

FEATURE:
Tom Lopez and
his magnetic
field viscometer

In the Spring of 2008, McNair Scholar Tom Lopez was trying to find the right project for his summer research. Tom wanted to do something original and preferred to focus some of his efforts on apparatus design and construction. By chance Professor Stottrup had just viewed a poster at the annual biophysical society meeting on the use of a magnetic needle viscometer (MNV) to study surfactant films (lipids or otherwise). The two hatched a plan to try to build one inexpensively from materials already available. From there Tom took off: he read several papers by people who had built MNVs or similar devices, ordered and read two dissertations by graduate students who had worked on the project, and even arranged a tour of a Stanford University lab where the MNV was developed. With the help of a generous donation from Boston Scientific of power supplies, Tom has his device up and running.

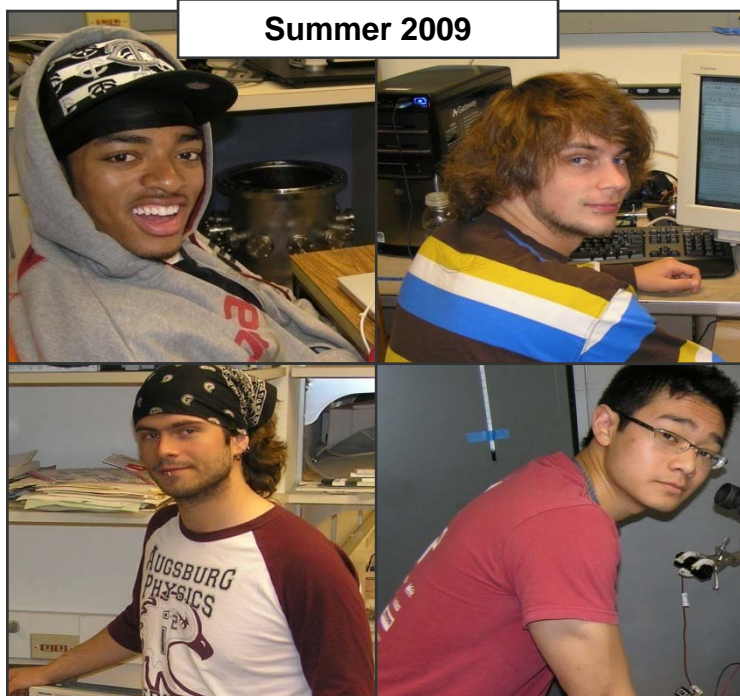
The basic operation principle of the MNV is analogous to the introductory physics problem of a sky diver reaching terminal velocity as she falls through the atmosphere toward earth. When a sky diver falling to earth comes to its terminal velocity there are forces of equal magnitude but opposite direction acting on the diver. By knowing the acceleration of gravity and terminal velocity of the diver we can extract the viscosity of the air. Similarly, the MNV allows us to determine the viscosity of the fluid a small needle is moving through at the air-water interface.

This summer Tom hopes to incorporate computer control and automation into the data acquisition and analysis. He will do this using LabVIEW and ImageJ; both programs are widely used in graduate schools and industry. Tom also is writing a manuscript describing his work so that other groups working with limited resources can build similar devices.

RECENT NEWS

- Andrew Nguyen (2010) and Christine Staloch (2009) both presented posters at the 53rd Annual Meeting of the Biophysical Society in Boston (March 2009).
- Lipids Lab collaborator Erkan Tuzel has accepted a tenure track position in the department of Physics at Worcester Polytechnic Institute. Congratulations Erkan! We look forward to working with you in the future.
- Professor Stottrup and his collaborators in the Zhu lab had their paper titled *Nanomechanical Contrasts of Gel versus Fluid Phase Supported Lipid Bilayers* accepted to the Journal of Physical Chemistry B.
- Nate Johnson took first place in the Minnesota Area Association of Physics Teachers meeting poster competition (April 2009). This is the 3rd consecutive year a Lipids Lab Member has won this competition. Tom, Andrew, Christine, and Sergio also presented posters and received many compliments.
- Andrew Nguyen and Professor Stottrup received an SPS award to purchase a high speed camera for research.
- We welcome Nick Hudson (2012) and Nick Ward (2011) to the Lab. Nick H. was awarded a Sundquist Fellowship and Nick W. is an LSAMP recipient and McNair Scholar.
- The Lipids Lab welcomes back Dan Forseth (2008) who will be working in the lab part time this summer. Learn more about Dan on the next page.
- Alison Heussler and Christine Staloch graduated from Augsburg with degrees in Chemistry and Physics. We wish them success in their upcoming adventures.

