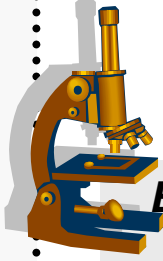


# B



### **Biology chosen as 1 of 4 SU Department to set up new design for university webpages:**

Rumor has it that the typical student looking for colleges spends approximately 7-9 seconds looking at a site before deciding whether or not to explore further. Thus, Southwestern is very keen on attracting student attention with up-to-date and flashy webpages. The Biology Department is taking part in a pilot effort to coordinate the webpages of academic programs across campus. Each faculty member will have their own profile and hopefully the possibility to update their own pages on a routine basis. SU students can already access course schedules via WebAdvisor so the new webpages need to streamline other information. We currently post *BioScope* on our page and will continue to do so. Other planned pages include one-stop-shopping for pre-professional students and hopefully a site for outside research opportunities. We also hope to have a place to post photos of Biology Events, a place to advertise the Biology Seminar Series and relevant links to other biology sites. The question is – what do you want to see on the Biology Webpages? Send your suggestions to Dr. Romi Burks ([burksr@southwestern.edu](mailto:burksr@southwestern.edu)) and they will be sent on to the webpage designer.

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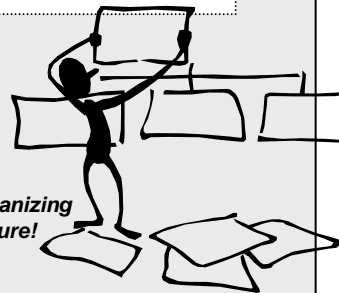
### **Biology Faculty Dr. Max Taub and Dr. Martín Gonzalez receive tenure!**



*Dr. Gonzalez masters the juggling of Petri plates!*



*Dr. Taub organizing all his literature!*



The Department of Biology gained two Associate Professors starting in the Fall as Southwestern granted both Dr. Taub and Dr. Gonzalez tenure. Dr. Taub will be spending his sabbatical this Fall working on a meta-analysis about the effects of increasing carbon dioxide on agricultural crops. Dr. Gonzalez will be teaching a new course in Immunology and has planned a semester sabbatical during the 2008-2009 academic year to continue his work on the mechanisms of DNA repair.





<p><b>Matt Kaufmann</b> President <a href="mailto:auffmam@southwestern.edu">auffmam@southwestern.edu</a></p>	<p><b>Sheila Raeke</b> Secretary <a href="mailto:raekes@southwestern.edu">raekes@southwestern.edu</a></p>
<p><b>Jason Burnham</b> Vice-President <a href="mailto:burnhamj@southwestern.edu">burnhamj@southwestern.edu</a></p>	<p><b>Amber Hoerauf</b> Volunteer Coordinator <a href="mailto:hoeraufa@southwestern.edu">hoeraufa@southwestern.edu</a></p>
<p><b>Bryt Piana</b> Treasurer <a href="mailto:pianab@southwestern.edu">pianab@southwestern.edu</a></p>	<p><b>Alison Unzeitig</b> Pre-Medical Chair <a href="mailto:unzeitia@southwestern.edu">unzeitia@southwestern.edu</a></p>

### Traditional Events:

- Fall 2008 Induction for new members
- Meet the biology professors
- Pre-med meetings
- Biology related movies in the Cove
- Elementary science fair
- Seminars with doctors, graduate students, professors, admission counselors, study abroad and other biology related jobs
- Pick up basketball game/ultimate frisbee
- Intramural team/Relay for Life

### Volunteer Opportunities in Georgetown:

- ▣ Habitat for Humanity
- ▣ Medical, Eye & Dental International Care Organization (MEDICO)
- ▣ Helping Hand Tutoring/Partners in Education (tutor in math, science and reading) (K-8th grade)
- ▣ SMARTeams (1-on-1 mentoring)

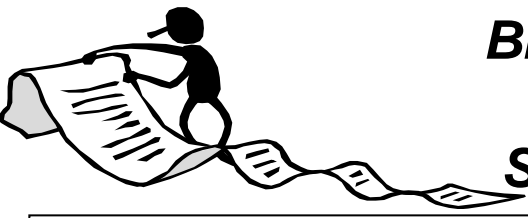


Each Fall, Tri-Beta inducts eligible applicants who have completed the introductory Biology course as well as 1 upper-level Biology course, and who have a 3.0 Biology GPA and a 2.5 overall GPA.

