23rd annual

UNIVERSITY RESEARCH
& CREATIVE ARTS SYMPOSIUM

NEW MEXICO STATE UNIVERSITY
CORBETT CENTER
APRIL 27, 2018

SPONSORS:
Executive Vice President and Provost Office
Honors College
Discovery Scholars (DSP)
New Mexico Alliance for Minority Participation (AMP)
Maximizing Access to Research Careers (MARC)
Howard Hughes Medical Institute Program (HMMI)
College Assistance Migrant Program (CAMP)
Building Research Achievement in Neuroscience (BRAIN)
Office of the Vice President for Research
College of Business
College of Education
College of Engineering
EXECUTIVE VICE PRESIDENT AND PROVOST OFFICE

HONORS COLLEGE
The Honors College provides qualified undergraduate students with opportunities to broaden and enrich their academic programs. In small classes taught by master teachers, honors students engage in lively discussion and collaborative investigation of interdisciplinary topics. Through the Honors Thesis, students undertake original research in humanities, science, engineering, agriculture, business, education, and the arts under close supervision by faculty mentors. Many students prepare for their thesis by doing an internship in a scientific laboratory or undertake independent research under the supervision of a faculty mentor.

NEW MEXICO ALLIANCE FOR MINORITY PARTICIPATION (AMP)
The New Mexico Alliance for Minority Participation, funded by the National Science Foundation, is a partnership of New Mexico’s six four-year universities and twenty public two-year community colleges. The goal of the Alliance is to increase the state’s graduation rate of ethnic minority students with baccalaureate degrees in science, mathematics, engineering, and technology.

COLLEGE ASSISTANCE MIGRANT PROGRAM (CAMP)
The NMSU College Assistance Migrant Program (CAMP), is a federally-funded program to help migrant or seasonal farm worker students attend college. Our program’s goal is to ensure that each CAMP student graduates from NMSU with a Bachelors degree. The program offers the first line of support for students to succeed in their first/freshmen year at NMSU and also provides many retention resources to help students persist to graduation. The program has been in existence since 2002.

MAXIMIZING ACCESS TO RESEARCH CAREERS (MARC)
The MARC Program (formerly Minority Access to Research Careers) is sponsored by the National Institute of General Medical Sciences within the National Institutes of Health. The goals of the program are to assist selected undergraduate students who demonstrate an interest in and the potential for research in the biomedical sciences to continue their education beyond the baccalaureate degree; to provide a research experience sufficient to result in presentation of research data at professional meetings; to facilitate an 8-10 week summer research experience off-campus; to improve academic performance; to provide funds for travel to professional meetings; and to assist students in entering graduate and professional programs. All past NMSU-MARC students have received bachelor’s degrees and more than 75% have gone on to graduate programs.

HOWARD HUGHES MEDICAL INSTITUTE PROGRAM AT NMSU (HHMI)
The NMSU Howard Hughes Medical Institute Program (HHMI) broadens access to science by providing students with opportunities to be successful in science through outreach to high schools in under-served communities, through the enhancement of undergraduate biology courses, by providing students with undergraduate research opportunities, and by providing the next generation of faculty with training in Scientific Teaching.

DISCOVERY SCHOLARS (DSP)
The Discovery Scholars Program (DSP) is a college wide interdisciplinary program which was created in Fall, 2014. DSP is a mentorship program where undergraduate students engage in research/creative activity with faculty mentors. The goal of the program is to support student research/creative activity and encourage students to apply for and successfully complete a Master’s degree, perhaps even a Ph.D. Through the program students are challenged to think through research questions and or creative activities, find solutions or ways to answer questions or implement creative activities, and then write up and present the outcome(s) of their work.

The five components of the program are:

1. Research/creative activity with Faculty mentor
2. Write up, creation of, and presentation of research/creative activity
3. Professional development (applying for graduate programs, learning about careers in student’s discipline, and development of writing and presentation skills)
4. Service/Outreach project completion
5. Feedback on the program

BUILDING RESEARCH ACHIEVEMENT IN NEUROSCIENCE (BRAiN)
The NMSU Building Research Achievement in Neuroscience (BRAiN) Program was founded in 2010 with a grant from the NIH BP-ENDURE initiative. The BRAiN partnership between UC Denver and NMSU faculty aspires to broaden participation among the doctoral (PhD) ranks of neuroscience and biobehavioral scientists by providing research and professional development opportunities for undergraduate juniors and seniors. BRAiN Scholars participate in academic year research at NMSU and a summer internship at the UC Denver Medical Campus. Enhancement activities include a yearly Honors seminar experience and attendance at national conferences such as SFN and ABRCMS.
table of contents

1 PREFACE
3 PROGRAM DESIGN
4 PREVIOUS SYMPOSIUM SPEAKERS
5 2018 SYMPOSIUM SPECIAL EVENT
7 SCHEDULE OF EVENTS
9 POSTER SESSIONS
17 PAPER SESSIONS
25 ABSTRACTS
The Undergraduate Research and Creative Arts Symposium, now in its twenty-third year, is the longest-running student symposium at New Mexico State University. Since 1996, more than 2,000 students have presented their work at the symposium. Many of these students have gone on to graduate school, law school, and medical school, and a few have returned to NMSU as professors.

URCAS is intended to recognize outstanding undergraduate research and creative projects and the faculty who have mentored them. It is also meant to show off the work of creative undergraduate students to the university and the community. And, of course, presenting at the symposium gives our students valuable professional experience.

The symposium is an annual celebration of undergraduate creativity in all fields. Represented here are some of the most advanced and creative projects presently being undertaken at NMSU. Many of the students presenting today are completing Honors Thesis projects, while others have worked with mentors in laboratories and other research and arts settings through the MARC, AMP, CAMP, HHMI, BRAiN DSP, and other mentoring programs.

Congratulations to these outstanding students and their faculty mentors:

Dr. Miriam Chaiken, Dean, Honors College
Dr. Michael Johnson, Director, MARC Program
Dr. Barbara Lyons, Director, BP-ENDURE (BRAIN) Program
Dr. Lakshmi Reddi, College of Engineering and Director, New Mexico Alliance for Minority Participation (AMP)
Dr. Cynthia Bejarano (CAMP)
Dr. Tim Wright, Howard Hughes Medical Institute Program at NMSU (HHMI)
Dr. Nancy McMillan, Director, Discovery Scholars Program (DSP)
Dr. Luis Vasquez, Interim Vice President for Research
Dr. Don Pope-Davis Dean, College of Education
Dr. James Hoffman, Dean, College of Business
Each year the Advanced Graphic Design class is summoned to design the URCAS logo, and the winning logo goes on to be incorporated in branded marketing materials. The students in the class were divided into teams and each student created and pitched a logo. This year, the students that participated in the URCAS logo design challenge included Dana Apodaca, Rush Allen, Katrina Chandler, Fernando Enriquez, Leslie Rascon, and Dexter Walker. The winning URCAS 2018 logo design belongs to Dana Apodaca & Leslie Rascon, with Leslie sketching the initial concept and Dana digitalizing it. The logo represents the diverse assortment of student work and the fun, celebratory atmosphere found at the symposium.

Honorable mentions are awarded to the following students: Leslie Rascon not only sketched the winning logo concept, but she also created the final poster design. She is a Junior studying Studio Art. Dana Apodaca digitalized the winning logo concept and was appointed art director & team leader. She is a Senior and will graduate in May with her Bachelors in Applied Studies & a minor in Studio Art. Rush Allen had a large hand in the layout design of the program. He is a Senior majoring in Studio Art and will graduate in May. And finally, Dexter Walker, who is a Junior studying Graphic Design. He created impressive designs for the logo, poster, & program and contributed to the program.
previous symposium speakers

2017  Bill McCamley  State Representative
2016  Dr. Debra Knapp  Prof. Frank “Paco” Gilpin  Sol y Arena Dance Company
2015  Dr. William Eamon Emeritus  Professor of History
2014  Dr. Sean Rogers  Department of Management
2013  Dr. Collin Payne  Assistant Professor of Marketing
2012  Dr. Paul Bosland  Regents Professor of Horticulture and Director of the Chile Pepper Institute
2011  Dr. Kenny Stevens  Associate Professor of Engineering Technology
2010  Dr. Kenneth Hammond  Professor of History
2009  Dr. Connie Falk  Professor, Agricultural Economics and Business
2008  Salim Bawazir, Ph.D.  Associate Professor, Department of Civil Engineering
2007  Dr. Elba Serrano  Regents Professor of Biology
2006  Dr. Mary O’Connell  Regents Professor, Department of Plant and Environmental Sciences
2005  Prof. David Taylor  Department of Art
2004  Dr. Robert Armstrong  Regents Professor of Physics
2003  Dr. Ann Hales  Professor, Department of Nursing
2002  Dr. Steve Stochaj  Associate Professor, Klipsch School of Electrical and Computer Engineering
2001  Robert Marquez  Doctoral Student, Chemistry
2000  Dr. Reta Beebe  Professor, Department of Astronomy
1999  Dr. Rudolfo Chávez Chávez  Regents Professor, Department of Curriculum and Instruction
1998  Dr. Kathleen West  Professor, Department of English
1997  Dr. Cookie White Stephan  Professor, Department of Sociology
1996  Dr. Champa Sengupta-Gopalan  Professor, Department of Agronomy and Horticulture
1995  Dr. Ann Hales  Professor, Department of Nursing
1994  Dr. Robert Armstrong  Regents Professor of Physics
1993  Dr. Kenneth Hammond  Professor of History
1992  Dr. William Eamon  Emeritus  Professor of History
1991  Prof. David Taylor  Department of Art
1990  Salim Bawazir, Ph.D.  Associate Professor, Department of Civil Engineering
1989  Dr. Elba Serrano  Regents Professor of Biology
1988  Dr. Collin Payne  Assistant Professor of Marketing
1987  Dr. Paul Bosland  Regents Professor of Horticulture and Director of the Chile Pepper Institute
1986  Bill McCamley  State Representative
1985  Dr. Debra Knapp  Prof. Frank “Paco” Gilpin  Sol y Arena Dance Company

