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Southwestern University

DEPARTMENT OF BIOLOGY

Welcome to the Biology Department

2011-2012 Biology Faculty and Staff

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Come Meet Us!

The Department of Biology occupies part of the 1st floor of Fondren Jones and most of the 2nd floor. Office numbers can be found in the SU Directory. We look forward to meeting and getting to know you soon!

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Left to Right: Romi Burks (Ecology), Christy Schaller (Technician), Maria Cuevas (Endocrinology), Ben Pierce (Genetics), Maria Todd (Cancer Biology), Rebecca Sheller (Neurophysiology), Martín Gonzalez (Microbiology), Linda Southwick (1st year Laboratories), Erika Borden (Microbiology) and Max Taub (Plant Physiology).

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ACS Grant Visit Update: "Biology's Best Practices in Promoting Undergraduate Research"

Funded by a grant awarded to the Biology Department by the Associated Colleges of the South, three sets of SU faculty groups will conduct site visits to peer institutions to gain strategies for more effective faculty-student research collaborations:

- Dr. Taub and Dr. Gonzalez visited Davidson College in Charlotte, NC in June.
- Dr. Ben Pierce and Dr. Rebecca Sheller visited Washington and Lee University in Lexington, VA on July 27-28, 2011.
- Dr. Todd and Dr. Cuevas will be visiting Trinity University, San Antonio, TX in August.

Each pair spent one and a half days on campus meeting with the Dean of the College, the Provost, and the Biology Department faculty and students participating in the summer research program.



Hello from the new Biology Department Chair,
Dr. Maria Cuevas

Email: cuevasm
Phone: x1698

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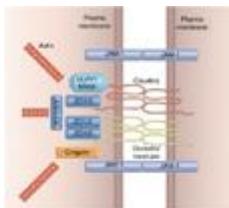
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Welcome to the Biology Dept. We are looking forward to this academic year and hope you take advantage of all the opportunities we have to offer. We wish you a smooth transition and please stop by our offices if you need anything. Our main goal is to help our students succeed..

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What We Did This Summer...

Summer Research:



An ACS Andrew W Mellon Faculty Renewal Grant in the amount of \$7151 was awarded to **Dr. Todd, Dr. Cuevas and Dr. Sheller** to investigate the role of claudin-3 in breast cancer metastasis.

The goals of the grant focused on 1) enhancing an existing collaboration between biologists from three different sub-disciplines; 2) becoming proficient in the use of newly acquired instrumentation; and 3) learning, optimizing and executing cell cycle, motility and invasion assays.

Dr. Todd, Dr. Cuevas and Dr. Sheller collaborate on a research project that seeks to delineate the function of claudin-3 - a protein found in the tight junctions that connect adjacent endothelial and epithelial cells. They have found that this protein is abnormally elevated in two breast cancer cell lines and completely absent in one breast cancer cell line. Abnormal levels of claudin-3 protein may disrupt tight junctions and thus compromise cell-cell connectivity. The latter may, in turn, contribute to the metastasis (or spread) of tumor cells to secondary organs.



Dr. Todd spent the summer optimizing a technique called a 'wound healing' assay that will enable her to study the effects of different levels on claudin-3 protein on the motility (or migratory ability) of breast cancer cell lines.

Dr. Cuevas spent her summer learning and optimizing cell invasion assays to study the possible invasion capability of the breast epithelial cancer cell line MCF-7 that will enable her to study the effects of different claudin-3 protein levels and hormones on invasion capability. She also started writing a manuscript for publication.



Dr. Sheller worked on the characterization of the subcellular localization of claudin-3 in various cell lines, including non-transfected MCF-7 cells, MCF-7 cells transfected with claudin-3 siRNA, normal breast epithelial tissues, and canine kidney cells (MDCK cells).