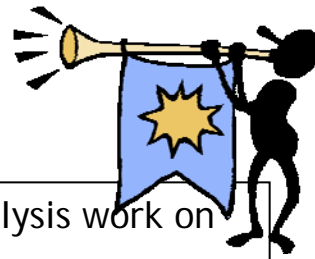
Students who do not yet meet these requirements, but who have an interest in Biology are inducted as Associate Members.

Faculty Sponsor: Dr. Cuevas with support of the entire Biology Dept.

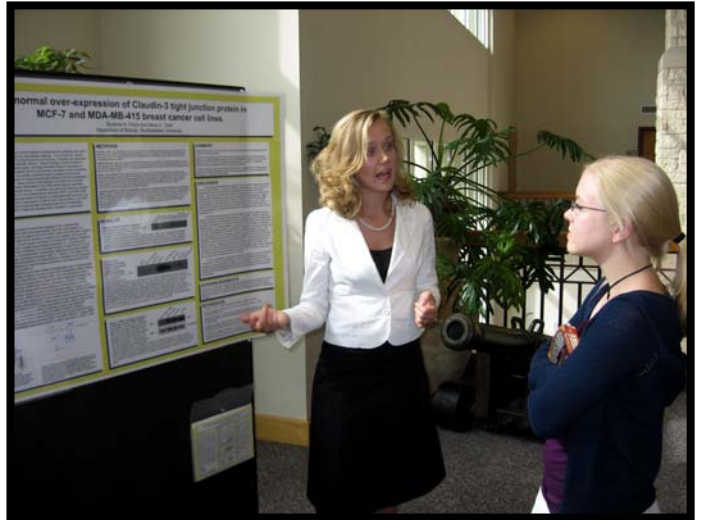
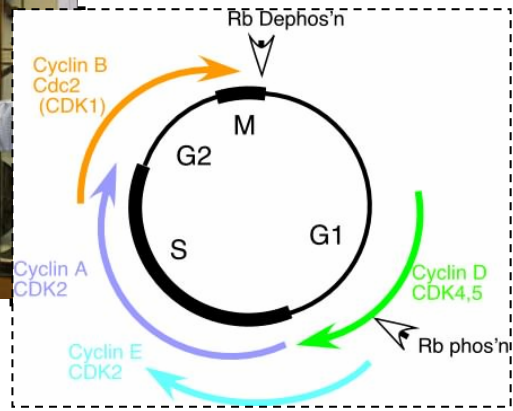