2018 symposium special event

FABLE JAZZ TRIO
under the direction of
DR. PANCHO ROMERO

CJ ANDREWS, PIANO
BRYANA GETCHELL, BASS
MICHAEL MARTINEZ, TRUMPET
schedule of events

8:30 AM  REFRESHMENTS & WELCOMING REMARKS
Dona Ana Room
Dr. Miriam Chaiken
Dean, NMSU Honors College

9:00 AM - 12:00 PM  POSTER SESSIONS
West Ballroom 3rd Floor

9:00 AM - 10:00 AM  PAPER SESSIONS
SESSION 1A
Col. Fountain Room 324
Testimony & Revolution

SESSION 1B
Sacramento Room 226
Advances in Biology & Chemistry

SESSION 1C
Rio Grande Room 228
Health & Medicine

SESSION 2A
Col. Fountain Room 324
Humanities Innovations

SESSION 2B
Rio Grande Room 228
STEM Innovations

SESSION 2C
Sacramento Room 226
Testimony & Gender in the Humanities

SESSION 3A
Col. Fountain Room 324
Chemical Engineering & Environmental Science

SESSION 3B
Rio Grande Room 228
Social Issues & Social Equity

SESSION 3C
Sacramento Room 226
Advances in Chemistry

10:15 AM - 11:15 AM

11:30 AM - 12:30 PM  LUNCHEON
Corbett Center East Ballroom
Luncheon Special Event:
FABLE JAZZ TRIO
Dr. Frank Romero, Director
CJ Andrews, Piano
Bryana Getchell, Bass
Michael Martinez, Trumpet

12:30 PM - 1:30 PM
poster sessions
ELISA ABETTA  
“Effects of thermal variation on growth and critical thermal maximum of dragonfly nymphs”  
Major: Wildlife Ecology and Management  
Faculty Advisor: Dr. Calleen Caldwell, Fish and Wildlife Conservation Ecology (NRCT)

COREY BOEHM  
“Neutron backgrounds for the CAPTAIN-Mills experiment at the Los Alamos Neutron Science Center”  
Major: Physics  
Faculty Advisory: Dr. Robert Cooper, Physics

VALERIE BREWER  
“Effects of urbanization on genetic structure in the song sparrow”  
Major: Conservation Ecology  
Faculty Advisor: Dr. Karen Mabry, Biology (HHMI)

CARLOS CAMPOS  
“Microsatellite Analyses of the Critically Endangered Blue-Throated Macaw (Ara glaucogularis)”  
Major: Biology  
Faculty Advisor: Dr. Timothy Wright, Biology (HHMI)

BRANDON CASTILLO  
“Acidosis of the Symbiosis: A growing problem within the realm of corals”  
Major: Biology  
Faculty Advisor: Ms. Michele K. Nishiguchi, Biology Department of Biology

STARVANNA COTTRELL  
“Steps to Reopen an Independent Restaurant”  
Major: Hotel, Restaurant and Tourism Management  
Faculty Advisor: Dr. Priscilla Bloomquist, HRTM (HR7M)

LUIS FERNANDEZ  
“Designing a novel backpack microphone for Budgerigars”  
Major: Biology  
Faculty Advisor: Dr. Timothy Wright, Biology Southwestern Natural Resources Career Track (SWNRCT)

SOFIA BALI  
“Effects of Hydrogen Bond Donors on Reactivity of Sulfite Oxidase”  
Major: Biochemistry  
Faculty Advisor: Dr. Marat Talipov, Chemistry (AMP)

ZOANNE BILLINGS  
“Reproductive fitness in correlation with parasite resistance in Biomphalaria glabrata snails”  
Major: Biology  
Faculty Advisor: Dr. Maria Castillo, Biology Department

MICHAEL BENNETT  
“Biochemical Characterization of Deinococcus radiodurans RepE, O, and R proteins”  
Major: Biochemistry  
Faculty Advisor: Dr. Shelley Lusetti, Chemistry and Biochemistry (MARC)

EDGARDO CAZARES  
“Medicinal Compounds and Nutritious Value in the Onion from the Allium Family”  
Major: Civil Engineering  
Faculty Advisor: Dr. Laura Rodriguez-Urba, Plant and Environmental Sciences (CAMP)

ANTHONY COLIN  
“Can Catnip Help Breeders to Develop Superior Onions?”  
Major: Horticulture & Agronomy  
Faculty Advisor: Dr. Christopher Cramer, Department of Plant & Environmental Sciences Honors Thesis, (HHMI)

ANTHONY CORNWELL  
“Glowin’ green with pHluorin: a novel biosensor for in vivo pH detection”  
Major: Biology  
Faculty Advisor: Dr. Michele Nishiguchi, Biology (HHMI)

RAWAN ELAKSHER  
“Characterization of two highly expressed genes potentially involved in chemotaxis”  
Major: Genetics  
Faculty Advisor: Dr. Paola Mera, Chemistry and Biochemistry NM Space Grant

ERICKA FLORES  
“Characterizing the onset of DNA replication and segregation in bacteria”  
Major: Chemical Engineering  
Faculty Advisor: Dr. Paula Mera, Biochemistry (AMP)

JORDAN GASS  
“Turning up the heat: the creation of a ‘super’ coral in the battle against global warming”  
Major: Biology  
Faculty Advisor: Dr. Michele Nishiguchi, Biology Department of Biology

TIANA GIBSON  
“’O ko’a mokupuni ka mokupuni- My Island is your Island! Impacts of Tourism on Hawaiian Reefs”  
Major: Environmental Science  
Faculty Advisor: Prof. Michele Nishiguchi, Biology Department of Biology

EMILY GREEN  
“Challenging visual search creates better incidental memories for objects and their perceptual features”  
Major: Psychology  
Faculty Advisor: Dr. Michael Haot, Psychology Honors Thesis

CLARA HANSEN  
“Social Affiliation and Call Sharing in Budgerigars (Melopsittacus undulatus)”  
Major: Biology  
Faculty Advisor: Dr. Timothy Wright, Biology (HHMI)
ALYSSA HENDREN
“Phytoremediation of Soils with Salt and Heavy Metal Contamination”
Major: Chemical Engineering
Faculty Advisor: Dr. Catherine Brewer, Chemical Engineering (AMP)

TRAVIS LEDOUX
“Continuous Flow Hydrothermal Liquefaction of Algae”
Major: Chemical and Material Engineering
Faculty Advisor: Dr. Catherine Brewer, Chemical and Material Engineering (AMP)

ESAI LOPEZ
“Phytoremediation of Heavy Metal Contamination on Arid Soils”
Major: Chemical Engineering
Faculty Advisor: Dr. Catherine Brewer, Chemical Engineering (AMP)

KARLA LOPEZ
“Optimization Of The Spray Dryer To Dry Cottonseed And Soy Protein”
Major: Food Science Technology
Faculty Advisor: Dr. Nancy Flores, Extension Family & Consumer Science Steinman Endowed Fellowship

KIAH LOWE
“Plants of Value for People & Pollinating Insects”
Major: Genetics & Biotechnology
Faculty Advisor: Dr. Christopher Cramer, Plant and Environmental Sciences (AMP)

MITCHELL MANFORD
“An historical-ecological framework for evaluating environmental change: Retracing the steps of pioneering Botanist Elmer Wooton and his botanical journey through the biomes of the Organ Mountains”
Major: Conservation Ecology
Faculty Advisor: Dr. Sara Fuentes-Soriano, Animal and Range Science (URAP)

LIZET MARTINEZ
“Temperature Adaptation Influences Symbiont Specificity in an Experimentally Evolved Bacterial-Squid-Luminous Bacterium Association”
Major: Microbiology
Faculty Advisor: Dr. Michele Nishiguchi, Biology (BRAIN)

SICILEE MACKLIN
“Characterization of Anthocyanin in Guar Seed Hulls”
Major: Chemical and Materials Engineering
Faculty Advisor: Dr. Catherine Brewer, Chemical and Materials Engineering (AMP)

RAKHILA MAMENOVA
“Comparison of carotenoid extractions using fresh and freeze-dried tomatoes”
Major: Biology
Faculty Advisor: Dr. Ivette Guzman, Plant and Environmental Sciences (USDA HATCH)

CLARA MAXAM
“Immune Response to Inhibition of CXCR4 during Early Pregnancy”
Major: Animal Science
Faculty Advisor: Dr. Ryan Ashley, Animal and Range Sciences (HHMI)

