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# PRISERS WEEKLY

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## First Issue!



Hello, PRISERS!  
I am Shimwoo Lee, and I put together this newsletter in the hopes that it will help us get to know each other better and learn about research in various other disciplines.

Every PRISE member is doing something meaningful, so why not share it? I hope you all enjoy the newsletter!

Oh, and let me introduce myself, too.

I am a rising sophomore in Mather House. I am planning to concentrate in Chemical and Physical Biology. I am originally from South Korea, and now I live in Modesto, California.

I am working in the Haigis Lab of Harvard Medical School, studying a family of proteins called sirtuins. They control lifespan and cell survival, and importantly, promote mitochondrial metabolism.

Since sirtuins are able to influence mitochondrial activity, the pressing question I

will try to answer is whether over-expression of sirtuins can mitigate the defects in mitochondria due to Friedrich's ataxia (FRDA), a neurodegenerative disease.

FRDA is the most prevalent recessive ataxia and symptoms include muscular defects, slurred speech and scoliosis. On a molecular level, the disease is linked to defects in the mitochondria, such as iron loading and increased susceptibility to oxidative stress.

Though currently, there is no cure for this disease, sirtuins may provide a key to finding a treatment.

What's fun about my lab? There is ice cream social every week (which used to be pizza and beer social hour before undergraduates students came to work for the summer)! Plenty of delicious ice cream in a bunch of flavors – Yum!

When I am not working, I like to spend my time jogging or doing Taekwondo.

Sincerely,  
Shimwoo Lee

*Feel free to send questions or comments to [shimwoo.lee@college.harvard.edu](mailto:shimwoo.lee@college.harvard.edu)*

## Corinne Tu



Year: Rising Junior  
Concentration: Joint Concentration in Astrophysics and Statistics  
House: "The family of fish - Cabot House!"  
From: "I was born in Paris, France (vive

la femme française!), I grew up speaking French in Montréal (where my brother was born), and am currently an American citizen in California (where my sister was born). My parents are from China, and I'm grateful that they have continued to speak Chinese with me at home. The Tu family is a mini-United Nations!"

PRISE Research project: "I work at the Harvard-Smithsonian Center for Astrophysics, studying extragalactic blazars. Blazars are blazing quasars (not blade + lasers, unfortunately) associated with supermassive black holes and relativistic jets (pew pew!)."

I'm trying to apply a new statistical method to analyze the variability of their gamma-ray emissions, in hopes of finding out more about blazar characteristics.

I think that this is an interesting topic because blazars are violent and I am not -- and opposites attract, of course."  
Embarrassing moment at lab: "I was taking a 15-minute power nap (I swear!) in my PI's office, but five minutes into it, she walked in. Awkward."

Interesting fact about Corinne: "I have very vivid and interesting dreams - they sometimes involve alliteration and I usually remember them, too. A particularly interesting one happened last semester, when I was a Teaching Fellow for Stat 104.

In my dream, I named the section that I taught (giving it a team name of sorts, to elicit enthusiasm and encourage unity): the name was "Carmile's Chlamydia," which is rather bizarre because I don't know anyone named Carmile and I certainly don't have chlamydia."

## Rachel Hinman



Year: Rising junior  
Concentration: Physics and Math  
House: Winthrop  
From: Seattle, WA  
PRISE Research project: "I am working with Harvard's ATLAS

group, which is part of an international collaboration of physicists who run the ATLAS experiment at the Large Hadron Collider.

By colliding protons moving at speeds close to the speed of light and detecting the particles that result from these collisions, the LHC promises to shed new light on a variety of important open questions in particle physics.

For instance, the experiment could substantiate or refute theoretical predictions regarding the origin of mass, the possibility of extra spatial dimensions beyond the ones we see, and additional symmetries of nature that may exist.

The first step in using high-energy collisions to improve our understanding of physics is to measure how well the equipment is performing.

I am using the production of the short-lived upion particle to quantify the efficiency of the detector at correctly identifying the muons into which it -- and many other particles -- decay."

Most interesting lab work so far: "Filtering out actual upion particles from background."

Fun Fact about Rachel: I like to snowshoe on Mt. Rainier.

# Stormy Monday Morning Blues?

**By Afoma Umeano**

As the great T-bone walker once said, "Call it stormy Monday but Tuesday's just as bad."

To the everyday worker, these immortal words ring true, but as PRISE fellows, we know better. We look forward to Mondays like CEOs look forward to their Christmas bonuses. We thrive on Mondays.

Why? Because our jobs are cooler than brand new igloos.

As the unemployment rate begins to steadily decrease, one thing has become astonishingly clear: more and more people have lame jobs.

Let's face it, due to the oil spill we've lost cool interesting jobs like "pearl diver" and gained horrible jobs like "outdoor pool cleaner." More and more people are trading their scuba diving equipment for a bottle of dial and a sponge (Sorry, "oil covered wildlife cleaner"), but here in oil-free Cambridge, there's a different sort of story.