## **BIOSCOPE FOCUS: Pedagogical & Scholarly Updates**



- In May, Dr. Max Taub presented a paper about his meta-analysis work on increasing global CO<sub>2</sub> at EcoSummit in Beijing, China.
- Dr. Maria Todd and Dr. Romi Burks participated in Southwestern first across campus summer research program by each mentoring two students:
  - Shea Spruill and Bryt Piana (see abstracts pg. 5)
  - Colin Kyle and James McDonough (see abstracts pg. 6)
- Ms. Southwick spent her summer teaching Anatomy & Physiology at the University of New Mexico-Gallup. Her classes served to meet the need of nursing students from local American Indian tribes.
- Dr. Martín Gonzalez, Dr. Maria Cuevas and Dr. Rebecca Sheller each taught a section of "Human Biology Today" during summer school. Congratulations to them as it is A LOT to teach in a SHORT time!
- Dr. Ben Pierce spent his summer updating his textbook *Genetics* for a 3<sup>rd</sup> edition. In his "spare" time, he also worked on Southwestern's large grant proposal to the Howard Hughes Medical Institute (HHMI).
- Dr. Romi Burks attended the Associated Colleges of the South Teaching Workshop at Rollins College, FL in June.
- Dr. Ben Pierce and Jose Granda (2007) presented a poster entitled "Effect of Disturbance, Position of Observer, and Moonlight on Anuran Call Survey Efficiency" at the Joint Meeting of Ichthyologists and Herpetologists in St. Louis, Missouri, July 12-15.
- Drs. Maria Todd, Maria Cuevas and Rebecca Sheller are currently planning a project to work together studying gap junctions of cancer cells. Their efforts currently involve writing a National Science Foundation Major Research Instrumentation Grant for necessary equipment.
- Dr. Romi Burks presented an oral presentation entitled "Bad Eggs" at the international limnology (i.e. lake studies) meeting in Montreal Canada, Co-authored with SU students, Sarah Hensley '08, Abby Youens '07 and Matt Barnes '05, this talk examined what could happen to an egg clutch laid by invasive applesnails.
- Dr. Maria Todd recently received notice of acceptance of her abstract to the 2007 American Society of Human Genetics Meeting to be held in San Diego, this October. Co-authored with students Kristen Meerbrey '05 and Shea Spruill '07, Dr. Todd will present "siRNA-mediated suppression of the wildtype and low molecular weight forms of cyclin E protein in the NIH-OVCAR-3 ovarian cancer cells."



**Suppression of abnormally elevated levels of cyclin E protein by siRNA restores growth regulation to NIH-OVCAR-3 ovarian cancer cells.**

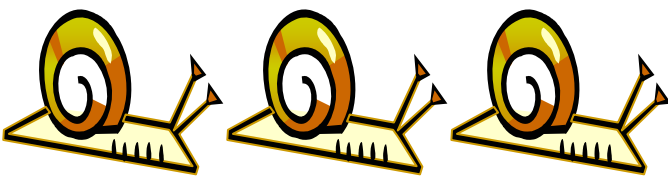
**Shea Spruill and Maria Todd**  
Biology Department, Southwestern University

The mutually exclusive loss of the G1 cell cycle regulatory proteins, RB or p16, appears to play a role in the development of the majority of human cancers. In contrast, most ovarian cancers coexpress RB and p16 proteins, which suggests an as yet unidentified mechanism of cell cycle deregulation in these tumors. We have previously shown overexpression of the wildtype and low molecular weight (LMW) forms of the cyclin E protein in the RB+/p16+ ovarian cancer cell line, NIH-OVCAR-3. In the current study, we have used small interference RNA specific for cyclin E, to inhibit synthesis of the wildtype cyclin E protein by approximately 70% and completely eliminate the expression of the LMW forms of the protein. Associated with the down-regulation of cyclin E expression, the cells underwent a marked shift in RB protein expression to the active, hypophosphorylated state and showed a significant decrease in the expression of cyclin A (which is usually expressed upon entry into S-phase). In addition, we observed a decrease in the proliferation of NIH-OVCAR-3 cells, consistent with arrest of the cells in G1 phase of the cell cycle. These data provide evidence that cyclin E overexpression may play a major role in the loss of G1/S cell cycle control in RB+/p16+ ovarian cancer cells and that the suppression of cyclin E protein expression may prove an effective gene-therapeutic approach to restoring regulated cellular proliferation.

