



# Southwestern University

## DEPARTMENT OF BIOLOGY

### BIOLOGY PROFESSOR RECEIVES \$25,000 FOR SALAMANDER RESEARCH



Dr. Ben Pierce has received a \$25,000 grant to conduct research that may help the threatened Georgetown salamander. The Georgetown salamander (*Eurycea naufragia*) is a small salamander believed to exist only in Williamson County. It lives in springs found in the South, Middle and North Forks of the San Gabriel River. The salamander recently became “threatened” because many of the springs where it lives have been degraded by development.

Williamson County and the Williamson County Conservation Foundation wish to develop a conservation plan for the salamander before the populations suffer too much damage. They have hired SWCA Environmental Consultants, an Austin-based consulting firm, to help them with this task. Ben Pierce, a professor of biology at Southwestern, has been awarded a subcontract from SWCA to help with several aspects of its work.

Pierce will begin by researching studies that have been done on other species of salamanders that may provide information helpful in developing a conservation plan for the Georgetown salamander. In addition, he and several Southwestern students will perform studies known as “mark-recapture” experiments that try and accurately determine the number of salamanders currently living at several sites in Williamson County. In addition, they will conduct monthly surface counts of salamanders at two springs. Pierce and his students have already been conducting such monthly surface counts for the past two years on a volunteer basis. Although the initial grant is only for one year, Pierce said he expects the project will continue for several years.

Protecting the Georgetown salamander represents one of several priorities of the [Williamson County Regional Habitat Conservation Plan](#), which was approved by the U.S. Fish and Wildlife Service in 2008 to offer a comprehensive approach to development in the county. If a county has a comprehensive habitat conservation plan, developers who wish to build on properties with endangered species get permission from the county instead of the federal government.

In addition to the Georgetown salamander, Williamson County acts as home to several species that are either endangered or threatened, including the black-capped vireo and golden-cheeked warbler, the Tooth Cave ground beetle, the Bone Cave harvestman and the Coffin Cave mold beetle. Pierce said a regional conservation plan is a “win-win” situation for all parties because development projects can move forward faster and a comprehensive plan is developed for protection of the endangered species as opposed to individual developers submitting their own plans. The conservation plan for the Georgetown salamander will likely involve both land acquisition and ongoing monitoring. The Williamson County Conservation Foundation has received nearly \$3 million in federal grants for compliance with the Endangered Species Act. Dr. Pierce will be hiring a student full time for 8 weeks this summer to work on the project, as well as some temporary field workers to help out with the mark recapture study.

# Wildlife Conservation/Ecology Field trips

On the morning of February 6, members of Dr. Jinelle Sperry's Wildlife Conservation and Dr. Gavin Van Horn's Ecology: Emergence and Influence classes piled into vans and headed for the gulf coast.



The primary goal included seeing Whooping Cranes, a bird species once perilously close to extinction with only 16 living individuals. Now on the road to recovery, the wild population hosts over 250 birds, most of which winter at Aransas National Wildlife Refuge on the Texas gulf coast.

The first stop of our weekend field trip included the Rockport Marina, where we boarded a boat for a guided tour of the bay. As hoped, we saw several Whooping Cranes, including a family group with a juveniles crane. In addition to the cranes, we saw over 35 species of birds including a White-tailed Hawk, Reddish Egret, Little Blue Egret, Great Blue Heron and Crested Caracara. We also saw several bottle nose dolphins swimming very close to our boat. We camped that night at a beautiful campground on the refuge and adjacent to the beach. Because the campground was open only to educational groups, we had the entire area to ourselves (other than some fearless raccoons).



The next morning, we took a guided tour of the refuge where we saw over 30 alligators, some of which were only a few feet from the trail! We headed back to Georgetown that afternoon. Overall, we had a wonderful trip and were able to more fully appreciate the conservation efforts that go into saving such a beautiful bird species.

To see photo album of Aransas pics visit <http://picasaweb.google.com/jinellesperry>.

