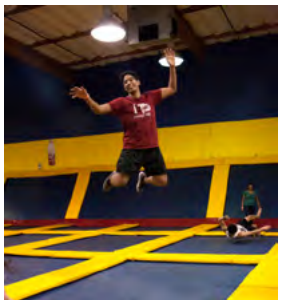
Pacific Union College

BIOLOGY
DEPARTMENT NEWSLETTER





Greetings, and welcome to another edition of the annual PUC Biology Department Newsletter. After a very dry December and January, rain has again come to Angwin. I informed my Histology students that a rainy day is a great time to study beautiful histology slides. I am not sure they fully embrace the idea but they, and the rest of our students, are studying hard during both rainy and sunny skies.

March is a time of joy for many of our students who have recently heard good news about acceptances to various graduate and professional programs. It is also a time of challenge and unease for some who have not been accepted into the program of their choice. With both groups of students I often revert to the advice my Father gave to me when I was an undergraduate "prepare yourself and there will be a place for you".

The PUC Biology Department continues to be a place where students can prepare themselves for lives of useful, Christian, service. I hope you enjoy this short update of selected activities going on in your Biology Department.

"This is my command—be strong and courageous! Do not be afraid or discouraged. For the LORD your God is with you wherever you go."
Joshua 1:9 NLT

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Contents

Department of Biology

Chair
Robin Vance, Ph.D

Faculty
Robin Vance, Ph.D; John Duncan, Ph.D.; Floyd Hayes, Ph.D.; Scott Herbert, Ph.D.; Bryan Ness, Ph.D.; Aimee Wyrick-Brownworth, M.Sc.

Laboratory Coordinator
Andrew Yoon

Newsletter credits

Editor
Aimee Wyrick

Contributors
Risa Baroi, Floyd Hayes, Gibby Muth, and Robin Vance.

Visit **www.puc.edu/biology** to view this newsletter in color and to see more pictures of current biology students and faculty.

DEPARTMENT HIGHLIGHTS

PUC Honors Biology Professor Emeriti with Photo Gallery

Professor Emeritus Terry Trivett has collected and framed ten black and white photographs of all the PUC Biology Department Professor Emeriti including time-frame taught at PUC, classes taught, and a brief note with career highlights. These will soon be displayed in the Clark Hall first floor hallway with a plaque. Be sure to stop by and see this the next time you are on campus.

The ten Biology Professor Emeriti are Kenneth Millard, Earl Aagaard, Terrence Trivett, Gilbert Muth, Sherman Nagal, Lloyd Eighme, Donald Hemphill, Ervil Clark, Joseph Fallon, and Harold W. Clark.

DEPARTMENT UPDATES

Farewell to Dr. Brian Wong

In spring of 2011 Brian Wong accepted a call to the mission field in China. Dr. Wong came to PUC in 2006 following Terry Trivett's retirement and soon became a vital part of the Biology faculty. He earned an excellent reputation among students for being a tough but caring professor. The high regard that students had for Dr. Wong was made clear when he was selected as 2009 PUC Educator of the Year.

Dr. Wong developed an on-campus research program and involved numerous students in the study of medicinal herb effects on prostate cancer. His research has been presented at AACR meetings, published in scientific journals, and even reported in our annual Biology newsletter. Dr. Wong taught some of the most challenging upper-division classes (Medical Microbiology and Histology) and introduced hundreds of lower-division students to the joys of biology and microbiology.

Brian Wong (shown here at 2011 PUC graduation) accepted a call to do mission work in Macao.

Brian and his wife Teresa moved to Macau in August 2011 where he now serves as Principal of Macao Sam Yuk Secondary School. The Wongs are doing well though they especially miss their two-year old grandson Rex. Our students, faculty, and administrators were sorry to see him leave PUC but we admire him for accepting this call and are inspired by his unwavering mission to bring more people to Jesus.