EDITH MONCADA
“Characterization of fermented jujube fruit (Ziziphus jujuba Mill)”
Major: Nutrition and Dietetics Sciences
Faculty Advisor: Dr. Nancy Flores, Department of Agriculture Steinman Endowed Fellowship

MONICA MUÑOZ
“A study of the mechanisms of communicative plasticity and their relation to social integration in budgerigars: techniques and troubleshooting.”
Major: Biology
Faculty Advisor: Dr. Timothy Wright, Biology (MARC)

KENDALL OGLE
Major: Communication Disorders
Faculty Advisor: Dr. Srikanta Mishra, Special Ed and Comm Disorders Honors Thesis

FRANCHESCA ORTEGA
“Evaluation of a large-scale survey method shows potential for invasive species management”
Major: Genetics and Biotechnology
Faculty Advisor: Dr. Brook Milligan, Biology Sundt Seminar

PABLO PARADIS
“Mid-infrared optical constants of InAsSb alloys and bulk GaSb”
Major: Physics & Electrical Engineering
Faculty Advisor: Dr. Stefan Zollner, Physics (AMP)

REBECCA MELENDEZ
“Determining the Attraction Rate of Female Aedes aegypti to Humans in Presence of Aqueous Ingredients”
Major: Biology
Faculty Advisor: Dr. Imma Hansen, Biology (URS)

LAURAIKE MEAVILLO
“Deciphering microbial communication in a beneficial mutualism: Cross species quorum sensing between Vibrio fischeri and Vibrio alginolyticus in Sepiola affinis”
Major: Biochemistry
Faculty Advisor: Dr. Michele Nishiguchi, Biology (BRAIN)

KARLY MILLER
“Using Gene Editing to Explore Directed Cell Migration During Sea Urchin Development”
Major: Genetics & Biotechnology
Faculty Advisor: Dr. C. Brad Shuster, Biology (BRAIN)

JOHN MIYAGISHIMA
“Green Earthen Embankment for Controlling Soil Erosion”
Major: Civil Engineering
Faculty Advisor: Dr. Salim Bawazir, Associate Professor, Civil Engineering (AMP)
ANDREW PARRA
“Characterization of Caulobacter mutant strain that is chloramphenicol resistant”
Major: Biochemistry
Faculty Advisor: Dr. Paola Mera, Biochemistry

HAILEY PECK
“Abroad in Nepal: Why International Travel is Valuable and Beneficial”
Major: Wildlife Science
Faculty Advisor: Dr. Brook Milligan, Department of Biology
Center for Molecular Dynamics Nepal (CMDN)

ANDREW PHILLIPS
“The Effects of Lossy EEG Compression on ERP Analysis”
Major: Electrical Engineering, Computer Science
Faculty Advisor: Dr. Charles Creusere, Klipsch School of Electrical & Computer Engineering

PRISILA RAMIREZ
“Assessing the role of DNA-PKcs in R-loop formation”
Major: Genetics and Biotechnology
Faculty Advisor: Dr. Amanda Ashley, Chemistry and Biochemistry
(HHMI)

JOVANNAH RAMIREZ
“Investigating the Transition Phase Within Push Pull Systems by Induced Starvation of Horn Flies (Haematobia irritans)”
Major: Animal Science
Faculty Advisor: Dr. Brandon Smythe, New Mexico State University Veterinary Entomology Research Laboratory
New Mexico State University Veterinary Entomology Research Laboratory

PAIGE RAMSEY
“Spatial distribution of conservation easements in the United States: drivers and implications”
Major: Geography
Faculty Advisor: Dr. Michaela Buenemann, Geography
Honors Thesis

ASHLEY REYNOLDS
“Rainforests of the Sea: Preserving Biodiversity of Hawaiian Reefs”
Major: Wildlife Science
Faculty Advisor: Prof. Michele Nishiguchi, Biology
Department of Biology

NUBIA RIVAS
“The hormetic effects of x-ray radiation on Parkinson’s disease symptoms in Drasophila melanogaster performance”
Major: Biology
Faculty Advisor: Dr. Giancarlo Lopez, Biology
(HHMI)

JADZIA RODRIGUEZ
“Influence of Local and Landscape Factors on Burrowing Owl Artificial Habitat Site Occupancy in Arizona”
Major: Wildlife Science
Faculty Advisor: Dr. Martha Desmond, Department of Fish, Wildlife and Conservation Ecology
Wilson Ornithological Society 2018 Jed Burtt Undergraduate Mentoring Grant

DAVID RODRIGUEZ
“Fluorescence-Lifetime Measurements by Flow Cytometry Reveal Altered Metabolism in Tamoxifen-treated Breast Cancer Cells”
Major: Chemical & Materials Engineering
Faculty Advisor: Dr. Kevin Houston, Chemistry and Biochemistry
(HHMI, CAMP)

ALEJANDRO SALAS
“Sequestration of Arsenic in Drainage Canal”
Major: Civil Engineering-Water Resources
Faculty Advisor: Dr. Salim Bawaziz, Civil Engineering (AMP)

ANDREAS SALAZAR
“Berta Cáceres: Hondureña Revolucionaria”
Major: Chemical Engineering
Faculty Advisor: Dr. Judith Flores Carmona, Curriculum & Instruction
Revolutionary Woman Class

RIGO SALAZAR
“Total Focusing Method (TFM) Development for Lamb Wave based Structural Health Monitoring”
Major: Civil Engineering and Mathematics
Faculty Advisor: Dr. Ehsan Dehghan Niri, Civil Engineering (AMP)

AMANDA SCHMIDT
“NMSU Contributes to Nepal Tiger Genome Project”
Major: Biology
Faculty Advisor: Dr. Brook Milligan, Biology
Department of Biology

MANUEL SERRANO
“NMSU Bridge Inspection Program”
Major: Aerospace Engineering
Faculty Advisor: Dr. Cynthia Bejarano [CAMP]

ALEXIS TORRES
“Therapeutic Interventions for Glioblastoma”
Major: Psychology
Faculty Advisor: Dr. Elba Serrano, Department of Biology (AMP)

KRYS TAL VARGAS
“In Search of “Nutri-chemicals” in Yellow Capsicum Fruits”
Major: Horticulture
Faculty Advisor: Dr. Ivette Guzman, Plant and Environmental Sciences
USDA NIFA Broadening Agricultural Science for Hispanics

SOFIA VILLA
“Impact of Joining Educators Rising”
Major: Bilingual/TESL Elementary Education with a focus in Math
Faculty Advisor: Dr. Karen Trujillo, Curriculum and Instruction
Alliance, Educators Rising
paper sessions
1A: TESTIMONY AND REVOLUTION  
Col. Fountain Room 324

Anayansi Ortega-Trinidad  
“Nicol Chinchilla, Revolutionary and Founder of Uptica”  
Major: Social Work  
Faculty Advisor: Dr. Judith Flores Carmona, Curriculum & Instruction  
(Revolutionary Women Course)

Antonia Holguín  
“Comandanta Ramona: A Zapatista Revolutionary Woman”  
Major: Government  
Faculty Advisor: Dr. Manal Hamzeh, Gender & Sexuality  
(Revolutionary Women Course)

Andrea Salazar  
“Berta Cáceres: Hondureña Revolucionaria”  
Major: Chemical Engineering  
Faculty Advisor: Dr. Judith Flores Carmona, Curriculum & Instruction  
(Revolutionary Women Course)

Jenna Rabe  
“Samira Ibrahim, a Revolutionary Woman”  
Major: Geography-Human Environment Relationships  
Faculty Advisor: Dr. Manal Hamzeh, Gender & Sexuality  
(Revolutionary Women Course)

1B: ADVANCES IN BIOLOGY & CHEMISTRY  
Socorro Room 226

Daniella Barraza  
“A vitamin B12 receptor serves a role in membrane stability of Caulobacter crescentus”  
Major: Biochemistry and Chemistry  
Faculty Advisor: Dr. Paola Mera, Chemistry and Biochemistry  
(Honors Thesis, MARC)

Grace Hooks  
“Targeting ERBB3 in Triple Negative Breast Cancer”  
Major: Biology  
Faculty Advisor: Dr. Amanda Ashley, Chemistry and Biochemistry  
(HHMI)

Matthew Amato  
“Metal binding specificity in a putative nickel solute binding protein”  
Major: Biochemistry  
Faculty Advisor: Dr. Erik Yukl, Chemistry and Biochemistry  
(MARC)

Sierra Strebe  
“Functional Characterization of Two Highly Expressed Genes in Caulobacter Crescentus”  
Major: Genetics & Biotechnology  
Faculty Advisor: Dr. Paola Mera, Chemistry and Biochemistry  
(MARC)

1C: HEALTH AND MEDICINE  
Rio Grande Room 228

Brent Carrillo  
“Genome-Wide Association of Vasodilator Drug Response in Pulmonary Arterial Hypertension”  
Major: Chemical Engineering  
Faculty Advisor: Dr. William Maio, Chemistry and Biochemistry  
(MARC)

Cailee Nelson  
“3D Printing of EEG Cap for Socially Assistive Robot Development Management”  
Major: Psychology & Human Resources  
Faculty Advisor: Dr. James Kroger, Psychology  
BP-ENDURE (BRAiN)