We continued our exploration of wildlife conservation and management by going on a field trip to a portion of the Balcones Canyonland Preserve (BCP) in southwest Austin on March 2nd. The BCP consists of a system of preserve lands which are managed for the conservation of endangered and threatened species of central Texas. We toured a site that, at one time, had one of the densest populations of Black-capped Vireos in the country. Black-capped Vireos represent an endangered bird species that breed only in Texas and Oklahoma. Today, no Black-capped Vireos occur on this particular BCP site but City of Austin biologists continue to manage the habitat to attract vireos back to the area. We saw a section of the site that they had prescribed burned less than a week before our visit. We enjoyed beautiful views of downtown Austin while learning about conservation in an urban dominated landscape. A big thank you to the Aransas National Wildlife Refuge and BCP biologists for helping to make our field trips such amazing successes!





Pictured are members of the Pierce Lab at the annual meeting of the Texas Academy of Science in Stephenville, Texas, March 14-16, 2010. Laura Kromann, Tiffany Biagas, Alexis Ritzer, Ben Pierce, Alex Hall.

# TAS

Ten biology students and three faculty spent Thursday night and Friday at the 113th annual meeting of the Texas Academy of Science in Stephenville, Texas. Dr. Ben Pierce served as President-Elect and Program Chair for this meeting and Dr. Romi Burks acted in the role of Awards Chair and Vice President. Pierce assumed the TAS Presidency at the end of the meeting and Burks will be responsible for the 114th meeting at St. Edwards in March 2011 as Program Chair and President-Elect.

Four students gave oral presentations and two more students brought posters to discuss (students and titles, respectively):

- Matthew Trawick, "Waterlogged: Egg Maturity Mitigates Effects of Water Stress on Reproductive Efforts of a Freshwater Invasive Apple Snail (*Pomacea insularum*)"
- Olivia Stanzer, "The Persistence of Pink: Potential Ecological Influences of Ovorubin in Egg Clutches of *Pomacea insularum*"
- Alex Hall, "Artificial Light and Nocturnal Anuran Calling Behavior in Northern Michigan Vernal Pools"
- Alexis Ritzer, "Two Year Population Survey at Two Sites of the Georgetown Salamander (*Eurycea naufragia*)"
- Tiffany Biagas, "Feel Free to Hit the Snooze Button: Time of Day Does Not Influence Surface Counts of the Georgetown Salamander (*Eurycea naufragia*)"
- Alexis Kropf, poster, "Size Really Doesn't Matter for Exotic Female Apple Snails (*Pomacea insularum*) in Terms of Fecundity"
- In addition, Matt Trawick and Alex Hall won best abstract awards in their section, Freshwater Science and Terrestrial Ecology, respectively. Matt also received 1st place recognition as the best undergraduate talk at the meeting.



Book Recommendation:  
"Don't be Such a Scientist" - about science in film/documentary

Must See Movie:  
Desperate Measures --- about protein deficiency



# BIOSCOPE FOCUS:

## Scholarly and Alumni Updates



Dr. Maria Todd has been granted tenure and promoted to Assoc. Professor of Biology at SU. Congratulations!!

Doug J. Hinchliffe, William R. Meredith, Kathleen M. Yeater, Hee Jin Kim, Andrew W. Woodward, Z. Jeffrey Chen, and Barbara A. Triplett. Near-isogenic cotton germplasm lines that differ in fiber-bundle strength have temporal differences in fiber gene expression patterns as revealed by comparative high-throughput profiling. (2010) *Theoretical and Applied Genetics* (Advance published online).

Mingxiong Pang, Andrew W. Woodward, Vikram Agarwal, Xueying Guan, Misook Ha, Vanithrani Ramachandran, Xuemei Chen, Barbara A. Triplett, David M. Stelly, and Z. Jeffrey Chen. Genome-wide analysis reveals rapid and dynamic changes in miRNA and siRNA sequence and expression during ovule and fiber development in allotetraploid cotton (*Gossypium hirsutum* L.). (2009) *Genome Biology* 10(11):R122.

