NMSU Faculty Featured in the Esquire Magazine’s “Genius Issue”

Photo: Drs. Khandan and Gude, NMSU
As we wind up the fall semester, I look back proudly at the achievements of NMSU researchers, you all, during this semester. Whether it is in the field of emerging pathogens, food security, alternative energy, STEM education, national security, or a host of other critical areas, NMSU is at the forefront doing what it does best—improving the quality of life for our citizens. We are looking at the impact of global warming on the water resources high on the mountains down to the Chihuahuan desert; we are engaged in studying deep-sea-water life to scoping the distance galaxies in order to unravel the mystery of how life began. Research at NMSU is thriving and, as a result, so is the quality of undergraduate and graduate education and experience. Our impact on this world and the future world through our graduates is immeasurable. It is satisfying to know we did our part this year, and as we wind down for the Holidays with fears of the effect the economic downturn may have on research, I know we will continue to do our part, continue to strive, and continue to succeed, because we are Aggies. Go Aggies! Go Research!

Vimal Chaitanya
This month, the Esquire magazine featured our very own Dr. Nirmala Khandan from the College of Engineering in its “Genius Issue.” What was interesting was that Dr. Khandan did not know about it. It was brought to his and our attention by other colleagues at NMSU. Here I ask him some questions so our readers know more about his novel invention.

**Q&A**

**Dr. Khandan, can you tell us about yourself?**

I joined NMSU in the Fall of 1989.

**When did you join NMSU?**

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**What courses do you teach?**

I teach CE 331 Hydraulic Engineering, which is an undergraduate course as well as EnvE 487 Air Pollution Control System Design, EnvE 552 Wastewater treatment, and EnvE 557 Water Quality Modeling that are graduate level courses.

**What are your research areas?**

My areas of research are: sustainable energy technologies; bioenergy-biohydrogen, algal biodiesel; desalination; and assessment of student learning.

**Are graduate students involved in your research projects?**

Of course, conducting experiments; demonstrating field systems; developing mathematical models; authoring papers; presenting papers; writing/contributing to research proposals, etc.

**This month’s Esquire Magazine listed you as one of the best and the brightest in the nation. Congratulations! How do you feel about that?**

It is gratifying to note that this project was recognized among some rather interesting and diverse projects from across the country. I am thankful to NM Water Resources Research Institute (WRRI) for funding this effort; and to my PhD student (now Dr.) Gude who took it from a conceptual level to near-commercial scale.

**Esquire listed your Solar Water Project as “ingenious”. Would you please talk about this project? When did you start working on it?**

The premise of this project is based on very fundamental scientific principles. It has been studied by a few others on a smaller scale in a batch mode. We have built upon the basic concept and integrated some novel features to operate it in continuous mode at higher efficiency. We have also incorporated technologies to utilize low grade waste heat or solar energy to enhance its sustainability.

We began the project in 2005, with a conceptual system design and a theoretical model to evaluate different process configurations. Based on the results of model simulations, a proposal was submitted to NM WRRI which was funded for the 2006/7 cycle. A prototype scale system was built under WRRI funding to demonstrate the concept and to obtain performance data under different test conditions to validate the model. Additional funding was provided by WRRI to two students working on this project to evaluate the feasibility of reclaiming high quality water from wastewater treatment plant effluents and to further refine the model. Outcomes of this research project include a PhD dissertation, three journal papers, three international conference presentations, and two patents.

**Do you have any collaborators for this project?**

Yes, Dr Andy Rosenthal of the Institute for Energy & Environment and Dr. Craig Ricketts of the Engineering Technology Department collaborated in lending critical hardware and instrumentation to complete the project.

**Did you have any external support for it?**

The NM Water Resources Research Institute provided the initial funding for the prototype scale demonstration, as well as addi-
Large-scale desalination is a smart solution if you live near the ocean and have energy to spare. But Nirmala Khandan, a civil-engineering professor at New Mexico State University, has developed a system that can be used in remote areas where there's brackish water available but no power. The system consists of two tall vertical pipes, one of which sits atop a tank to which saltwater has been added. The tops of the pipes are connected with a third, horizontal pipe, essentially creating vacuum that enables the water to boil a lower-than-normal temperature. As it boils, fresh distilled water evaporates out and condenses in a second tank at the base of the second pipe. What little energy the system requires comes from a connected solar generator, which can give the batteries enough juice when the sun is out to last more than twenty-four hours. Worldwide Water, a Seattle company, recently licensed the technology and is developing a prototype that will cover the daily water needs of as many as fifty people at a time.

