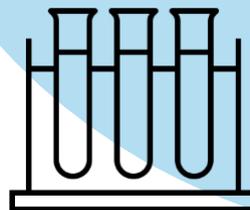


2021

Cc

Block 7

# Chemistry



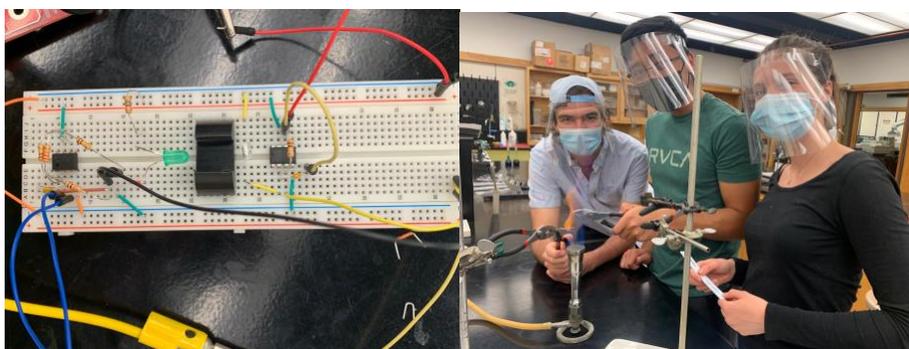
## Block 7 CC Chemistry Newsletter!

This block we highlighted an instrumental chemistry class and senior research of Westly Joseph and Yayi Wang!

## Featuring CH342: Introduction to Instrumental Chemistry

This block we are highlighting the CH342 Introduction to Instrumental Chemistry Course. This course is based around understanding the instruments behind many analytical techniques. Students learn the basics behind complex instrumentation and examine the electrochemical, spectrochemical properties.

The first week of the block students learned how resistors, photodiodes, op amps, and capacitors work together to power many instruments. Then, using these basics, students build their own spectrophotometer. One stage in this process is shown below on the left using an electronic “bread board”.



Above on the right, you can see three students making homemade electrodes used in the detection of BPA, a common contaminant and health hazard found in many daily products.

The final week of the block was spent on group projects on their choice. Some students examined the chemical composition all-natural fertilizers and others completed trace metal analysis on wines.

Hear what students have to say about the course:

### Avery Newton '22

*“Instrumental was probably my favorite class I’ve taken at CC. I think it’s cool how it’s pretty much strictly lab, and we get to use a bunch of instruments that we’ve heard about but not really used before, and we use them for real world type applications like measuring BPA concentrations. I also think it’s cool how we learned how they worked more in depth (like the wiring/circuits) and got to build a functional spectrophotometer from scratch.”*

### Jared Mendiola '22

*“Despite instrumental chemistry not being as musical as the course title suggests, this course unveiled the intriguing intricacies of chemical instrumentation and the principles by which they function. From constructing my own simple spectrophotometer using circuits to conducting a fascinating factor analysis of ancient coins, the variety of topics covered throughout the course provided contexts that satisfied my chemical curiosities. The course was capped off with an open-ended project, where I was able to explore a topic of my interest while also gaining practical scientific writing experience.”*

Preregistration Deadline  
coming soon!

Preregistration is available and will be closed soon (April 30<sup>th</sup>)! Make sure all your classes are filled out and ready to go for Fall 2021.

Scan the QR code below to log into banner and look at which classes are being offered by the Chemistry and Biochemistry Department.



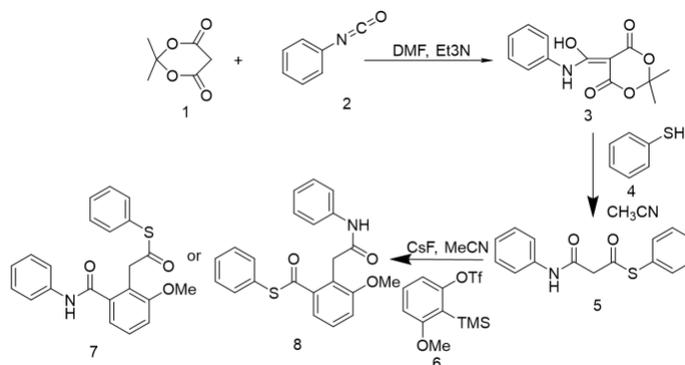
# Senior Thesis Projects



## Westly Joseph

During the summer of 2020, I did research with Prof. Amanda Bowman in the Inorganic Lab. The goal of my research project was to assess the efficacy of activated pistachio-nut shells for filtration of lead(II) contamination from water. I enjoyed getting to eat a lot of pistachios, turning the shells into powder, learning how to activate the powder using a tube furnace, and getting comfortable using the ICP. From my preliminary research, I found that pistachio shells are a good carbon material for lead(II) filtration from water.

Approximately 87% of the 16 trials completely absorbed enough lead(II) for the ICP intensity level detection to be in the noise of the machine making lead essentially undetectable in the filtered solution. Future research opportunities include filtration of other heavy metals and assessing the reusability of the activated carbon material!



## Yayi Wang

A three-part synthesis of ortho-disubstituted arenes from benzyne and monothiomalonamides (MTMAs) was conducted to investigate the scope, mechanism, and application of benzyne's potential to form carbon-carbon bonds with dicarbonyl compounds and its tendency to form ortho-disubstituted benzenes. The project contained three steps: synthesis of Meldrum's acid derivative 3, MTMA 5, and two expected ortho-disubstituted arenes 7 and 8. The preparation of Meldrum's acid derivative 3 started with Meldrum's acid 1 and phenyl isocyanate 2. Synthesized Meldrum's acid derivative 3 was then treated with thiophenol 4 to afford MTMA 5. The last part was the nucleophilic addition reaction between benzyne and MTMA 5. The nucleophilic addition reaction is facilitated by the deprotonation of the  $\alpha$  hydrogen in MTMA and benzyne's electrophilicity. Based on the work done in the Kisunzu research lab on benzyne and MTMA 6, we expected to obtain ortho-disubstituted benzene products 7 and 8 and figure out their configurations using  $^1\text{H}$  NMR and IR spectroscopy. The one-step insertion may contribute to the library of benzyne reactivity and offer alternate routes for natural product synthesis and medicinal drug discovery. Since the thiol group in MTMA left as a good leaving group under heat in the benzyne and MTMA reaction, the expected hypothesized ortho-disubstituted arenes were not obtained in this experiment. Thus, further studies are required to figure out the required reaction conditions to synthesize disubstituted arenes and the final product of this reaction.