Dr. Romi Burks joined the Editorial Board of *Freshwater Biology* (by invitation) and is also now Section Chair of the Researchers at Primarily Undergraduate Institutions (PUI) group for the Ecological Society of America.

Publication in the lab of Dr. Romi Burks, Associate Professor of Biology, continues to proceed a little faster than a snail's pace. Burks, current senior Matt Trawick '10 and alumni Colin Kyle '09 recently published a paper, "Pink Eggs and Snails: Field oviposition patterns of an invasive snail, *Pomacea insularum*, indicate a preference for an invasive macrophyte" in the Shallow Lakes volume of the peer-reviewed journal *Hydrobiologia*.



Kyle '09 also recently finalized a paper co-authored by Trawick '10, alumni James McDonough '09 and Burks for the *Texas Journal of Science* entitled "Population dynamics of an established reproducing population of the invasive apple snail (*Pomacea insularum*) in suburban southeast Houston, Texas." Kyle continues to complete other publications while managing his time as a 1st year graduate student in Ecology and Evolution at the University of Chicago. Kyle also just received notice of an award for an NSF Graduate Fellowship!



The following students have been accepted to Medical School:

UTMB in Galveston: Lauren Williams '10, Sheila Raeke Pinkston '07

UTHSC San Antonio: Carlos Cardenas '10, John Wooten '10, Kristin Yeung '09

UT Health Science Center Houston: Carissa Fritz '10

TAMU Health Science Center: Jason Jones '07, Laura Kromann '10

UNT Health Science Center (TCOM): Talitha Morton '10, Mary Pennington '10

West Virginia College of Osteopathic Medicine: Kerry Pattie '10

Jessie Carrier '09 will be attending PA school at UTMB in Galveston.

Matt Barnes is a PhD candidate at the University of Notre Dame in Aquatic Ecology.

Ian Bothwell '08 has been accepted to Cornell's PhD program in Biological Chemistry.

Update from Brandon Boland '07:

I'm currently a first-year graduate student in the Molecular Metabolism & Nutrition program at the University of Chicago. I've just completed my first lab rotation examining the role of the SMRT corepressor on insulin sensitivity in the adipocyte. In the spring, I'll begin my second rotation exploring autophagy of insulin granules in the pancreatic beta cell. In insulin resistant diabetic patients, insulin biogenesis is increased in the beta cell but granule exocytosis remains relatively steady. These granules gradually build up but the cellular autophagic mechanisms that regulate their degradation are poorly understood. An elucidation of this process could lend insight into the pathophysiology and treatment of Type II diabetes.

Update from Sarah Hensley '08

I'm currently working on adapting microbial cultures to fuel cell electrodes in order to enhance power production. We did this by taking marine sediments and utilizing a poised electrode to select for those bacteria (predominantly Geobacteraceae) that are able to reduce the anode efficiently. These fuel cells could be used to power any electronics that are hard to power, such as deep sea monitoring equipment.



# Students Get SMArT



If you hang around the second floor of FJS on a Monday afternoon, you may notice a crowd of enthusiastic students entering the hallway and partaking in snacks and science from 5:00-6:00PM. These students are curious and determined individuals who want to know the answers to the millions of questions surrounding them every day, and are not too busy to sit down and think of a way to answer these conundrums. While intellectual curiosity and a desire to learn are traits that may not be all that unique in our science building, where concepts are introduced and challenged by eager minds on a daily basis, the students to which I am referring are all between the ages of 8-11. These students are part of the SMArT program, which combines the talents of Southwestern students with the eager curiosity of local elementary school students in an inquiry-driven project to answer a scientific question.