Esquire, December 2008

What would you like to see happening for your invention in the future. Is your goal to commercialize it?

Applications have been filed for the U.S. and International patents, and are currently “pending.” The technology has been exclusively licensed to World Wide Water Inc. who are building a larger scale version for demonstration.

What is your next project?

With respect to this project, we are refining the process configuration to further increase the energy efficiency by incorporating multi-stage operation. Other on-going projects include biohydrogen production, microbial fuel cells, and computerized assessment of problem-solving skills of undergraduates. The next project in preliminary development stages is algal biodiesel production.

Dr. Khandan can be contacted at nkhandan@nmsu.edu
In the late 1960s, Jerome Kagan, an eminent child psychologist at Harvard, began studying the interplay between infants’ emotional reactions and their attachment to their mothers. Another eminent Harvard psychologist, Elizabeth Spelke, then an undergraduate student who worked with Kagan at Harvard, said in a 2006 article in The New Yorker magazine, “I realized that we didn’t have a clue about what babies actually understood. I really wanted to study these emotional and social issues. But it seemed as if we first needed to know some basic things about what infants perceived and understood. So I made what’s become a thirty-year detour into human nature and the human mind.” For Laura Thompson, NMSU Professor of Psychology, the focus of her last seven years of NIH-funded research has been on interleaving these extensive but separate strands of research, infant affect and infant cognition, to gain a better understanding of how infants’ emotional reactions influence their learning and memory for important aspects of their experiences.

Her interest in infants’ minds came about during one transformative semester when she diverged from her path of research on perception and memory for language in older adults, to explore how stress can negatively affect the formation of memories. It began with a unique study investigating the effect of differing levels of emotional arousal on learning and memory for words in matching and mismatching contexts. The participants in this study were experienced skydivers who learned and recalled words in the air and on the ground in matched and mismatched land and air contexts. Results showed that, under extremely stressful conditions such as skydiving, contextual cues are unlikely to become encoded or linked to to-be-learned material, and therefore cannot serve as retrieval cues. One of the students in Thompson’s skydiving training class, despite having received repeated instructions not to release her main parachute, nevertheless accidentally released it, and just barely avoided a fatal accident.

NMSU Psychology Professor Receives Grant to Study Infant Learning
That same semester, Thompson collaborated with a colleague, Victor Johnston, to determine whether or not 8-month-old infants are able to discriminate very slight differences in human facial structure. The researchers adopted what is known as “the preferential looking technique” which involves showing the baby one stimulus on one monitor, and another stimulus on another monitor. The experimenter is positioned in front of the baby, but behind a booth which contains the monitors. She carefully watches the infant, pressing and releasing switches corresponding to the babies looking at the two monitors. Looking longer at one type of stimulus or another is informative, not only about infant preferences, but also about whether they can distinguish, or perceive, two categories of stimuli. After watching dozens of babies in this manner, it became apparent to Thompson that there were vast differences between babies in terms of how they approached this novel and challenging experience. Some were calm and nonplussed, gazing back and forth between the faces, while others, like the skydiving student in training, did not seem to be encoding the information even though they were looking at the images. After discussing her research with NMSU Anthropology Professor Dr. Wenda Trevathan, a project was co-created to investigate how stress affects infant learning.

The emotional and physical impact experienced by adults in response to challenging situations can be thought of in terms of a continuous scale, going from mild to severe, and can also be transitory or frequent. Chronic stress reactions are associated in adults with a host of health problems. The ability most adults have to manage their stressful reactions is thought by scientists to be influenced by genes, but interacts with experience, evolving into somewhat consistent, individualized stress responses.

