

GREETINGS FROM THE LAB

Last fall, 15 Augsburg students were given the opportunity to work on a semester long guided inquiry project through their Modern Physics Lab course. This experience required the use of teamwork, advanced instrumentation, and interactions with professional scientists at a regional characterization facility.



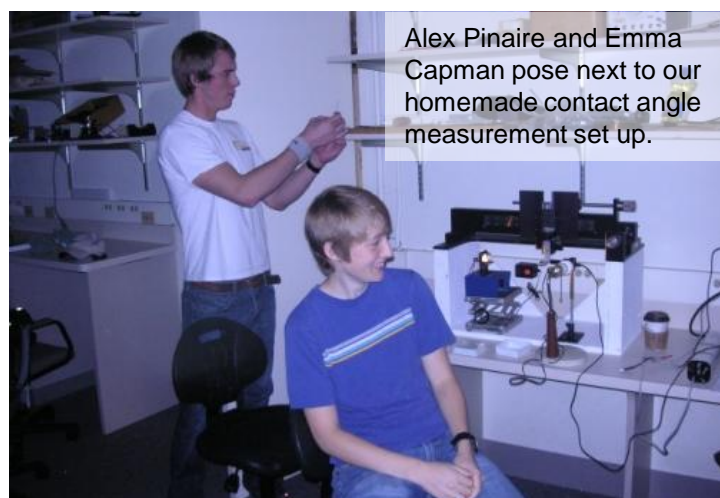
Kim Carlson carefully loads her sample into a Scanning Electron Microscope (SEM). By the end of the semester Kim had become a certified SEM user at CharFac.

The goal was simple: Engage students in laboratory experiences which will more closely mirror their future work as scientists and engineers.

During the first half of the semester students followed the procedure of Sigmund and Hsu (Langmuir 2010) to cheaply and easily prepare super hydrophobic surfaces. Samples required analysis and preparation using an Atomic Force Microscope, Contact Angle Apparatus, Langmuir-Blodgett deposition set-up, and Scanning Electron Microscopy. Students worked in teams of three to reproduce results and learn how to use instrumentation commonly used in industry.

During the second half of the semester students were challenged to pose their own question regarding the preparation of these surfaces and test a hypothesis. To avoid unrealistic expectations, students worked with Dr. Stottrup to come up with thoughtful hypotheses.

"I can't tell you how valuable modern physics has been to me. I'm currently in advanced analytical chemistry and all the subject matter we deal with is applied modern physics. The most useful part of modern is that you truly get to know the electron and the photon; once you understand the behavior of these particles, every other aspect of science begins to make more sense. Who would have thought that physics would airlift me to success in chemistry!?" Kim Carlson enthusiastically reports.



Alex Pinaire and Emma Capman pose next to our homemade contact angle measurement set up.

To assess the effectiveness of this approach students were given both affective and content based standardized tests.

Support to make these improvements into the Modern Physics Lab curriculum and inspire the scientists and engineers of the future was provided by the National Science Foundation (DUE 0837182).



Nathan Ly and Jazmine Darden clean the Langmuir-Blodgett Trough. Both students anticipate doing undergraduate research this summer. Both students were warned not to harm the protective glass enclosure! But it is hard to keep your hands off of the equipment when you are engrossed in scientific conversation



RECENT NEWS

- Prof. Stottrup and Dr. Matthew Goertz of Sandia National Labs will have their first book chapter published this spring in *Surfactants in Tribology*, Volume 2.
- Working with collaborators, Prof. Stottrup was awarded an NSF MRI grant to purchase a Brewster Angle Microscope and Liquid-Liquid Langmuir film-balance.
- Nathan Ly, Trevor Rodriguez-Sotelo and Lance Kifer presented at the 4th annual NDSU undergraduate research symposium.
- Lance Kifer, Trevor Rodriguez-Sotelo, and Gottlieb Uahengo were accepted to be McNair scholars.
- Tom Lopez traveled to USC as part of a REACH fellowship.
- Prof. Stottrup has joined the University of Minnesota as an Adjunct Faculty of Bioproducts and Biosystems Engineering.

Scientist Profile:

**Andrew Nguyen;
Aerotek/3M**

For this issue we caught up with recent lab alum Andrew Nguyen. He graduated in 2010 with a double major in chemistry and physics.

Andrew contributed greatly to the software development and line tension studies. As you can tell from the photo, Andrew is an avid rock climber and loves a great San Francisco burrito at the Biophysical Society.



When did you know that you liked science? ...do you like science? I have always liked science and I still do. I began taking a stronger interest in science during high school. Science and mathematics courses were always more enjoyable to me. The more I learned... the more interested I became. I don't think I recognized that science would be my lifestyle until after graduating from college. I miss being in an academic setting where everyone around you is there to learn. Knowledge is a powerful tool and science is an important way of knowing things. Knowledge is the way to a better future.

How would you describe your field? Are you an engineer, physicist, chemist? I would like to think that I am all three. If I had to choose which described me best it would be an engineer albeit having a physics and chemistry degree. I consider myself a practical person. I like to deal with specific real world problems where I can see tangible results. What I really believe in is that in principle the engineer, physicist, and chemist is very similar. We are all efficient problem solvers and adept learners. The difference is only in the subject matter. For instance if you were to give an engineer a chemist's job, the engineer would be able to do it. But it would take him more time to learn how to because he does not possess the technical knowledge.

What is different about working in industry rather than working in academia? My experience with science in industry has not been very extensive (as well as academia) so I can't comment with too much information. The main difference is that in industry you are looking for tangible and practical results. The bottom line is that industry is fueled by money. The problems that you are presented with in industry are well defined. In academia, there is more freedom to learn in my opinion.

What brought you to 3M?

3M has always been at the forefront of technology. Their products are everywhere and most of us don't realize it. I wanted to work for a reputable company. I want to be where the best of the best is.

How did you become associated with the Augsburg College Lipids Lab

Near the end of my freshman year Dr. Stottrup asked me if I was interested in working in the lab. I likely showed some interest in working in the lab but I don't think I ever inquired about it. I was lucky that another student did not ask first. After spending some time in the lab, Ben suggested that I apply to the Undergraduate Research and Graduate Opportunity (URGO) summer research program. I began helping with what I could ever since.

What is the favorite part of your day? Is it lunch time yet? Honestly, a nice break with some food is sometimes exactly what you are waiting for during the day. But really, the main reason why I like lunch so much is because it allows me to interact and meet with others. It is time where you can share knowledge and get to know others. I like to have lunch with as many people as I can so I can network. Networking is very important to me. A lot of people say, "It's not what you know, it's who you know".

What advice would you have for students interested in careers in science? Learn as much as you can. Do what interests you. You might not know what really does interest you so it is important to keep an open mind and expose yourself to as many things as possible. My biggest mistake in college was not interacting with more people and asking more questions. The more questions you ask the more you will learn. Try to overcome the fear of asking questions. Don't be afraid to try something... nothing will happen if you do not initiate it. But that is what I believe in... I have only been out of college for less than 1 year and have a lot to learn!

Special Thanks To: Anonymous Donors, Augsburg College and URGO; Dean and Amy Sundquist; LSAMP, Research Corporation; The McNair Program; MN Space Grant; and the NSF DUE 0837182 & CHE 1040126.

GET INVOLVED! We have many great projects for students in the lab. If you're interested in becoming involved, please contact:

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