Science and Math Achiever Teams (SMArT) is an afterschool enrichment program for elementary school students which works to fuse mentoring and question-based inquiry to excite the imaginations of students about any science or math topic in which they are interested. Yale University undergraduate, Rowan Lockwood started SMArTeams in 1991, and it came to Southwestern through Southwestern Biology professor, Dr. Romi Burks. Dr. Burks served as a co-founder and Volunteer Coordinator for the program at Loyola University Chicago from 1992-1995 and after coordinating the program at Southwestern for several semesters, she is happy to relinquish the facilitating of the 8th semester of SMArT to Southwestern students.



This spring, there are 11 students from McCoy elementary school working with Southwestern undergraduates, and the variety of projects and questions being posed this semester has been absolutely astounding. From fossils, jellyfish, cats and habitats, to sharks, underwater and above-water volcanoes, these projects encompass all major science fields, including biology, chemistry, geology, and physics. An achievement party will be held at Southwestern University to celebrate the accomplishment and share the knowledge gained by Southwestern and McCoy elementary students. The elementary students will present their projects and posters from 5-6pm on April 19, 2010 in the Bishop's Lounge at Southwestern University. All students, faculty, and staff are encouraged to attend and discover the amazing world of science and the astounding abilities of a future generation of scientists.

**Please Come to the Achievement Party Monday, April 19 5-6 pm in the Bishops Lounge!**

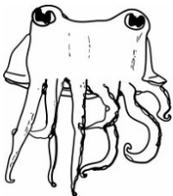
# Student Groups



"TriBeta members need to complete a minimum of 5 volunteer hours. 3 of these total hours must be through a BBB sponsored event. Be sure to consult the BBB Volunteer Opportunities for a list. Send all questions to [warnert@southwestern.edu](mailto:warnert@southwestern.edu). SENIORS...be sure to submit hours before April 23rd!!"

BBB has started it's own garden plot for the SU garden grow-off sponsored by the garden club.

President: [Jessica Bolton](#)  
 Vice-President: [Dena Leerberg](#)  
 Treasurer: [Janet Del Real](#)  
 Secretary: [Laura Kromann](#)  
 Volunteer Coordinator: [Tammy Warner](#)  
 Pre-Med Coordinator: [Carlos Cardena](#)



## SU Animal Behavior Society

Tailspin Dog and Car Wash + Raffle  
 April 17<sup>th</sup> at Noon  
 Kappa Sigma Parking Lot

Jen Penland  
President

Brittany Ford  
Vice President

Morgan Mingle  
Secretary

Jade Tinker  
Treasurer

Stephanie Henderson  
Publicity

Matt Trawick  
Minor Coordinator

Alex Hall  
Web Master



Animal Behavior society will be holding a fundraiser benefitting Georgetown Animal Outreach:  
 The Kappa Sigmas are co sponsoring this event. People can come and get their cars and/or dogs washed on saturday afternoon to help raise money for GAO. The purchase of a car or dog wash will serve as a raffle ticket. People are also welcome to buy raffle tickets by themselves. Prizes currently include a Spa Massage from Novita Spa, a pound of coffee from Cianfrani's, \$25 giftcard from City Lights and A Dinner for 2 at Amante's.

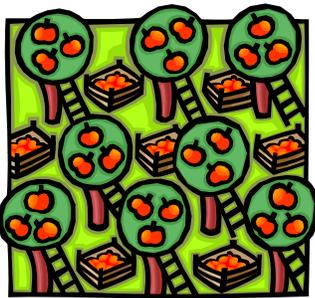
Congratulations to Jessica Bolton---recipient of the Animal Behavior Award of Excellence!  
 Jessica has been accepted to Duke University's PhD program in Neuroscience.