However, until very recently, almost nothing was known about why some infants seem to regulate their emotional reactions better than others, nor whether this had any impact on their ability to learn during their emotional reaction. If an infant experiences a psychobiological stress reaction during a novel event, does it hinder or help his/her ability to learn during those moments? Does the sensitivity of the infant’s mother play a role in emotional regulation during learning? Surprisingly, the only study conducted prior to Thompson and Trevathan’s research showed that increasing, not decreasing, stress reactivity was associated with better memory in infants. Stress is assessed by measuring the hormone cortisol found in saliva. However, in two studies with infants 3- and 6-months of age, Thompson and Trevathan found that infants whose cortisol increased (called “up-regulators”) during the session showed no learning or memory of the stimuli in the novel learning event, whereas infants whose cortisol declined (the “down-regulators”) did show learning and memory.

Over the past three years, Thompson has undertaken a longitudinal study of over 100 first-time mothers and their infants during the first year of life, to try to discern whether or not infants exhibit the same pattern of emotional regulation during learning as they get older, and how regulation may be affected by maternal sensitivity and by infant temperament. Not all of the data have been analyzed from this large project, but some results are clear. Even though mothers display consistent patterns and levels of behavioral sensitivity towards their infants, the data show that, no matter what the infant age, there is no correlation between the pattern or degree of cortisol reactivity they exhibit during learning events and maternal sensitivity measured during a 10-minute free play episode in the lab. Since maternal sensitivity was unrelated to patterns of infant stress reactivity, it appears that infants play a much larger role in their ability to learn during a challenging experience than was previously thought.

In the longitudinal study, Thompson again found that the cortisol “up-regulators” did not learn, while the “down-regulators” did, and moreover, the initial level of cortisol was more predictive of learning than the pattern of reactivity. What factors influence infants’ psychobiological readiness to learn prior to the beginning of a novel event? Could maternal sensitivity play a role in getting infants up to a high, but not too high, level of arousal, just prior to a learning event? These are some of the questions that will be addressed in Thompson’s research during the next four years with a new $1.17 million dollar grant from the NIH.

Dr. Laura Thompson can be contacted at thompson@nmsu.edu.
The CREST Center for Research Excellence in Bioinformatics and Computational Biologydevotes resources to sponsoring outreach in the field of Bioinformatics and Computational Biology, including two summer programs offered on the NMSU Campus. The Computer Science Summer Program is aimed at introducing community college students from underrepresented minority groups to NMSU, Computer Science, possible career opportunities in Computer Science, and the field of bioinformatics. This program is particularly interested in attracting women and American Indian students, who historically are underrepresented in the field of Computer Science. It is an intensive five week program that actively recruits from community colleges in the Southwest, including Dona Ana Community College, El Paso Community College, San Juan College, and Dine College, located on the Navajo Nation. All students must be current community college students interested in computer science who have expressed an interest in transferring to a four-year institution.

During the summer program students study Java programming, Web programming, robotics, and bioinformatics. Each week Computer Science faculty present possible research areas an effort to show these participants the vast multitude of research and career choices available with a degree in Computer Science. These presentations have included video game design, database structures, sensor networks, and computer music. Additionally, guest speakers from various NMSU campus groups give presentations about NMSU, including the office of Financial Aid, Admissions, and the Center for Academic Success.

The Bioinformatics Summer program is a two week program for local high school students. Recruitment efforts are made at all area schools, including Mayfield High School, Las Cruces High School, Onate High School, and Mesilla Valley Christian School. Selected students must have a very strong interest in both math and science and the selection process is extremely competitive. Both groups participate in an intensive two-week program in hands-on research and application of the principles of bioinfor-
This includes sessions in the Computer Science labs learning about the computational tools that have been created to help those in the field of bioinformatics deal with the vast amounts of available data. Additionally, students participate in hands-on lab work in various chemistry and biochemistry labs on campus, including a forensics component as well as experiments analyzing their own DNA. Students also spend time conducting their own research project using tools in both the CS lab and the wet labs.