PRISE fellows all over the world (or greater Boston area) are doing cool things! Whether you are collecting livers, manipulating heart cells, or surgically drugging rats with cocaine (let's not judge how some PRISE fellows get their kicks) we are doing cool.

And with all this in mind, how can Monday be stormy?

"If anything its going to be sunny with clear skies" states Jeff O'Reilly, the weather guy, "with a high in the low 80s." Google weather agrees.

The debate rages on, but this reporter knows better. We won't know for certain until after the start of the new semester. Until then, happy Monday.

Remember to read next week for my analysis of Tuesdays and proper lab lunch etiquette--"How to wipe when you don't have a napkin."

Sincerely,  
A fellow PRISE fellow.

## Afoma Umeano



Year: Rising sophomore  
Concentration: Bio-medical engineering  
House: Lowell House  
From: Augusta, GA  
"Home of the masters golf tournament."

Originally from Enugwu Agidi, Nigeria"  
PRISE Research Project: Afoma works at Dr. Sean Wu's lab in the Cardiovascular Research Building at MGH.

We research heart development and disease modeling using IPS and stem cells.  
Why is it interesting: Heart disease is the number one killer in developed countries. Through my lab's research, heart disease regression is a very attainable possibility in which stem cells etc. can reverse heart disease, for which as of now there is no cure."  
Most embarrassing moment at lab: "I unknowingly sang Justin Bieber's "Baby" out loud in front of the elevator and my lab tech laughed at me."

Afoma's Hobby: "No real hobby. Procrastination maybe? Crosswords and sporcle are ever present in my life!"

## Debbie Lin

Year: Rising senior

Concentration: History and science

House: Currier House

From: Born in Taipei, Taiwan; grew up in the San Gabriel Valley of California

PRISE Research Project: "I work in the Seidman lab at HMS. My research project is on cardiovascular genetics, specifically hunting for and characterizing clinical phenotypes of as-yet unknown mutations contributing to dilated cardiomyopathy, a condition in which the left ventricle of the heart becomes progressively too weak to pump blood around the body.

I extract and analyze DNA from blood and saliva samples of people from families with very strong patterns of inheritance but had been screened negative when tested for known mutations.

It is particularly exciting because I have met some of the families in our "research roundups" when we discuss research participation with them, obtain consents, and administer the tests such as blood draws and echocardiograms.

Now, how is identifying a few letters wrong in the genetic code useful to them?

Most immediately, if we are able to identify and validate a mutation common to all the affected members of the family, we could figure out which of their healthy but at-risk relatives have the mutation and need to be followed-up, and which are at no higher risk for dilated cardiomyopathy

than you or me.

One of my subprojects is collaborating with a number of colleagues on validating a series of likely-disease-causing mutations on a very large genes. Among these mutations is a variant that has been found in one of the families with which I am working.



Given how particularly nasty (transplants, heart failure, and implantable cardioverter defibrillators -- ICDs -- galore) and widespread the disease is in their huge family, I look forward to being able to identify very soon which of them need not worry, and which of them should take appropriate precautions.

At the moment, the disease is largely irreversible once it has progressed, other than via transplant, though there

are promising therapeutic options for prevention or at least halting the disease, so early identification is important.

In the longer term, knowing which genes are affected can give useful clues to the mechanisms of disease progression. It's not yet well understood, but it is clear that that is not uniform across the entire patient population, depending on which molecules in the heart are affected. This fundamental understanding could lead to development of powerful therapies to treat cardiomyopathy."

Interesting fact about lab: "The summer is still young! Though I am rather more interested in the clinical implications of the work than its potential to reveal fundamental secrets of the universe, there is something magnificent about taking a sample of processed blood or saliva or whatever, pouring in just under a shotglass worth of 100% (200-proof!) ethanol, and seeing it appear to gel for a few instants before yielding lovely white strands of DNA floating around. There's probably some joke to be made about the origin of life and alcohol, but it's pretty awesome either way."

Fun fact about Debbie: "Coffee has an unreasonably narrow "therapeutic window" for me -- hard to get enough to help without overdosing. Instead, my poisons of choice to stay awake are absurd amounts of sugar, blasting Youtube music and (thanks to Currier's singles) boogying if nobody's watching, and chugging smoothies."

## Kidus Asfaw



Year: Rising sophomore  
 Concentration: Engineering Sciences  
 House: Eliot House  
 From: Addis Ababa, Ethiopia  
 PRISE Research

Project: "I work in the David Edwards Lab in the Engineering Sciences Laboratories. We are working on research pertaining to better drug delivery methods.