Melissa Chavez  
“Elucidating the Impact of Protein Phosphatases in the Replication Stress Response”  
Major: Biology  
Faculty Advisor: Dr. Amanda Ashley, Chemistry and Biochemistry  
(MARC)
2A: HUMANITIES INNOVATIONS  
Col. Fountain Room 324

Galen Skibyak  
“Ikebana’s Journey to the West: History, Symbolism, and the Post World War II Rise in America”  
Major: History  
Faculty Advisor: Dr. Elvira Masson, History  
(Honors Thesis)

Juan Araiza  
“Poetry Is A Necessity”  
Major: English  
Faculty Advisor: Dr. Richard Greenfield, English  
(Honors Thesis)

Lauren Flores  
“Female Maturation into Monstrosity in Stoker, The Witch, and Raw”  
Major: Digital Film Making  
Faculty Advisor: Dr. Laura Ahn Williams, Interdisciplinary Studies  
(Gender & Sexuality Studies)

Olivia Ababio  
“Damsel in Distress vs. The Bunny Boiler: Gender in Stalking Films”  
Major: CMI Digital Filmmaking  
Faculty Advisor: Dr. Laura Ahn Williams, Interdisciplinary Studies  
(Gender & Sexuality Studies)

2B: STEM INNOVATIONS  
Rio Grande Room 228

Dante Avalos  
“Resolving the mechanism of glycine oxidation by GoxA”  
Major: Biochemistry  
Faculty Advisor: Dr. Erik Yukl, Chemistry and Biochemistry  
(HHMI)

Joshua Gomez  
“Biomass Carbon Capacitors”  
Major: Chemical Engineering  
Faculty Advisor: Dr. Meng Zhou, Chemical and Materials Engineering  
(AMP)

Michael Kaemingk  
“Preparation for Experiments in Nuclear Physics”  
Major: Engineering Physics  
Faculty Advisor: Dr. Robert Cooper, Physics  
(Honors Thesis)

Virginia Fuentes  
“Design and Fabrication of a Biinspired Robotic Jellyfish Using Cable-Driven Actuators”  
Major: Mechanical Engineering  
Faculty Advisor: Dr. Abdessattar Abdelkafi, Mechanical and Aerospace Engineering  
(AMP)

2C: TESTIMONY AND GENDER IN THE HUMANITIES  
Socorro Room 226

Alisha Porter  
“Queer in Queer Spaces: A Revolutionary Woman”  
Major: Gender/Sexuality  
Faculty Advisor: Dr. Manal Hamzeh, Gender & Sexuality  
(Revolutionary Women Course)

Makenna Caballer  
“The Gender Flipped Alter Ego in High Tension”  
Major: Gender & Sexuality Studies  
Faculty Advisor: Dr. Laura Williams, Interdisciplinary Studies  
(Gender & Sexuality Studies)

Kendall Anderson  
“Revolutionary Art and Resistance through Expression”  
Major: English  
Faculty Advisor: Dr. Manal Hamzeh, Gender & Sexuality  
(Revolutionary Women Course)

Devin Narveson  
“Everyday Woman, Revolutionary Woman”  
Major: Government  
Faculty Advisor: Dr. Manal Hamzeh, Gender & Sexuality Studies  
(Revolutionary Women Course)
3A: CHEMICAL ENGINEERING & ENVIRONMENTAL SCIENCE
Col. Fountain Room 324

Ahmed Muhyi
“Preparation and characterization of a mixture of two different molecular weight Polyether sulfone”
Major: Biology
Faculty Advisor: Dr. Reza Foudazi
Chemical and Materials Engineering

Aliah Guerrero
“Environmental conditions and timing of hatch of largemouth bass Micropterus salmoides in a Southwest irrigation reservoir”
Major: Fish and Wildlife Conservation Ecology
Faculty Advisor: Dr. Colleen Caldwell, Fish and Wildlife Conservation Ecology
(SWNRCT)

Angelique Amado
“Structural Analyses of Cobaloxime Catalysts Using X-Ray Spectroscopy”
Major: Chemistry
Faculty Advisor: Dr. Feifei Li, Chemistry & Biochemistry (HHMI, Discovery Scholars)

Gabriel Clark
“Improving Biomass and Forage Quality of Alfalfa Using Genetic Engineering Tool”
Major: General Horticulture
Faculty Advisor: Dr. Champa Sengupta-Gopalan, Plant and Environmental Sciences (HHMI)

3B: SOCIAL ISSUES AND SOCIAL EQUITY
Rio Grande Room 228

Ana Reynolds
“Tension in Classical Conservatism: Can a compromise be reached to address climate change?”
Major: Government
Faculty Advisor: Dr. Neil Harvey, Government (Honors Thesis)

Tylan Tapley
“An Honest Discussion Regarding Immigration”
Major: Government
Faculty Advisor: Dr. Gregory Butler, Government

3C: ADVANCES IN CHEMISTRY
Socorro Room 226

Jacqueline Kieltyka
“Overexpression of Insulin-like Growth Factor Binding Protein 1 (IGFBP1) Drives Tamoxifen Resistance in Human MCF-7 Breast Cancer Cells”
Major: Biochemistry, Biology, Chemistry
Faculty Advisor: Dr. Kevin Houston, Department of Chemistry and Biochemistry (INBRE)

Matthew Mena
“Contrasting mitochondrial metabolism with glycolysis in cancer cells with time-resolved flow cytometry”
Major: Chemistry
Faculty Advisor: Dr. Jessica Houston, Chemical Engineering (MARC)

Jordan Salas
“Effect of Confinement on the kinetics of coordinated thiosulfate on Thiosulphato-pentaammine Cobalt Chloride”
Major: Biochemistry
Faculty Advisor: Dr. Michael Johnson, Chemistry and Biochemistry (MARC)
Stalking films perpetuate damaging patriarchal views within our society. By looking at female protagonists when they are the object of obsession, using the film The Boy Next Door (Rob Cohen, 2015), this essay illustrates the ways the commercial sub-genre punishes female sexuality and engages in victim-blaming. Shifting the focus to female stalkers, by analysing Obsessed (Steve Shill, 2009), I also examine the way this seemingly transgressive role for women in film, where they’re allowed to be independent, sexually confident and even violent, becomes very limiting when said behaviour is denounced. Additionally, I explore the origin of the ‘crazy career woman’ trend of female stalkers and the way it conveys society’s fear of post-feminism and its perceived threat to the American family unit.

**ELISA ABEYTA**

“Effects of thermal variation on growth and critical thermal maximum of dragonfly nymphs”
Major: Wildlife Ecology and Management
Faculty Advisor: Dr. Colleen Caldwell, Fish and Wildlife Conservation Ecology
Gender & Sexuality Studies (NRCT)

Temperature is a critical variable for survival of all ectotherms. This study will demonstrate how acclimation to different temperatures affect the growth and critical thermal maximum (CTMax) of dragonfly nymphs. Nymphs will be measured and acclimated to one of two temperature treatments for two weeks, re-measured and placed in a heat bath where they will be subject to increasing temperature until they reach CTMax. We predict that those acclimated to higher temperatures will have a higher CTMax and greater growth than those acclimated to lower temperatures. This suggests that thermal changes similar to those tested here could alter invertebrate communities.

**ANGELIQUE AMADO**

“Structural Analyses of Cobaloxime Catalysts Using X-Ray Spectroscopy”
Major: Chemistry
Faculty Advisor: Dr. Feifei Li, Chemistry & Biochemistry (HHMI), Discovery Scholars

Cobaloxime catalysts containing vinyl axial ligands are effective in the dehalogenation of air pollutants and as models for vitamin B12 complexes. To elucidate and enhance the efficiency of this catalytic system, we have developed an analysis protocol to investigate axial ligand effects using X-Ray Absorption Spectroscopy (XAS). Analysis of the pre-edge in X-Ray Absorption Near-Edge Spectroscopy (XANES) spectra revealed unexpectedly large peak areas, contrary to our initial expectations. We then utilized Extended X-Ray Absorption Fine Structure (EXAFS) and show that a single atom difference in the vinyl axial ligand can cause notable EXAFS effects. Our protocol provides a framework for future spectroscopic studies of these promising catalysts.

**MATTHEW AMATO**

“Metal binding specificity in a putative nickel solute binding protein”
Major: Biochemistry
Faculty Advisor: Dr. Erik Yukl, Chemistry & Biochemistry (MARC)

Transition metal homeostasis is related to pathogenicity in gram-negative bacteria, thus prokaryotic type ATP binding cassette (ABC) metal transporters make for appealing targets for the development of novel antibiotics. These transporter systems depend upon a periplasmic solute binding protein (SBP) to bind their respective metal with high affinity and specificity. Transcriptional analysis in our model gram-negative organism Paracoccus denitrificans under zinc deprivation showed an uncharacterized ABC transporter pden1341-1345 to be upregulated. Biochemical investigation of pden1341, the SBP portion of the ABC transporter series was performed to characterize its role in zinc homeostasis in Paracoccus denitrificans.