At the conclusion of the summer programs, the Computer Science Department hosts a poster session. Here, students present their research projects, which they have compiled into a presentation caliper poster to NMSU faculty and staff, as well as their invited family members. Students also participate in extra curricular activities, including game nights, movie nights, swimming, and swing dancing lessons, and Tea with the Faculty, which gives the CS faculty an opportunity to meet the program participants and an opportunity for the participants to have a discussion with CS faculty.

Recruitment for summer 2009 will begin in early Spring. If you have any questions or are interested in obtaining more information, please contact Jessica Haebe, the CREST Center Program Coordinator at (575) 646-6365 or by email at jhaebe@nmsu.edu.

Recent Publications:


Fusidic acid is a novel steroid antibiotic that can be used against serious infections caused by “golden staph,” or Staphylococcus aureus.

“In this publication, we utilize a novel transcriptome analysis package, ‘the Staphylococcus aureus microarray meta-database (SAMMD),’ which was used to compare and contrast the fusidic acid induction transcriptome against 89 publicly available transcriptomes,” says Dr. John Gustafson, professor at the Department of Biology. “By doing so, we were able to determine that fusidic acid induces both a coldshock and an amino acid starvation response, demonstrating that these two responses are cross-protective in nature against the protein synthesis inhibitor fusidic acid. Without the use of SAMMD, we would have been hard pressed to draw these conclusions,” Dr. Gustafson adds.

This project was supported by:

- The National Institutes of Health: S06 GM008136-32 (J. E. G., NMSU SCOR Program);
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J.E.G. and S.Z. also acknowledge the former and ongoing support of the NMSU Undergraduate Howard Hughes Medical Institute Program (S2005881)

2. Dr. Jon Hunner is a professor in the Department of History. His new book “Dr. J. Robert Oppenheimer, the Cold War, and the Atomic West” has been accepted for publication in 2009 by the University of Oklahoma Press.

3. Dr. Charles Harris is an emeritus professor and Dr. L. Ray Sadler is an emeritus associate professor in the Department of History. Their co-authored book "The Secret War in El Paso: Mexican Revolutionary Intrigue, 1906-1920," has been accepted for publication by the University of New Mexico Press in Spring, 2009.

4. Newly appointed faculty member Dr. Roger P. Mellen has won a prestigious award for his dissertation. Mellen, a tenure track assistant professor in the Department of Journalism and Mass Communications was presented with honorable mention in the Margaret A. Blanchard Doctoral Dissertation Prize, given out by the American Journalism Historians Association. This national award was presented on October 4, 2008, at the national convention in Seattle. Mellen also presented his research in a panel at the convention. His dissertation was, “A Culture of Dissidence: The Emergence of Liberty of the Press in Pre-Revolutionary Virginia,” and was completed last August at George Mason University in Fairfax, Virginia. Mellen is currently working on a monograph, and is teaching Broadcast Journalism at NMSU.

The Men of Mah Jongg

Mark Medoff, senior fellow at the College of Extended Learning, directed a new play by Richard Atkins, The Men of Mah Jongg, for the Electric Theater Company of Scranton, PA. The play closed in Scranton on November 23. It reopened at the Queens Theater in the Park in New York on December 5.
Celebrating NSF ADVANCE Program’s Accomplishments by Dr. Tracy Sterling

Significant changes have been brought about at NMSU since the inception of the NSF-ADVANCE Institutional Transformation Program in 2002. ADVANCE was the first externally funded effort to deal with gender equity at NMSU. As a result, its substantial monetary resources have provided leverage for a methodological study of the status of women in the disciplines of Science, Technology, Engineering and Mathematics (STEM) where women are underrepresented in tenure-track faculty positions relative to Ph.D. degrees awarded. In addition, it has provided the resources to create programming and policy change to improve climate, as well as double the numbers of tenure-track female faculty hired into STEM disciplines. The core initiatives for faculty recruitment and retention are now available to all faculty on campus, as the program has been institutionalized and is now located in The Teaching Academy.

In November 2008, over 40 faculty and administrators gathered to celebrate the accomplishments of the NSF-ADVANCE Institutional Transformation grant and to honor the many faculty, staff, and administrators whose vision and dedication made this initiative successful. The achievements of the female STEM faculty members whose work was supported by ADVANCE were also recognized.