This summer **Dr. Pierce** continued his research on the Georgetown Salamander, conducting monthly surveys of salamanders at two sites with SU biology students **Evan Firth, Kira McEntire, Olivia Pavlich, and Ashley Wall**. He analyzed data that they have collected over the past year and prepared a end-of-the-year report on their salamander grant. Along with **Dr. Burks**, he submitted a proposal for another year of funding by the Williamson County Conservation Foundation. The Foundation approved a grant of new \$32,000 for research at SU on the salamanders and invertebrates for this coming year. Student **Ashley Wall** worked with Dr. Pierce on her project involving education about endangered species, which is funded by a grant from Williamson County.



Dr. Taub worked on a manuscript, "Effects of growth at elevated CO₂ on concentrations of essential minerals in plants: A meta-analytic synthesis" with two students, **Gillian Graham '11** and **Charlotte Huskey '11**.



Dr. Gonzalez and his three research students **Kimberlee Pierson, Morgan Bailey, and Ali Erkin** worked this summer to further understand how the prokaryotic error-prone DNA polymerases are regulated after they have been expressed and how this factors in bacteria becoming antibiotic resistant.

Summer Trips:



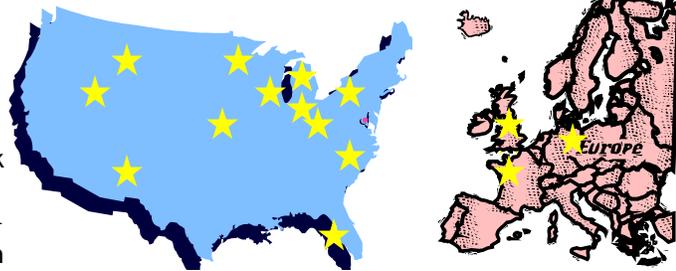
Visiting Professor Dr. Erika Borden spent time sight seeing while in Washington, D.C. and also enjoyed Disney World with her family!!

Dr. Cuevas went to London, Germany and Paris with her family in July. They visited friends they have not seen in 14 years.



Dr. Taub visited family and in-laws in New York, Michigan and Illinois.

After catching up on manuscript reviewing, work for the Texas Academy of Science and a million other things, Dr. Burks went on a Midwest tour - going to Chicago in May and then driving through Ohio/Michigan/Indiana/Chicago friend hopping in late July. Already thinking about SU and the start of FYS, Burks even managed to make a stop at a chocolate factory and snag some chocolate beans.



Dr. Todd together with her husband (Sean), son (Aidan) made their annual trip home to England to spend time with their family and friends. They enjoyed 6 glorious weeks of weather in the high 70's/low 80's - perfect for playing on the beach (Granny lives in an idyllic village by the sea in N. Devon - come and see the photos in her office!) and sight-seeing in her home town of London (with her brother and sister and their families).

Biology Technician Christy Schaller visited family and friends in South Dakota and Minnesota, and enjoyed reconnecting with college sorority sisters at a 25 year reunion!

Dr. Sheller went to Lancaster, County, PA for a family reunion. She reunited with aunts, uncles, and cousins that she had not seen in 20 years.

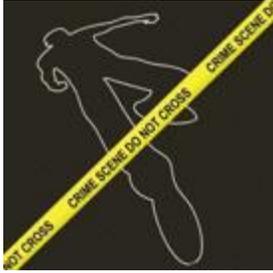
Dr. Pierce rounded out the summer with a family reunion and 10-day vacation in the mountains of New Mexico.



Lab Professor Linda Southwick traveled to Iowa to visit family, to South Dakota to the Badlands National Park, to Washington State to be with grandchildren, and spent a week with their family in Sun Valley, Idaho. On the way home, she visited National Parks in Utah.

**Where did you go? See the
Biology Department
Facebook Page to
Contribute**

Summer School



Linda Southwick taught a non-science majors course in Forensic Biology for May Term. This class explores techniques used to solve crimes. The students learned about fingerprints, shoe prints, handwriting, currency, blood typing, blood spatter, hair, saliva, tool marks, ballistics, bones, and DNA electrophoresis. After learning how to collect and analyze evidence, the students received mock crime scenes to apply the techniques they had learned. After analyzing all the evidence, each group gave an oral presentation on their findings. During June, Ms. Southwick modified the course to be part of the STEPS program for high school students. The students covered the same techniques and this time each group gave a poster presentation for their families at the wrap-up event.



