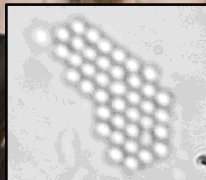
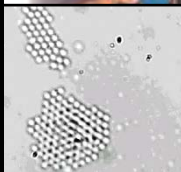
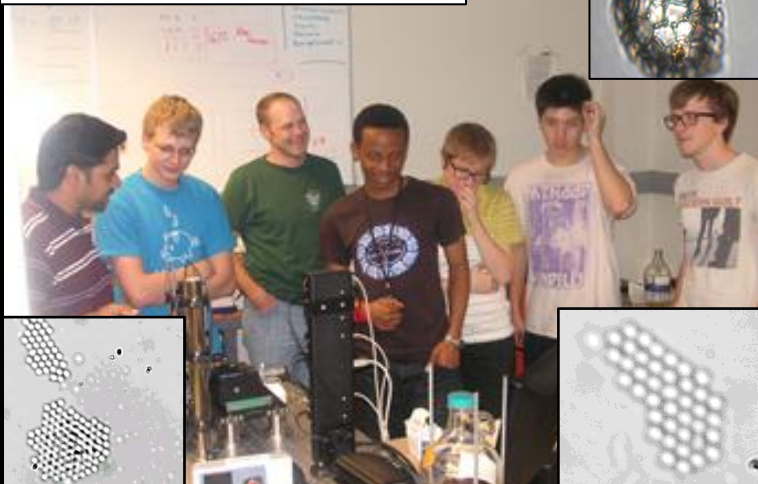


GREETINGS FROM THE LAB

New Instrumentation!!! Augsburg's Biophysics Lab has recently assembled an optical trap. An optical trap, also known as an optical tweezers, is an instrument used to manipulate microscopic-sized objects using light. The first optical trap was built from a standard optical microscope using two lasers. Modern optical traps use a single focused laser beam. The laser beam strikes and interacts with the particle. This results in a change in momentum transferred to the particle and the particle becomes trapped at the focus of the laser beam. An optical trap can be used to measure displacement, which can be used to calculate forces in the 10-100 piconewton range. This technique is applicable to large molecules or small biological structures. Since it can be used on a variety of structures, optical trapping has many applications in nanotechnology and biology. Since our trap uses IR light, we can manipulate biological systems without causing too much harm to the specimen. This opens up the ability to measure the force of the flagellum or cilia on bacteria. Our optical trap will be used this fall in the advanced Physics lab to perform experiments with the behavior of silica beads. The optical trap was put together using existing equipment in the lab with the help of a generous donation from Ken Rosenblum, Anonymous Supporters of Augsburg Biophysics, and support from the National Science Foundation. Ben Grant carried out most of the work during the spring and summer of 2012.

There is almost a glow to Ben Grant (second from left) as he demonstrates his new tool.



Luis Hernandez(left) and Promise Okeke (right) learn how to use the optical trap to observe silica beads (pictured above).

CONGRATULATIONS TO ALL OUR LAB ALUMNI

- Dr. Erik Lundberg finished his PhD in Electrical Engineering at Cornell and is now at MITRE Corporation in Bedford, MA.
- Kyle Sontag finished his PhD in Physical Chemistry from the University of Georgia in the summer of 2012.
- Christine Staloch works as analytical chemist at General Mills, Ben Hoffmann as an electrical engineer at Seimens, Andrew Nguyen as a process engineer at 3M, Alison Heussler continues to work at Nanocopoeia, and Ben Sonquist continues to work at STARBASE Minnesota to inspire future scientists!
- 2012 graduate and Lab alum Jake Anderson was accepted into the Masters in Mechanical Engineering Program at the University of Minnesota. Justin Gyllen is starting the Mechanical Engineering Program at the University of California, Riverside and Sergio Romero-Garcia is studying engineering at UST and working as a Quality and Applications Engineer Co-op at Lasersharp Flexpak Services LLC.



Lab Alumni Tom Lopez (center) hosted Prof. Stottrup and Nathan Ly for an evening on the town while they attended the 2012 meeting of the Biophysical Society in San Diego.

