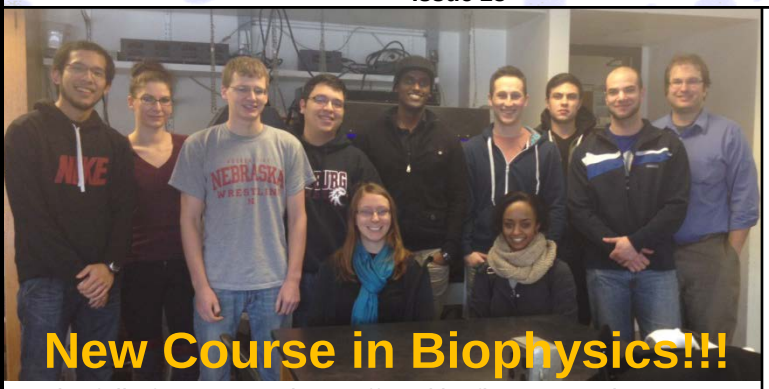
The Micelle

Spring 2014

Issue 13

Micelle: (*pronounced:* my-cell) 1) Unit of structure built up from polymeric molecules as a molecular aggregate that constitutes a colloidal particle. 2) **The Newsletter of Augsburg Biophysics**



New Course in Biophysics!!!

In the fall of 2013 Augsburg offered its first course in biophysics (PHY 317). This interdisciplinary course was taken by 10 students majoring in biology, chemistry, and physics. As an interesting side note on the history of the Augsburg Physics program, the very first full time physics faculty member at Augsburg was a young biophysicist by the name of Herb Lindquist. Today, Herb has taken a tremendous interest in our lab and the physics department. We simply wouldn't be enjoying our successes without his help and support. Thank you Herb.

Our course used Philip Nelson's textbook *Biological Physics* and focused on thermodynamics and statistical mechanics as applied to biophysical phenomena. Students got to explore concepts of free energy and entropy reflected in phenomena such as protein folding and the self-assembly of lipid membranes. The course also included a lab where students could get hands on experience with some of the powerful techniques biophysicists use to probe a diverse range of length scales. These techniques included fluorescence microscopy and spectroscopy, image processing and analysis, and molecular dynamics simulation. We also thank Ken Rosenblum for his support of the development of an optical trap. Finally, we used an Arduino project to introduce students to the world of microcontrollers. These devices provide tremendous computing power for proto-typing new tools and designing new experiments.

Leveraging our location in Minneapolis and technologies like Skype we were able to introduce students to professional biophysicists as part of the course with four guest lectures. Dr. Nidanie Henderson-Stull spoke about the use of x-ray crystallography to determine the protein structure. Dr. Bengt Svensson gave an overview of computational techniques used in biophysics. Matt Blosser explained recent discoveries in how fatty acids might have aided in the origins of life on earth. We also were privileged to have a guest lecture from Dr. Jennifer Ross, an expert in muscle proteins, who was the 2013 recipient of the Margaret Oakley Dayhoff award. Thank you to all our guest speakers.

One of the great aspects for me in teaching the course was that I got to interact with students from across the sciences at Augsburg. The experience really gave me a firsthand appreciation of how we train undergraduates and how our different disciplinary approaches inform how we tackle problems and find solutions. -Prof. Stottrup

