

Rachel Besser

Rachel was born in Honolulu, Hawaii and moved to Boca Raton, FL when she was 7. She attended Spanish River High School and participated in the new biotechnology magnet program which had started her freshman year. This biotechnology program sparked her interest in STEM. Right after high school graduation, she started as an agricultural and biological engineering student at the University of Florida. In December of 2014, she graduated cum laude with her bachelor's degree from the University of Florida. Rachel knew she wanted to pursue a career in the medical field and decided to enter a PhD program for biomedical engineering. She started at the University of Miami in fall of 2015 under the guidance of Dr. Ashutosh Agarwal. Her graduate work focused on developing an in vitro neuromuscular junction platform to study neurodegenerative diseases. She graduated from UM in December 2019 and recently started a position as a pre-market reviewer at the FDA on the neurosurgical devices team. During her time in graduate school, Rachel worked with her golden retriever, Graham, to join a therapy dog organization. Rachel and Graham volunteered at local hospitals in their free time.



1)Q: What made you choose the University of Miami?

A: When I started applying to graduate schools' I was determined to move out of Florida (I just wanted a change!). When I read about Dr. Agarwal's work I was instantly intrigued and so I reached out for a meeting. After meeting him I knew I wanted to be in his lab, which led me to UM.

2)Q: Tell me about your training process.

A: When I started in the lab I worked on a project with a materials engineering and cardiovascular focus. My first two years were spent devoting most of my efforts on developing a stiffening hydrogel. At the end of my second year the lab hired a post doc with specialty in materials science. Simultaneously, we had a UM clinician reach out for help with a new neuromuscular junction project he wanted to start. Dr. Agarwal thought I could use my skills with hydrogels and cell culture to lead this neuromuscular junction project. Over the last 2.5 years of my training I worked with a team including Dr. Mario Saporita's lab to develop my neuromuscular junction platform.

3)Q: Describe your working experience with the institute.

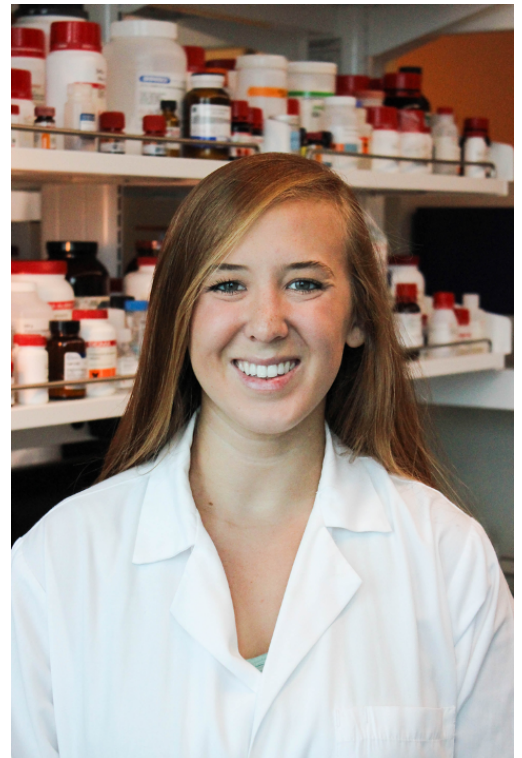
A: Throughout my graduate career, I worked with the clean room numerous times to use their equipment. We made wafers using the facility, which were subsequently used to fabricate hydrogels with highly specific topography. I also used the other available equipment to help measure material properties of my hydrogel. This work led to a paper in Biomaterials Science and earned us a spot on the cover.

4)Q: What did you particularly enjoy most?

A: When the facility purchased an AFM (Atomic Force Microscope), it was very exciting for me. I had spent about a year training under a professor at the medical campus, Dr. Moy, and using his AFM. Once the clean room purchased an AFM, I was able to have more access and it was useful and convenient.

5)Q: Tell me about your most exciting scientific breakthrough?

A: My most exciting scientific breakthrough came at the end of my graduate experience. We built our platform to have a more physiological orientation of the cells in comparison to the current existing models. We hypothesized that this distribution would have positive cellular outcomes, which we saw immediately in our cultures. Your neuromuscular junction has acetylcholine receptor clusters that allow the neuromuscular junction to function properly. When we compared the size of these clusters located on skeletal muscle cultured on our platform compared to traditional platforms, we observed a significant increase in size (the clusters you see in the body are much larger than what we see in in vitro experiments). This finding showed us that we were moving in the right direction with our platform, which was very exciting!



6)Q: How do you think the research has impacted you as a scientist/engineer and how has it influenced your career path?

A: My graduate work taught me how to be an independent scientist and a critical thinker. In my current career, there are numerous times that I think about how graduate school prepared me for a certain task or scenario. Overall, my research made me a more confident and inquisitive individual.

7)Q: Tell me what your next steps will be and career goals.

A: Currently, I just started my pre-market reviewer position with the FDA. I am excited to start this opportunity with the neurosurgical devices team where I can ensure neurological devices are safe and effective before they reach the patient. In the future, I want to move towards a job in project management either within the FDA or move to the private sector.