PUC BIOLOGY NEWSLETTER

ISSUE 8 **WINTER 2011**

Greetings from the Pacific Union College Biology Dept.

You see me when I travel and when I rest at home. You know everything I do. You know what I am going to say even before I say it, Lord… You saw me before I was born. Every day of my life was recorded in your book. Every moment was laid out before a single day had passed. Psalm 139:3-4, 16, NLT

One of the great joys of working with our students is seeing them grow and mature into individuals who, not only are prepared by a rigorous academic program, but are willing to give support and service to others throughout their lives. One of the values of this annual Newsletter is to inform those of you who have graduated and are living your lives of service about some of the events occurring at your alma mater. Some good news:

- First quarter enrollment in the Biology Department grew by 32% to 141 students. This follows an 18% growth in the previous academic year.
- Our graduating Seniors in 2010 averaged at the 95 percentile on the nationally normed Major Field Test in Biology.
- Over the previous nine years an average of 21.5 PUC students have matriculated into medical school. Matriculation rates into other professional programs are also outstanding.
- The Environmental Studies major established in 2008 and housed in the Biology Department, nearly doubled in size from last year jumping from 8 to 15 students.
- Faculty and student research continues to grow and prosper (see examples given in this Newsletter).

We hope you are enjoying every moment of your journey through life and that you will enjoy this brief update on the happenings in the PUC Biology Department. Thank you so much for your continued support and encouragement. We invite you to keep in touch with us.

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Biology faculty highlights from the past year:

John Duncan (jduncan@puc.edu) is involved with PUC Prep, the high school on campus, and teaches the biology course and helps to prepare students for the Intro to Chemistry course that they take the PUC Chemistry department.

Floyd Hayes (fhayes@puc.edu) was recently awarded a $50,800 grant from the National Audubon Society, National Fish & Wildlife Foundation and National Oceanic and Atmospheric Administration to study the breeding Western and Clark's Grebes of Clear Lake.

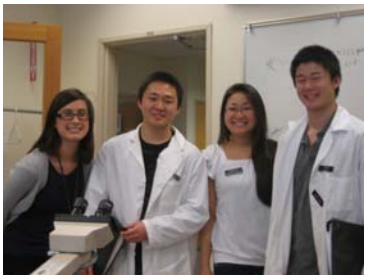
Bryan Ness (bness@puc.edu) spent the 2010 summer teaching limnology at Rosario Marine Station in Puget Sound, Washington. Dr. Ness was also the keynote speaker at the Pacific Union Conference of SDA Inservice for California High School Science Teachers and spoke on *Science in the 21st Century: Clones, Bones and Genomes*.

Robin Vance (rvance@puc.edu) continues to Chair the Biology Department and is working on the five-year Departmental Program Review.

Brian Wong (bwong@puc.edu) continues his cancer research and mentors up to five students each quarter. Dr. Wong and students presented posters at the April and November 2010 AACR meetings and will also present at the April 2011 meeting in Orlando.

Aimee Wyrick (awyrick@puc.edu) taught a college-level biology class to a group of high school students at Leoni Meadows Honors Science Camp 2010. She also continues as Academic Director of PacificQuest.

BIOLOGY LAB COORDINATOR



Alyssa Zima (pictured on the far left) is the new biology lab coordinator. Alyssa graduated in June 2010 and will be heading on to LLU School of Pharmacy this next school year. She is an asset to our department and has done a great job. She gets things done and always with a smile!

You may remember that Diana Chung served as our first ever lab coordinator. We are pleased to report that Diana is now in her first year of dental school at LLU.

2010 GRADUATES

On June 14 2010, 11 Biology majors and the very first Environmental Studies major graduated from PUC. As always, we are proud of our graduates and their accomplishments. The biology faculty wish them every success.

Ron Gruesbeck	Charles Raya
Kevin Jin	Molly Reeves
Jeeyoon Jung	John Stewart
Brian Kim	Kevin Tan
Lucas Kim	Christina Widmer
Julian Martinez	Alyssa Zima

BIOLOGY DEPARTMENT PHOTO GALLERY

Carrie and Christine at the biology club pre-vespers.

