



THE UNIVERSITY of NEW MEXICO

# Undergraduate Research Opportunities (UnO)



Biannual Newsletter



Fall 2010

**WELCOME!** The UnO Program, sponsored by the National Science Foundation and the Museum of Southwestern Biology, encourages undergraduates to consider careers in science through research experiences in *near-peer* mentorships with graduate students. This format maximizes the student's field, laboratory, and museum research experience, and enhances career opportunities.

## WE'VE HIT A RECORD NUMBER OF PARTICIPANTS!

The UnO program started in Fall 2007 and our goal is to provide project-based research experience for students from underrepresented backgrounds so that they consider science careers and graduate school early in their college experience. So far so good; three have already entered graduate programs, one into medical school, and an additional four are working in biology related jobs. We currently have 15 faculty mentors, 10 graduate student mentors and a **record of 21 mentees** from all over the country!

UnO conducts weekly seminars covering a broad range of topics related to research, graduate education and careers in science, including an emphasis on communicating science and ethics in research. UnO has come a long way from our founding, with over 35 oral or poster presentations at local, national and international conferences (e.g. Ecological Society of America). We are now moving full steam ahead, looking toward the future as these new scientists start their careers.



**Where are our UnO students from?**



★ Birth locations

### Meet Graduate Student Coordinator and Mentor **Yadéeh E. Sawyer**

Yadéeh is the new coordinator for the UnO program. She is investigating effects of past climatic history on current genetic structure of three small mammals and the associated implications for island ecosystem management, in Southeast Alaska. "My desire to pursue a graduate education in biology is driven by my career goals to connect research and policy with regards to ecosystem management. I want to be on the fore-front of educating the public, policy makers, and researchers on how to work together effectively to preserve our natural world."



## Summer Show-Offs

UnO students talked it up this summer at various conferences locally and internationally.

- ◆ **Matthew Peralta** presented “The biological control of mosquito larvae populations using larvivorous fish; An eco-friendly approach” at the MARC/IMSD research symposium on August 10th at UNM.
- ◆ **MJ Vargas** presented “Antibiotic producing bacteria in lava tube caves in El Malpais National Monument, NM” at the MARC/IMSD research symposium on August 10th at UNM. She was given a special thanks for arranging the location and equipment for the symposium, saving valuable time and money.
- ◆ **Hallie Rane** presented “Gene conversion and DNA sequence polymorphism in the sex-determination gene *fog-2* and its paralog *ftr-1* in *Caenorhabditis elegans*” at the Evolutionary Biology of *Caenorhabditis* and Other Nematodes, Hinxton, Cambridge, UK, June 2010.
- ◆ **Kate Cauthen** attended the Human Behavior and Evolution Society conferences in Eugene, OR.
- ◆ **Hiyatsi Bassett** and **Randle McCain** attended the American Society of Mammalogists annual meetings in Laramie WY.

## UnO Students head to SACNAS

Five of our enthusiastic UnO students are presenting their research at the 2010 SACNAS National Conference (September 30 - October 3, 2010): “SACNAS is a society of scientists dedicated to fostering the success of Hispanic/Chicano and Native American scientists—from college students to professionals—in attaining advanced degrees, careers, and positions of leadership.”



Check out the presenters:

- **Hiyatsi Bassett** “North Pacific ermine (*Mustela erminea*) provide insight into the Coastal Refuge Hypothesis” (SAT3-912, pg 63)
- **Joey Chour** “Morphological variation of the greater earless lizard *Cophosaurus texanus* in New Mexico” (SAT3-645, pg 195)
- **Matt Garcia** “Microbial diversity in Hawaiian and Azorean lava tubes: a comparison” (SAT3-265, pg 269)
- **Jesse Trujillo** “Microsatellite analysis of spikedace, *Meda fulgida*, in the Gila River” (FRI1-912, pg 63)
- **MJ Vargas** “Antibiotic Producing Bacteria in Lava Tube Caves in El Malpais National Monument, NM” (SAT3-847, pg 129)

## Moving along: Summer Research Activities



**Hiyatsi Bassett** is investigating the phylogeography of North Pacific ermine, *Mustela erminea*, testing the validity of three clades using nuclear and mitochondrial DNA data. During the summer she conducted fieldwork in Alaska and the Rocky Mountains.



**Alyssa Begay** began her research project on parasites titled “Relationship of gordiids from an international biodiversity hotspot, the Madrean Pine-Oak Woodland Sky Islands”.



**Nicole Caimi** just began the program in July with field work in Chiapas and Oaxaca Mexico. She is studying the phylogeography of *Anolis* lizards.



**Joey Chour** is examining “Morphological variation of the greater earless lizard *Cophosaurus texanus* in New Mexico” in a study that combines field work and statistical analysis. She collected additional samples this past summer.



**Matthew Garcia** has finished his Hawaiian field work with the help of his mentor **Diana Northup**. Although he still needs to collect additional rock samples for his study, he is catching up on sequencing and applying new techniques that are quicker and less costly.





**Ali Ghadimi** is investigating White Nosed Syndrome, a devastating disease killing off cavern-dwelling bats across the United States. Funded by the National Parks Service, he is testing soil for presence WNS fungus present at El Malpais. Ali is also working with **Mike Spilde** trying to detect microbes that masquerade as minerals in lava caves. Data can then aid in life detection on other planets.