Welcome to new faculty member Dr. Shelton "Scott" Herbert

In fall 2011, Dr. Shelton "Scott" Herbert joined the department as an Assistant Professor of Biology, replacing Dr. Brian Wong. Scott hails from Tennessee, where he grew up aspiring to become a science teacher. After obtaining a B.A. in Biology at Southern Adventist University in 1992, Scott conducted research on the venom expenditure of rattlesnakes with Dr. William Hayes at Loma Linda University, earning M.S. and Ph.D. degrees in 1998 and 2007, respectively. While a graduate student in 1994, Scott met the love of his life, Darlene Alipon, while stuck on a remote road during a LLU Student Association camping trip in Death Valley, and eventually married her in 2001. They have a daughter, Cambria, who was born in 2005. After teaching biology at several community colleges in southern California for a decade, Scott is happy to be here teaching Biological Foundations, Immunology, Microbiology, Medical Microbiology, and Physiology Lab. In his spare time, Scott enjoys hiking, backpacking, scuba diving, amateur radio, music, computers, and photography. Darlene is working as a certified occupational therapist assistant and 6-year-old Cambria has developed into a keen rock climber. Since moving to Angwin, Scott and his family have often opened their home to students and colleagues. Scott is looking forward to developing a research program with students on the venom expenditure and other behavioral aspects of venomous snakes, especially rattlesnakes.

Scott Herbert is the newest Biology Professor and is shown here with his wife Darlene and daughter Cambria.

Welcome to new Lab Coordinator Andrew Yoon

Our newest Lab Coordinator is Andrew Yoon. Andrew is a PUC graduate and graduated with his Biology B.S. in 2011. Andrew's responsibilities range from ordering lab supplies to hiring teaching assistants. He has taken on the job with seeming ease and we are fortunate to have his help. Originally from Texas, Andrew plans to continue on to medical school in the next year or two.

This is the fourth year that the Biology Department has enjoyed the benefits of a full-time Lab Coordinator. Each of our Lab Coordinators has become a special part of our department and when we think back we don't know how we ever managed things without this help.

Just a quick update on our former Lab Coordinators: Alyssa Zima (2010-2011) is in the midst of her first year at LLU School of Pharmacy. We hear good reports from her and wish her continued success. Diana Chung (2008-2010) has almost completed year two at LLU School of Dentistry. She has also done very well and makes us proud!

STUDENT PERSPECTIVES

Bianca Tolan is a freshman biology major. For high-school she attended Orangewood Academy in southern California.

By Bianca Tolan

My interest in biology began back in Jr. High when my teacher took the 7th and 8th grade class on a field trip to the Albion Field Station. We spent a week conducting experiments on the soil, water, and various plants around the area. My teacher's enthusiasm and dedication were contagious and having her again for high school Biology and then AP Biology, I really came to love and appreciate the course. My career aspiration is to go into the field of Medicine.

The Biology Department has amazing professors that enjoy teaching and do so in a way that the students can grasp the concepts. Last quarter I took Biology 111 from Dr. Herbert, and all of his jokes throughout the lesson helped us to remember facts as well as made class more enjoyable. For example, when discussing photosynthesis, he said, "you have to ask what the hog said, otherwise, you'll never know what the pig meant!" Yet what truly makes the Biology Department unique is that through the study of biology, you realize how complex every living thing is and you gain an appreciation for life.

This quarter I am taking Biology 112 with Dr. Bryan Ness. In Biology 111, we learned that the fusion of a male gamete with a female gamete during fertilization will produce a zygote with any of about 70 trillion diploid combinations, as well as in this quarter of Biology 112 where we are dealing with genetics and learned that there are around 30,000 genes in each cell of the human body. I think it's fascinating how unique we all are and how much variation there is among us.

Sophomore Environmental Science major Daniel Stoppelmoor is from San Pedro, California.

By Daniel Stoppelmoor

Growing up I have always had an interest in animals and their environment. This was fueled by hours of Animal Planet and National Geographic channel. It was my senior AP Environmental Studies class in high school when I first got a good taste for this field. This class really set itself apart from all the others throughout my high school career.

With this major I've been able to experience the Biology Department with different classes, labs, and teachers. The program is diverse and will likely satisfy those with interests in the field of environmental studies and biology.. Labs allow you to take specimens and compounds that allow you to manipulate and observe all the many concepts we've learned in class or through textbooks. I also really like the various labs and museum collections with a seemingly endless number of specimens.

In this quarter winter 2012 I am taking Vertebrate Biology from Professor Hayes. This class is interesting for me because it allows me to learn more about the macroscopic perspective of biology. It deals more with animals, which I thoroughly enjoy. As always, with Professor Hayes's classes, this class takes us on exciting field trips, which are the favorite of many.

Junior Biology major Christopher Walters lived with his missionary parents in Thailand before coming to PUC.

By Christopher Walters

I grew up in places like Guam, Ethiopia, and Thailand so I have gotten to see nature in all parts of the world. In Guam, I would go snorkeling all the time and in Ethiopia and Thailand I would always go hiking, so I have always been interested in studying and observing nature. In addition to that, my dad is a missionary doctor so he has inspired me to be a doctor as well. When I got to PUC I decided that Biology would be a perfect way for me to study premed and my other interests in Biology.

