

BIOrhythms

Washington University Biology Department Newsletter

January 2009

"Sometimes our fate resembles a fruit tree in winter. Who would think that those branches would turn green again and blossom, but we hope it, we know it."

—Johann Wolfgang von Goethe

Helpful Links

[Biology Home Page](#)
[Biology Course Listings](#)
[Faculty Listings](#)

BIOrhythms is a publication of the Washington University Biology Department for Undergraduate Majors

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Featured in this issue:

Faculty Spotlight: Robert Blankenship: Biochemistry

Staff Spotlight: Amy O'Brien: Science Outreach

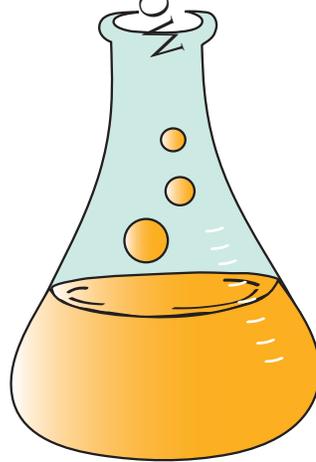
Course Spotlight: BIO 437 DNA Manipulation Lab

Overseas Study: Scott Fabricant on UQ in Australia

Get Involved: Clubs & Volunteer Opportunities

Calendar: Biology Events and links to event listings

MOLECULAR BIOLOGY & BIOCHEMISTRY TRACK



I can't tell you how many times I've had students come into the Student Affairs office confused about the Biochemistry Track, because there are two different ones listed in the Biology handbook. I'd like to take this opportunity to explain the differences. The short answer is that "Biochemistry and Molecular Biology" is the old Track and "Molecular Biology and Biochemistry" is the current version. The old one is still listed in the book for those that declared the major before the requirements changed and haven't graduated yet.

Before there were Tracks, "Biochemistry and Molecular Biology" was a special major that students would need to get permission to declare. When the Tracks were introduced in December 2006, the special major was discontinued but the name and requirements remained the same, including one extra semester of biochemistry, two extra semesters of physical chemistry and one extra semester of math on top of the regular Biology major requirements.

Recently, the Track was changed to "Molecular Biology and Biochemistry". The biggest difference between the old and new tracks is that the physical chemistry requirement was dropped completely. Now two extra semesters of biochemistry and two extra semesters of math are required to complete the track. The diploma will read "Biochemistry and Molecular Biology" no matter which version students declared. Students can speak with Professor Allan Larson if they have questions about the Biochemistry Tracks.

—Erin Gerrity, Student Coordinator

Overseas Study: the World Classroom

Overseas Study offers many summer and semester-long programs for Biology Majors and Pre-Med students in the United Kingdom, South Africa, Ireland, Costa Rica, and Australia. Summer programs take less planning (as far as four-year curriculum) than semester programs. Biology programs are especially accessible since there is no second language requirement for most programs. Wash U students are required to take four to five courses, depending on the program, typically two or three for major credit. Courses are approved for major credit by Allan Larson; others are considered elective. The curriculum is mostly coursework, with some field work too. Students can also petition to participate in other programs. Professor Allan Larson must approve alternative programs that are not offered through the Overseas Office.

SEE PAGE 4 for special feature on UQ in Australia & Application Deadlines

Contacts for Study Abroad:
Amy Suelzer (Costa Rica)
Jennifer White-Redding (Alternative Programs)
Jessica Mervis (UK, Ireland, Australia, South Africa)

Contact for Biology Dept:
Professor Allan Larson

Participating Institutions:

- ❄ King's College London
- ❄ Organization for Tropical Studies in Costa Rica
- ❄ Organization for Tropical Studies in South Africa
- ❄ Trinity College Dublin
- ❄ University College London
- ❄ University of Queensland in Australia

BIO 437: Laboratory on DNA Manipulation

Majoring in Biochemistry requires the completion of one of four labs offered for the Track. BIO 437 is one of these options, offered Fall Semester and taught by Professor Robert Kranz. The goal is to give students general lab experience, using the scientific method and typical experimental techniques to study DNA or RNA. Professor Kranz helped to start the lab about 18 years ago and has been the primary instructor for the last two years. The basic concepts and experimental protocols have remained the same over time. He stresses that it is an investigation-driven lab, not a cookie-cutter lesson style class. Learning here includes troubleshooting and changing course to make things work. The lab is limited to 12 students who cover 33 different projects over the semester. Students gain experience using lab equipment such as:



Centrifuges to separate components such as DNA or cells from solutions;
Water baths using different temperatures to copy certain types of DNA;
PCR machines used for DNA amplification (*pictured above*);
Incubators to grow E. coli for the first two modules;
Nanodrop spectrophotometer, recently purchased by the department, to determine amounts of RNA and DNA;
NSLC often use the computers to access public programs/websites for analyzing DNA and RNA.

