

Alief Moulana; 2019; Biology and Mathematics

Petrov Lab, Stanford University; Stanford, CA

Multicultural Alumni Network Fellowship

I was working on a research project with Dr. Monica Sanchez, a postdoctoral fellow at the Petrov Lab in Stanford University, Stanford CA. My project focused on the effect of genetic background on evolvability of different natural yeast isolates. During this summer, I did an experimental biology lab work for the first time. Although I experienced some difficulties in adjusting to wet lab setting at first, my mentor taught me most of the techniques that we would use in the project early in the summer. She would observe how I performed multiple techniques until I felt comfortable doing them on my own. By the second or third week of the research internship, I felt confident enough to conduct most of the project by myself.

During this summer, I also got the opportunity to use my computational skills to help my mentor process and analyze data for her another project. The scripts that I wrote for the analyses would eventually be used for subsequent analyses for the project I was working on as well. While writing these scripts, I became more confident in my coding ability. Although, I have been involved with computational projects in the past, I rarely wrote long scripts to process genomic data. In my past experience, I mostly used readily-available software instead of using my own algorithm to solve problems. Therefore, although my research project this summer was meant to give me first-hand experience in wet lab work, I also did a lot of computational work.

In this internship, I learned that in addition to computational work, I am also interested in doing wet lab work in my future research. Although I am still much more interested in sitting in front of a computer or using a paper and a pencil to figure out the

answer to evolutionary biology problems, the idea of supplementing that work with more empirical approach seems intriguing to me as well. In this summer, I have also learned how to think as a scientist. For example, when designing primers to use in the PCR reactions, I applied the knowledge I learned from my genetics class at Carleton to my work at the lab. Furthermore, I also had to go through multiple papers that have used yeast as a model organism to study evolution to fully learn what kind of techniques were appropriate for our purpose. These are the skills that I will eventually need to succeed as a scientist.

One of the most important skills that I gained from my experience this summer was how to communicate effectively with other scientists. I had multiple opportunities to talk with graduate students and postdoctoral fellows at the lab during my internship. These talks ranged from more informal conversations during lunch to formal presentations during joint lab meetings. Although I did not spend much time talking to the principal investigator (PI) of the lab, I also got to meet other principle investigators in other labs. Outside my internship at Stanford, I also kept in touch with my mentor from the previous summer to write a paper for journal publication as a result of my previous internship. In this process, I had the chance to connect with other individuals who were expert in this field and learned a lot about my topic before writing the paper. Throughout the writing, I developed both spoken and written communication skills with other scientists in the field.

The network that I built through the internship was significant in preparing me for graduate school applications. As I became more comfortable in talking with other scientists, I started to talk to my potential graduate school advisors as well. So far, I have only received positive feedback. I learned that most scientists are actually friendly human beings, and that they would respond to my inquiry if I showed my interests in their research. Since I have known that I will go to graduate school since my freshman year, I spent my time this summer to really prepare myself for this next step of my career. The experience that I had this

summer has definitely prepared me often more for this upcoming graduate school admission cycle.

I am most grateful for having the opportunity to learn and do research in one of the best groups in my field. I am also really grateful for the guidance that I received from my mentor who not only taught me how to do multiple wet lab techniques but also helped build my confidence in computational skills. My mentor also gave me invaluable advice about how to prepare for graduate school and shared her own experience as a scientist with me. As a person of color, it was really relieving for me to learn that another person of color has done an amazing work in the field I am interested in.

Looking back, I didn't think that I would be working in this lab for the summer, since I got mostly negative response from the other labs I was applying to. However, I kept trying until I finally secured a position at this lab. During the process of finding the lab to work in, I also got to know the work of many other scientists in the field. I even talked with a lot of them before deciding to join this lab. So, my advice for students seeking a summer position at a lab is to keep sending e-mails and looking for labs you are interested in.

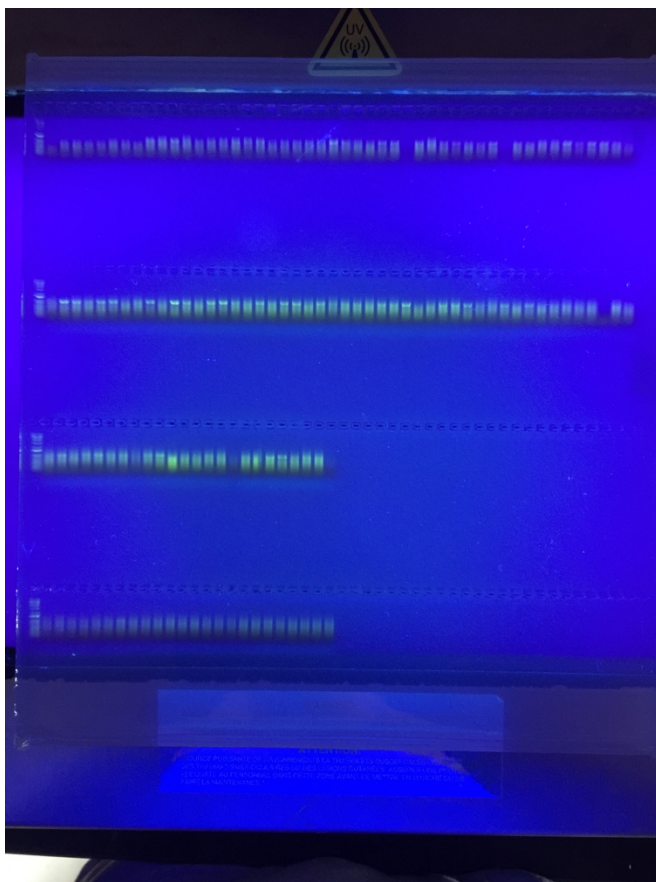
This summer wouldn't have been possible without the help I receive from my peers and faculty, especially my advisor Rika Anderson. I am also thankful for the advice I received from my previous mentor Mehdi Bouhaddou. Finally, I would like to thank Multicultural Alumni Network whose funding made this summer possible for me.



Lab Space



Yeast on a petri dish



Multiple-deck gel