Christine, Chloe, and Zach plant seeds in Greenhouse Gardening lab.

Lawryn, Mark, and Peter lead song service.

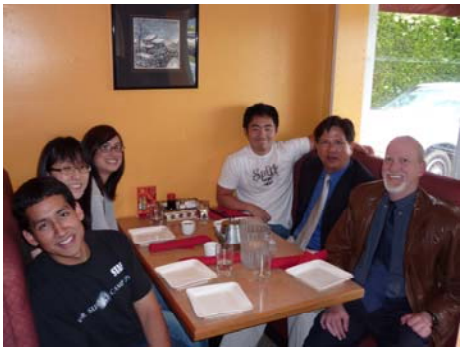
Dustin and his plate of curry.

Biology 112 laboratory.

Peter, Jordan, Mike, and Rob.

Peter, Stephen, and Brandi on a geology fieldtrip to Tomales Bay.

Beverly, Darlene, and Crystal at the Body Worlds Vital exhibit.



Julian, Jeeyoon, Alyssa, Lucas, Dr. Wong, and Dr. Vance at dinner.

STUDENT RESEARCH & INTERNSHIP

Who are you? I am Haruka Ito a sophomore majoring in Biology. I love all aspects of Biology, but am most interested in the potential for innovative ideas and research that can make impacts in medicine.

What did you do? I am working on sea turtle research with Dr. Stephen Dunbar from Loma Linda University and the organization ProTECTOR. I took measurement data on several recently captured Hawksbill turtles. Two of the turtles had been recorded before, but their flipper tags were missing. Since each turtle's head scale patterns are unique like human fingerprints, I positively identified the turtles by manually comparing the head pictures in the database with those of the unidentified turtles. I am currently digitizing turtle faces and analyzing them using a program to see how effectively individuals can be identified by their head scale patterns.

When and where did you do this work? I spent 12 days during the summer 2010 collecting field data in Roatan, Honduras.

Haruka Ito traveled to Honduras to study Green sea turtles.

What did you learn? I realized the importance of individual identification in learning more about the little known lives of sea turtles and their impact on the whole ecosystem. In Honduras, many locals depend on selling turtle meat and eggs to make a living. Therefore, researching with an organization like ProTECTOR can also involve working immensely with the locals and harnessing their help in both research and teaching about the importance of wildlife conservation.

How did PUC help prepare you for this experience? I found that the third quarter of Biological Foundations (BIOL 113) helped me a lot for this research experience. The research methods that I learned while taking that class, including data measuring, coming up with methods, and abstract and paper writing, were directly put to practical use with this project.

To learn more about this research please visit http://www.turtleprotector.org/

Who are you? I am Rob Frey and I am a Junior Biology major. I plan to go on to Medical School and specialize either in cranial facial reconstruction or infectious disease.

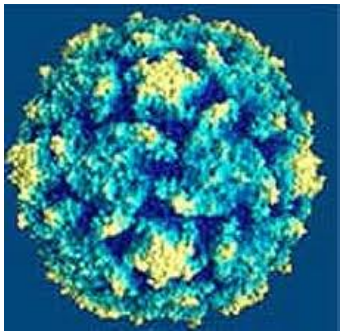
What did you do? I participated in research that studied Post Transplant Lymphoproliferative Disease, specifically how Epstein Barr Virus (EBV) induces B-cell lymphoma and its specific signaling pathway. My specific goal was to show that EBV was constitutively signaling not through the B-cell receptor (BCR), but through a viral mimic LMP2A. Another goal was to confirm the results of two other experiments and identify which is ultimately responsible. I was able to confirm that EBV was signaling through the AKT pathway not the ERK. Also, I was able to confirm that XIAP stabilization was AKT dependent.

When and where did you do this work? My research internship was for two months in summer 2010 at Stanford University School of Medicine.