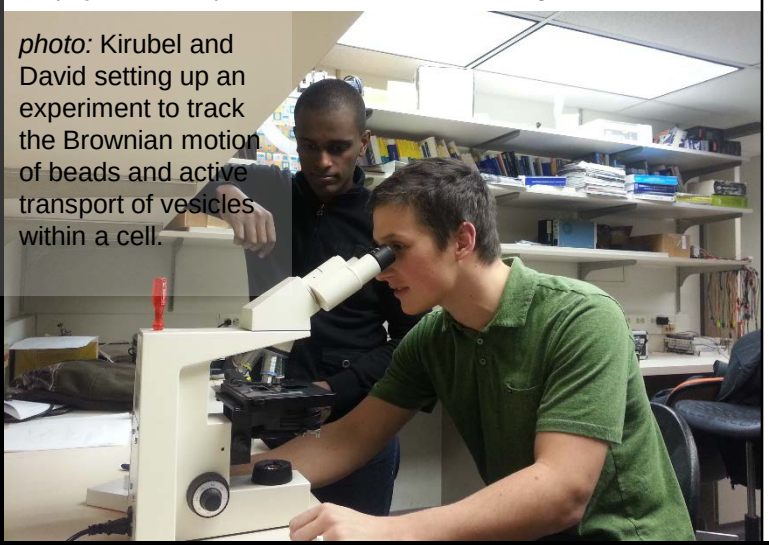


photo: Kirubel and David setting up an experiment to track the Brownian motion of beads and active transport of vesicles within a cell.

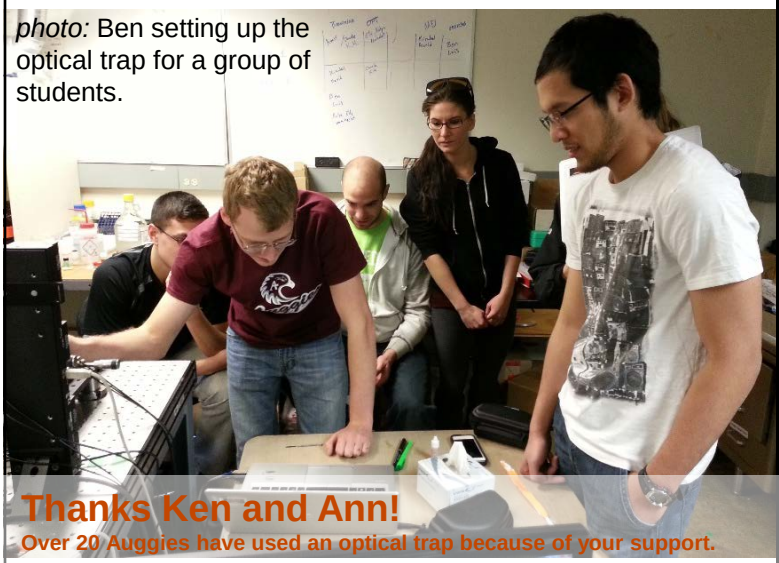


photo: Ben setting up the optical trap for a group of students.

Thanks Ken and Ann!

Over 20 Auggies have used an optical trap because of your support.

RECENT NEWS

- Biophysics at Augsburg is growing. Dr. Nidanie Henderson-Stull will be carrying out research at Augsburg as a member of the biology department. Welcome Nidanie!!!
- Sergio Romero Garcia has donated more equipment from Banner Engineering. More importantly he has donated his time and expertise. **THANK YOU SERGIO.**
- 8 Auggies went to San Francisco for the 58th Annual Biophysical Society Meeting. Check out the next page for details.
- Emil Eldo and Eleni Beyene presented their work at Microscopy across the Disciplines in January.
- Luis Hernandez presented his poster at the prestigious Society of Hispanic Professional Engineers conferences. This competition was by invitation only. Congratulations Luis!
- Ravi's work with the lab was featured in the University of Minnesota's College of Continuing Education. It is a great piece which highlights the lab nicely.
- Prof. Stottrup continues to facilitate work with researchers at the University of Minnesota.
- Elly Bier was awarded a research position at NIST to work with long time collaborator and friend of the lab Michael Halter.
- Prof. Stottrup and Sam McKagan, PhD, have submitted two abstracts for the Summer meeting of the American Association of Physics Teachers. It is in Minneapolis!!!

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2014 Auggies at BPS

Ben Grant, Promise Okeke, Prof. Kunz, Luis Hernandez, Eleni Beyene, Prof. Stottrup, Emil Eldo, Kirubel Frew

Augsburg Biophysics takes San Francisco!

Profs. Kunz and Stottrup like to refer to the summer of 2013 as the "the best summer ever!" It paid off: this year the lab had more presentations and students attend the 58th Annual Meeting of the Biophysical Society than ever before. Four presentations and 6 Auggie Biophysicists made the journey in frigid February to San Francisco. Thanks to Augsburg and NSF for providing the support for this trip. We got all kinds of great ideas and can't wait to get down to business this summer. Some of us also learned how gorgeous the weather is in San Francisco in February… some lessons were particularly painful for Minnesotans this winter.