Students Joseph Tella and Joanna Kovalski explain the three modules demonstrated in the lab:

1) **Cloning or genetic engineering:** The nanowire-like structure of the Shewanella bacteria makes it a great conductor of electricity. Since E. coli is easy to grow in large quantities (in the incubators), students extract genes from the Shewanella bacteria and move them into E. coli. This study may lead to an alternative energy source in the future.

2) **“Knocking out” genes:** Students mutate structures by taking E. coli cells and getting rid of certain genes believed to be part of electron transport. They then take the genes cloned in the first module and replace the “knock out genes” as a way to move electrons away from the host and into the system they want to exploit.

3) **Microarray-levels of RNA expression:**

Students test levels of RNA by running RTPCR products on gels and checking levels. When the gene CPC is overexpressed in the Arabidopsis plant, it is resistant to phosphate stress. Students harvest RNA samples from the plants and send them to a company that carries out the microarray analysis, provides data on the content, and sends the results back to class. Students then verify that data, or the “results of the microarray”. Students make copied DNA (cDNA) from their RNA samples to analyze messenger RNA (mRNA) levels. When students run samples on a PCR Machine, this is essentially a synthetic method of copying and quantifying the gene levels. —cont'd on page 5



Pictured above, Ross Zeitlin takes DNA samples amplified from the Arabidopsis plant and loads them into the gel. The levels of product tell him how much mRNA was there.

Faculty Spotlight: Robert Blankenship, Lucille P. Markey Distinguished Professor of Arts and Sciences



Bob Blankenship is from a small town in Southeast Nebraska, just a few miles from the Missouri River. He received his undergraduate degree at Nebraska Wesleyan University in Lincoln, Nebraska and his PhD in Chemistry at University of California-Berkeley. He and his wife Liz then began an amazing and eye opening odyssey through Asia and the Middle East before taking a position at the American University of Beirut in Lebanon. He was very excited about the job but it was unfortunately timed with the start of the Lebanese Civil War, which began only a few days after he started and lasted

over 20 years. They were evacuated to Athens, Greece for several months, hoping to wait out the situation, but eventually decided to go back to Berkeley. His career then took him to University of Washington in Seattle for post-doctorate work, then on to an assistant professorship at Amherst College in Massachusetts. In 1985, they moved to Arizona State University in Tempe and stayed for 21 years.

Bob and Liz came to St. Louis and Washington University in July 2006. They are really enjoying the city, citing the many good restaurants and opportunity to live within walking distance of campus as very appealing. Bob hikes, cooks and collects fossils, particularly trilobites, in his spare time. As far as the job itself, the most attractive part for him is the ability to work half in biology and half in chemistry because it so perfectly suits his background and current research.

—cont'd on page 5

Staff Spotlight: Amy O'Brien, Science Outreach



Amy O'Brien has worked in Science Outreach for the past eight years. She currently runs Summer Undergraduate Research Fellowships (SURF) and Summer Scholars in Biology and Biomedical Research (SSBBR). These programs allow her to work closely with students, her favorite part of the job. Amy grew up in Chicago and moved to St. Louis with her husband in 1987. They fell in love with the city because it has the warmth and friendliness of a small town with the amenities of a bigger city. People are down to earth, the cost of living is reasonable and the city is very easy to navigate without the constant stress of Chicago traffic!

Amy earned her degree in restaurant management at the University of Illinois in Champaign. Though not a very popular major (10 people majored in this vs. hundreds in other fields such as accounting) she's found it to be a "strangely useful" degree, combining marketing, accounting and organizational skills with food science, nutrition, chemistry and microbiology.

Amy lives with her husband and two children in Webster Groves. Her son Sean is a sophomore at Webster Groves High School and daughter Megan recently started college at Truman State University in Kirksville, MO. Amy also enjoys community volunteer work. She's been a Girl Scout leader in the past and has her Master Gardener's certificate from MO Botanical Garden. She currently serves on the Webster Groves School Board and sings with the St. Louis Harmony Chorus, a women's acapella chorus.

Don't miss the
Summer Research
Opportunity Information
Meeting Wednesday, Jan. 21,
6:30 to 8:00pm in
Rebstock 215!