# SU Garden Club Grows!

The garden club has had a busy year. In the fall we started with a tremendous amount of weeding left over from the summer. The hillside had yams growing all summer which allowed them to grow to unusually large sizes and shapes. It was a scavenger hunt looking for the yams and digging them up but in the process we learned that yams are specialized stems called tubers and were able to see the aggregate of clusters they form underground. Later in the season we planted some cool weather vegetables and greens to grow over the break such as spinach, greens, broccoli and lettuce. We also planted a plot of strawberry plants and in January a plot of asparagus (which is a hearty perennial) with the help of SU staff and Georgetown Community member Josh Anderson, which will be ready to harvest in 2 years. This spring we built and planted a spiral herb garden which involves permaculture methods and adds to the aesthetics of the garden. The plot creates microclimates for herbs using ordinal directions for warmth preference and vertical spacing for water preference. We also learned more about using the greenhouse to extend the growing seasons and set up two community plots for spring foods one using the efficient square foot gardening method and the other using furrows. We hope to use these as demonstration plots as we bring in Boys and Girls club to learn about the garden.



The greatest gift of the garden is the restoration of the five senses. ~Hanna Rion



This spring we initiated a grow off between organizations to increase participation in the garden and to encourage civic engagement. The grow off involves 7 organizations, Roteract, BBB, ZTA, CKI, APO, ACS, CAC and 2 Paideia cohorts; which are growing fresh foods to donate to the caring place.. A Food Farming and the Hebrew Faith class, under the direction of Dr. Jensen, started to work on an experimental terrace on the hillside. We are very excited to be making progress in educating and learning about a most integral act of life- growing and eating food. Some future goals for the garden are to use our own made compost, have a fruit orchard, plant native and edible plants, and incorporate and outdoor teaching space.

**HELP WANTED:** Two students to conduct research this coming summer with Dr. Burks!

Each student will receive a stipend of \$2100, eight weeks of housing at Southwestern, \$500 for research supplies and coverage of travel expenses.

Students will work with me to develop their own line of inquiry based on the life history and ecology of the island apple snail, *Pomacea insularum*. Skills sought include a natural curiosity for the way "nature" works, dependability, a reasonable degree of independence, clear communication skills and a positive attitude in the face of challenging field days or tedious lab work. If interested, please feel free to talk to current research students in my lab: Matt Trawick, Olivia Stanzer, Megan Rice or Alexis Kropf as well as visit my webpage. If still interested, then please send me an email describing your interest in research, why you think snails are cool, 5 adjectives that best describe you, your favorite species and why and the one trait that you think will make you a good research student.

**FREE Tutoring Available for  
1st Year Students!**

**Tuesday, Thursday, & Sunday  
7-9 pm**

**In the Library (near the  
Prothro Room)**

**Congratulations!**

**Biology Student of the Year  
Lauren Williams**

**Upcoming Biology Seminar  
Monday April 26, Noon, FJS 148**

Tiffany Biagas, Alex Hall, Laura Kromann, Alexis Ritzer, Ben Pierce  
"The Natural History and Ecology of the Georgetown Salamander, *Eurycea naufragia*"



**New Wetland Course  
to be Offered This Fall  
By Dr. Burks**

Wetland Ecology and Policy will focus on biological topics ranging from nutrient cycling to hydrology and plant adaptations to restoration of degraded habitats. We will focus on learning and applying the scientific definition and function of wetland habitats.

Probably more than any other aquatic resource, wetlands do not exist in a 'static vacuum' in terms of their biological state or legal state. After gaining a scientific understanding of what properties embody a wetland, we will use the second third of the course to delve into the social and political debate that surrounds wetland science including wetland restoration versus creation.

During the last third of the course, students will apply the biology of wetlands to write a draft bill that addresses an overarching area, wetland conservation and preservation. The basis of this course focuses on providing an understanding of how wetland ecosystems can integrate with society, within the demands and confines of their natural structure and function.

**Dr. Todd's Tumor Biology Course**

The topic of cancer encompasses a range of issues, which vary in personal importance according to one's unique perspective, be that of a patient, family member, advocate, physician, politician or research scientist. In this class, we address the complexities of this topic, taking a 'bench-to-bedside' journey from biomedical research discovery to the development of clinical applications - diagnostic/prognostic markers, drug/gene therapies - all the while keeping the person (or patient) at the heart of our inquiries.