**Abnormal overexpression of claudin-3 tight junction protein in MCF-7 and MDA-MB-415 breast cancer cell lines.**

**Brytanie Piana and Maria Todd**  
Biology Department, Southwestern University.

Tight junctions function both to connect adjacent endothelial and epithelial cells and to regulate the flow of molecules through the transcellular pathway. The 24-member claudin family of proteins are integral to tight junction structure and function. Claudins are expressed in a tissue and developmental stage-specific manner. Recent findings of abnormalities in claudin expression in tumors of different types, including elevated claudin-3 expression in ovarian cancers, have indicated a possible role for tight junction disruption in the metastasis of tumor cells. In the current study, our primary objective was to compare the levels of claudin-3 protein expressed by a panel of normal reproductive tissues with those expressed by breast and ovarian cancer cells. Using western blot analysis, we found that the basal level of claudin-3 expression was barely detectable in all of the normal tissues assessed (with the highest levels in normal breast tissue). In contrast, we observed markedly elevated (over 50-fold) expression of claudin-3 in two breast cancer cell lines, MCF-7 and MDA-MB-415. In order to determine if the overexpression of claudin-3 deregulates tight junctions, we have used siRNA to suppress claudin-3 expression to that of near normal levels in the MCF-7 cells. This will enable us to perform future studies comparing both the transepithelial resistance and invasiveness of MCF-7 cells that express either elevated or suppressed levels of claudin-3.



### The Flow of Research in Aquatic Ecology

**James McDonough, Colin Kyle, and Romi Burks**

Biology Department, Southwestern University

Conducting research furthers our knowledge of the world in which we live. Research occurs in all academic disciplines, although the process varies from field to field. In the biological subdiscipline of ecology, researchers investigate the interaction between organisms and their environment and address issues such as exotic invasive species, global climate change, and ecosystem preservation. Ecological research normally takes place using experiments in a laboratory or field setting. Within ecology, researchers follow a similar method of developing experimental questions and designs. This summer, we experienced this process through field collection and experimental design and construction. In addition, we found some over-arching trends that also shaped our research. Using the form of a flow chart, we have outlined the major steps that ecologists take to reach a workable research question based on our experience this summer in the SURGE program. In this chart, we discuss topics such as choosing a research field, picking a research topic within that field, and finally developing a testable question. By constructing this flow chart, we hope to give the reader perspective on how ecologists conduct research while sharing our summer research experiences.



### Pink Eggs and Snails: Oviposition Behavior in *Pomacea insularum*

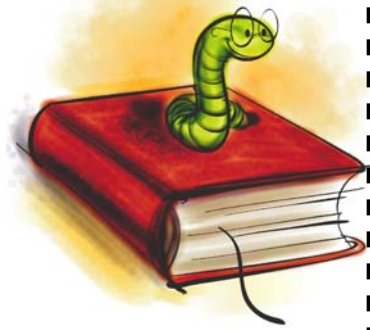
**James McDonough, Colin Kyle, and Romi Burks**

Biology Department, Southwestern University

Invasive exotic species represent a major threat to the world's ecosystems and cause approximately \$120 billion in damage annually in the U.S. Mollusk invaders appear particularly destructive due to their small life stages and high reproduction rates. A recently identified invasive species of applesnail, *Pomacea insularum*, exhibits alarming characteristics including large size, whole plant consumption and high reproduction. To slow down their invasion in North America (TX, AL, GA, and FL), we studied *P. insularum* oviposition (i.e. egg laying) behavior. We investigated oviposition trends at Armand Bayou (Houston) by documenting clutch height above water and clutch dimensions. To observe oviposition and *P. insularum* behavior, we presented captive breeding females in 2 light conditions (shaded or unshaded) 4 different structures on which to lay eggs: elephant ear (plant), wood, metal, Astroturf. In the field, snails laid clutches of consistent volume an average of  $33.4 \pm 16.3$  cm above the water. In the lab, females laid almost exclusively on elephant ear and ignored other structures, with more clutches produced in unshaded versus shaded environments. Because egg number directly translates into population growth, knowledge of oviposition will improve our ability to slow down invading populations by locating and removing clutches before they can hatch.

