

## **A Tale of Two Projects: Asymmetric Gold(III) and Synthesizing a Mechanism Intermediate**

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This summer is the second that I have worked in Professor Carolyn Anderson's lab and this year she gave me two different goals to work towards. The research that the Anderson lab does is primarily based in organic synthesis methodology; that is, investigating a specific set of reactions in the hopes of supplying useful tools for others to use. My first project falls quite well into this realm of exploration. My hope was that I would be able to work towards making chiral variants of the gold(III) product we had previously optimized and test the successfulness of a variety of different chiral catalysts in the process. However, I got bogged down in the technical challenges of the reaction. I spent most of my time trying to iron out a procedure that involved the use of our oxygen-free and water-free argon box, whilst still maintaining the yields that we were getting on the benchtop. This involved me trying all the different kinds of glassware combinations I could think of and a bunch of different solvents. In the end, I think I identified something that though limited, could be used to move forward in this area.

My second project leans away slightly from methodology and more towards total synthesis. I was tasked with attempting to synthesize an intermediate in the sequence of the mechanism we proposed for our gold(I) indolizine chemistry. If we know the mechanism of formation, we can make better choices when optimizing our reaction, because we have a better idea of what is going on. The plan is that after I make the intermediate, we can subject it to the reaction conditions and if we see product we know we are on the right track. My starting material was the product from my first project, so I could use what I made there to help with this one. For the first step, the first reaction we tried, a Mukaiyama aldol, was unsuccessful. This is likely due to the low reactivity of our starting material. We turned to a more reactive Grignard reaction, which worked, albeit in low yields. We moved on to a Wacker-type oxidation which we hoped would be selective for the aldehyde we were looking for. I have yet to procure any results for this reaction at this juncture. Unfortunately, this is as far as I could progress this summer. I was able to complete the first step of this synthesis, with 3 or 4 more steps to come.

In addition to my work this summer, I was blessed to be able to attend the biennial National Organic Symposium in Davis, California with Dr. Anderson and one other of my lab mates, Katt Frndak. We spent a week on the campus of University of California Davis, listening to three or four lectures daily, engaging in fun activities during the afternoons, and attending poster sessions in the evening. Each of us also presented posters of our own. From this experience, I learned a lot about how the scientific community operates, and I also got a better feel for what grad school might look like for me. In that regard, I heard many different stories from a wide range of people about their grad school, post-doc, and even current work experiences. It really helped me get a feel for what is coming in my future.

Along those lines, I found that my work this summer was really beneficial for me. My work this summer was different enough from my work last year, that it was a vital addition to my knowledge, allowing me to try many different types of reactions in contrast to last year's one. I feel more confident now that I can go into a different research setting and be an independent and useful worker. The many presentations that I have given throughout my time working have made me more comfortable talking about my science and I am thankful for Professor Anderson's wealth of advice on that topic. All in all, I feel that my two years of combined experience has prepared me well for what I may do in the future.