

Kester Wade  
19<sup>th</sup> July 2016.  
NASA Mid-Internship Update

Five weeks in, I'm happy to report that this summer at NASA has been such an exciting journey. I have been living and working alongside exceptional student interns, and gaining access to countless new learning opportunities about space! This immersive program has been nothing short of inspirational.

My home for the summer- Ames Research Center- is located within an old Air Force Base in Mountain View, California. Built in the 1950's, the entire NASA campus has a vintage feel, though its surrounded by the very technological Silicon Valley, and even shares borders with Google. But simply being at NASA has allowed me to sit in on deeply interesting seminars on topics surrounding space exploration. Most notably I've learnt about revolutionizing the observation techniques employed when exploring a new planet, and listened to a motivational speech from the NASA Administrator on achieving the impossible as a former astronaut and as the first African American to head NASA.

So how do I fit into the NASA Space Program? For these ten weeks, I am part of the Advanced Life Support Group, focusing on the wellbeing of astronauts on the International Space Station (ISS). More specifically, my team focuses on astronaut's access to potable water. Currently, sending just one liter of water to space costs on the order of a million US dollars- considering fuel, material, storage and other costs. Therefore, NASA aims to recycle all of the water present on the ISS. But NASA's triple redundancy protocol, which involves always having two back-up plans in place, has not been affordable given the high cost of maintaining additional weight on ISS. My group endeavors to develop a water treatment system that can easily repair itself and last much longer, thus eliminating the need for triple redundancy.

I've applied chemistry concepts like forward osmosis (when a fluid moves from high to low concentration), general engineering from building a water filtration system to model the ISS, and even chemical analysis to identify and choose the best materials! Alongside a team of five other college students hailing from around the US, Mexico and even Scotland, I have setup and run various experiments, create protocols, and push the project further to completion.

Within this team, I have also encountered and embraced the novel craziness that is NASA as boundaries are continually being pushed! In order to be fully committed to my lab group's goal of recycling water in space, we put our methods to the tests by filtering out the toxic impurities in our own urine, then drinking it! We were even afforded a tour of the centrifuge- a twenty-foot wide rotating device used to subject astronauts and objects to large gravitational forces, much more than those experienced on earth.

Thus far, my experience at NASA has been nothing short of amazing! I have been introduced to so many interesting individuals and awesome research, all at the intersection of realizing the trip to Mars. Furthermore, I've made invaluable connections that will undoubtedly open exciting new doors in the future. This experience has been so inspirational, and I look forward to continually maximizing on this experience of a lifetime!