**KENDALL ANDERSON**

“Revolutionary Art and Resistance through Expression”
Major: English
Faculty Advisor: Dr. Manal Hamzeh, Interdisciplinary Studies/Gender & Sexuality Studies

Revolutionary Woman Course

I would argue the opposite: we need it now more than ever, specifically we need producers of poetry to keep it alive and is often dismissed in our present society as being pretentious and unimportant in the grand scheme of the world. I argue that poetry is a necessity in our present society as being a way to answer the following questions: how is poetry politically disruptive and how does it work as a tool of intervention and awareness in contemporary society?

**JUAN ARAIZA**

“Poetry is a Necessity”
Major: English
Faculty Advisor: Dr. Richard Greenfield, English
Honors Thesis

Although poetry has historically been seen as a legitimate form of art and creation, it has lost some of its significance and is often dismissed in our present society as being pretentious and unimportant in the grand scheme of the world. I argue that poetry is a necessity in our present society as being a way to answer the following questions: how is poetry politically disruptive and how does it work as a tool of intervention and awareness in contemporary society?
Daniela Barraza
“A vitamin B12 receptor serves a role in membrane stability of Caulobacter crescentus”
Major: Chemistry & Biochemistry
Faculty Advisor: Dr. Paola Mero, Chemistry & Biochemistry
Honors Thesis, [MARC]
In E. coli, the BtuB transmembrane receptor is involved in the active transport of vitamin B12. We have identified a potential novel function of the receptor BtuB in the bacterium Caulobacter crescentus. We began by constructing a btuB deletion mutant and collecting data regarding morphology, growth, and viability characteristics as compared to wild type. Using a methionine mutant, we showed that BtuB in C. crescentus is capable of transporting vitamin B12 at >pico-molar range. In addition, transmission electron microscopy and antimicrobial agent data suggest that BtuB is playing a role in membrane integrity aside from vitamin B12 transport. Understanding the functions of the BtuB receptor is important given that this receptor plays a colonizing role for bacteria in the mammalian gut.

Chloe Battista
“I Seed What You Did There – Exploring the Seeds of Success Program in the NMC Herbarium”
Major: Conservation Ecology
Faculty Advisor: Dr. Sara Fuentes-Soriano, Animal and Range Sciences
Native Plant Society of New Mexico - Otero Chapter, NMC Herbaria Student Fund
Plants collected in the Chihuahuan desert by the Seeds of Success national program, and deposited at the NMSU herbarium have been analyzed to create a much needed seed collection reference. Species taxonomy, geographic distribution, and seed morphology data have been extracted from 91 species, 79 genera, and 28 plant families from 13 counties across New Mexico. Morphological seed descriptions and images are being created to be published online as well as in scholarly and public reports. Three flowering plant groups including willow trees, cacti, and legumes (9 taxa) are used as study cases for this presentation.

Michael Bennett
“Biochemical Characterization of Deinococcus radiodurans RecF, O, and R proteins”
Major: Biochemistry
Faculty Advisor: Dr. Shelley Lusetti, Chemistry & Biochemistry
(MARC)
Deinococcus radiodurans is a novel bacteria that is resistant to DNA damaging agents and can be used as a model to study the homologous DNA repair pathway. Previous studies show that the RecF, O, and R proteins may regulate RecA filament clearance at an intermediate step of recombination. Since D. radiodurans RecA has a higher affinity for duplex DNA over single-stranded DNA, a series of experiments were run to test if RecFOR bound to DNA and if it would remove RecA from an ongoing strand exchange reaction. Results show that while RecO interacts with RecA during the strand exchange activity and that it binds to DNA, RecF and RecR do not. This could suggest that RecF and RecR require RecO in order to interact with RecA.

Zoanne Billings
“Reproductive fitness in correlation with parasite resistance in Biomphalaria glabrata snails”
Major: Biology
Faculty Advisor: Dr. Maria Castille, Biology Biology Department
In the snail Biomphalaria glabrata, the intermediate host to Schistosoma mansoni, some strains show various levels of susceptibility/resistance to infection by the parasite. We hypothesized that susceptible snails would have higher fertility than their resistant counterparts as a trade-off between reproductive fitness and infection resistance. An experiment was designed to quantify three aspects of reproductive fitness: eggs laid, eggs hatched, and juvenile survival. Preliminary results indicate that resistant snails had higher fecundity (eggs laid), while the susceptible snails had higher fertility (hatching survival), suggesting that in B. glabrata there is a reproductive fitness cost associated with resistance.

Corey Boehm
“Neutron backgrounds for the CAPTAIN-Mills experiment at the Los Alamos Neutron Science Center”
Major: Physics
Faculty Advisor: Dr. Robert Cooper, Physics
The CAPTAIN-Mills experiment is a new effort underway at Los Alamos National Laboratory (LANL) to search for sterile neutrinos and light-mass dark matter. Neutrons produced in time with the neutrino beam are a particularly problematic background because CAPTAIN-Mills will use the low-energy coherent elastic neutrino-nucleus scattering (CEvNS) process to detect events. A 1-kg liquid scintillator neutron detector was deployed for a week at the experimental location to measure neutron backgrounds. The data analysis required involves making cuts of data. These cuts isolate neutron pulse from background and gamma ray pulses. This poster will show the analysis of this neutron data.

Valerie Brewer
“Effects of urbanization on genetic structure in the song sparrow”
Major: Conservation Ecology
Faculty Advisor: Dr. Karen Mabry, Biology (HHMI)
We investigated the effects of urbanization on genetic diversity and genetic structure in rural and urban populations of song sparrows (Melospiza melodia). We genotyped 223 song sparrows captured at 7 sites along a gradient of urbanization and in and around Blacksburg, VA, using 15 polymorphic microsatellite loci. We used GENEALEX and STRUCTURE to assess genetic diversity and genetic structure among capture sites. We found that genetic diversity was comparable between urban and rural song sparrow populations, and found no significant genetic structure. Results to date are consistent with genetic panmixia in a less urbanized environment.

Makenna Caballer
“The Gender Flipped Alter Ego in High Tension”
Major: Gender & Sexuality Studies
Faculty Advisor: Dr. Laura Williams, Interdisciplinary Studies
Gender & Sexuality Studies
High Tension is a French slasher film with a plot twist. Marie and Alex are college students visiting Alex’s family when we are introduced to the mysterious killer. In the end, it is revealed that Marie has been the killer all along and she has been the unreliable narrator. In my essay I discuss the final girl characteristics of Marie and the gender construction of her and of her alter ego, the male killer. I explore how this type of character, the protagonist with a villainous alter ego, is portrayed throughout this film while discussing gender and sexuality.

Carlos Campos
“Microsatellite Analyses of the Critically Endangered Blue-Throated Macaw (Ara glaucogularis)”
Major: Biology
Faculty Advisor: Dr. Timothy Wright, Biology (HHMI)
A key aspect in the conservation of endangered populations is understanding their underlying genetic structure. The Blue-Throated Macaw is endemic to Bolivia and is the most endangered species of macaw still existing in the wild. We plan to use genotyping data to create a pedigree and structure analysis to aid Blue-Throated Macaw conservation and breeding programs. PCR was used to amplify 12 polymorphic microsatellite loci from 33 wild and 37 captive Blue-Throated Macaws. Individuals were genotyped at each locus to determine genetic diversity and relatedness. Future steps involve the addition of 40 more samples from wild individuals into the study.
Acidosis of the Symbiosis - A growing problem within the realm of corals
Brandon Castillo

Acidosis of the Symbiosis - A growing problem within the realm of corals. When environmental stress occurs, corals will bleach, releasing their symbiotic zooxanthellae into the water column. Without this symbiotic relationship, corals eventually die. This has very serious implications as coral reefs are considered a valuable component of the ocean’s biodiversity and provide ecosystem services exist. The objective of our study was to identify genetic influences on vasodilator drug response in PAH. The results identify several genetic variants that are potentially associated with vasodilator responsiveness in PAH. These results require replication of signals in an independent cohort.

Elucidating the Impact of Protein Phosphatases in the Replication Stress Response
Melissa Chavez

Elucidating the Impact of Protein Phosphatases in the Replication Stress Response. The DNA damage response (DDR) pathway is a complex network that promotes genomic stability. We are investigating the role of protein phosphatases (PP1, PP2, PP4, PP6, and Wip1) in modulating the cellular responses to replication stress in cells with depleted levels of the DDR protein, DNA ligase IV. We exposed BY549 cells to replication toxins to assess phosphorylation and of checkpoint proteins. We conducted immunofluorescence on these cells to investigate the distribution of the desired protein in the cells. Understanding the interplay between DDR proteins and phosphatases will provide novel insights into the biology of triple negative breast cancer.

Improving Biomass and Forage Quality of Alfalfa Using Genetic Engineering Tool
Gabriel Clark

Improving Biomass and Forage Quality of Alfalfa Using Genetic Engineering Tool. Alfalfa is a legume plant that forms root nodules which are the site for N2-fixation and nitrogen assimilation. Sucrose produced from the photosynthate in the leaves is transported to the nodules to provide energy and C-skeletons required for N2-fixation and N assimilation. We have genetically engineered alfalfa plants to produce more sucrose and these engineered plants exhibit increased biomass and superior forage qualities, two desirable traits for dairy farmers. The transgene is now being moved into elite alfalfa lines by backcrossing to check if these elite lines will retain its elite traits along with the additional superior traits associated with the transgene.