Science Outreach Programs for Undergrads & Pre-Freshmen

SURF, funded by the Howard Hughes Medical Institute and various other agencies, is an opportunity for freshmen, sophomores and juniors to apply for a 10 week research project with faculty mentors, earning a \$3750 stipend. Participation jumped from 45 to 73 students in 2007 due to increased funding and interest. When the research projects are complete, the participants join students from other fields to present their projects and findings at the annual Undergraduate Research Symposium. Many students continue to work with their SURF mentors throughout the academic year as paid lab technicians or in work study positions.

High school seniors apply for SSBBR when they apply to Washington University. This pre-freshman program lasts seven weeks. Participants are matched with faculty mentors to learn basic research skills and lab techniques and apply those to the work of a specific lab.

For more information:

<http://www.nslc.wustl.edu/Research/HHMI/surf.html>

<http://www.nslc.wustl.edu/Research/prefreshmen.html>

or you can reach Amy in Life Sciences 202D, 935-7170.



Overseas Study: the World Classroom cont'd

Scott Fabricant, a senior biology major, spent a semester at University of Queensland in Brisbane, Australia, near the Great Barrier Reef, beginning July, 2007. Since the semester only ran up to Thanksgiving, he stayed abroad, traveling with other American exchange students around Australia . . .

Application Deadlines for Semester Abroad

Fall semester: February 1st

Spring semester: May 1st

Summer: February 15th

Scholarship application deadline for University of Queensland: February 9th

Check the website for other scholarship opportunities and deadlines.



Biology Abroad: Scott Fabricant Down Under

University of Queensland in Brisbane, a mid-sized city near the coast, is a perfect niche for the would-be biologist. The weather is typically warm and sunny, and the seasons are reversed so the semesters actually run from February to June and July to November. Their summer break is during our winter. With reefs, rainforests, and outback all within reach, the experience of spending a semester at UQ includes opportunities to take field trips and longer excursions to explore reef diving, the famous Australia Zoo and plenty of chances to take in the surrounding culture and natural landscape.

Students live in dorms on campus, participating in activities and classes with local students. UQ tries to blend the students together as much as possible. There is a resident director from Wash U for the American students, providing orientation, continued support and advice as well as planning activities and excursions to help students get the most out of their experience abroad. Scott Fabricant talks about his time at UQ...



On the people...

Scott tried to blend in and associate with Australians as much as possible while he was there, to completely immerse himself in their culture. He finds Australians to be very friendly and believes that they find it isolating when American students stick together and don't reach out to locals.

On the housing...

Scott liked the idea of living in a residential college. He said the dorms there are much more socially driven, more like a fraternity than just a place to live, with rivalries and parties. Some of them are co-ed as well. He found it to be an easy

way to meet people, both locals and other exchange students from America and other parts of the world.

On the classes....

Many biology courses offer field trips as part of the curriculum. The most popular courses cover Australia's terrestrial environment, with a field study on Fraser Island; and Australia's marine environment, with a field study on the Great Barrier Reef. Scott took a third course on rainforest field ecology where he got to spend a week in Lamington rainforest, collecting data on burrowing spiders. Other student projects included creeping vines, basking lizards, and night foraging wallabies. They all stay in bunk houses in the forest. Scott also took a course about vertebrate biology where his first dissecting experience ever was a daunting ox fetus!

On the general atmosphere...

Brisbane is a warm place with friendly people and fun places to hang out. It is not a tourist trap but has plenty of transportation to get to more touristy places such as the Sunshine and Gold Coasts. The Australia Zoo was a memorable highlight for Scott (see kangaroo picture to right). He and other friends got to go behind the scenes at the zoo and even met the late Steve Irwin's family (they conduct research there). Scott's favorite part about being on campus at UQ was the urban wildlife. He saw possums, water dragons, parrots, and giant fruit bats wandering around campus all the time, and the kookaburras kept him up all night.



GET INVOLVED: Clubs and Volunteer Opportunities



Biology Club: Professor Lunch with Alan Templeton

Back in that long-forgotten time of last semester, Dr. Alan Templeton joined the Biology Club for another of our flagship professor lunches. The man, who has more titles, honors, and kudos than we could keep track of, came to share his extensive knowledge and experience with us. His research interests range widely from humans to retroviruses,

but all share that common thread we all share: genes. Dr. Templeton uses the powerful techniques of molecular genetics to tease out facts and surprises about human evolution, coronary heart disease, the HIV virus and AIDS, conservation of species, and even the very meaning of the word 'species'! Hints: humans probably interbred with Neanderthals, the causes of heart attacks are complicated, the meaning of 'species' is even more complicated, and HIV is way scarier than health class taught you. Wanna know more? Dr. Templeton tells all in his courses - Population Genetics in fall and Molecular Evolution in spring. And don't forget to keep an eye out for the next professor lunch coming soon. Email wubioclub@gmail.com for more information. —*Scott Fabricant*

Blankenship cont'd: He enjoys interacting with faculty and students in both fields and loves teaching the combination. Bob always had a natural instinct and knack for science, plus an encouraging mother who was interested in science herself. He grew up during the era of sputnik, erector sets, and chemistry kits, immersed in a culture that was obsessed with science and technology. His high school chemistry teacher was also a major influence, laying the groundwork and a solid foundation for Bob's future success.