Presently, we are studying a method called Spray Drying, which makes drugs into powdered-forms, making them into inhalable forms. One of the major problems with traditional vaccines is that they need to constantly be refrigerated. This brings about a challenge to countries where electricity may not be readily available.

With our new drug delivery system, however, we can keep drugs stable at room temperature. Additionally, drug release and specificity is also dramatically increased by making drugs inhalable."

Embarrassing moment in lab: "After changing the PBS buffer for a gel, I hastily put the sample in the refrigerator instead of the incubator. The result was that I had to make the gel all over again. Funn!"

Fun fact about Kidus: "After a year of novel tastes, I have come to a decision that buffalo chicken is my favorite American food."

## Marion Liu

Year: "I am going to be a senior. Woot 2011!"

Concentration: "I am a proud MCB concentrator"

House: "Dunster. D-HAUS!!!!!!"



From: "I grew up in Philly and I consider myself to be from Philadelphia, but currently my family lives outside of Chicago"

PRISE Research Project: "I work in Dr. Sun Hur's lab at Longwood. We do part crystallography and part biochemistry, so very similar to what you saw in the movie *Naturally Obsessed*. Our target proteins are two RNA sensors in the innate immune system, which are responsible for detecting viral RNA and initiating an

anti-viral response. I am doing biochemical assays on these proteins to understand the function of each domain in the protein and how RNA recognition is achieved.

This topic is interesting because your cells contain many thousand fold more of self RNA, yet these two proteins are able to discriminate rapidly between self and non-self RNA and initiate a response. Understanding the mechanism of how this happens would help us develop therapies for RNA viruses and vaccines that are more effective.

Lab funness: "I get to freeze crystals. You find a crystal under the microscope, use a very tiny loop and scoop out the crystal. While the crystal is in the loop, you hold your breath and say a prayer, hoping that the crystal stays in the loops. Then you put it in liquid nitrogen. If you are like me, the first couple of times, you mostly just get air bubbles or protein skins."

Fun fact about Marion: "I like watching the Food Network and I like to cook. My ideal date is at a supermarket. There is something really sciency and really artsy about being able to put together the perfect dish."

## Chioma Madubata



Year: Rising senior  
 Concentration: Molecular and Cellular Biology  
 House: Quincy House  
 From: Maryland  
 PRISE Research  
 Project: "I work in the Schreiber Laboratory

at the Broad Institute. My research project involves optimizing an assay for measuring reactive oxygen species (ROS) in pancreatic cells. ROS is thought to contribute to the pancreatic damage that occurs in Type I and Type II diabetes, but its precise role remains poorly understood.

Once this assay is developed, I plan to use it to characterize ROS in cells under diabetic stress and then to screen for small molecules that affect ROS levels. ROS is an interesting topic because it affects various cellular signaling pathways and changes in ROS levels have also been implicated in the progression of other diseases like cancer.

I am excited to work on this pancreatic ROS project because any additional knowledge gained about the progression of diabetes might be useful in creating better treatments.

Lab fun: "A fun thing I want to do someday is set up a hammock in my lab area. I am inspired by my previous PI who successfully secured a hammock in his office and used the hammock when reviewing papers; I am certain the relaxing atmosphere will improve my focus."

Interesting fact about Chioma: "I love to

sing, and because of a childhood spent listening to the radio and watching music videos, I am fairly good at recognizing pop and Top 40s songs from the 80s and 90s after less than 5 seconds of intro."

## Akansha Tarun

Year: Rising sophomore  
 Concentration: Undecided (Considering Philosophy, Chemistry, or Mathematics)  
 House: Cabot (Yes, the Quad!)  
 From: Illinois



PRISE Research Project: "My work in Dr. David E. Cohen's lab focuses on phosphatidylcholine transfer protein (PC-TP or StARD2) and its interaction with other proteins. Particularly, I am looking at the influence of StARD2 polymorphisms and I am testing the interacting domains of PC-TP.

As I learn new techniques to address these topics, I am inspired by the possibilities of science. In combination with technology, science holds the key to solving numerous health-related and non-health related concerns.

Thus, while I easily get absorbed in the interesting details of my project, what makes me most excited about my project is the bigger picture. PC-TP plays a key role in metabolism, so its connections to diabetes and obesity help bring meaning to my daily work."

Embarrassing moment at lab: "One day in lab, not too long ago, I was so excited to get started on a protocol that, after retrieving my samples from the cold room, I immediately returned to my bench to begin my work.

A little while later, when I looked up, I noticed that a different lab member than usual was sitting across from me. It took me only a few moments after that to realize that I had been working at the wrong lab bench for quite some time.

Turning to the post-doc whose bench I had been working at, I thought that I would feel embarrassed. Instead though, we laughed together. I guess that, in most new labs, rows and rows of lab benches look awfully similar!"

Fun fact about Akansha: "I love taking a nice long run by the river and then getting bubble tea afterwards! It is my new summer tradition."