The biology teachers are very helpful to their students; they are always there to answer questions about the class or even how to study for one of their classes. The biology department also gives a lot of opportunities for students to work or do research. Last year, Dr. Wong gave me the opportunity to work as a TA for his Microbiology class and I continue to do so with Dr. Herbert this year. It's a lot of fun working as a TA because I get to help fellow students to learn all of the information I enjoyed learning about.

The Biology class I'm taking this quarter is Cell and Molecular Biology from Dr. John Duncan. In C&M, we are learning about how cells work, what they are made of, and how all the various organelles within the cell work. From General Biology I was given an overall idea about these subjects but in this class we go much more in depth. One of the interesting things we learned so far are the factors that make up life. The class got into an interesting discussion when asked the question "is a human egg cell alive?" Most people would think that it was alive, but according to the factors that make up life, it is not.

STUDENT PERSPECTIVES

Biology Senior Stephanie Lao is graduating this year and is an alumnus of Loma Linda Academy

By Stephanie Lao

Before I chose Biology as my undergraduate major, I already knew that I wanted to someday become a physician. At first, my mindset about being a Biology major was quite narrow. I wanted a solid background about the human body before graduate school. However, I was introduced to the humongous range of what Biology is really about. Starting as a freshmen Biology student, I learned how to make kim chi, study mushrooms, and observe the effects of aspirin on plant growth. Biology is everywhere and it was a great pleasure learning about the world that surrounds me.

I like the Biology department because it gives an unintentional trip to a stair-master without the gym because of the extensive stairs to Clark Hall's front doors and then an added 45 steps to the third floor. In addition, the Biology department has a warm feeling and a signature scent that students can recognize anywhere. It is a great place filled with respected professors that are not detached from their students but rather are always open to friendly conversation and mentoring.

I am currently taking Philosophy of Origins, which is being taught by Professor Aimee Wyrick and Histology from Dr. Robin Vance. In both cases, Philosophy of Origins and Histology, are classes that are mainly taken by seniors. Finally, I am no longer afraid of entering a class of unknown faces but rather a room filled with people I have grown close with during the past three years.

Philosophy of Origins is not your typical Biology class because instead of teachers asking students, students question their own opinions about scientific topics, controversies, and findings. Compared to anatomy, which studies the human body on the macroscopic level, Histology studies the microscopic level. Histology students learn about the structures of various tissues and cells found throughout the body.

STUDENT RESEARCH & INTERNSHIP REPORTS

Jon Eilers sits on a whale fossil in the Pisco-Ica desert in coastal Peru.

By Jon Eilers

Who are you? I am Jon Eilers and a Senior Biology major. I plan to attend graduate school and focus on epigenetics and bioinformatics.

What did you do? I participated in ongoing research of the lithology and stratigraphy of the Pisco Basin Formation in Peru. In particular I measured and recorded the magnetic susceptibility of sediment in various lithostratigraphic sections. Data analysis revealed the high likelihood of a maximum flooding surface.

When and where did you do this work? For three weeks of September 2011, I was a part of a group doing field research in the Pisco Basin near Ica, Peru.

What did you learn? It was fascinating and quite enjoyable to be an active participant of a research team. Along with geological knowledge, I acquired a new appreciation for fieldwork and a broader view of what scientific research entails.

How did your experience at PUC help prepare you for this experience? I had not taken a geology class prior to this experience and so had very little knowledge of what were studying until after I arrived in the field. However, having a solid understanding of the scientific method, critical analysis of scientific research papers, and being able to have meaningful discourse about the research were all abilities acquired from a variety of science classes taken at Pacific Union College.

Brandon Noyes and Marcus Carty survey eelgrass in the Albion River.

By Brandon Noyes

Who are you? I am Brandon Noyes and a Senior Biology major. My current goal is to enter Medical school and specialize in Emergency Medicine.

What did you do? Marcus Carty, Professor Aimee Wyrick, and myself conducted a survey of the eelgrass (*Zostera marina*) population in the Albion River near PUC's Albion Field Station. This species of eelgrass is endangered and the survey gave a baseline census of the population prior to the construction of a new boat dock (see Albion Update for more details). This, combined with subsequent surveys, will be used to determine the impact of the dock on the eelgrass density.

When and where did you work this summer? The survey was performed in June, 2011 at Albion Field Station, Albion, California.