The laboratory component of the course affords students the opportunity to practically apply their theoretical knowledge and contribute to an ongoing research project investigating tight junction protein deregulation in breast cancer.

Meetings with cancer survivors/advocates and a physician/cancer researcher further enrich the course experience as their personal and professional stories provide unique and inspiring insights into the 'human face' of cancer.



Dr. Russell Broaddus, MD/PhD, visited with Tumor Biology students to discuss his career as a physician/scientist at MD Anderson.



# Learn something new from BioScope Magnifications: Tryptophan

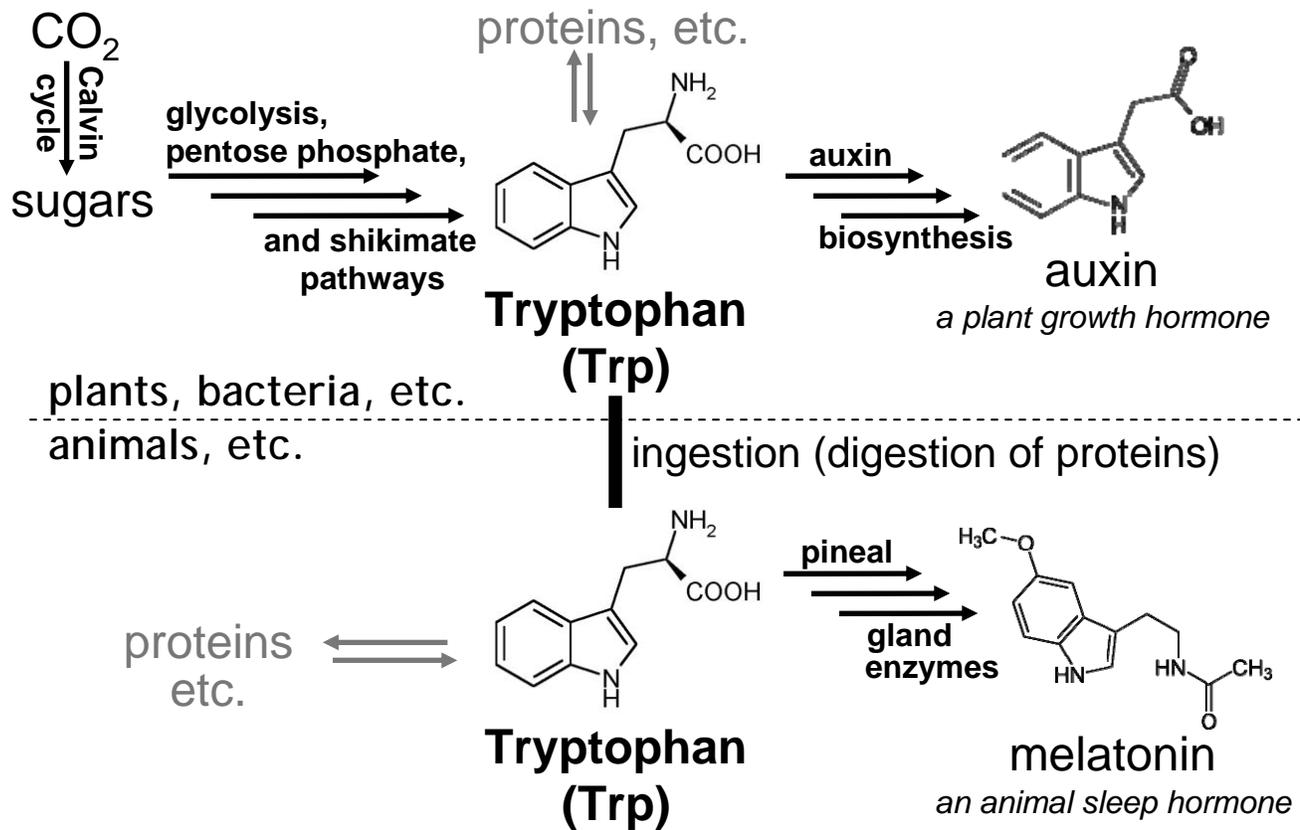


**Molecule:** Tryptophan, an essential amino acid.

**Pathway:** Component of most proteins, precursor of certain hormones, neurotransmitters, and more.

**Organisms:** All(?!) Yes, including turkeys.

**Ecosystems:** All.



Tryptophan is synthesized from ribose via several enzyme-catalyzed reactions (arrows in figure) in plants, many bacteria, and certain other organisms. In plants and some bacteria, tryptophan molecules can be further modified to yield the plant growth hormone auxin. Tryptophan is classified as an “essential” amino acid because humans cannot biosynthesize it, and must instead ingest tryptophan in their diet. Besides being used as a building block for proteins, tryptophan is metabolized into the hormone melatonin in the pineal gland, and is also used to make the neurotransmitter serotonin. Melatonin and serotonin stimulate sleep.

image refs: [www.edinformatics.com/.../melatonin\\_molecule.htm](http://www.edinformatics.com/.../melatonin_molecule.htm)  
[www.biopsychiatry.com/tryptophan/index.html](http://www.biopsychiatry.com/tryptophan/index.html) [www.planthormones.info/](http://www.planthormones.info/)