What did you learn? During my months Stanford, I had a lot of catching up to do. Fortunately, I had a basic knowledge of immunology, but it was very limiting. Everyday during lab or after work, I had to read up on what others have researched on PTLD, EBV, AKT pathways, etc. Also, I read up on a lot of immunology, resulting in the purchase of immunology textbook. I learned so much during this summer internship. I learned various techniques of western blotting, refining my technique on cell culturing, and most of all learning how to work in a highly rigorous scientific environment. It was a definite challenge.

How did PUC help prepare you for this experience? It was a great advantage for me when I went to Stanford to already have a basic knowledge of cell culturing, because I had already done some research for Dr. Wong. Also, the basic knowledge of immunology that I acquired in Biological Foundations 113 gave me a good foundation to build upon.

Rob Frey on his last day at Stanford University School of Medicine with the binder full of western blots to submit to his supervisor.



The Epstein Barr Virus (EBV)

STUDENT RESEARCH & INTERNSHIP

Who are you? My name is Peter Han and I am a Biology and Film & Television Production double major. I plan on going to medical school; that's really all that's certain for now.

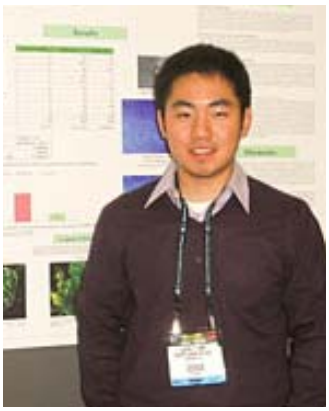
What did you do? Our research team, headed by Dr. Brian Wong, assessed the chemopreventative properties of *Plantago major*, a herb found in most temperate areas of the world. Using an aqueous extract, we looked at the effects of *P. major* on azoxymethane induced aberrant crypt foci, a putative precursor of colon cancer, in mice. We also ran an *in vitro* study with human colon cancer cell lines and paraffin stained mouse colon sections, both analyzed for evidence of Caspase 3 induction, a key player in apoptosis. I am the first author and so I wrote and made the poster for our experiments.

When and where did you do this work? I've worked on this project during spring, summer, and fall quarters of 2010. I work in Clark hall, either in the research room, where all the mice are held, or the microbiology lab. We presented our research in Philadelphia this November, at the AACR Frontiers in Cancer Prevention conference in November.

What did you learn? I have learned that science is a collaborative effort. I have been learning throughout my time at PUC, and through this research, of the amazing amount of complexity and detail that a single cell, a single organelle, or a single enzyme holds. There's so much more information than what's in our textbooks.

How did PUC help prepare you for this experience? PUC's low student to teacher ratio makes it possible for undergraduate students to participate in this graduate level lab work. There are very few places where undergraduate students are given as much free reign as here at PUC. As a Biology major, I have learned much of the scientific backing from Biology classes. However, much of the skills I learned were taught personally by Dr. Wong—again, attributed to PUC's close student-professor relationship and ratio.

Peter Han with his poster presented at AACR in November 2010. His research focused on the effects of *Plantago major*.



Lucas Kim with his research poster presented at AACR in April 2010. His research focused on the effects of *Oldenlandia*.

Who are you? I am Lucas Kim, a 2010 graduate of PUC. I graduated with a Biology B.S. and plan to go to dental school.

What did you do? I took part in research that studied the effects of Chinese herbs on colon cancer. My duties included taking care of our experimental mice, sacrificing and dissecting mice, preparing tissue cultures, performing tests on cancer cells, and many other things. We also wrote several abstracts and created posters that we presented.

When and where did you do this work? I participated in this research at PUC during my senior year of 2009-10.

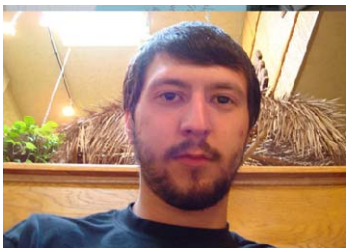
What did you learn? This was the first time I participated in scientific research. I learned a lot of things about research and how important it is. Although it is time consuming and tedious at times, it is critical to the advancement of science. This is something that I realized while attending a national cancer conference where thousands of people from all over the world gathered together to share their knowledge and work for a greater cause. It was an amazing and inspirational experience.