What did you learn? I learned a lot about the difference between slack tides and non-slack tides! Since each individual plant within our lead-weighted 0.5 m2 PVC-pipe quadrat had to be counted, much of the survey had to be done while floating in the river. Diving down in SCUBA gear and fighting the current while trying to minimize sediment disturbance is much easier near slack tide than it is otherwise!

How did your experience at PUC help prepare you for this experience? The survey report was written up by Marcus Carty and myself. Even though Professor Wyrick was the project's principal investigator and, therefore, our final editor, I found that I called upon skills learned from classes all over campus: Intro to Statistics from Dr. Best, Biological Foundations courtesy of Professors Ness, Wyrick, and Wong. I also benefitted from the patience and attention to minute details learned from G Chem and O Chem labs with Dr. Davis and Rajagukuk, respectively.

Darlene Teddy researched catastrophes for her summer internship.

By Darlene Teddy

Who are you? I am Darlene Teddy and a Junior Environmental Studies major. I plan to go on to Dental School.

What did you do? I assisted a team of researchers studying the impacts of past, present and possible future catastrophes. The types of catastrophes that I researched were floods, earthquakes and landslides. I was responsible for researching and reading different studies conducted and writing a report for each catastrophe. With the information and data that was collected, several mock-ups were tested and the vulnerability of the area including buildings, people and environment was assessed.

When and where did you do this work? My internship was for two months in the summer of 2011 at The Nanyang Technological University of Singapore.

What did you learn? I learned that researching can be tough and tedious. Researchers actually have a lot of work to do but are rarely acknowledged. While doing research and talking with several different professors I learned that there are so many factors that are interconnected with catastrophic events. I also realized that calling them "natural" disasters may not be accurate as there are almost always human influences that bring about a catastrophe. I also learned that new technology has made it easier to actually create accurate digitized mock-ups of entire cities and these make data collecting easier.

How did your experience at PUC help prepare you for this experience? The entire environmental class sequence, Conservation Biology, Pollution and Environmental Quality, and Energy and Climate Change (ENVR 360, 361, 362) all prepared me very well as they established a good foundation. I learned from those classes that conservation is very important as changing environments may be catastrophic. Knowing this, I looked at all the research I did from an environmental perspective. I found real situations that reflect these human influences such as, deforestation that weakens soil which can cause landslides and pollution and human settlements narrowing rivers that leads to increased flooding.

Zach Gately worked with the Napa County Public Health Department to assess a low-income neighborhood.

By Zachary Gately

Who are you? I am Zachary Gately and I graduated June 2011 with an Environmental Studies major. I am currently working on my master's in public health with a concentration on global health and epidemiology at Loma Linda University.

What did you do? I did a needs-based assessment of one neighborhood in the City of Napa, focusing on drainage, bus stops, the condition of the streets, and locations of daily needs (banks, markets, etc.).

When and where did you do this work? I did my internship with the Napa County Public Health Department in 2011 (during the final two quarters of my senior year).

What did you learn? Looking back, I learned much more from my internship than I realized at the time. Now in my graduate program, I am learning how to do the things that I already did. My internship gave me valuable "real life" experience and skills that I could not have gained in the classroom. The biggest single point that I learned was to be observant: everything is related to public health. Also, don't be afraid to ask. I found this internship by just calling the county office. Find a niche and go after it.

How did your experience at PUC help prepare you for this experience? Being that public health is more of a social science field, I found enrolling in classes that make one think differently prepare you well. Courses include Bioethics, Philosophy of Origins, Intro to Political Thought, and many others in various academic departments. I recommend that college students should be involved, jump on any opportunity you can, and try to network. In the future, you never know who you might call upon. Someone you met while a student intern can be a valuable asset to you in the future. This person may help you to get a job, be a source of information, and/or be your mentor.

Doug Weidemann and Dustin Baumbach studied two heron species (Butorides) native to Panama.

By Doug Weidemann

Who are you? I am Doug Weidemann and senior Biology Major. After I graduate, I will attend graduate school at the University of Miami where I will study tropical ecology.

What did you do? Dustin Baumbach and I worked on two projects in summer 2011 under the supervision of Dr. Floyd Hayes. This was the second year of a study on the breeding biology and reproductive success of Western and Clark's Grebes at Clear Lake, California.

For our second project, we studied the extent of hybridization in the Panama contact zone for Green and Striated Herons. Since, the two species differ in neck color and hybrids show intermediate coloration, we compared neck colors of over 40 birds seen in the field with previously identified specimens. This gave us a measure of the hybridization rate which we compared with previously published data from museum specimens.