Forensic Biology students ready to put their new skills to the test!



Forensic biology students analyze their crime scene.



Students from the summer STEPS program gear up in preparation for analyzing the crime scene.



STEPS students take notes on their findings .

Erika Borden taught a summer session Intro Bio I course at Georgetown University.



Bio Faculty Trivia
- did you know?
Dr. Gonzalez favorite Beatle is the late George Harrison

Meetings attended:

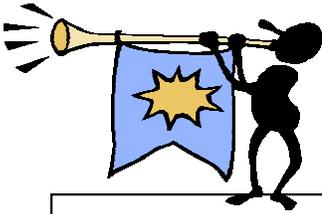
Dr. Pierce attended and presented a paper at the *Eurycea* Alliance meeting in June, and former student Alex Hall '11 presented their research at the Joint Meeting of Ichthyologists and Herpetologists in Minneapolis in July.

Dr. Taub attended an Associated Colleges of the South Environmental studies conference in Atlanta and attended the annual meeting of the Ecological Society of America in Austin.

Christy Schaller attended the annual conference for NAOSMM (National Association of Scientific Materials Managers) in Minneapolis in July.

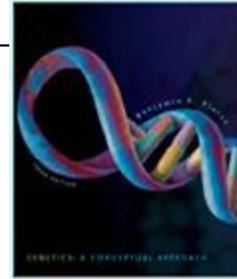
Dr. Gonzalez presented his research on DNA-damage induced toxin genes of *E. coli* at the national American Society for Microbiology meeting in New Orleans, LA. To celebrate his outstanding presentation, he consumed a rather large amount of oysters and soft-shelled crabs.

Dr. Burks attended and participated in numerous activities at the Ecological Society of America meeting in Austin. She also ran board meeting of the Texas Academy of Science



BIOSCOPE FOCUS: Publications

The Southwestern Naturalist accepted a manuscript for publication authored by Dr. Pierce with SU biology graduates **Alex Hall**, **Alexis Ritzer**, and **Tiffany Biagas**. Dr. Pierce also worked on the next edition of one of his genetics textbooks.



Dr. Taub published a pedagogical paper that can be shared with other ecologists: Daniel R. Taub and Graham, Gillian (2011). Global Temperature Change in the 21st Century. *Teaching Issues and Experiments in Ecology*, Volume 7.

Dr. Burks spent part of the summer finishing up edits for two new peer-reviewed scientific papers that have been published. First, 2009 Honors graduate and 1st author of the paper, **Colin H. Kyle** along with co-author **Alexis Kropf '12** (pictured with Burks and helper Brandon O'Connor '12) have their work on oviposition, or egg-laying behavior, of island apple snails (*Pomacea insularum*) included in a special issue of *Current Zoology* focused on invasive species. The article entitled "Prime waterfront real estate: Apple snails choose wild taro for oviposition sites" provides evidence for a preference of apple snails to lay their pink egg clutches on another invasive species plant (wild taro, *Colocasia esculenta*) and contradicts the prediction that larger females lay the largest eggs clutches. Smaller snails can produced just as many eggs.



The second paper, "Quite the appetite: Juvenile island apple snails (*Pomacea insularum*) survive consuming only exotic invasive plants" will soon appear in *The Journal of Molluscan Studies* with Burks as the first author, alumni **Sarah Hensley '08** and **Kyle '09** as co-authors. The first draft of this paper began as a Brown Working Paper and went through several iterations before finding its proper home in *JMS*. Ecologists usually consider these plants to be less nutritious and desirable than native plants. Contrary to what the literature would have predicted, the snails grew just fine on subpar resources.

Alumni Shannon Essler published! Characteristics of patients using extreme opioid dosages in the treatment of chronic low back pain

Shannon Essler, Southwestern University, Georgetown; Terrell Benold, M.D., UT Southwestern - Austin FMRP Sandra Burge, Ph.D., Department of Family and Community Medicine, UTHSCSA Published in [Texas Family Physician](#)



Advice for First Years...

