

Southwestern University

Nov. 4th 2004: The Biology Department's Honor Society, **BBB**, Inducts 31 Members!







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 meet these requirements, but who have an interest in Biology are inducted as Associate Members. This year's induction took place in The Lord Center and was followed by tantalizing snacks from Chick-Fil-A.

With recent officers graduating in December or having other Spring obligations, ISBS, also elected new officers for Spring 2005:

President: Josephine Thinwa
Vice-President: Sarah Raison
Secretary: Bhavik Kumar
Treasurer: Aurora Low
Historian: Christina Granado
Volunteer Coordinator: Kristen Meerbrey
PreMed Chair: Jeanna Van Pelt

email: thinwaj@southwestern.edu
email: raisons@southwestern.edu
email: lowa@southwestern.edu
email: granadoc@southwestern.edu
email: meerbrek@southwestern.edu
email: vanpeltj@southwestern.edu

Please contact these individuals if you are interested in learning more about BBB

Faculty Sponsors: Drs. Sheller, Cuevas and Gonzalez Previous ßß Faculty: Dr. Burks & Ms. Johnson

<u>ßßß Goals</u>

- 1) To promote biological understanding and appreciation.
- 2) To provide activities and experiences in biology.
- 3) To expose students to numerous avenues in the biological field.



Undergraduate Researchers
Mark Your Calendar!
Abstracts Due:
February 21, 2005



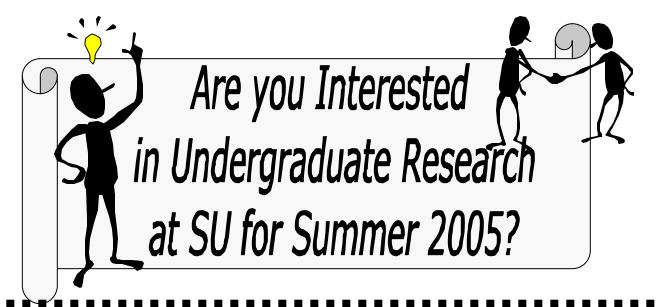
Undergraduate Research and Creative Works Symposium

April 7, 2005





- VERY EXCITING NEWS PEER REVIEWED PUBLICATION Biology Major Matthew Garcia, Environmental Studies Major Becca Marfurt & Dr. Max Taub recently published a webpage review in Frontiers in Ecology and the Environment (2004) 10(2): 549.
- UPCOMING NATIONAL PRESENTATIONS: Senior Austin Hill will present his Ecology research with Dr. Romi Burks as a poster presentation at the American Society of Limnology and Oceanography in Salt Lake City, UT. Senior Becca Marfurt will present her research on applesnails at the Associated Colleges of the South Environmental Summit in Atlanta, GA, and also at the Freshwater Mollusk Conservation Society's annual meeting in May in St. Paul, MN, under the theme of aquatic invasive species.
- MASTER'S DEFENSE: Katie Atchison, a graduate student of Dr. Martín Gonzalez from the University of Colorado Denver, successfully defended her Master's Thesis entitled "Physiological and molecular characterization of cadmium resistance in a environmental *Pseudomonas* isolate."
- CAPSTONE DEFENSE: Congratulations to Jason Matthews for completion of his capstone defense, "In Vivo Degradation of UmuD by the ClpXP Protease," showcasing his undergraduate research with Dr. Gonzalez. Double congrats to Jason for a new marriage as well. Dr. Maria Todd served on the Capstone Committee.
- IACUC APPROVAL: Dr. Rebecca Sheller and Dr. Maria Cuevas received approval for protocols from the Southwestern Institutional Animal Care and Use Committee (IACUC). Dr. Burks now has a proposal pending for use of redear fish in Ecology lab.
- CONFERENCE ATTENDANCES: Dr. Todd also recently attended the Special Meeting regarding Cell Cycle and Cancer Therapeutics within the American Association of Cancer Researchers in Fort Lauderdale, Florida. In October, Dr. Sheller attended the annual meeting for the Society of Neuroscience in San Diego, CA.
- **PUBLICATION SUBMITTED: Dr. Burks** just completed a book chapter, "Telling macrophyte tales: new insights into the established importance of aquatic vegetation in regulating trophic interactions in shallow lakes," that will be in review for publication in *Wetlands as a Natural Resource* published by Springer Verlag.
- INTERNSHIPS: Environmental Studies Major Sarah Wolters, under the supervision of Dr. Taub and Dr. Burks, completed an internship examining the vegetation present in Southwestern's Environmental Zone. Visit her poster on the 1st floor of Fondren Jones.
- **REVIEWS:** Congratulations to **Drs. Taub, Gonzalez, Cuevas & Burks**, all of whom recently submitted materials for comprehensive reviews.