Professor Blankenship teaches courses in General Biochemistry and Bioinorganic Chemistry. In his research lab students research photosynthesis using a range of techniques, including spectroscopic analysis, molecular biology, genome sequencing and evolutionary analysis. He is also a BIO 500 Mentor for those students interested in doing an independent study. His research at Washington University takes place in two separate labs, one in the Chemistry Department and one in Biology. The Blankenship Labs study the mechanism of the energy storage in photosynthesis and the early evolution of photosynthesis, including the transition from anoxygenic photosynthesis to oxygenic photosynthesis. The research is very interdisciplinary, often working with geologists and physicists, using spectroscopic, biochemical and molecular evolution techniques and also the fossil record. To learn more about Bob Blankenship and the Blankenship Labs, visit <http://biology4.wustl.edu/faculty/blankenship/index.html>.

Do You Have...

An announcement you'd like to make?

An interesting story or fun fact you'd like to share?

A professor or course you'd like to suggest for a spotlight?

We want your input! Send ideas and information to:

gerrity@biology2.wustl.edu

BIO 437 cont'd: A DNA sample is mixed with primers and these samples amplify the gene they want to look at. The DNA is identified by putting the samples into an electrophoresis gel and looking for the correct sample size.

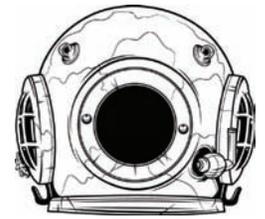
Volunteer Opportunities

Science Outreach: The Bernard Harris Summer Science Camp holds extension activities throughout the academic year for the previous summer's campers. The next Saturday Academy is scheduled for: March 15, 2009 from 1:00 to 3:30 PM. We are looking for undergraduate volunteers to help facilitate this event. The students are middle-school age, grades 6-8, and activities are science related. Volunteers arrive at Busch Lab at 12:00 to set-up and then act as teaching assistants in a science activity, interacting with the students as positive role models, and help clean up afterwards. Interested WU students should contact Chris Mohr by phone (314) 935-8271 or e-mail mohr@wustl.edu.

Other Volunteer Opportunities: subscribe to the Community Service Connection, an email newsletter: <http://www.communityservice.wustl.edu/csconnection/>



Biology Department Calendar



Links to General Calendars and Regular Events:

Washington University Record Calendar: <http://record.wustl.edu/calendar>

Evolution, Ecology, & Population Biology Seminars, Thursdays, 4:00pm, Rebstock 322, check the website for topics/schedule: <http://www.biology.wustl.edu/seminars/evpop.html>

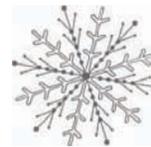
Bioforum, alternating Fridays, 4:00pm, McDonnell 361, check the website for topics/schedule: <http://www.biology.wustl.edu/seminars/biologyforum.html>

Plant Lunches: most Tuesdays at noon (1st Tuesday of month @ DDSPC, others @ McDonnell 212)
Contact Professors Tuan-hua David Ho or Mark Running for topics/schedule.

Donald Danforth Plant Science Center (DDSPC), Weekly Seminar Series—Wednesdays, 4:00pm, AT&T Auditorium, check the website for topics: <http://www.danforthcenter.org/opportunities/seminars.asp>

Division of Biology and Biomedical Sciences (DBBS), all lectures and seminars:
<http://dbbs.wustl.edu/dbbs/website.nsf/SDN>

January 2009



19th Martin Luther King, Jr's Birthday—SCHOOL CLOSED

21st Summer Research Opportunity Information Meeting—6:30 to 8:00pm, Rebstock 215

27th Last Day to Drop/D on SP2009 Course With No Permanent record Notation

30th Last Day to Change Grade Option on a SP2009 Course to "P" or "A"



February 2009

1st Most fall and full-year study abroad program applications due

23rd Sophomore Convocation: Deadline to Declare a Major
Fall 2009 Course Listings Available On-Line



March 2009

9th-15th, Spring Break— SCHOOL CLOSED

10th Mid-Term Grades Posted

23rd Viktor Hamburger Lecture given by Dr. Sydney Brenner, Nobel Prize winner in 2002—Graham Chapel @ 4:00pm, free and open to the public