Can Catnip Help Breeders to Develop Superior Onions?
Anthony Colin

Can Catnip Help Breeders to Develop Superior Onions? Onion breeders must overcome the same destructive pests and diseases facing global production. The necessary process of enclosing flowering onions in fabric cages for a month of cross pollination limits our available control options. A field study was conducted during the 2017 growing season to assess the impact of a co-planting of catnip (Nepeta cataria L.) on onion thrips populations, development of the viral disease thrips transmit Iris Yellow Spot (IYS), resultant onion seed yield, and honey bee hive weight. Results indicate that co-planting catnip reduces populations of onion thrips with no effects on IYS disease severity and onion seed yield.

Steps to Reposition an Independent Restaurant
Anthony Cornwell

Steps to Reposition an Independent Restaurant. There are a total of 6 steps: 1) Understand Current Position, 2) Market Analysis, 3) Competitive Analysis, 4) Customer Analysis, 5) Positioning Strategy, and 6) Implementation. These principles have been used to analyze an actual independent restaurant, the Van Horn Cattle Company. Results of the analysis forecast an increase in revenue, customer satisfaction, and a regain of market share for the restaurant.
“Characterization of two highly expressed genes potentially involved in chemotaxis”

Major: Genetics
Faculty Advisor: Dr. Paula Mera, Chemistry & Biochemistry
NM Space Grant

Chemo taxis allows bacteria to adapt by moving to chemically favorable environments. In Caulobacter crescentus, the gene cagA is found within a region that controls chemotaxis; however, its function remains unknown. Our hypothesis is that CagA has a role in chemotaxis. To test our hypothesis, we used genetic engineering, double recombination, and bacterial physiology assays. We found that Caulobacter encodes an additional gene (cagA1) with similar DNA sequence. We showed that CagA and CagA1 are membrane-bound. Our preliminary data suggest that CagA is an inhibitor of the rate of swarming. These are exciting results that are currently validating.

“Designing a novel backpack microphone for Budgerigars”

Major: Biology
Faculty Advisor: Dr. Timothy Wright, Biology
Southwest Natural Resources Career Track (SWNRCT)

Recording the vocal interactions of specific animals within a flock setting. We assessed the effects of these microphone backpacks on the vocal and social behavior of budgerigars prior and after the attachment of backpack. The backpacks had minimal effects on behavior, suggesting that this design will be useful for recording vocal interactions within larger groups.

“Characterizing the onset of DNA replication and segregation in bacteria”

Major: Chemical Engineering
Faculty Advisor: Dr. Paula Mera, Biochemistry

There is still a lot unknown in how bacteria regulate and maintain DNA replication and segregation coordinated throughout the cell cycle. The proteins DnaA and ParA are involved in triggering the onset of replication and segregation, respectively. Our hypothesis is that DnaA and ParA “talk” to one another. I will construct a strain of Caulobacter crescentus with parA controlled under an inducible promoter and the wild type copy of parA clearly deleted. I will determine if altered ParA levels or expression of a variant ParA affects the physiology, morphology, and timing of chromosome replication and segregation.

“Female Maturation into Monstranity in Stoker, The Witch, and Raw”

Major: Digital Film Making
Faculty Advisor: Dr. Laura Anh Williams, Interdisciplinary Studies
Gender & Sexuality Studies

As examples of a new sub-genre in horror, I argue that these films blend conventional elements from the horror genre with those of a dramatic coming-of-age story, resulting in a narrative that explores the horrors of female maturation through a new lens that allows for a rich, nuanced telling of the female experience where the protagonist is both the monster and hero of her story.

“Biomass Carbon Capacitors”

Hawaiian coral reefs generate approximately $800 million annually with over 10% of that revenue due to tourism. However, lack of regulating tourism and human impact has led to corals being threatened and/or destroyed. Factors such as chemicals from sunscreen, increased CO2, ocean acidification, and diving or snorkeling combined have immense consequences on the coral ecosystem. Therefore, we examined the effects of tourism by assessing the use of national and state parks to obtain information regarding human impacts due to tourism. Data analyzed will help determine what types of changes need to occur to protect this natural resource.

“Design and Fabrication of a Bioinspired Robotic Jellyfish Using Cable-Driven Actuators”

Major: Mechanical Engineering
Faculty Advisor: Dr. Abdessattar Abdelkefi, Mechanical and Aerospace Engineering

Currently, there is a growing need for the adaptation of autonomous robotic systems capable of performing tasks in aquatic environments that present a challenge for hominoid observation. This challenge persists due to human fragility in aqueous environments and the underdeveloped robotic systems that are deployed. Our solution to this problem is to work on the design and fabrication of a bioinspired robotic jellyfish that can operate underwater with a high-power efficiency. The motion of the system will be performed using cable-driven actuation. After fabrication, the system will be tested at the NMSU water pond to determine if it is viable for a specific mission.

“Biomass Carbon Capacitors”

Major: Chemical Engineering
Faculty Advisor: Dr. Meng Zhou, Chemical and Materials Engineering

Energy storage devices such as capacitors and supercapacitors have been a crucial aspect of recent technology such as electric vehicles, memory, emergency systems, and affordable water deionization. Capacitors were constructed of carbon composites materials produced from biomass that is coated on graphite substrates. The carbon composites used were characterized by XRD, Raman, SEM, TEM, TGA, and ASAP to confirm the quality of electrode material used. The resulting capacitor is then subjected to cyclic voltammetry and galvanostatic charge/discharge tests. This research showed the viability of sustainable composite electrodes and capacitors for various commercial applications.

“Female Maturation into Monstranity in Stoker, The Witch, and Raw”

Major: Chemical Engineering
Faculty Advisor: Dr. Paola Mera, Biochemistry

InStoker, The Witch, and Raw, the monster and hero of the story is outside of their ideal range of 73°F to 84°F. Corals have a low tolerance for increased water temperature. Resistant corals will be healthier and able to support a more varied fauna. Long-term conservation of diverse coral reefs is the foundation for sustainable fishing, increasing tourism, and conducting bio-medical research.

“Biomass Carbon Capacitors”

Major: Chemical Engineering
Faculty Advisor: Dr. Michele Nishiguchi, Biology

We examined the effects of tourism by assessing the use of national and state parks to obtain information regarding human impacts due to tourism. Data analyzed will help determine what types of changes need to occur to protect this natural resource.

“Biomass Carbon Capacitors”

Major: Chemical Engineering
Faculty Advisor: Dr. Abdessattar Abdelkefi, Mechanical and Aerospace Engineering

Currently, there is a growing need for the adaptation of autonomous robotic systems capable of performing tasks in aquatic environments that present a challenge for hominoid observation. This challenge persists due to human fragility in aqueous environments and the underdeveloped robotic systems that are deployed. Our solution to this problem is to work on the design and fabrication of a bioinspired robotic jellyfish that can operate underwater with a high-power efficiency. The motion of the system will be performed using cable-driven actuation. After fabrication, the system will be tested at the NMSU water pond to determine if it is viable for a specific mission.

“Biomass Carbon Capacitors”

Major: Chemical Engineering
Faculty Advisor: Dr. Michele Nishiguchi, Biology

We examined the effects of tourism by assessing the use of national and state parks to obtain information regarding human impacts due to tourism. Data analyzed will help determine what types of changes need to occur to protect this natural resource.

“Biomass Carbon Capacitors”

Major: Chemical Engineering
Faculty Advisor: Dr. Abdessattar Abdelkefi, Mechanical and Aerospace Engineering

Currently, there is a growing need for the adaptation of autonomous robotic systems capable of performing tasks in aquatic environments that present a challenge for hominoid observation. This challenge persists due to human fragility in aqueous environments and the underdeveloped robotic systems that are deployed. Our solution to this problem is to work on the design and fabrication of a bioinspired robotic jellyfish that can operate underwater with a high-power efficiency. The motion of the system will be performed using cable-driven actuation. After fabrication, the system will be tested at the NMSU water pond to determine if it is viable for a specific mission.
EMILY GREEN
"Challenging visual search creates better incidental memories for objects and their perceptual features"
Major: Psychology
Faculty Advisor: Dr. Michael Houck, Psychology
Honors Thesis
During repeated visual search, memory for non-target items allows for swifter search decisions, and working memory (WM) load has been shown to affect how well a searcher remembers these "distractors." Through four experiments, we varied WM load by asking participants to search for a certain amount/type of objects. Afterwards, participants were given a surprise memory test in which they had to choose between three (or 16) foil objects and a previously seen item. Results showed higher accuracy for high WM loads and a tendency to choose incorrect items that visually resembled the correct one.

ALIAH GUERRERO
"Environmental conditions and timing of hatch of largemouth bass Micropterus salmoides in a Southwest irrigation reservoir"
Major: Fish and Wildlife Conservation Ecology
Faculty Advisor: Dr. Colleen Caldwell, Fish and Wildlife Conservation Ecology (SWINHTC)
Elephant Butte Reservoir is the largest reservoir in New Mexico and home to a population of Largemouth Bass, New Mexico’s most popular warmwater sportfish. However, recruitment into the population is currently limited. Ecological processes that underlie recruitment include predation, food availability, and abiotic factors such as water temperature and water level. Our goal was to relate environmental conditions to timing of hatch of Largemouth Bass. We retrospectively identified a range of hatch dates using otoliths from young fish and compared these hatch dates to water temperatures and water level. Hatching occurs as temperature approaches 18.3°C and when water level is stable.