Looking back, it is clear that significant changes have been brought about since the inception of this $3.75 million non-renewable grant. Specific successes and publications are enumerated at http://www.advance.nmsu.edu/. Major recruitment and retention initiatives included:

Twenty-five new hires received over $1 million in start-up package enhancement awards. This strategy coupled to working with Department Heads and Search Committees to broaden applicant pools has doubled the hiring rate for female tenure-track faculty in STEM from 17% in the years prior to ADVANCE to 35% in the seven years of ADVANCE, creating a net increase in STEM female faculty of over 40% (see figure).

Bi-annual P&T workshops, the Mentoring program where there are now over 100 participants, Department Head Training, and the year-long ADVANCing Leaders Program are available to all faculty on campus.

Strong grass-roots support with over 60 faculty members and administrators filled 115 volunteer positions on the six ADVANCE committees over the life of the grant.

Partnering for policy change to create a transparent and flexible Promotion & Tenure process, the Employee Climate Survey, the President’s Commission on the Status of Women, and NMSU’s first Ombud’s office.

Over $1 million for research, travel, undergraduate research, and visiting professor awards to enhance research and teaching programs, as well as build collaborations across the nation.

A new $0.5 million award, NSF-ADVANCE PAID, is disseminating our best practices of Mentoring and P&T workshops to UNM, NMT and LANL, and is also providing annual department head retreats to discuss recruitment and retention of faculty.

THE DATA: In a world where female and underrepresented minority faculty researchers in the sciences are in high demand, it is diffi-
cult for universities to attract high quality, diverse faculty members. For this reason, start up packages, and start-up package enhancement can play a huge role in attracting and retaining high quality diverse faculty.

This has been the experience of the ADVANCE Program at NMSU. The ADVANCE grant came at a very unique time in NMSU history. Recent waves of retirement in the STEM fields in 2001 had left several tenure-track positions open. The ADVANCE Program was able to offer over $1 million in start up package enhancements to 25 tenure-track female scientists and engineers increasing the representation of high-quality female academic scientists at the University.

NMSU’s program worked to both increase awareness of diversity issues and bring in high demand female STEM faculty. By training department heads and search committees in proper searching techniques, about the importance of diversity, and about cognitive errors that we commonly make which may result in subtle discrimination, ADVANCE helped to reduce barriers to diverse candidates in the hiring process. By taking the time to meet with female candidates and working with departments to augment start up packages, the program was able to surpass its initial goal of increasing the number of women in STEM fields by 20%, and actu-

![Women as a Percentage of Tenured and Tenure-Track Faculty by Discipline Grouping 1995-2008](image)

*Natural and Physical Sciences are: Astronomy, Chemistry & Biochemistry, Computer Science, Geological Science, and Physics*

ally increased this by 40%. The number of STEM new hires roughly doubled the rate at which women were being hired into NMSU’s STEM fields. The increased hiring rates of women at the university have not, however, proven detrimental to the hiring of men into STEM fields at NMSU.

![Number of Women STEM new hires pre-ADVANCE and during ADVANCE](image)
Additionally, the ADVANCE Program has increased the representation of female faculty members at all levels of the tenured and tenure-track professoriate. Hiring of female faculty members in the years before the ADVANCE Program was sporadic, however since the program’s inception, at least one quarter of all new hires have been women in any given year. This shows a trend for change.

Dr. Sterling can be contacted at tsterlin@nmsu.edu.
Meet Jorge Achata
Entomology, Plant Pathology and Weed Science Graduate Student
By Hamid M. Rad

Jorge Achata is a graduate student who is defending his dissertation in a couple of months. He was born and raised in Peru and joined NMSU in 2006. Interviewing him before he becomes too busy with his defense sounded like a good idea.

Q&A

How did you become interested in insects?

I think it was during my first year at elementary school. I was lucky that we lived in a house with a big yard to play in. Ever since, I’ve been playing in the dirt looking for the next little critter I haven’t seen yet, poking roly-pollies or petting bees on their furry thorax and getting stung by wasps.