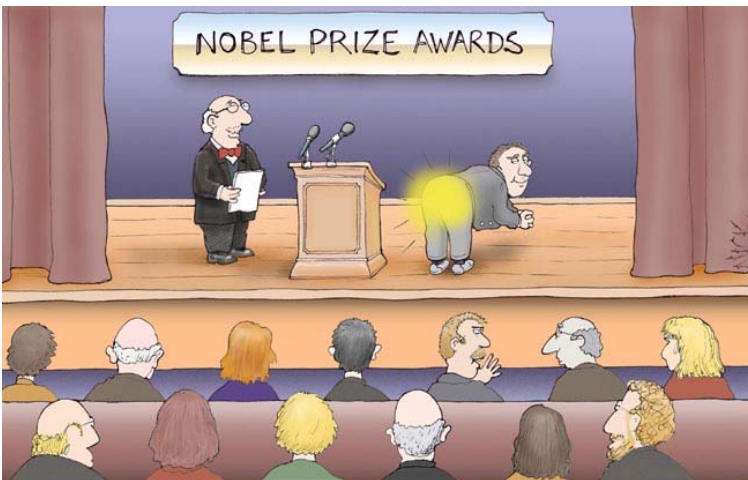
# Advice from a BookWorm:

(This will be a new feature if BioScope where faculty and students recommend books to read)



## How to win the nobel prize [An Unexpected Life in Science] by J. Michael Bishop (2004)

ISBN-10: 0674016254 ISBN-13: 978-0674016255



Recommendation by Dr. Veronica Martinez: "[This book] was given to me by a good friend and (perhaps because of the place I am in my career) I've enjoyed the book very much. I especially was inspired by Dr. Bishop's comments on academia and teaching. Very inspirational and well written.

"He doesn't deserve this! It was a complete fluke! Just a freak lab-accident with some firefly DNA and suddenly it's like the sun shines out of his arse..!"

***Need some artwork for your room??? Check out these images that you can get blown up to frame sizes!***

Microscopic Imagery - Art and Science

# BioArtography

• Availability • Order Form • Pricing

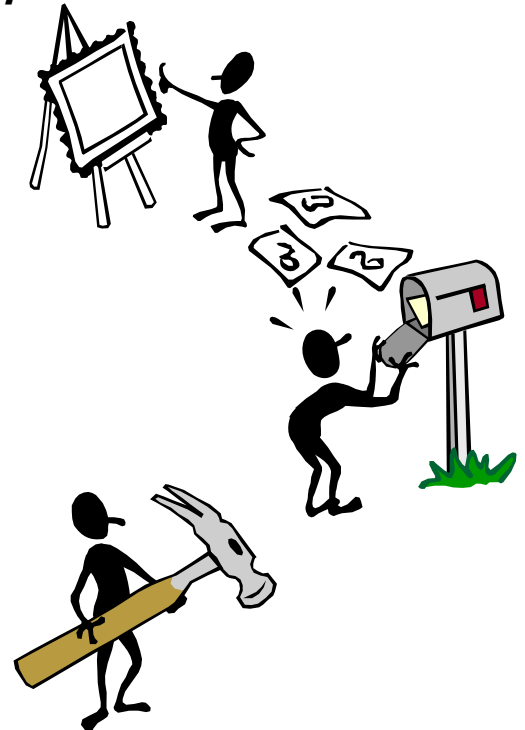
### Headress

(Therese Roth, Graduate Student, Cell and Developmental Biology)

These cells have been cultured from a mouse sciatic nerve. The green stain shows that these cells express neurofibromin, the protein product of the NF1 gene. The red fluorescence highlights actin protein, which gives the cell its shape. The blue fluorescence identifies the nucleus of the cells. Gene mutations in the NF1 gene cause tumors under the skin. Such tumors can become large and disfiguring.

Available Sizes for this Image :				
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BioArtography





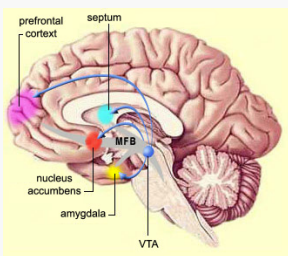
Learn something new from *BioScope Magnifications*:

• **MOLECULE and PATHWAY: ANANDAMINE & DOPAMINE WITH CB1 and CB2 RECEPTORS**

Contains similar active ingredient as THC which is found in marijuana.