When and where did you do this work? We studied grebe colonies on Clear Lake, a large lake in Lake County, California (2010 and 2011 summers). In Panama, we worked in central Panama in the old Canal Zone for two weeks in July 2011.

What did you learn? We discovered that hybridization is relatively common between Western and Clark's Grebes. Close to a third of the nests with a Clark's Grebe adult involved a mixed pair. However, since the majority of nesting grebes (90-95%) were Western Grebes, statistically, the two species still mated assortatively. Based on data from the past two seasons, we discovered that colony locations change regularly and that most colonies are relatively undisturbed by humans. Even though similar numbers of nests were built this year, the reproductive success rate was lower this year than last year. Unfortunately, we were not able to determine the cause.

Based on the number of herons with intermediate-colored necks, we found that the two species are still hybridizing. However, the proportion of hybrid birds is similar to data from 50 years ago which suggests that mating is actually assortative and the hybridization zone is stable.

How did your experience at PUC help prepare you for this experience? I took several classes as a biology major that helped me with these two studies. Ecology and Vertebrate Biology taught me how speciation and hybridization occurs, which helped me study hybridization in both herons and grebes. I also used what I learned in Introduction to Research Methods to coauthor a technical report on our grebe research. Finally, two mathematics classes, Introduction to Statistics and Statistical Methods, helped me analyze my data properly.

BIOLOGY CLUB

2011-2012 Biology Club officers: Kevin Yee, Finster Paul, Risa Baroi, Peter Han, and Stephanie Lao.

Finster Paul jumps at Sky High during a recent Biology Club event.

This year, the theme for PUC's Biology Club has been "the passionate pursuit of life." We try to incorporate this into the events of the club by motivating students to get involved in PUC as well as the nature that surrounds this campus. Some events that we have already been involved in include hiking out to Inspiration Point, co-sponsoring a trip with the PUC Student Association to Sky High (see photo), and worshiping together with students and faculty during Friday evening Prevespers.

Not only does the Biology Club strive to make a difference on campus but we also take action in the local community. One way we have already accomplished this was to team up with Professor Wyrick's Conservation of Biology class during Fall Quarter for a restoration project on the shores of Lake Berryessa. For this restoration project, students and club members planted native oak trees by the lakeside and learned valuable lessons as to why it is important to conserve natural habitats.

Future events and projects this year include Habitat for Humanity and other local conservation projects.. We want PUC students to get involved with these projects so that we can continue to make a positive impact at PUC and in the community. The Biology Club also hopes to plant a garden where students can relax, further enjoy PUC's natural setting, and to take a moment to appreciate life.

The Biology Club wants to encourage others to conserve nature and to passionately pursue an appreciation for life.

RECENT GRADUATES

Pictured from L to R: Brian Wong, Warrie Layon, Lawryn Ask, Robin Vance, Samantha Singh, Aimee Wyrick, John Duncan, Pierce Pfitzner, Trevor Gomes, Zoe Thompson, Zachary Gately, Christine Akamine, Eric Heung, Floyd Hayes, Esther Tak, and Stephen Grove. Not pictured: Edna Hernandez, Jae Won Lee, Ok-Kyu (Eddie) Lee, Michael Lee, Sara Stump, and Andrew Yoon.

In 2011 we graduated 14 Biology majors and three Environmental Studies majors. It is hard to believe since 2008 the Biology Department has said farewell to sixty of our graduates! Each of these students has left their mark at PUC and we continue to pray for their success.

ALBION FIELD STATION

The newly constructed Albion Boat Dock was dedicated in October.

The Albion Boat Dock project was completed this summer and dedicated to Beth McKee Alexander for her dedication and support of Albion in general and the boat dock project in particular. This is the culmination of 6-7 years of work with seven governmental agencies and the raising of $250,000 for its construction.

Built just upstream from where the old dock has been since we obtained the station in 1947, it consists of an elevated walkway, 120 feet in length, extending out from the shore over the shallow water and mud flat to the floating part of the dock. The 160 feet of floating dock is on the edge of the channel where there is deep enough water for our boats at all tide levels. Twenty eight 12-inch steel pilings were driven with a vibratory hammer, each filled with rebar and concrete driven to "refusal" which is about 25 feet below the surface of the later at low tide.

Google "Albion" and follow the links to photos and discussion that gives more detail on the construction of the dock.

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