



PUENTES



Bridges to the
Baccalaureate

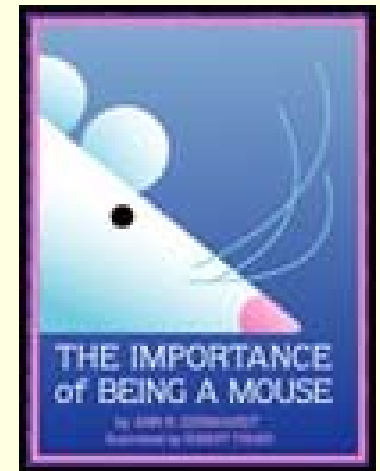
PURPOSE

- Increase the number of under-represented minorities in Biomedical Research



What is Biomedical Research?

- Although “biomedical” implies an emphasis on human & animal health & disease..
- Biomedical Research involves a thorough investigation of anything related to biological systems.
- Often subdivided into Biophysics, Bioengineering, Biochemistry, etc.



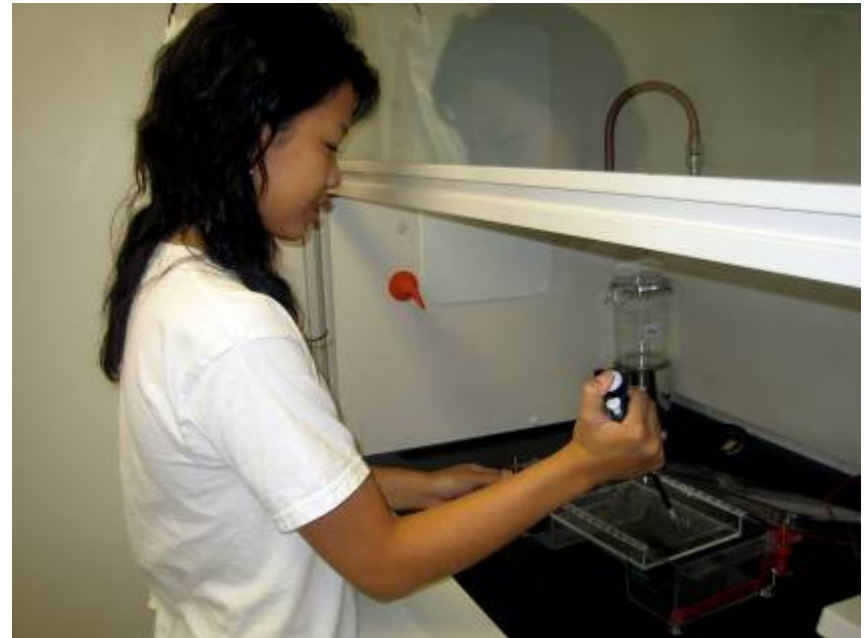
METHODS

- Introduce students to the meaning of science early in their academic careers
- Emphasize the practice of the scientific method
- Provide a background for science
- Give students an opportunity to work with experienced scientists
- Provide money for stipends, supplies & travel



WHAT YOU GET

- Spring Semester Course at LCC
 - Team taught
 - 3 hours credit – Tuition paid*
- Summer Research experience at TAMIU
 - \$1500 stipend
 - Tuition paid*- 3 hours credit
 - Travel funds for scientific meetings

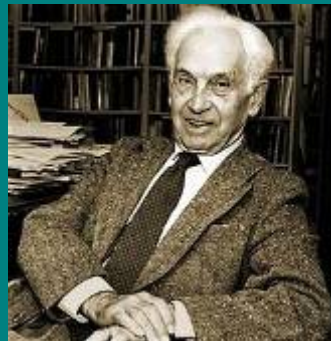


*Depending on your financial aid package

Participating TAMIU Faculty

- Dr. David Beck Microbiology & Tick Borne Diseases
- Dr. Mario Garcia-Rios Molecular Genetics
- Dr. Eugenio Jaramillo Materials & Computational Chemistry
- Dr. Sushma Krishnamurthy Environmental Toxicology
- Dr. Hari Mandal Organic Chemistry
- Dr. Neal McReynolds Scorpion Behavioral Ecology
- Dr. Dan Mott Spider Taxonomy & Natural History
- Dr. Fernando Quintana Biometry & Epidemiology
- Dr. Josh Stevenson Plant Anatomy & Microtechniques
- Dr. Tom Vaughan Water Quality