How did PUC help prepare you for this experience? As a Biology major, I knew many of the basics of cellular biology which helped me understand what I was doing. During my work, I took many classes that overlapped with what I did in research. For example, both Histology and Immunology taught me about the differences between healthy and not healthy tissues which allowed me to distinguish the cancer tissues under the microscope. They also helped me prevent contamination of tissue cultures by showing me stringent lab techniques.

Current and recent graduates who participated in Dr. Wong's research in the past year: Alyssa Zima, Jeeyoon Jung, Brian Kim, Rob Frey, Michael Lee, Stephen Frey, and Sara Stump. Students from outside our department also participate occasionally.

STUDENT RESEARCH & INTERNSHIP

Dustin Baumbach used a scanning electron microscope to study biotite crystals.



Who are you? My name is Dustin Baumbach and I am a Senior Environmental Science major. I plan on pursuing a Ph.D in Marine Biology and doing research on deep ocean life or teaching for a little while.

What did you do? I participated in the research looking at a specific type of rock called a biotite crystal and analyzed it using x-ray spectrometry on a Scanning Electron Microscope for its different chemical structure from different places in Peru. This would show if the crystalline structures were the same and be able to date the layer of rock that the sample was taken from to be able to date fossils in that layer.

When and where did you do this work? I worked during the month of August the summer of 2010 at the Loma Linda University Earth and Biological Sciences program with Dr. Kevin Nick, a professor in the department of Geology.

What did you learn? I learned that the chemistry and structure of different rocks can be vitally important for geologists, but also very fun to observe and try and figure out the 3D structure of the crystal. I also learned how to use a different type of micro scope, a Scanning Electron Microscope, which was an amazing thrill to learn because I knew I would be using different types of microscopes later on in my scientific career and so it was nice to have an introduction to something new. I also learned how to use a new statistics program and how to analyze the statistics that I plugged into the program, which I thought was interesting because I had never used a statistics program before. Geology is an important area in science and is more fun to analyze than what I thought it would be, Dr. Nick made my experience a lot of fun and taught me some valuable lessons through this internship.

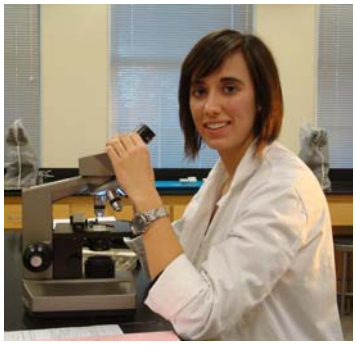
How did PUC help prepare you for this experience? The General Chemistry trio (CHEM 111-112-113) really helped me in this experience because of the amount of chemistry I needed to use to figure out the structure of the crystal and also the ratio of the amount of chemicals of the crystal. Also, the class Intro To Statistics (STATS 222) helped me a lot because it helped me understand some of the statistics that I collected of the ratio of the chemicals of the crystal.

Who are you? My name is Zoe Thompson, and I am senior Biology major. I am planning on attending graduate school to obtain a Ph.D. in neurobiology, and eventually teaching at the college or university level.

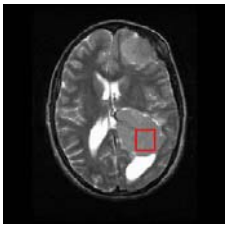
What did you do? I worked with both a neurologist and a radiologist, analyzing magnetic resonance spectroscopy (MRS) of epilepsy patients' brains to find out what kind of information this fairly new type of imaging can give us, and how it compares to the more commonly used magnetic resonance imaging (MRI).

When and where did you do this work? I worked for a little over two months this past summer at the Loma Linda University Medical Center.