**Nick Homziak** began working in the Arthropod Division of the MSB in April 2010. In August he collected at White Sands National Monument. He will focus his project on the Lepidoptera of White Sands and Cuatrocienagas Protected Area in Mexico.



**Andrea Jackson** is brand new to the program and is working hard to select a mentor and a project. We expect to hear a lot from her in the coming semesters!



**Joanna Johnson** recently selected a project with two parts: 1) To investigate two clades of marten (*Martes martes*) in their two regions and the associated contact zone to see if they hybridize, and 2) investigate the status of island endemic *Martes caurina*. She will test her hypotheses using ecomorphological techniques measuring and imaging skeletal material in museum collections.



**Diego Matek** worked in the mammal division of the MSB all summer. He is investigating chipmunks (*Neotamias*) and their associated parasites. There are 23 species of chipmunks with two lice and three pinworms species associated. Preliminary research shows lice DNA matches the nuclear DNA of chipmunks, but sample size is still small for results to be significant.



**Randle McCain** has been tracking the status and biology of Mexican Gray wolves by working with the wolf recovery team to archive specimens from captive breeding programs.



**Matthew Peralta** started work on food web dynamics in the Rio Grande and is studying fish as means of top down control on mosquito larvae populations by limiting the spread of mosquito borne-illnesses. Summer dry-downs cause the river to become prime breeding grounds for mosquitos.



**Jackson Sabol** is brand new to the program and will start a project soon. His interest in biology led him to Grand Isle, Louisiana to document the worst oil spill in US history and the subsequent devastation and its effects on the people and animals there.



**Ashley Smiley** began this past summer by working at the MSB and joined a field crew in Southeast Alaska. She is now working in the Division of Birds and is learning how to prepare bird specimens and will participate in crane surveys. She will focus on avian malaria or heart morphology in birds along elevation gradients in South America. She feels that she has a lot of resources to guide her academic experience.



**Kelly Speer** compiled her Biology Honors thesis entitled "A relict population of shrews in New Mexico illustrates phylogeographic diversification in response to environmental change". She sequenced DNA from shrews collected in the Dakotas, Utah, and Montana and created a map displaying the relationships between altitude, habitat type, and species of the *cinereus* complex. She is now studying abroad in Austria and will be working with Andrew Hope to publish her thesis.



**Elizabeth (Lizzy) Stone** did research with a PhD student at Emory at Lizard Island Research Station on the Great Barrier Reef in Australia. They were looking at a symbiotic relationship between these organisms and an algae called *Symbiodinium*. From this trip she got the idea for her current project, comparing *Symbiodinium* communities found in the forams to communities in their respective substrates and the water column.





**Sophia Thompson** spent this summer working in the MSB, Division of Mammals. She went to Nevada and Idaho and spent three weeks collecting data on small mammals. Through the museum, she is assisting Yadéeh Sawyer to study how island isolation and size may affect genetic diversity in the vole, *Microtus longicaudus*. They are currently gathering information on island size and area for the islands of southeast Alaska.



**Martha Jo (MJ) Vargas** is finished sampling nearly all locations for her project “Antibiotic Producing Bacteria in Lava Tube Caves in El Malpais National Monument, NM”. She had a few crazy adventures while in the field and has built a database for all soil data. She is learning new methods of analysis and went to Scottsdale Arizona to Golden Key conference.



**Jesse Trujillo** has increased his working loci from 2 to 7 in his project “Report on the genetics of *Meda fulgida* (Spikedace) in the Gila River”. In October he plans to obtain more samples (90 is his target) and switch to multiplexing methods.

And two of our graduating seniors (Fall 2010)...

**Kate Cauthen: Congratulations!** While Kate Cauthen waits for her project approval, she prepares the logistics for data collection. She also experienced specimen management in the MSB. She is a senior majoring in biology and psychology and minoring in statistics. Currently she is in the preparatory stages of her biology honors thesis project, entitled “In-group versus out-group directed altruism as a function of Perceived Vulnerability to Disease”. She is particularly interested in the evolution of religious behavior and disease avoidance. She also completed an honors thesis in the psychology department that won the Rachael Dowler Outstanding Thesis Award for best honors thesis, and honorable mention in the competition for the Goldwater Scholarship. Kate hopes to start graduate school in fall 2011 to study the evolution of human behavior. Her ultimate career goal is to teach and research at the university level.



**Hallie Rane: Congratulations!** Hallie presented her UnO research at the Evolutionary Biology of *Caenorhabditis* and other Nematodes conference, in Cambridge, UK. She spent the rest of the summer in the lab studying how a particular gene (*fog-2*) affects fecundity; her results imply that the gene on its own is not directly responsible for fecundity differences between natural isolates. She is now moving on to a new project. She is studying gene conversion and gene duplication in the nematode *C. elegans*. Her last project looked at the contribution of gene conversion to DNA sequence variation in two genes within natural populations of *C. elegans* to further illuminate the role of this mechanism in molecular evolution. A classic lab rat, Hallie is an adamant believer in the power and importance of basic scientific research and its ability to advance human knowledge and ultimately to shape sociocultural and technological advances. She will begin graduate school in Fall 2011 and plans to ultimately dedicate her career to the elucidation of answers to fundamental questions in evolutionary biology.



Interested in our program? We are now accepting applications! Check us out on the web:  
<http://www.msb.unm.edu/UnO/education.html>

Or contact Sylvia Brunner, Coordinator at [Sylvia.brunner@gmail.com](mailto:Sylvia.brunner@gmail.com)

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