RECENT NEWS

- Profs. Stottrup and Dupont led a team of Augsburg faculty to create the AugSTEM program. With the support of a \$600k from the National Science Foundation, talented STEM students will receive scholarships and career training.
- Dr. Tracy Bibelnicks led a project to bring STEM educators and future STEM teachers together around disciplinary research topics. The Lab welcomed back Dan Forseth who helped run the pilot program this summer. Geri Handberg, a HS chemistry teacher from Stillwater worked with lab member Nora Helf to study the material properties of a yeast/bacteria biomaterial. This project was sponsored by the Margaret A. Cargill Foundation. Thank you!!!
- Nathan Ly presented results at the 2012 Biophysical Society Meeting in San Diego. Prof. Stottrup appeared on a Faculty panel focused on making the transition from graduate student and post-doc to faculty at a small institution.
- Students presented research at several regional meetings including: NDSU's undergrad symposium, the Spring MAAPT, the U of M's IPRIME, and the regional networking event of the Biophysical Society.
- Trevor, Gottlieb and Nathan headed to summer research programs. We have an interview with them (page 2) to learn about their experiences.
- Prof. Stottrup gave multiple presentations to the summer meetings of the AAPT and ALPhA on his work with Modern Physics Labs.

We caught up with three previous Lab Alumni doing summer internships and asked them to reflect on their experiences: Gottlieb Uahengo (Harvard University), Trevor Rodriguez-Sotelo (Oakland University) and Nathan Ly (NIST).



(L-R) Nathan, Gottlieb, and Trevor hard at work in the Physics Department.

This summer Gottlieb is currently working on an image processing project to more accurately track and count particles. Trevor is studying the behavior of oil jets that are used to cool the piston heads of engines and Nathan is working on ways to compute uncertainty in green fluorescence protein (GFP) measurements. We asked our three off-campus researchers to answer some questions about summer research and working off-campus.

What do you think is the biggest benefit to getting off campus to do research?

Nathan: It's good to experience how different institutions operate. Being somewhere unfamiliar forces you to think differently, and working with new people helps generate new ideas. And if you show you can be an asset to an institution, it will provide you with a strong letter of recommendation.

Gottlieb: Meeting other like-minded individuals! The highlight of this summer has been time spent discussing scientific ideas, and the possible solutions to some of science's intriguing questions.

Trevor: The connections you make. They can help you prove to other institutions or employers that you can shine in various environments.

Do you think your previous experiences prepared you in any way for your summer research?

N: I would not have been able to secure my summer REU without previous research experience; it will put you in the right mindset.

G: Absolutely! Working in a lab can be very intimidating, but I knew what was expected of me. It wasn't easy, but having previous experience definitely helped me get things done.

T: Yes, I was ready to start working the first day and I already knew what to expect. Experience gave me a small layer of confidence that others did not have, and that was a tremendous help.

Are you having fun?

N: Yes, but research will always be a struggle. There are times where I am very frustrated, but there are also times where I truly enjoy my work here.

G: Yes! It's almost unfair, that I'm having this much fun.

T: I was not expecting to have a blast every day, or to have exceptional results. But I had a lot of fun.

How do you think your experience this summer will help you as you make choices about your career in the future?

N: There are so many new things I've learned at NIST. It's gotten me thinking about graduate school on a deeper level, assessing the things that graduate programs look for in students.

G: This summer has definitely exposed me to different interesting projects that all aim to build a better future. It has helped me narrow my interests and explore the various interesting avenues to a career in STEM.

T: I now know that I want to obtain at least a masters in automotive engineering from Oakland University and enter the automotive industry.

What advice would you give to students?

N: Going off campus for summer research is always fun and you will learn a lot, but it also requires a lot of discipline.

G: Find what you love to do and pursue it whole-heartedly.

T: Get involved as much as you can and *never* be afraid to ask questions.

Special Thanks to this Summer's Volunteers:

Jessica McKay, Kendra Fleming, Elliott Weiler
Dr. Joan Kunz, and (as always) Ravi Tavakley.
Your work is crucial to the lab's success!



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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