A Few Examples



Dr. Beck

What is the tick activity on the TAMU campus?
What is the tick activity in Webb county and South Texas?
What is the level of disease burden in those ticks?
Where do the female ticks go to lay their eggs? Can the preferred habitats be identified?
What is the level of tick exposure in the population?
Long term goal – Can the tick activity, disease burden, and tick exposure be combined to predict disease risk, and to implement specific control measures.



Tick CO₂ Traps

Tick traps also known as carbon dioxide (CO₂) traps are white cloth approximately 1 m by 0.5 m in size and a approximately 0.25 kg of dry ice place in the center of the cloth. The traps are set for three hours.

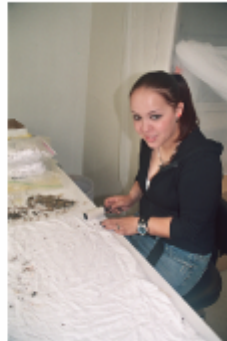
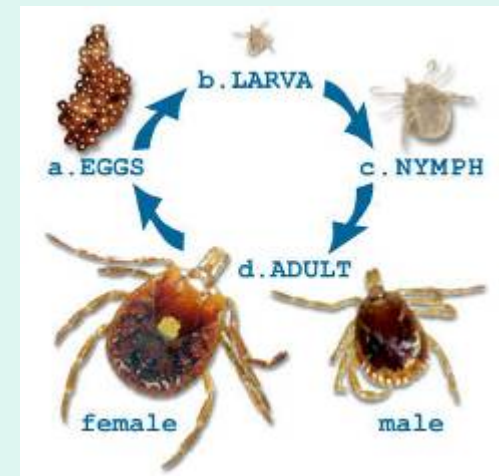


Figure 3: Right - A CO₂ trap.
Left - Collecting larva off of the trap.



Dr. Garcia-Rios

- *Helicobacter pylori* is a bacterium that is implicated in the vast majority of gastric ulcers and infects tens of millions of Americans. Using the Polymerase Chain Reaction and other molecular biology tools, We are investigating Mexican fresh salsas as novel reservoirs for H. pylori.
- The amino acid proline is one of many small metabolites that plants use for osmo-protection. Drought tolerance is enhanced in plants that over produce proline. We are studying the kinetic properties of the enzyme Pyrroline 5 Carboxylate Synthetase (P5CS), in particular its gamma-glutamyl kinase activity. We have obtained P5CS crude extracts from Silver Nightshade, a plant that is drought tolerant. We hope to determine if the production of proline in Silver Nightshade is regulated by allosteric control of the P5CS activity. The tools we use are from classic enzymology.
- The artificial sweetener Splenda® is now ubiquitous in the marketplace. Splenda contains sucralose, a derivative of sucrose that has been modified by chlorination. Since many chlorinated xenobiotic compounds are known to be toxic, we are looking for microorganisms capable of de-chlorinating sucralose to glucose and fructose. We are using DNA shuffling and other molecular genetic tools.



Dr. Mott

- We are working to increase the knowledge of south Texas spiders and there is much to do
- My specific area of interest is the Family Mimetidae or Cannibal spiders. They generally restrict their diets to other spiders.



