

GWIS Travel Award: The Gordon Research Conference on Optogenetic Approaches to  
Understanding Neural Circuits and Behavior  
July 21<sup>st</sup> – July 26<sup>th</sup>, 2024, in Lucca, IT

I recently attended the “Optogenetic Approaches” Gordon Research Conference in Lucca, IT. This was my first international conference, during which I was able to learn about the structure of science and funding opportunities in other countries. Especially considering that I am nearing the end of my graduate training, it was important for me to learn about postdoc opportunities outside of the US. I was paired with Dr. Francesco Papaleo, who works at the Italian Institute of Technology, as my mentor for the conference. We were able to meet for lunch and discussed differences in the culture of science in Italy compared to the States. For example, since PIs in Italy are not reliant on grants to pay their own salary, as well as the salaries for everyone in their lab, there is less pressure on the PI to always be submitting grants. However, there are fewer PI opportunities in Italy than in the States. It was truly a pleasure to discuss these differences with Dr. Papaleo and obtain a better understanding of the scientific culture in Italy.

At the conference, I presented a poster on my PhD thesis work titled “Inhibitory Neuron and PV-Subtype Specific AAV Targeting in the Marmoset Monkey”. This poster characterized using inhibitory neuron and PV-subtype-specific AAVs in the marmoset monkey, highlighting the fact that PV-subtype-specific AAVs show laminar biases outside what is normal for PV cell distribution. I discussed these findings with researchers in optogenetics across the world and across model systems. I received crucial feedback on our technique that may improve the caliber of my results. One suggestion was to inject the viral construct systemically for improved coverage across the laminar layers since our construct has the ability to cross the blood–brain barrier. We had some great discussions about the hurdle of moving optogenetics from mice to primate species, which helped me realize the large knowledge gap on this topic in the field of optogenetics.

Additionally, I was able to hear unpublished research from leaders in the field such as Dr. Elena Govorunova, who has characterized a large portion of Channelrhodopsins (ChRs), which are a subfamily of microbial rhodopsins that serve as receptors for phototaxis in green algae and are genetically added to neuronal cells in optogenetic experiments. Of particular interest to our lab, Dr. Govorunova spoke about characterizing new Kalium ChRs, which are light-gated potassium channels that can open within 1msec of photoactivation. Our lab has begun characterizing an optogenetic tool called BiPOLES, which offers bidirectional optogenetic control (red wavelength light turns on neurons, and blue wavelength light turns neurons off). This new research from Dr. Govorunova’s lab has led to a new version of this tool called K-BiPOLES that may provide faster neuronal responses. I was able to bring this new information back to our lab to inform our future testing and purchasing decisions.

It was a privilege to be able to attend this international GRC. Like most GRCs, this conference was focused on presenting unpublished research and fostering networking among the trainees. It was my first opportunity to connect with students, postdocs, and PIs who work in my field. My network has expanded due to the small conference size and friendly atmosphere. I found that attending a conference like this was also essential for

keeping up with my rapidly growing field. Stepping outside of our lab's scientific expertise has allowed me to examine projects from a different viewpoint, and to bring a more holistic view of optogenetics back to our lab and our university. I am very grateful to GWIS for a travel award.