For more words of wisdom check out the new SU Biology Facebook Page at SUBIOLOGISTS@groups.facebook.com



1. Talk with your faculty (Dr. Burks)
2. Check job openings around the country so you can get a good idea of what's out there. This will help you select the classes you might want to take later. Apply for summer internships in January!!! (Becca Marfurt)
3. Study in a group for your bio classes (and really this goes for all classes)--it's more fun and you will understand the concepts better. And don't wait till the week before the test to meet up; it's best if you can meet regularly once a week! (Katy Goldey)
4. Try to get some experience in research. It is great to see the application of what you are learning in your classes. You will also gain information and skills (specifically scientific writing skills) that you will be graded on in future classes. Also a great way to network for your future career (Erica Navaira).



5. If you're planning on going to graduate/professional school, look into the pre-requisite classes as early as possible. Also keep in mind that requirements can vary by school, so check out the pre-reqs for a few different places! Try to get your pre-reqs taken care of as early as possible- it will make your life much easier when you're applying later on! (Jen Penland)

6. Also if your planning on going to graduate/professional school, start getting relevant work/research experience as early as you can. It really is important to get diverse experience and to get to know people in the field you want to go into. And keep good records about what you've done. (Stephanie Russell Beeson)



SMArT Begins 12th semester at SU!



SMArTeams (i.e. Science and Math Achiever Teams) pairs SU student mentors with 3rd - 5th graders from a Georgetown ISD partner school. Led by fabulous **Biology Senior Meredith Liebl**, students come and check out SU on Mondays from 5-6 pm and explore a project of inquiry with their SU mentor.

Ask yourself
“Would I like to be
a SMArT mentor?”

More info can be found on the webpage of the Office of Civic Engagement. Or, if you are interested in checking out the program, just email Meredith leiblm@su.edu.

Interest Meeting for Mentors: Sept. 2
SMArT begins: Monday, Sept. 12
SMArT Directors include Ms. Suzy Pukys and Dr. Romi Burks



Student Groups

Beta Beta Beta

The Biological Honors Society, Beta-Beta-Beta, promises a commitment to engaging students in the appreciation of biology study, scientific research and the importance of biological issues. At Southwestern University, BBB informs students interested in a medical career about the admissions process. This year they also have plans to host information sessions throughout the year for BBB members interested in going on to graduate school!

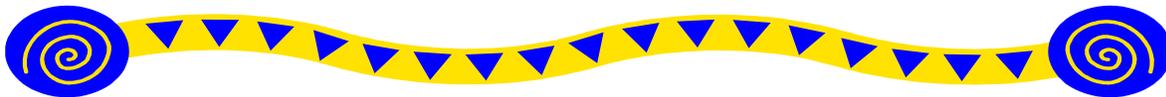


2011-2012 BBB officers:

President: [Morgan Bailey](#)
Vice-President: [Bertha Ortega](#)
Treasurer: [Alexis Kropf](#)
Secretary: [Katlyn Hoover](#)
Volunteer Coordinator: [Nick Ortiz](#)
Graduate School Coordinator: [Jenna Gaska](#)
Pre-Med Coordinator: [Heather Petty](#)

Faculty Advisors: Rebecca Sheller and
Linda Southwick

Anyone interested in Biology, including first year students, can join βββ as an associate member (one-time dues are \$45). Membership can be upgraded to "full" as students progress in their studies of biology. For more information visit the national βββ website: <http://www.tri-beta.org/aboutbbb.html>



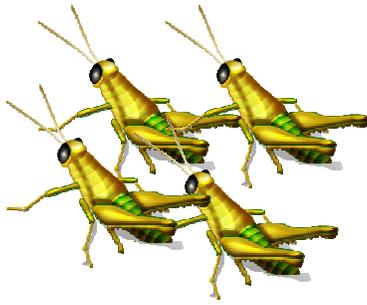
**Southwestern University
Animal Behavior Society -
Check out separate FB Group**



**Interested in AB?
Not in the Intro Class starting
in October? Talk to Dr. Burks**

Several students and faculty members from the Animal Behavior Program presented their research at the Southwestern Psychological Comparative Association (SCPA) annual meeting held in conjunction with SWPA in San Antonio April 7-9.