CLARA HANSEN
"Social Affiliation and Call Sharing in Budgerigars (Melopsittacus undulatus)"
Major: Biology
Faculty Advisor: Dr. Timothy Wright, Biology (HHMI)
Vocal learning, the ability to modify acoustic sounds based on social context, is a trait important for species living in social groups. We investigated whether captive budgerigars who are more affiliated with each other in a social network share a higher proportion of call types. We examined the relationship for 3 different groups of birds consisting of various sizes and sexes. Contact call recordings and behavioral observations were conducted for a period of 4 weeks. We found a weak correlation between birds the proportion of shared call types and strength of affiliative connections.

ALYSSA HENDREN
"Phytoremediation of Soils with Salt and Heavy Metal Contamination"
Major: Chemical Engineering
Faculty Advisor: Dr. Catherine Brewer, Chemical Engineering (AMP)
Salinity in soil can complicate the process of heavy metal phytoremediation as suitable plants need high uptakes and tolerances for both contaminants. In arid regions, salinity can be hard to manage as high evaporation rates and low precipitation rates cause a buildup of salt in the root zone of plants, making plant growth difficult. The goal of this project is to identify salt-tolerant native plant species and evaluate their phytoremediation potential. A literature review was conducted on existing phytoremediation research. Three plants of interest were identified: Larea tridentata (creosote), Baccharis sarothroides (desert broom), and Nerium oleander (oleander). Soil from Sunland Park, NM, an area contaminated with lead and arsenic from the old ASARCO smelting operations, was collected and characterized. A greenhouse study was designed to test the plants’ ability to uptake lead and arsenic when exposed to varying levels of stress from heavy metals and salt.

ANTONIA HOLGUIN
"Comandanta Ramona: A Zapatista Revolutionary Woman"
Major: Government
Faculty Advisor: Dr. Mamal Hamzaeh, Gender & Sexuality Studies
This presentation is a testimonio drawing from Comandanta Ramona’s speeches and reflecting on her role in the Zapata movement. The Zapatistas are rebels and civil rights activists who have fought for gender equality and the rights of indigenous peoples in Southern Mexico since 1994, the year that the North American Free Trade Agreement came into effect. Comandanta Ramona’s testimonio will demonstrate her fight countering heteronormative and capitalistic power structures making her a revolutionary inspiration in Mexico and beyond.

GRACE HOOKS
"Targeting ERBB3 in Triple Negative Breast Cancer"
Major: Biology
Faculty Advisor: Dr. Amanda Ashley, Chemistry & Biochemistry (HHMI)
Triple Negative Breast Cancer (TNBC) is an aggressive clinical subtype of breast cancer that has no ERBB2 gene amplification. We sought to identify genetic vulnerabilities specific to anthracycline-resistant TNBC that can be targeted for therapy. ERBB2 is an epidermal growth factor receptor protein that heterodimerizing with other EGFR proteins such as ERBB3 to stimulate intracellular signaling. We identified ERBB3 as a potential target in doxorubicin-resistant TNBC. ERBB3 depletion does not increase sensitivity to doxorubicin, however, results show that apoptosis in TNBC cells is triggered by knockdown alone, and hence ERBB3 may be a target of therapeutic interest.

MICHAEL KAEMINGK
"Preparation for Experiments in Nuclear Physics"
Major: Engineering Physics
Faculty Advisor: Dr. Robert Cooper, Physics
Honors Thesis
Nuclear physics seeks to answer the questions regarding the fundamental nature of our universe. To accomplish this, it investigates the interactions of particles. The instrumentation needed to make these measurements must be designed, built, tested, and monitored to ensure accurate results. As an undergraduate researcher, I am participating and have participated on this work for the COHERENT experiment, the ATLAS experiment, and the Captain Mills experiment. My work has involved simulations, hardware development, software development, and data analysis.

JACQUELINE KIELTYKA
"Overexpression of Insulin-like Growth Factor Binding Protein 1 (IGFBP1) Drives Tamoxifen Resistance in Human MCF-7 Breast Cancer Cells"
Major: Biochemistry, Biology, Chemistry
Faculty Advisor: Dr. Kevin Houston, Chemistry & Biochemistry (INBRE)
Tamoxifen is a commonly prescribed adjuvant treatment for breast cancer patients with estrogen receptor (ER)-positive breast cancer. In addition to selective estrogen receptor modulation, Tamoxifen acts on the G-Protein Coupled Estrogen Receptor (GPER1) pathway. This pathway has proved to be a mechanism of Tamoxifen resistance acquisition in MCF-7 breast cancer cells. It has also been shown that GPER1 mediates the accumulation of the insulin-like growth factor binding protein 1 (IGFBP1), resulting in the inhibition of the IGF-1 R in (ER)-positive breast cancer cells. This study investigates how overexpression of IGFBP1 affects Tamoxifen resistance, further emphasizing the role of GPER1 in Tamoxifen efficacy.
TRAVIS LEDOUX
“Continuous Flow Hydrothermal Liquefaction of Algae”
Major: Chemical and Material Engineering
Faculty Advisor: Dr. Catherine Brewer, Chemical and Material Engineering (AMP)

Biofuels produced from a third generation of algae for hydrothermal liquefaction (HTL) continue to develop rapidly. Advantages of algae-derived bio-crude oils from hydrothermal liquefaction include high algae growth rates and strong CO2-mitigation potential. For HTL, hot subcritical water is used to depolymerize lipids, proteins and carbohydrates in algae; variations to the HTL temperature, pressure, and reaction time enable optimization of the bio-crude oil yields. Oil yields can be further optimized by transitioning from batch reactors to continuous flow reactors due to the higher heating rates and steady-state conditions. Work on the development and testing of a pilot-scale continuous flow HTL reactor this semester has included system recommissioning for higher pressure and temperatures, continuous operation of gradually increasing solids loading levels of algae, and characterization of products produced from HTL of algae grown on wastewater.

ESAI LOPEZ
“Phytoremediation of Heavy Metal Contamination on Arid Soils”
Major: Chemical Engineering
Faculty Advisor: Dr. Catherine Brewer, Chemical Engineering (AMP)

Larrea tridentata (creosote bush), Baccharis sarothroi (desert broom), Nerium oleander (oleander) have been identified as species that grow in arid regions and particularly for urban farms. We expect that this research will diversify, stabilize, and fortify local ecosystems while simultaneously bringing our communities closer in touch with nature.

SICILEE MACKLIN
“Characterization of Anthocyanin in Guar Seed Hulls”
Major: Chemical and Materials Engineering
Faculty Advisor: Dr. Catherine Brewer, Chemical and Materials Engineering (AMP)

The goal of this project is to characterize guar seed hulls which contain darkly-colored anthocyanin compounds. A general perception is that lightly-colored guar seeds produce high quality gums. Here, guar seeds of varying colors will be characterized by extraction and chromatography methods to identify and quantify the anthocyanin compounds. These results will be compared to the galactomannan content and size distribution of the polysaccharides as markers of guar gum quality. Several anthocyanins have potential for higher value applications such as antioxidants. The most abundant and promising anthocyanins in guar seed hulls will be identified.

RAKHILA MAMENOVA
“Comparison of carotenoid extractions using fresh and freeze-dried tomatoes”
Major: Biology
Faculty Advisor: Dr. Ivette Guzman, Plant and Environmental Sciences (AMP)

Carotenoids work as antioxidants that quench free radicals at the cellular level. Free radicals can cause cell injury and could lead to cancer and chronic disease. Carotenoids (yellow, orange, and red pigments) are found in many fruits and vegetables like tomatoes (Lycopersicum esculentum). This study investigated lutein and zeaxanthin in four different varieties of tomatoes utilizing two different methods. Tomatoes were grown at the USDA organically certified NMSU Student Research and Education Garden. Results indicate a difference in carotenoid amounts between two extraction methods. Our goal is to know whether fresh or dried tomatoes in our diet deliver more carotenoids.
a critical role in establishing new associations under changing environmental conditions.

**CLAURA MAXAM**
“Divine Immune Response to Inhibition of CXCR4 during Early Pregnancy”
Major: Animal Science
Faculty Advisor: Dr. Ryan Ashley, Animal and Range Sciences

Immunological changes after inhibiting chemokine receptor 4 (CXCR4) at the fetal-maternal interface in sheep were investigated. Osmotic pumps containing CXCR4 inhibitor or saline (control) were surgically installed to deliver treatments into the ovine uterus. Blood was collected daily and spleen tissue collected at necropsy on days 20 and 35 of gestation for mRNA analysis. Compared to control, TGFβ1 expression rose on day 14 and IL10 declined on day 26 in peripheral blood. In spleen from treated ewes, TGFβ1 increased while IL10 decreased on days 20 and 35, respectively. These results indicate disrupting CXCR4 signaling in the uterus affects peripheral immunity.

