

## Summer Internship Report 2017

### **Phillip Berger, C'19**

Hometown: Oak Ridge, North Carolina



### **Chemistry Research Assistantship: Platinum Salts Sewanee, Tennessee**

**Provide an overview of the organization/research project and a summary of your responsibilities, tasks, and/or projects.**

The summer was spent working with Dr. Bachman in the Sewanee Chemistry Department. Officially the title is “Ionic liquid crystalline related to the perovskite solar cell materials: Synthesis and characterization of systems utilizing multi-chain aliphatic ammonium cations and metal complex anions”, but in layman’s terms, I spent the summer combining platinum salts with inorganic materials to produce a new substance. The responsibilities of the job were numerous including running the experiments, operating the machinery needed to analyse the new substances, and holding meetings with Dr. Bachman discussing where the project was heading/ how the results mattered to the larger picture.

**During your internship, what did you accomplish or how did you make a difference? In what ways did you grow in your professional and technical skills?**

Due to the nature of the project, there was not a stopping point where the term “accomplished” could be used. However progress was made on the project. The project uses several different metal combinations to create the molecules, and platinum was the focus of the summer. While work with platinum has not been fully completed, a significant portion has been finished.

Summer research allowed me to grow in several ways as a scientist and acquire many new skills. The greatest of these skills would be the abstract idea of what research actually is. Rather than having the mindset that the road to the final product is straight forward, I learned to view it as a path with many branches moving off to the side. Starting with one question is how the summer began, but by the end there were many new ones that needed to be answered as well before the first is able to be answered. In addition to this mindset more technical skills were honed, including the use of various analytical machinery such as TGA, IR, DSC, and NMR.

**Describe a problem that you helped to solve at your internship. What skills or knowledge from your education at Sewanee helped you address the problem?**

During the duration of the project, multiple issues appeared. One such issue was during the project: one reaction simply failed to run on multiple occasions. Despite the theoretical science saying that the reaction should work, it was quite obvious that the reaction was failing. Having done a small amount of research with Dr. Miles previously, I was able to use the skills I learned while working with him regarding online research and reading previously published papers to find that the solid we were using only partially dissolved in the solvent we were using. After some more research, it was found that hot water was the best solvent, at which point the reaction was modified to use hot water and the resulting yields were close to what we had originally expected.

**In what way were your teamwork skills strengthened?**

While the majority of the summer research was spent in a more solitary situation, the summer did allow for a proliferation of communication between myself and a research figure. This will be invaluable for the future with regards to making connections with others and with dialogue between me and graduate school professors.

**How did your internship affect your career plans?**

The summer allowed for a wealth of information with regards to my future plans. Many misconceptions about grad school have been revoked and I am much more prepared for the transition from undergraduate to graduate level.

**In what ways did your internship cause you to encounter people of different backgrounds from your own? What steps did you take to communicate effectively with such persons? What did you learn from such persons' perspectives?**

Unfortunately, due to the way summer research is done, I was not able to meet anyone new outside of the lab and thus this question is not applicable to my experience.

**Words of thanks to your internship funding donors:**

I would like to thank all involved for the opportunity. It was both a wonderful addition in terms of work experience and in terms of personal development.