The Department of Biology is now recruiting students for the **BSRP – Biology Summer Research Program – tentatively** to take place Summer 2005.

- Purpose To provide an opportunity for qualified students majoring in biology to become involved in a research project with a faculty mentor at Southwestern University.
- Eligibility Qualified students majoring in biology and currently enrolled at Southwestern University are eligible for a summer undergraduate research position provided they (1) have a minimum GPA of 3.0 (on a 4.0 scale) or with permission of faculty and (2) will be enrolled as a full-time student during the 2005-2006 academic year. We strongly encourage members of groups underrepresented in the sciences (i.e., women & minorities) to apply.
- **Projects** Participating students will work closely with a faculty mentor experienced in teaching students how to do research. Each student-faculty team will conduct original research in one of three general areas: Cell/Molecular Biology, Organismal Biology, or Ecology/Population Biology. The possibility for interdisciplinary projects also exists. Detailed descriptions of the research areas can be found on the next page. Completed projects will be showcased at the BSRP banquet, the 2006 Undergraduate Research and Creative Works Symposium and at regional scientific meetings.
- Program Dates May 23-July 15th 2005 (tentative)
- Stipend Student stipends will be \$300 for each of the 8 weeks.
- Requirements Students selected for participation are requested to enroll in one hour of independent study during the Spring semester. Students will be asked to conduct research with a faculty mentor for at least 40 hours per week, write a substantial paper, and present their research at a state or national scientific meeting such as the annual Texas Academy of Sciences meeting (Spring 06). For many students, the research and research paper will support the capstone requirement for biology majors.

AREAS OF RESEARCH:



Dr. Romi Burks

Dr. Burks has two on-going projects in the lab. First, students could investigate how *Daphnia* (commonly called a water flea) respond to or avoid predators based on chemical cues. Second, students could contribute to the lab's efforts to provide basic ecological information about *Pomacea canaliculata* (the channeled applesnail which is invasive to Texas).



Dr. Maria Cuevas

Dr. Cuevas uses cell culture techniques to investigate the genotoxic effects of tamoxifen and its metabolites. Together with students, Dr. Cuevas will treat endometrial cell lines with estrogen and four difference selective estrogen receptors and also examine target genes with a variety of techniques.





The bacterial (*Escherichia coli*) proteins that Dr. Gonzalez studies, UmuD and UmuC, comprise an error-prone DNA polymerase (DNA polymerase V) necessary for survival of the bacterium following extensive DNA damage. DNA polymerases function in replication of DNA within the cell (whether that cell is part of a multi-cellular organism or a unicellular bacterium) and this activity is accomplished with a high degree of accuracy. Ironically, the UmuDC DNA polymerase functions only after extensive DNA damage has occurred and then replicates damaged DNA incorrectly resulting in mutations in the bacterial DNA. This compromise allows the bacterium to survive severe DNA damage, although at the expense of accuracy. The Gonzalez lab looks at how the organism regulates activity of these proteins after they are no longer needed.

Dr. Rebecca Sheller

In the spring and summer of 2005 I will be working with Southwestern students on the mechanisms of long term survival for severed medial giant axons (MGAs) in the crayfish central nervous system. MGAs are large, identifiable neurons. When the axons of these neurons are severed from their cell bodies, the axons survive in vivo for approximately one year. The mechanisms for this long term survival are not known. This spring and summer my lab will be investigating a possible role for the protein, ubiquitin, in the survival of the severed axons. Ubiquitin is a highly conserved protein that tags proteins for degradation via the proteosome degradation pathway (see more about ubiquitin under **BioScope Magnifications!**).



Dr. Max Taub

Dr. Taub's research examines the physiological factors that cause plant species to have different natural distributions with respect to such environmental factors as soil fertility, water availability and temperature. His research focus is on understanding how biochemical differences among grass species in the mechanisms by which they accomplish photosynthesis (NAD-ME vs. NADP-ME C4 photosynthesis) translate into different whole-plant responses to temperature, nitrogen and water.



Dr. Maria Todd

Dr. Todd's research involves the characterization of breast and ovarian cancers for abnormalities in critical cell cycle regulatory proteins. Using modern techniques of cellular and molecular biology, Dr. Todd's lab is attempting to correct specific genetic defects in cancer cells. This will enable us to assess the effects of gene-based therapies upon cancer cell growth and tumorigenicity.

Go Talk to Faculty about their interests & possible projects!!



Learn something new from BioScope Magnifications:



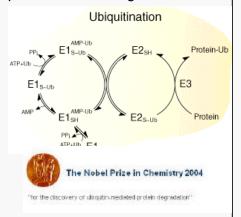
MOLECULE & MOLECULAR PATHWAY: UBIQUITIN

A highly conserved protein of 76 amino acids that is abundant in all eukaryotic cells. When conjugated to other proteins, ubiquitin marks them for degradation in the proteosome or for transportation to specific compartments within the cell.

