Students of Applied Physics Interview Project

Applied Physics Student Council

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The Problems

1 The University of Michigan is big, and Applied Physics students are lucky because we can work anywhere in the school. But students can have a hard time figuring out if they should apply or who they should work for with so many options.

Prospectives: Why Should I Apply?

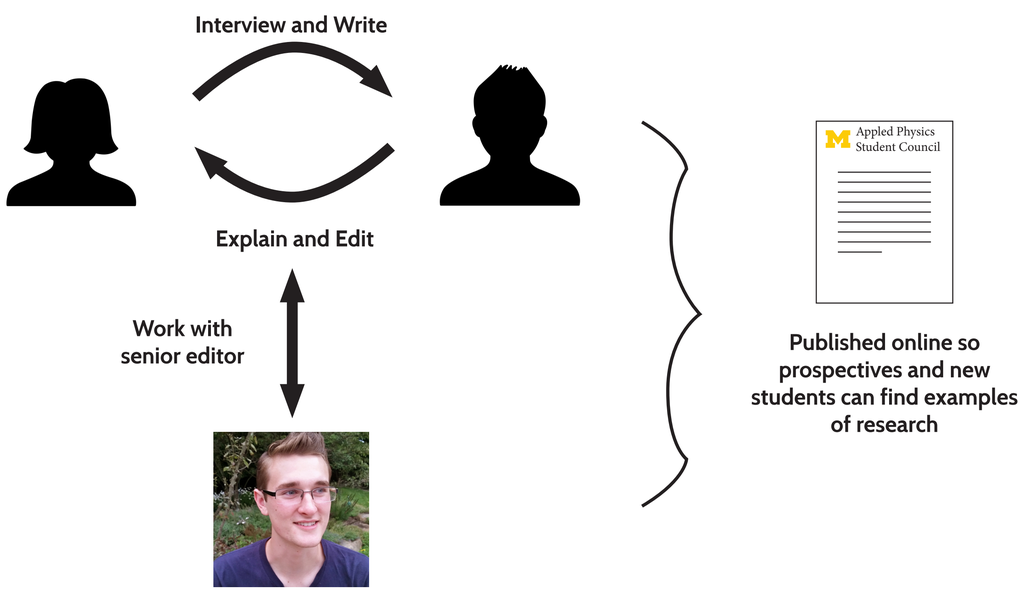
First-Years: Who should I work for?

Entire School
+
Outdated Faculty Websites
+
Can Only Have So Many Seminars
=

2 Graduate students recieve no formal communication training. Learning this is essential to getting the public or funding agencies to understand why your research is important.

Our Solution

The *Students of Applied Physics* project helps both of these problems. Current students get experience explaining research to a different audience from both a writer's and editor's perspective. The results of this work get published online, allowing new students to see the research being done by current students.



Some Excerpts

Cell membranes are composed of polar molecules called lipids, which have a hydrophobic side and a hydrophilic side. These lipids self-assemble into a bilayer, with the hydrophilic ends facing outwards towards water and the hydrophobic ends facing towards each other, providing a barrier between the fluids inside and outside of the cell. In addition, living membranes contain a wide variety of proteins that attach and interact with to the lipid bilayer. These proteins determine the signaling and binding properties of a cell, and fluctuations in lipid concentration affect the cell's ability to transmit and accept information. But there is controversy over whether anesthetics work by binding directly to proteins inside the cell membrane or if other properties of the membrane like lipid organization are more important.

-From Morgan Whitcomb's article on Thomas Shaw

Libby does a type of spectroscopy using three different laser pulses. By varying when the lasers pulses are on the sample, she can see both the initial state of the system and how it responds to specific wavelengths of light. By taking many measurements over time, Libby can understand how the states interact and explain the different processes excited in a biological system by the sun's light. Using these methods, Libby usually studies light-absorbing pigments that are important in photosynthetic processes, like chlorophyll. This is important because photosynthesis is something that we understand macroscopically but not microscopically. Understanding these really fast energy and charge dynamics could help us to design new photosynthetic light harvesting processes that could be applied to solar cell technology.

-From David Geroski's article on Libby Maret

But knowing how much water is added to the ocean is the *easy* part. Understanding how soon and how fast ice actually melts is more difficult. For example: as glaciers melt, cracks form that can cause large pieces of ice to break off and fall into the ocean. This process is called iceberg calving and helps determine how fast the water of a glacier moves into the sea. Concerted research efforts in this area have made progress in describing iceberg calving in Greenland, but it turns out that those results don't translate into understanding Antarctic ice.

-From Thomas Shaw's article on Morgan Whitcomb

Read the first full article now!

http://bit.ly/ap_interview

Compared to a halogen bulb, super continuum lasers offer many benefits, but one of the most important is the ability to be highly directional and focusable. This means infrared spectroscopy can be performed in situations where a traditional halogen bulb is insufficient. For example, the gases coming out of the exhaust pipe of a moving car could be probed, and the various chemical compounds and their concentrations could be determined, which is useful for vehicle emissions testing. Or the subtle differences in the chemical fingerprint of a cancerous cell and a nearby healthy one can be determined spectroscopically, which is particularly important for colon, breast, and skin cancer.

-From Brian Worthman's article on Ramon Martinez

What happens when batteries malfunction? Only one of the biggest news headlines of 2016: total recall of the Samsung Galaxy Note S7 for critical battery failures resulting in fires. This is a big problem given that Li-ion batteries are present everywhere from cell phones to power tools to Boeing airplanes. These reactions are very much not swell. Luckily for us, Mallory's reaction to all of this is to study how the materials that compose batteries can affect their performance and safety. The Applied Physics fifth-year PhD student is especially concerned with the application to electric automobiles. Cell phone batteries are small, low voltage, and built to release pressure themselves, thereby reducing the scope of the damage they can cause. Electric car batteries have similar safeguards in place, but they are by necessity larger, and with larger batteries come larger risks.

-From Joseph Iafrate's article on Mallory Fuhst

Before coming to the University of Michigan, David spent a year after undergrad working for Raytheon working on remote sensing. At Raytheon he became interested in understanding how all the pieces of remote sensing technology fit together...Signal processing is being applied in many creative ways to form new technologies, but the concepts behind the technology have a much longer history. Perhaps the most well known of its initial applications is RADAR. RAdio Detection And Ranging (RADAR) transmits an electromagnetic radio wave signal (mm to km wavelength range) that propagates through a medium (like air or water). Any other materials in the path of the waves (rocks, enemy submarines, etc.) will cause the emitted waves to reflect and return back to the point of transmission. The returned signal can then be deconstructed to inform the receiver of the obstacles ahead. But proper analysis of these signals requires a detailed knowledge of the signal propagation material and concepts of waveform mixing.

-From Libby Maret's article on David Geroski

AP Student Interested in writing? Sign up today! Right here!