working with oysters, followed by a few years of work in a rainbow trout aquaculture facility. Recently, I completed my dissertation where I have worked with infectious diseases in mice, ferrets, and monkeys. My research is considered virology, but my future position will likely include immunology; although, I have a the option of transitioning into many related fields, including drug discovery, neuroscience, or cancer research. Trust me when I say that I had none of this convoluted career path planned when I graduated from WJU. Despite the collaborative nature of science, getting to where you want to be tends to be singularly driven by your own motivation and accomplishments. It is about taking advantage of the opportunities that are available to you and making your own path.

My goal this morning is to share my experiences and describe how WJU helped shape where I am today. However, this is not a pep talk to make you think research is the greatest job in the world. The theme is honest results. Unfortunately, some of the things I have learned are not pleasant. I feel it is important that you have proper

expectations should you pursue a scientific career. Foremost, science is hard. That is a fact. The hours are long, it will probably require nearly a decade of work before you are paid well, your boss and coworkers (or patients) likely won't appreciate your efforts for a while, you probably won't become famous, you will spend more time troubleshooting than reporting successful results, and very few people will ever understand what you are talking about. As research involves increasingly complicated systems (think plates of bacteria vs. human trials), the work requires significantly growing amounts of attention and paperwork. Joys like hobbies, vacations, and a family/social life can quickly become secondary to your work. For example, it was not uncommon for either of my daughters to sit in the lab while I tended to cell cultures or prepared experiments for the next day. There is also the necessity of writing grants to financially support your work. Research funding is not easily achieved, as you must compete against thousands of researchers, government budget cuts, and the potential that your work could fail. I hope most of you enjoyed success with your projects, but more advanced molecular work can require months just to develop the materials needed for an experiment that should require one week to complete. If you are working with animals or people, there are even more factors that need to be controlled. The reality of research is the bulk of your time will be spent reading literature, planning experiments, troubleshooting, attending meetings, and worrying about secure funding.

So then why should we bother with 12+ hour days, failed experiments, or unhappy patients? To make the world a better place? Because somebody has to, right? *Ad maiorem Dei gloriam*? For me, I wanted a career that is challenging and has the potential to make a positive impact on society. When I reflect on my life, I want to be able to say that the world is a better place because I was here. This concept is something I always believed in, and this ideal was honed here at WJU, especially through my work at the Mother Jones house where I mentored children at the Laughlin Chapel and volunteered at the Catholic Neighborhood Center (both on 18th street). While I enjoyed the local outreach (and it was spiritually fulfilling), I decided to pursue a career in research because I believed it would have much broader societal effects. Remember how I said opportunities arise? Well, WJU directly provided such an opportunity to start my career. My original plan post-graduation was to join the Jesuit Volunteer Corps, but an alumnus named John Supan presented graduating students with the opportunity for a Masters fellowship to perform oyster research at Louisiana State University. Based on my interest in aquatic sciences, I applied for the position, received it, and moved to Baton Rouge. The focus of the research was on post-harvest treatments to prevent the growth of *Vibrio* bacteria that can cause severe illness in individuals that eat raw oysters. I spent three years studying marine biology, aquaculture, and public health. I was then offered a position with the USDA National Center for Cool and Cold Water Aquaculture after I was rejected for another job at the same facility. It was akin to getting drafted because I was hired to potentially fill a position. After a few years of being a fish janitor and working with government scientists, I decided to go back to school to pursue a degree in virology from the University of Pittsburgh. Why? Because I read a book and decided that viruses were a more interesting area of study. I applied to Pitt's Graduate School of Public Health and have spent the last five years involved in HIV drug

resistance and prophylaxis research. I hope to use that training to work with emerging and high-containment pathogens. Some of these opportunities were presented to me and some were actively pursued, but all of them I just jumped into knowing that I was ready for the challenges.

My path from Wheeling to Louisiana and now Pittsburgh was not easy but I was well prepared. Here at WJU, I learned to work with people from diverse backgrounds. For the rest of your life, you will have to work with people that will underwhelm, outshine, and/or annoy you. So I hope you learned to be a good (or at least a tolerable) person through interactions in clubs, dorms, sports, or group projects. Although you may not believe me now, the education here is excellent. At the time I did not fully appreciate the all-around focus of the Jesuit education, and wished I could just take the science classes to complete the degree. Every one of you counting down those 100+ credit hours understands. I am now thankful for that experience because we are encouraged to analyze ideas using multiple disciplines. We are trained to question and reason, which is crucial for developing your own ideas and defending your work. The classes I took here were harder than most in my Masters program and on par with some of my doctoral classes. Thus, if you made it through your schedule here, you are sufficiently prepared to survive graduate level courses. Through your involvement in Research Day, you learned experimental design and time management so you could properly conduct a project. Larger universities may have access to bigger labs and better research opportunities, but WJU provides enough experience to allow you to be competitive with students from those schools. A prominent advantage of WJU is the personal interest of the faculty in the students' success. I truly hope you found at least one professor to connect with because that may not be the case later. At large schools, even within "smaller" research programs, you are more likely to be treated as a means to get projects completed. I am thankful for the mentoring I received here, and I hope that all of you will come to appreciate this in the future.

While I was here, I thought that I was missing out on the "true" college experience like tailgate weekends, fraternity parties, and stuffy academic hierarchy that is all touted in television and movies. Again, I had no plans to pursue a research career when I started here. I just wanted to party and pass my classes. When I did get the big-school experience, I was thankful I chose WJU because I was fully prepared to succeed at the graduate level. The people, education, and opportunities available here helped guide and prepare me for what I have accomplished.

Congratulations to all of you on making it this far and good luck to the students with a definite plan. For those who are just winging it like I did, please be diligent in applying for any opportunity that may help you get to wherever you think you might want to be. Put aside your expectations and collect as much experience as possible. You may accidentally find your calling or at the very least figure out what you don't want to do. What comes after WJU might not be easy, just know that you have been properly trained to succeed, and I hope you find what makes you happy.