Summer 2009

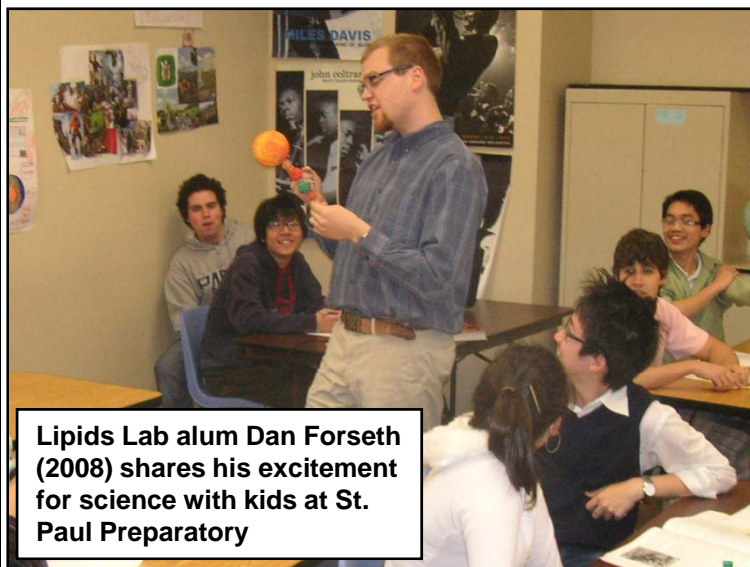


In addition to Tom Lopez, four other students will be working in the Lipids Lab this summer: (clockwise from top left) Nick Ward, Nick Hudson, Nate Johnson, and Andrew Nguyen. Andrew is also working as an intern at Aveda and SarTec.

The Micelle

Spring 2009

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**



Lipids Lab alum Dan Forseth (2008) shares his excitement for science with kids at St. Paul Preparatory

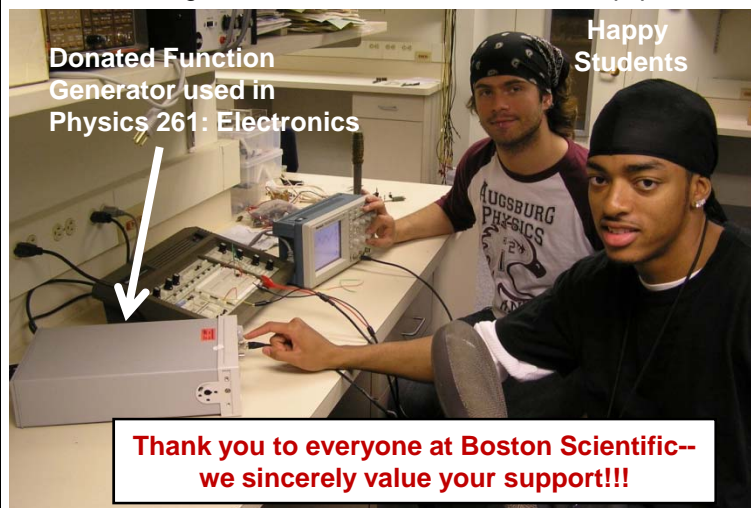
What is a typical day like at St. Paul Preparatory? St. Paul Preparatory is an international school where students choose to leave their countries to study in the United States. Students do this because it increases their chances of attending an American college. I teach Algebra 2 and Physical Science to 9th through 12th grade English Language Learner (ELL) students. English is a second (or third) language for all of the students at the school, so it is not only important to present the material of the classroom, but also being sure they understand the English that they encounter in my classroom.

How did your experience in the Lipids Lab prepare you for your current position? As a Biology major, I had a view of science that revolves around the processes of life. The lipids lab initiated my interest in interdisciplinary work. In my classroom, I try to incorporate the idea of interdisciplinary work every day. While teaching science, I often ask students questions about culture and other topics. Even the science that we cover is interdisciplinary. We are currently studying astronomy, but we are also exploring basic physics concepts.

What do you see is the biggest obstacle to overcome in getting students to consider studying science? Students often have preconceived notions of what science is. They often believe that science is a concrete subject that has questions and answers. This makes it hard for them to understand that science can offer an abstract approach. I try to incorporate those abstract questions into my classroom every day. It is very fun and engaging to ask students to come up with answers to unanswerable questions. This idea of abstract science makes an invigorating classroom and helps students with their critical thinking skills.

What advice would you give our science students at Augsburg College? I would have to say that there are many uses for a science degree and you should not always just choose one path. In my spare time, I try to use my scientific skills in other places besides teaching. This could include doing small experiments in my own time, or connecting my science background with another subject of interest. It is important to realize the potential that having a science degree in other aspects of life.

Augsburg Physics received a generous gift of equipment from Boston Scientific. Jimmy Wong and Brian Teschendorf, both of Boston Scientific, helped organize these donations. Tom Lopez and Nate Johnson used two power supplies to build a Magnetic Needle Viscometer (see front page). Using LabVIEW these students can control the field strength with their laptop. Students in Physics 261: Electronics regularly used function generators and other donated test equipment.



KEEPING TRACK OF ALUMNI

- Erik Lundberg has been awarded a NASA Graduate Student Research Program (GSRP) Fellowship. This award will support Erik as he finishes his PhD in Electrical Engineering at Cornell.
- Kyle Sontag has just published a paper with colleagues at the U of GA titled: *Formation of conjugated polymer brushes by surface-initiated catalyst-transfer polycondensation*.
- Ben Sonquist was featured on the 10 o'clock news as part of the STARBASE Minnesota program to excite elementary school students about careers in science.

If you are a Lipid Labs Alumni please drop us a line and let us know how you are doing.

Special Thanks To: Professor Zhu and members of his lab for their continuing support; Erkan Tuzel, Sylvio May, Dan Kroll, and the rest of the NDSU biophysicists; Mike Halter and his colleagues at NIST; Augsburg College and URGO; Dean and Amy Sundquist; Research Corporation; The McNair Program; and MN Space Grant Consortium.

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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