

Mikyaila Jaramillo

Graduation Year: Junior

College: Engineering

Major(s): Chemical Engineering

Minors(s): N/A

Scholar Group Membership: N/A

Did you received other funding for this project?: N/A

Could you have completed this project without CUSE funding? No

Project Title: Metastasis on a Chip

Project Location: Wake Forest Institute for Regenerative Medicine

ND Faculty Mentor: N/A

Project Type: Research

Why did you undertake this project/experience? Deepen your knowledge of a topic or issue, Prepare for graduate school (MA or PhD), Prepare for professional school (MD, MBA, JD), Career discernment and/or preparation

Did your funded experience help you:

[Deepen your understanding of your coursework or field of study]: Very Much

[Discern your interests and post-bac goals]: Very Much

[Become confident in your ability to set and achieve your goals]: Very Much

[Gain a more nuanced view of local, national, or global communities]: Yes

[Improve your written and verbal communications skills]: Yes

Tell us about your experience.

The time I was able to spend at the Wake Forest Institute for Regenerative Medicine (WFIRM) provided me a thorough exposure to the possibilities of science. My project, "Metastasis on a Chip," focused on the spread of cancer cells between organs. I created two representations of an organ system that linked an intestine organoid with a liver organoid. One was a microfluidic which linked the two organoids through a small channel. The other representation eliminated the vascular element by placing the organoids adjacently on a chip. In both designs, the organoids were held in a hydrogel to provide structure and shape but allow cancer cells originating in the intestine organoid to travel and invade the liver organoid. My daily work mostly involved cell culturing, assembling chips, and imaging changes. I prepared and maintained the intestine, liver, and cancer cells necessary for the chips. These were placed within a hydrogel mix and then pipetted onto a PDMS chip. Upon hardening by UV light, the chips were assembled and administered media. Every few days, I replaced the media in the chips and imaged to track the cancer cell migration. On a subset of the chips, the media contained a small amount of marimastat, a drug used to inhibit the travel of cancer cells. These chips were watched for lessened migration of cancer cells away from the originating organoid. I also completed immunohistochemistry on a selection of the chips. I completed a Live/Dead stain that I was able to section and image. Prior to this summer, my research experience was primarily limited to lab

courses and largely undeveloped for my work at WFIRM. Upon conclusion of my time at Wake Forest, I felt confident in proper cell culture and imaging skills. I was creatively and technically stimulated.

Describe the impact this project had, both on you as a student-scholar and on the people you worked with.

I was able to gain more confidence in my research abilities and knowledge of the many elements that go into discoveries. This was an amazing experience for me in understanding the process and culture of research. I was able to learn many new techniques and learn from researchers with vastly different backgrounds from mine. Additionally, I was able to lay a foundation for the continuation of the Metastasis on a Chip project.

Describe how this experience is connected to your plans as a student or future professional.

For the remainder of my undergraduate career, I hope to continue more work in microfluidics. In the future, I hope to continue to explore the biomedical engineering field through graduate school or medical school. I am very interested in the research aspect and anticipate working in a lab environment during my gap year. This experience has helped me to understand and appreciate the culture of research. I had not been very enticed by the aspect of research prior to this summer. This experience completely changed my perception of lab work.

What advice would you give other students who are planning to pursue similar projects?

Be flexible and creative. Things may not go as planned and it is important to troubleshoot and devise new methods to ensure better results. Make the most of the experience. I feel very blessed to have been placed where I was and under my PI. Talking with the lab technicians and graduate students was very enlightening in determining my direction.