Other important lessons included:
The importance of meeting graduate school representatives in person to better understand the process at each graduate school. Luis got a bunch of great tips on his graduate school hunt.

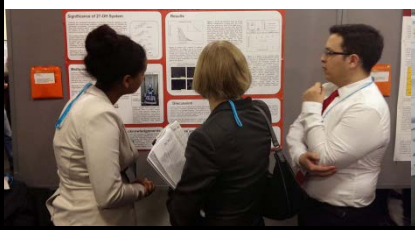
Prof. Kunz did some valuable networking at the Membrane Chix annual dinner.

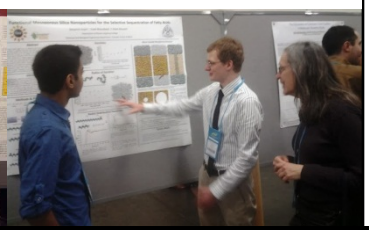
Luis, Kirubel, and Ben got some great ideas to improve some of our equipment by talking to vendors. One vendor even provided us with the tools needed to modify their product to fit our needs. It is really cool to interact with small business people and see how interested they are in solving problems.

All the Auggies really enjoyed meeting scientists of all sorts of backgrounds and interests. There is a lot you can do with a science degree and creativity.

Finally, if you are going to go to the annual dance and mixer… don't forget your free drink tickets. Prof. Stottrup decided to skip the dance this year and catch up on sleep.

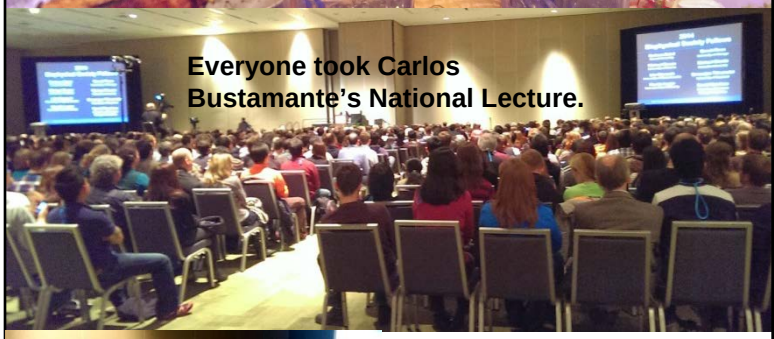
photos: Ben, Eleni, and Luis practicing their poster explanations before the crush of the crowds.





The last day of the conference offered an example in how opportunities are so often random and as Louis Pasteur would say "fortune favors the prepared mind." By chance the Augsburg team met with a long time supporter of the lab Dr. Anne Hinderliter. She mentioned an opportunity for a position and connected us with the owner of a small company. The position was a perfect fit for Ben Grant. He had an interview and has begun a position with Fluorescence Innovations. Way to go Ben! One of the mysteries of life is that key moments often seem to be a combination of hard work, preparation, and random chance. Biophysics is the perfect preparation for that. Onward and upward.

Profs. Kunz and Stottrup had their hands full keeping track of Promise and the rest of the gang.



Everyone took Carlos Bustamante's National Lecture.

Luis, Kirubel, and Ben snagged a picture with Steven Chu! Nobel Laureate and former U.S. Secretary of Energy. He is a passionate advocate for the role of science in decision making.

Special Thanks To: Anonymous Donors, Augsburg College and URGO, McNair Scholars Program, Dean and Amy Sundquist, Ken Rosenblum, Research Corporation, Eppley Foundation for Research, and NSF awards DUE 0837182, CHE 1040126, and DMR 1207544.

GET INVOLVED! We have great projects for students, as well as equipment and expertise for collaboration. Check us out at: http://web.augsburg.edu/~stottrup

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Interested in Giving?

Prof. Stottrup would be happy to connect you with Augsburg's Development Office.