Ubiquitination pathway:

Ubiquitination of proteins requires 3 types of enzymes: E1 (Ubactivating), E2 (Ub-conjugating) and E3 (Ub-ligases). Ub is initially activated by E1 in an ATP-dependent fashion. E2 and E3 then work together to recognize the substrate protein and conjugate Ub to it. From this point, the ubiquitinated protein may be shuttled to the

proteosome for degradation.



ECOSYSTEM – Indonesia Coral Reef



While attention is clearly focused on the rising human toll of the tragedy, some dive operators and marine biologists are reporting that from Sri Lanka to Thailand corals are suffocating under layers of mud, heaps of rotten fish, are clogging beachfronts, and rare turtle nesting sites have been washed out to sea. Reef-forming coral grows only about half a centimeter (one fifth of an inch) a year. It may take years for the corals to recover.

FROM THE WASHINGTON **POST:**— A synthetic form of a sea-snail venom was approved Tuesday (12/28) by the Food and Drug Administration as a novel approach to treating severe, chronic pain. The drug, called Prialt, was approved for hard-to-treat pain associated with cancer, AIDS and neuropathies. Based on a compound found in the poison of the South Pacific cone snail, it controls pain in an entirely new way by blocking the calcium channels in nerve cells that transmit pain signals - and may have broad implications for the future of pain management.

ORGANISM –
 Conus magus,
 Giant Cone
 Snail



LOOKING FOR OTHER SUMMER RESEARCH OPPORTUNITIES?

Check out all the available materials Outside the Nat. Sci. Division Office on The 2nd floor of FJSH (across from couches & Ms. Johnson's office) BioScope aims to heighten communication and engagement between biology students and faculty. If you have ideas for activities that can bring Biologists together, please forward them to Biology Chair, Dr. Rebecca Sheller (shellerr).

Also, if you haven't signed up on the Biology list-serve (su-biology), please do so ASAP as faculty often post Announcements about outside research and career opportunities.



DON'T FORGET BIOLOGY SEMINARS

A cartoon reminder to keep in mind the importance of correct referencing & specificity.

www.nearingzero.net

All BIOLOGY STUDENTS should make a very strong effort to attend The Biology Seminar Series 12:00 TUES or THURS in Room 151:



BRING YOUR LUNCH OR GO TO LUNCH (FREE!) WITH SPEAKERS AFTER TALKS!

Speakers & Topics are Under Development:

January & 1st week of February: Candidates for Brown Chair For more info, watch for announcements or contact Dr. Maria Todd, Biology Seminar Series Coordinator









9/29/04: Dr. Burks's Lab Adventures into the Field for Research

- A. Ready to disembark: Field house at Armand Bayou
- B. Hunting for juvenile applesnails among water hyacinth
- C. Fed & refreshed after a long field day

Pictured in C: Brandon Boland, Lindsey Loveless 7Dr. Burks, Austin Hill, and Becca Marfurt (at her house) +Friends of the lab Yesenia Ramirez & Julia Aleman; Additional Burks Lab Member Cathy Duong in Pict A.

IMPORTANT ANNOUNCEMENT:



The Job Ad: Lillian Nelson Pratt Endowed Chair **BIOLOGY**

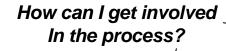
The Department of Biology at Southwestern University invites applications from broadly trained Evolutionary Biologists for the Lillian Nelson Pratt Endowed Chair in Biology . Preference will be given to applicants with expertise in developmental and/or molecular approaches. Appointment will be at a rank commensurate with the experience of the individual filling the position, to begin August 2005. A PhD in a relevant discipline, a strong commitment to undergraduate teaching, and a record of distinction in both teaching and research are required.

Teaching responsibilities will include upper-level Evolutionary Biology for majors, participation in the Introductory Biology sequence, and possible additional courses as required by Departmental needs. The successful candidate may elect to participate in Southwestern's interdisciplinary Env ironmental Studies Program. The successful candidate will be expected to maintain a research program that actively involves undergraduates.

What does it mean to hold a Brown Chair at Southwestern?

Brown Chairs are positions of leadership and high regard among the faculty at SU. Brown Chairs also are responsible for hosting the annual Brown Symposium on a topic of general interest to the university and community. Brown Chairs receive support to maintain their scholarship and provide substantial opportunities for undergraduates.

- 1. Attend Candidates' Seminars
- Communicate with your Student Representatives – Aurora Low (lowa@southwestern.edu) & Greg Hagemann (hagemang@southwestern.edu)
- 3. Visit with the Candidates during the designated "student time" (likely in the pm)
- Fill out the Student Survey
- 5. Lunch with the Candidates



Seminars will likely be either Tuesday or Thursday at noon but look for postings!