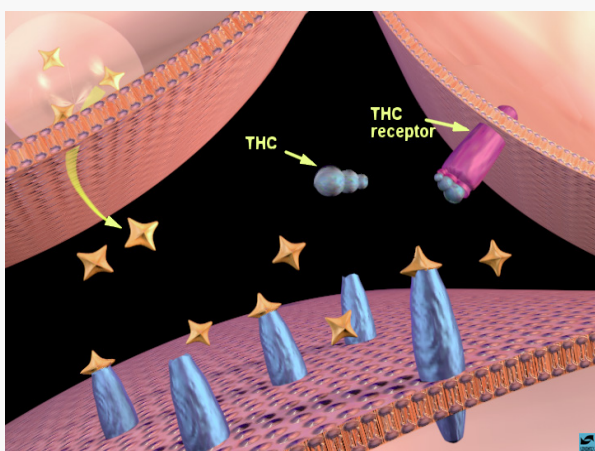


Discovered in the brain in 1992. In Sanskrit, means "bliss." Anandamide was Discovered in chocolate in 1996



Targets receptors CB1 and CB2 in the nucleus accumbens of the brain.

But you don't get "high" off of chocolate because the anandamide concentration in chocolate is very low. Anandamide is quickly broken down (even when your brain makes it) - so it doesn't last long. Nevertheless, it may contribute to why chocolate tastes so good!

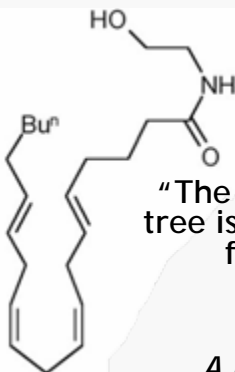


• **ORGANISM: *Theobroma cacao***



© 2004 Encyclopædia Britannica, Inc.

Pronounced "ka-kow," this tree produces pods, the insides which hold "seeds" or beans that eventually become the product chocolate. A special fly, called a midge, pollinates the tree. The pods grow directly from the trunk, a special adaptation called cauliflory. A single acre of trees produces about 1 ton of beans.



**ECOSYSTEM: Lowland rain forest**

"The natural history of the cacao tree is woven within the ecological fabric of the rainforest"

---Young 2007

*The Chocolate Tree  
A Natural History of Cacao*



Students and Faculty interested in submitting announcements, items for focus, profiles or highlights (i.e. Magnifications) to *BioScope* should email Dr. Burks (burksr).

Next Issue: November 2007

## Biology Department says 'goodbye' to good friend and colleague, Joan Strandtmann

Joan passed away after a long illness at the end of the July. She served as the Biology Department Technician for over six years. In that time, she encountered innumerable crazy things, some of which she brought to Department meetings for the faculty to guess what the identity (we often had no idea)!! In this picture, Joan sits with the Department wearing one of the Undergraduate Research and Creative Activities Symposium t-shirts (April 2004). She was a great supporter of our students. We will miss her care, her wit and her commitment to Southwestern.



# SEMINARS



## Science & Math Achiever Teams

You could be SMART too??  
SMARTeams is an outreach initiative that pairs SU students one-on-one with a 3<sup>rd</sup>, 4<sup>th</sup> or 5<sup>th</sup> grader to work on a project of inquiry over a period of 10 weeks. Plans are currently underway to make this service learning and civic engagement project count for 1 hr academic elective credit.

If you are interested, talk to Dr.

Burks or some past SMART participants (Amanda Mohammed, Erica Navaira, Jessica Bolton, Brittany Ford, Anna Frankel, etc...).



"Bloody glow-worms... Coming over here... Hanging out in our dingy bars... Wantonly luminescing... Enticing our youth... Attracting our women... Eating them all..."

Do you like to write?  
Need a create outlet?  
Enjoy connecting Biology with other things?

Consider becoming involved in *BioScope!*  
Student writers and editors needed.  
Contact Dr. Burks ([burksr@southwestern.edu](mailto:burksr@southwestern.edu))