Mimetes puritanus



Dr. McReynolds

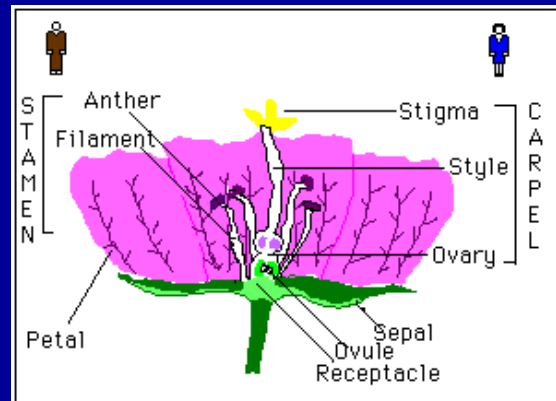
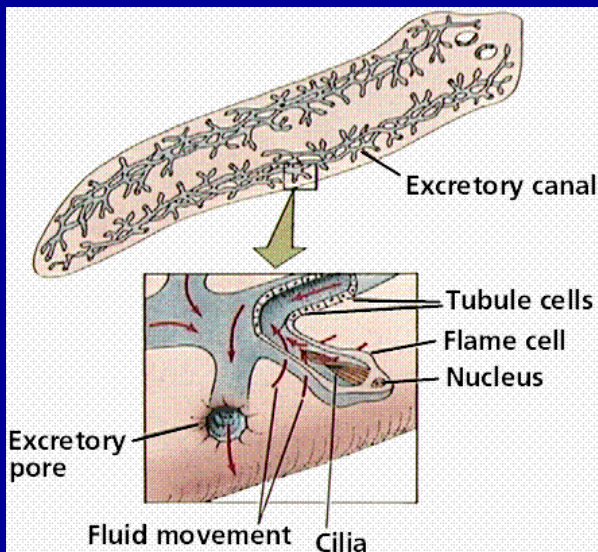
How does habitat selection affect the scorpion, *Centruroides vittatus* (Scorpiones: Buthidae)?

The behavior of *C. vittatus* is being observed on the campus of Texas A&M International University in the Tamaulipan Biotic Province. The research is now working three main projects: (1) the affect of prey availability on the blackbrush, *Acacia rigidula* on foraging by *C. vittatus*, (2) the interaction of different size classes of scorpions for cactus refuges and (3) interaction between scorpions and other guild members (e.g. wolf spiders).



Dr. Quintana

- Applications of mathematical and statistical methodologies to the study of life processes.
- Production of monoploid plants from cells in the anthers
- Invertebrate physiology



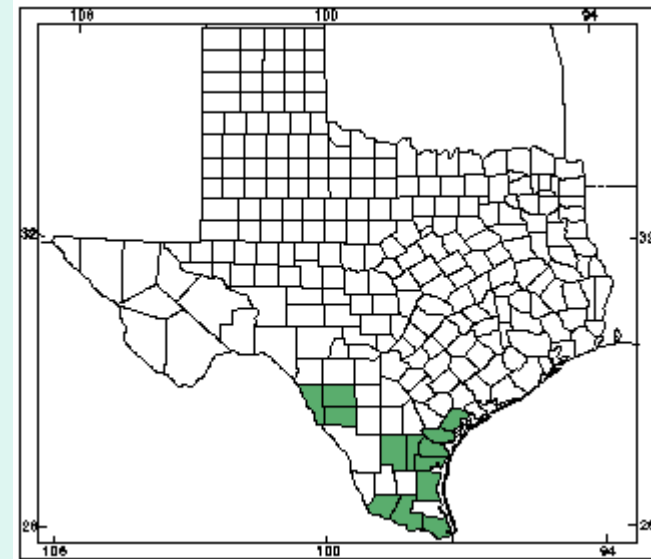
Dr. Josh Stevenson

- Project: Microscopy and Microtechnique
- Outcome: Learn the techniques used to prepare biological specimens for observation under the microscope
- Although I work with plants, the techniques we will cover are applicable to the study of any organism
 - Similar preparation for medical biopsies



Dr. Vaughan

- I am currently working on Rio Grande water quality. This includes periodic sampling of four sites, one up stream, of Laredo, one in town, a third downstream and one at the Webb/Zapata county line. Basic water chemistry, fecal coliform bacteria and *E. coli* are measured.
- I am also working on other aquatic projects, i.e. turtle population studies and the distribution and populations of the Rio Grande Siren.



What do you need to do?

Express your interest in PUENTES to your instructor

- There are limited positions so do this early

Sign up for the Spring course at LCC

- Although this is not required for the summer program, it is strongly recommended

Plan on working 4-5 weeks in the summer at TAMIU

Programs will be varied and flexible

- The summer program will be for 45 contact hours