- Psychology Professor **Jesse Purdy** presented a paper titled "Exploring the Interaction Between New Technology and Old Ideas."
- Purdy and seniors **Elizabeth Anne Wilson** and **Alex Hall** presented a paper titled "Retention of Learned Association following Metamorphosis in African Claw-toed Frogs."
- Senior **Carissa Winland** and Psychology Professor **Fay Guarraci** presented a paper titled "Nice Guys Finish Last": Mate Choice, Reproductive Success, and Testosterone in Rats. Senior
- **Morgan Mingle** presented a paper titled "Chimpanzee See; Chimpanzee Do: A Study of Social Learning and Handedness," which was done in collaboration with William Hopkins from Agnes Scott College, Sarah Brosnan from Georgia State University, Lydia Hopper, Susan Lambeth, and Steven Schapiro from The University of Texas- M.D. Anderson Cancer Center.
- Mingle also presented a paper titled "Acoustic Preference for World Music in Chimpanzees," which was done with Victoria Horner and Timothy Eppley from [The Living Links Center at Yerkes National Primate Research Center](#) and Frans B. M. de Waal from Emory University.



Insects on the Menu?

(Article condensed from SU Webpage)



Bio Faculty Trivia
- did you know?
Dr. Cuevas really
does not like
crickets.



Steven Rubin makes chocolate dipped crickets for students in the Invertebrate Ecology class.

Could insects be the food source of the future? The practice of eating bugs is known as entomophagy, and it is [creeping its way into the culinary world](#). Dr. Romi Burks, an associate professor of biology at Southwestern, became intrigued with the idea after watching an episode of “Top Chef Masters” in which culinary masters made appetizers with crickets, earthworms, mealworms and even scorpions.

“Although insects appear in a number of cultural specialties, their use is only now becoming more common in North America,” Burks said. In addition to being a good source of protein, one of the main arguments for eating bugs focuses on the environmental benefits. A [2010 journal article](#) reported that insects exhibited a higher growth rate and produced less carbon emissions than the equivalent amount of more common proteins like beef and pork.

Burks decided to begin introducing students in her Invertebrate Ecology class to a menu consisting of insects and other invertebrates. Students sampled dishes that included crunchy spicy crickets, flour pancakes with dried mealworms, and earthworm sliders soaked in a portabello mushroom marinade. While most students were slightly hesitant about the endeavor, Burks said most warmed up to the experiment with a little encouragement.

“The bug lab was really neat because it was definitely something you don’t get to do often and I enjoy trying new foods whenever I can,” said student Preston Davis. “I like the feeling of actually doing things rather than just talking about them in the classroom.” As part of the class, the students also wrote final exam essays about entomophagy and whether they think it will eventually become a primary food source.

“I don’t think eating bugs will be THE food movement of the future. The fact that they may be ‘greener’ than cows and other livestock does not trump the taste of a steak,” Davis said. “I think bugs will become a more common food item than they are now, as long as people push the environmental argument, because that seems to be the thing to do these days. But I don’t expect to see bugs in McDonald’s Happy Meals anytime soon.” This is not the first time Burks has used food in her teaching. She uses [popcorn to teach statistics to students](#) in her Methods in Ecology and Evolution class and uses [chocolate to teach students about evolution and phylogenetics](#).