As a child I was very curious. I remember asking my parents about the noise dragonflies make when they fly and learning that you don’t step on some particular darkling beetles because they stink.

When we moved from that house, my parents didn’t know why I was carrying a little bucket with a sieve on top. But then they were not surprised to find out that it was my pets’ house. I was rearing yellow sulfur butterflies and took them with me to the new house. Shortly after that, we had butterflies emerging on the backyard of our new apartment. That was 1990, I was in third grade. So as I mentioned before, it’s been a life-long passion. I used to collect insects and pin them. Now I’m more interested in insect photography.

How did you learn about NMSU?

I was getting close to finishing my thesis back in Lima, so I was looking for a place to start a Masters program. I happened to meet Rossio Kersey, who got her Ph.D. here at NMSU working on microarrays on alfalfa. Well, she’s Peruvian too and at that time she was visiting her family and giving talks at a scientific meeting in Lima. We had the chance to talk and it turned out we both worked in Crop Protection in the International Potato Center. She actually used to work in the same lab as I was. She told me about several opportunities for a masters program and helped me define what I wanted to do next. One of those options was NMSU’s Entomology, Plant Pathology...
and Weed Science with Dr. Rebecca Creamer.

**How was the process of obtaining visa to the U.S.? Was it difficult?**

Not really to be honest. I had to fight against time and mailing delays due to hurricane Katrina to get all the paperwork submitted to the grad school and international programs on time, but after I received my paperwork, I just made an appointment with the embassy and my visa was ready the same day.

**How do you compare NMSU to universities in Peru?**

The public universities in Peru are extremely competitive. Admission is based on an exam, that I found much harder than the GRE, and that varies depending on the school you are applying to. Going to a public school in the capital also meant being exposed to a good share of cultural diversity, which is comparable to NMSU. In terms of budget, though, public schools in Peru definitely don’t have the resources available here in the U.S., which is one of the main reasons I came here. I wanted to have hands on experience in experimental biology, especially genetics to later apply it to evolution.

**How was the department of Entomology, Plant Pathology and Weed Science? How are the faculty members?**

We are what I consider a very small department, and I really like it. I think I’ve met every single grad student and faculty member who has been with us during the past three years. I’ve been a Teacher Assistant (TA) for Plant Pathology twice. We, the graduate students, founded NMSU’s Entomology Club. Because of teaching and the involvement in the Entomology Club, I have met a lot of undergraduate students in the department, as well. We are hoping they would stay and pursue graduate degrees here, keep the club alive and work on the ongoing projects in the labs.

The faculty members at the department have always been helpful with my research projects. I’m friends with the entomologists and work directly with the plant pathology/weed science people. I think I was very lucky for that.

**Who was your advisor? How helpful has she been in your studies/research?**

Dr. Rebecca Creamer is my advisor. She’s been extremely helpful and understanding. It’s always nice to have somebody with such a diverse background supporting you and enriching my research with her guidance. We have become very good friend; I will really miss her when I’m gone.

**Was there any particular faculty member that helped you the most or you found particularly a good mentor/teacher? If so, who?**

Dr. Creamer has been an incredible mentor. Other professors have helped me too; for example, Dr. Tracey Sterling who is part of my committee. She’s helped me understand the physiology part of my project. I’ve worked in her lab most of last semester. Dr. Soum Sanogo has also been especially helpful on topics such as in vitro culture and fungal biology. Dr. Steven Hanson and Champa Sengupta-Gopalan (from the Department of Plant and Environmental Sciences) allowed me to use their lab resources too. Without their help, I could not have finished this work.

**Was there any particular class/subject you liked most?**

I really liked Plant Virolgy with Dr. Creamer and Aquatic Insects with Dr. Richman. Those are definitely the classes liked the most, for a simple reason: I think interactions are the engines that keep biological systems working and evolving. By studying complex systems such as aquatic environments, in which food networks function on a three-dimensional way we can have a better notion of how complex animal interactions can be. In the case of plant viruses, we have a situation in which an organism is being attacked by stress. And even though there is no way it can run away from that stress, there is still so much that a plant can do in terms of biochemical responses, physiological changes and use of genetic plasticity. Actions and reactions that create an arena for all living beings to adapt, to evolve, or to go extinct; those are what I like. I also liked the SAS class with Dr. Steiner. I like statistics, but never before have I had the independence that I have now to analyze my own datasets. There is so much you need to know about your data before you can share your work in a publication. I consider myself an independent thinker, and as such I have to be able to analyze my own material, and also to understand where the weaknesses of my work are.