**Suburban legend:**  
**Turkey makes you sleepy because it has lots of tryptophan.** The key to regulating melatonin and serotonin production seems to be Trp transport across the blood/brain barrier, not the amount of Trp ingested. Also, turkey flesh has about “normal” levels of tryptophan. Sigh.

# Biology course offerings

## Fall 2010



<b>Pathophysiology</b>	Monday, Friday 8:35AM - 9:50AM,	<b>Wheeler</b>
<b>Wetlands Ecology</b>	Monday 1:50PM - 4:50PM,	<b>Burks</b>
<b>Genetics</b>	Lecture Tuesday, Thursday 8:35AM - 9:50AM, Laboratory Thursday 2:20PM - 5:20PM,	<b>Pierce</b>
<b>Botany</b>	Lecture Wednesday, Friday 11:00AM - 12:15PM, Laboratory Tuesday 2:20PM - 5:20PM	<b>Taub</b>
<b>Biology of Reproduction</b>	Lecture Tuesday, Thursday 12:50PM - 2:05PM,	<b>Cuevas</b>
<b>Human Anatomy</b>	Lecture Monday, Wednesday, Friday 10:00AM - 10:50AM, Laboratory Monday 1:25PM - 3:25PM	<b>McLean</b>
<b>Microbiology</b>	Lecture Tuesday, Thursday 10:00AM - 11:15AM, Laboratory Tuesday 2:20PM - 5:20PM, or Wed 1:50PM - 4:50PM	<b>Gonzalez</b>
<b>General Biochemistry I</b>	Lecture Monday, Wednesday, Friday 9:00AM - 9:50AM, Laboratory Tuesday 12:30PM - 4:30PM, or Thursday 1:30PM - 5:30PM	<b>Foote</b>

## Biology minicourse registration decision tree

1. Which afternoon do you prefer to have lab?

Monday  
1:50-4:50

Tuesday  
2:20-5:20

Wednesday  
1:50-4:50

Thursday  
2:20-5:20

Friday  
1:50-4:50

2. Do you prefer lecture at 10 am or 11 am?

10

11

10

11

10

11

10

11

10

11

3. Register for:

BIO50-100-02  
BIO50-102-02  
BIO50-110-02  
BIO50-112-02

BIO50-100-04  
BIO50-102-02  
BIO50-110-04  
BIO50-112-02

BIO50-100-01  
BIO50-102-01  
BIO50-110-01  
BIO50-112-01

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BIO50-112-03

BIO50-100-05  
BIO50-102-03  
BIO50-110-05  
BIO50-112-03

Go to Biodiversity lecture  
on the first day of classes.

Go to Cell Biology lecture  
with Dr. Sheller on the first day of classes.