INSECTS ARE FOOD™

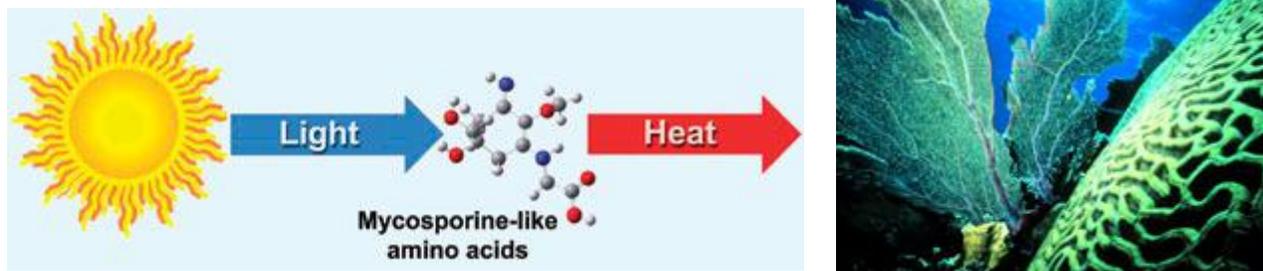


Entomophagy is the future



Learn something new from BioScope Magnifications: Record heat at SU - are you protected?

Palythine is a mycosporine-like amino acid (MAA), compounds present in organisms such as fungi, bacteria, algae and marine organisms. MAAs are thought to have a number of biological activities, including photoprotection.



Spanish scientists have established how natural products protect plants from sun damage. The compounds could be used as active ingredients in sunscreens. Using computational techniques on **palythine - a compound found in coral** - as a model compound, Diego Sampedro at the University of La Rioja, Logroño, investigated what happens to the molecule after it absorbs UV light. Sampedro found that when UV light was shone on palythine, the molecule rapidly dissipated the light energy into heat energy without forming reactive, harmful, photoproducts. He looked at the mechanism in detail on both the protonated and neutral forms of palythine, as scientists were unsure which form was active in the coral. He found that both forms underwent a bond rotation to transform light into heat energy, but the protonated form was responsible for the main absorption of the radiation.

'MAAs may be commercially important in the near future as they present the features needed for a very efficient photoprotector: strong absorption over a useful range of wavelengths, efficient conversion of light energy into heat, photostability and lack of reactive intermediates or by-products,' explains Sampedro. 'Some of the components of commercially available sunscreens do not meet all of these criteria.'

Learn more about this at: <http://www.rsc.org/chemistryworld/News/2011/February/25021103.asp>

...and don't forget to wear your sunscreen to prevent melanoma!!



Join us at [SUBIOLOGISTS@groups.facebook.com](https://www.facebook.com/SUBIOLOGISTS); also su-biology List-serve

Stay connected, find delicious recipes, learn with us, shop with us and more!

Invasivore.org |
Eat Invasive Species



Effects of Rising Atmospheric
Concentrations of Carbon
Dioxide on Plants
By: Daniel R. Taub (Biology
Department, Southwestern
University)

<http://www.etsy.com/people/PlayinHookyDesigns>

Biology Course Offerings Fall 2011

Choice 1:

First Half: Aug-Oct MWF

Cell Biology: 10 am 50-102-01
11 am 50-102-03

Second Half: Oct-Dec MWF

Biodiversity: 10 am 50-112-01
11 am 50-112-03

Lab choices

W: 100-01 and 110-01
Th: 100-03 and 110-03
F: 100-05 and 110-05

First Year
Mini courses

Choice 2:

First Half: Aug-Oct MWF

Biodiversity: 10 am 50-112-02
11 am 50-112-04

Second Half: Oct-Dec MWF

Cell Biology: 10 am 50-102-02
11 am 50-102-04

Lab choices

M: 100-02 and 110-02
T: 100-04 and 110-04
T evening: 100-06 and 110-06

Biology minicourse registration decision tree

1. Which afternoon do you prefer to have lab?

Mon
1:30-4:30

Tues
2:30-5:25

Tues
7:30-10:30

Wed
1:30-4:30

Thurs
2:30-5:25

Fri
1:30-4:30

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

10

11

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

BIO50-100-06
BIO50-102-02
BIO50-110-06
BIO50-112-02

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

BIO50-100-03
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BIO50-102-03
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BIO50-112-03

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

Go to Biodiversity lecture with
Dr. Burks on the first day of classes.

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