What did you learn? I learned a lot about neuroanatomy, as well basic imaging techniques like MRI and electroencephalography (EEG). But I also learned firsthand how to think like a scientist: coming up with hypotheses and discarding them when necessary, how to allocate my time and resources to various aspects of a project, and how to coordinate and synthesize the advice from my research mentors.



Zoe Thompson used MRS to study the brains of epilepsy patients at Loma Linda University Medical Center.



How did PUC help prepare you for this experience? My education from PUC has been and will continue to be a great foundation for scientific research. I have had a lot of hands-on experience with the scientific method and small experiments in my various biology labs. Also, because of my work in organic chemistry, and as a lab assistant, I am familiar with the technique of nuclear magnetic resonance, which actually proved very helpful to understanding MRS as well.

STUDENT RESEARCH & INTERNSHIP

Who are you? I am Doug Weidemann and during the past 3 years at PUC I have had several opportunities to assist one of my professors with his research. As a biology major who plans to become a field biologist, these experiences have been invaluable.

What did you do? I worked with Dr. Floyd Hayes and we collaborated with the National Audubon Society to study the two species of *Aechmophorus* grebes (Western and Clark's Grebes) found in California. In certain parts of California, these two species of grebes have not been breeding very successfully. Our part of the research concentrated on measuring breeding success and discovering what might be causing breeding failure. We did our field work at Clear Lake, a large lake about an hour's drive north of PUC. We visited the grebe colonies several times a week and counted nests, eggs, and chicks, and measured colony parameters such as size, water depth, and density. We also spent time observing the birds and nests to try to determine the reasons for nest failure.

When and where did do this work? Summer 2010 was my second summer doing research full time with the PUC Biology Dept.

Doug Weidemann studied the breeding success of the grebes of Clear Lake.

What did you learn? Over 1300 nests were constructed last summer in the colonies that we monitored. Most nests were located in shallow marshes and sloughs along the margins of the lake or within floating mats of algae and pondweed in open water. While more grebes attempted to breed on Clear Lake this summer than in the past several summers, nesting success was still very low. We are not completely sure why the grebes were not very successful, but it could be partially due to predation from other animals such as river otters and disturbances from boats and people.

How did PUC help prepare you for this experience? Even though field techniques are difficult to learn in the classroom, several classes that I took last year helped prepare me for this summer's research. Vertebrate Biology and Animal Behavior helped me to understand the ecology and behavior of the grebes. Introduction to Research Methods, helped me improve my analytical and writing skills, which was important because at the end of the summer I helped write a technical report summarizing our research. I have really appreciated how PUC supports the two important parts of an education: knowledge, through the classroom; and practical skills, through opportunities like this.

ALBION FIELD STATION UPDATE

Much has been accomplished at Albion over the last five years. Construction of a permanent boat docking facility is planned for this summer at a cost of $200,000. It involves driving 30 twelve-inch steel pilings. A generous donor is challenging us to raise half the needed amount. We need your help in reaching our goal by June 15, 2011. Please send your donation to: Development Office, Pacific Union College, One Angwin Ave, Angwin, CA 94508, and mark your donation ALBION PROJECT.

To view this newsletter in color, for more information about the department, and to see more pictures of current students and faculty. Please visit our website http://www.puc.edu/academics/departments/biology

Issue 8, Winter 2011 newsletter edited by Aimee Wyrick

PUC BIOLOGY CLUB UPDATE

The Biology Club has already hosted two pre-vespers in the 2010-2011 school year. In October a group of fifty students met at the home of PUC President Dr. Heather Knight. Students enjoyed a musical vespers and a devotional. In early January another large group had pre-vespers at Professor Wyrick's home. Several upperclassmen students talked with the group about their experience as a PUC student and their interest in biology. The worship was followed by a dinner of curry, salad, and hot chocolate! It was a chilly evening but everyone enjoyed the get-together. In late January, a group of 45 traveled to the San Jose Tech Museum to visit the Body Worlds Vital exhibit.

For February the club has organized a snow weekend in the Sierra foothills. The group will also spend a day with Berryessa Trails and Conservation removing invasive plants from a section of Lake Berryessa shoreline.