**Did the department have adequate equipment for your research?**

Yes, for the most part. There are always extra ideas that you get down the road, which sometimes have to be developed somewhere else. But I think that’s very normal. At some point you
meet people from other fields, your ideas get influenced by theirs and that’s how collaboration starts. As I mentioned before, I’ve used Dr. Sengupta-Gopalan’s lab in the Department of Plant and Environmental Sciences, as well as Dr. Barbara Lyons lab in the Department of Biochemistry. I also have some of my analysis done on the Poisonous Plant Lab at the USDA-ARS in Logan, Utah.

**Would you please talk about your research more specifically?**

My research focuses on the fungal endophytes that live endophytically in locoweeds. Locoweeds are legume plants in the genera Astragalus and Oxytropis that are toxic to grazing animals. The fungi within the plants produce the alkaloid toxin swainsonine. Consumption of the plants containing the toxin causes serious losses for ranchers throughout the western US.

My part on this research is to establish a numeric relationship between the amount of fungus present inside the plants and the amount of swainsonine that is produced. In growth chamber experiments in very young plants the growth of fungus is positively correlated with the amount of swainsonine that is being produced. The other aspect of the research is to carry out similar analyses in natural field plants from different locations at different times of the year.

**Why is this research important?**

The importance of this project can be seen from two different standpoints. The first one is the direct management of the problem. Locoweeds pose a problem for ranchers, especially overgrazed pastures. When grasses are stressed they take longer to recover, as a result locoweeds spread more aggressively. It is important to know how alkaloid levels vary on function of age and season so to decide if the weed needs to be controlled or if the economic impact will be minor. Locoweeds usually have high nutritional value. If the swainsonine content is not enough to produce behavioral and physiological changes in livestock, it could be used as green forage.

**What are the employment prospects for graduates in this field?**

Usually, they will work in the academia if not in an assortment of different industries. From the entomology point of view, their employment could be with the USDA or extension work, or with pest control companies. From the genetics point of view the companies vary a lot. People move a lot in the first five years after graduation. Some people remain close to agriculture industries from production to improvement or crop protection. Others go to biomedical fields.

**Who would be your ideal employer (s) in the future?**

My ideal employment would be with a university or an institution such as the Smithsonian or a natural history museum.

**Have you had any employment offers?**

I just had an interview with Monsanto for a position in Hawaii, working on transgenic corn experiments. I’m considering it. It sounds like a good experience to work with such a big company in such a pretty place. I just submitted my official application and I’m waiting to see what will happen.

**What is your message to undergraduate students who might be interested in Entomology, Plant Pathology and Weed Science?**

EPPWS is a very friendly department and a really nice place to work at. Faculty members are engaged in meaningful research. I’d say just come over and meet Dr. David Thompson, our Department Head. He is a very friendly and open person. He can tell you all about the department and opportunities for the students.

Jorge Achata can be contacted at jorgeachata@yahoo.com
Winners of the 8th Annual URC Research and Creativity Activities Fair

1. Andrea Campanella, Brandon Bestelmeyer, Gary Roemer, Deb Peters

for their project entitled

Complexity in Rodent Community Responses to Grassland-Shrublands Transitions

2. Ashraf El-Sadek, Max Bleiweiss, Manoj Shukla, Steve Gulden, Sam Fernald

for their project entitled

Hydrologic Modeling on the Rio Grande Using the Automated Geospatial Watershed Analysis (AGWA) Tool

3. Christopher Arrigo, Amy Fierro Lopez, N. Khandan, Geof Smith

for their project entitled

Dairy Manure-based Microbial Fuel Cell Energy Production
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http://research.nmsu.edu/news

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