**LAURAINMEDIAVILLO**
“Deciphering microbial communication in a beneficial mutualism: Cross species quorum sensing between Vibrio logei and Vibrio fischeri symbionts in Sepiola affinis”
Major: Biochemistry
Faculty Advisor: Dr. Michele Nishiguchi, Biology

The Environmental Protection Agency (EPA) has certified 25 ingredients more or less safe for humans and environmental use. The purpose was to determine the percent attraction in female Aedes aegypti to humans in presence of each of these 25 ingredients e.g. cinnamon oil, citrusella oil etc. at four different time points: 0,1,2 &3 hours. A Y-tube experiment was done for each oil and the percent attraction rate was calculated each time by counting number of mosquitoes close to the human containing 500 ul of oil.

**MATTHEW MENA**
“Contrasting mitochondrial metabolism with glycolysis in cancer cells with time-resolved flow cytometry”
Major: Chemistry
Faculty Advisor: Dr. Jessica Houston, Chemical Engineering

Cancer cells exhibit unique genetic, intrinsic, and conformational differences as compared to their non-transformed counterpart. All these transformations are associated with uncontrollable cell growth, inhibition of apoptosis, and intense anabolism. Thus, evaluation of glucose uptake in cells is fundamental for cancer research.

**KARLY MILLER**
“Using Gene Editing to Explore Directed Cell Migration During Sea Urchin Development”
Major: Biology
Faculty Advisor: Dr. C. Brad Shuster, Biology

During gastrulation, changes in cell shape, adhesion, and mobility drive the formation of the germ layers. Work in the lab has identified the Cdc42 as a potential regulator of Primary Mesenchymal Cell (PMC) mobility and skeletonogenesis in the sea urchin embryo. To further examine the role of Cdc42, we are applying CRISPR/Cas9 gene editing to inactivate Cdc42. Five target single guide RNAs (sgRNAs) were designed and transcribed in vitro, and will be co-injected with Cas9 mRNA into sea urchin eggs. Protocols for in vitro and in vivo validation will be developed to verify the editing efficacy of each sgRNA.

**JOHN MIYAGISHIMA**
“Green Earthen Embankment for Controlling Soil Erosion”
Major: Civil Engineering
Faculty Advisor: Dr. Reza Foudazi, Chemical and Materials Engineering

The purpose of this experiment is to study the effects of molecular weight on polyetherulfone (PES) membranes. Using a mix of two different molecular weight (Mw) PES at the same concentration to find a viscosity that mimics a higher Mw PES, we can find a relation of the amount of lower or higher Mw PES that affects the properties more. According to results, having 0.8 g lower Mw PES and 0.08 g higher Mw PES had the closest viscosity. More results will be obtained by creating more mixtures to bring the best viscosity to concentration that of the higher Mw PES.
MONICA MUNOZ
“Everyday Woman, Revolutionary Woman”
Major: Government
Faculty Advisor: Dr. Manal Hamzel,
Gender and Sexuality Studies
Honors Thesis

This presentation is a testimonio about my mother, Jasmine Harris, and about her experience being diagnosed with epilepsy four years ago. This testimonio will lay out the social, financial, and health challenges that she is continually struggling with. The testimonio will expose a bigger pattern of ableism, classism, and sexism.

Budgerigars evolved a lifelong communicative plasticity allowing them to converge upon shared contact calls within a new social group. Data suggests this plasticity may be due to downregulation of FoxP2 in vocal nuclei in budgerigars. We hypothesize that FoxP2 overexpression decreases neuropasticity involved in song learning, thus limiting budgerigars’ ability to learn new contact calls therefore affecting social integration. Here we present the development and troubleshooting of techniques to test our hypothesis on the role of FoxP2 in vocal learning in budgerigars.

DEVIN NARVESON
“Everyday Woman, Revolutionary Woman”
Major: Government
Faculty Advisor: Dr. Mandal Hamzel,
Gender and Sexuality Studies
Revolutionary Women

While a child is developing, it is important to take advantage of the plasticity of the brain to advance physical, cognitive, and social skills. However, children with disabilities are not, always, as able to benefit from that time. In this study we 3D printed an EEG cap that will record brain activity while participants are completing a motor task. The research goal is to better understand the neural mechanisms in children with motor deficits. By better understanding these mechanisms, further research can be conducted to understand how socially assistive robots (SARs) might be designed to benefit children with motor disabilities.

KENDALL OGLE
Major: Communication Disorders
Faculty Advisor: Dr. Srikanta Mishra,
Special Ed and Comm Disorders
Honors Thesis

Hearing loss is one of the most undetected disabilities globally. Hearing healthcare services are often underserved in developing areas. As a result, there is higher prevalence of hearing loss or deafness in populations within these areas. This thesis investigates and critically reviews contemporary research on the subfield of humanitarian audiology to present possible outcomes, pitfalls, and solutions of humanitarian audiological practices and services in specific regions. From this research, a set of practical guidelines for prospective audiology students and licensed audiologists within the United States has been developed to help clarify and contribute information within the subfield. These guidelines provide essential and awareness on hearing loss and prevention methods.

CAILEE NELSON
“3D Printing of EEG Cap for Socially Assistive Robot Development”
Major: Psychology & Human Resources Management
Faculty Advisor: Dr. James Kroger, Psychology
BP-ENDURE (BRAIN)

Using growth curves, I observed a reproducible difference in growth rate of this mutant strain compared to wild-type. The resulting testimonio will shed light on the revolutionary transformation of grassroots organizing done by and for women. Rural activism highlights and demonstrates that reciprocity and solidarity are necessary to revolutionize communities often concealed by larger institutions.

FRANCESCAS ORTEGA
“Evaluation of a large-scale survey method shows potential for invasive species management”
Major: Genetics and Biotechnology
Faculty Advisor: Dr. Brook Milligan, Biology
Sundi Thal

Mexico is a mega-diverse country; however, its biodiversity is threatened by invasive species that disrupt the balance of ecosystems. A method for efficiently addressing them is vital for maintaining biodiversity. An autonomous aerial survey system shows potential for large-scale evaluation of invasive species. To verify this system, we compared aerial data to data from ground-based field work. Aerial data was gathered 30 meters above ground via a box search pattern, covering a plot containing the invasive species Tillandsia recurvata. Verification of a reliable survey system will promote identification and eradication of other invasive species in Mexico.

ANAYANSI ORTEGA-TRINIDAD
“Nicol Chinchilla, Revolutionary and Founder of Uptica”
Major: Social Work
Faculty Advisor: Dr. Judith Flores Carmona,
Curriculum & Instruction
Revolutionary Woman Class

This presentation is the testimonio of Nicol Chinchilla, a Costa Rican who at twenty-four years old addressed issues of gender inequality, environmental protection, and the empowerment of women through her community-based organization Uptica. Employing ethnography (an intimate conversation), a Chicana methodology Nicol will share about her community, her motivation for Uptica, and her commitment to addressing global social injustices at a community level. The resulting testimonio will shed light on the revolutionary transformation of grassroots organizing done by and for women. Rural activism highlights and demonstrates that reciprocity and solidarity are necessary to revolutionize communities often concealed by larger institutions.

PABLO PARADIS
“Mid-infrared optical constants of InAsSb alloys and bulk GaSb”
Major: Physics & Electrical Engineering
Faculty Advisor: Dr. Stefan Zollner, Physics

Doped and undoped layers of InAsSb alloys were grown on similar GaSb substrates by MOCVD. Their optical constants were determined using two different methods. First, we expanded the dielectric function into a sequence of Kramers-Kronig consistent B-spline polynomials, assuming thicknesses obtained from the growth parameters. Second, we fitted the data as a sum of oscillators representing the free-carrier and interband optical response, which allows a physical interpretation of the results. In the doped layers, a free-carrier reflection band can clearly be seen in the spectra, while the undoped layers show an absorption increase at the band gap.

ANDREW PARRA
“Characterization of Caulobacter mutant strain that is chloramphenical resistant”
Major: Biochemistry
Faculty Advisor: Dr. Paola Mera, Biochemistry

Understanding how bacteria develop resistance to antibiotics will advance the treatments of bacterial infections. We have a potentially novel mutation in Caulobacter crescentus that results in chloramphenical resistance. Our hypothesis is that this mutation makes cells weaker compared to wild-type. Using growth curves, I observed a reproducible difference in growth rate of this mutant strain compared to wild-type. Using Colony Forming unit assays, I discovered that the mutant strain is less viable. Under high-resolution microscopy, the mutant cells seem to be chubbier compared to wild-type. I am currently testing growth rates in different media, and quantifying differences in cell size.
HAILEY PECK
“Abroad in Nepal: Why International Travel is Valuable and Beneficial”
Major: Wildlife Science
Faculty Advisor: Dr. Brook Milligan, Department of Biology
Center for Molecular Dynamics Nepal (CMDN)
The benefits of traveling are more pronounced now since international travel has increased. Our experiences in Nepal allowed us to personally recognize the benefits of international travel. Travel nurtures societal ideology and affects individual perception of the world. If people traveled more, society would benefit from the increase in global health, higher economic output, and a calm political scene. Individuals can nurture their network, grow as an individual, and empathize with anyone on the planet. International travel will foster a healthier population that is capable of efficient progress and compromise.

ANDREW PHILLIPS
“The Effects of Lossy EEG Compression on ERP Analysis”
Major: Electrical Engineering, Computer Science
Faculty Advisor: Dr. Brook Milligan, Department of Biology
Will foster a healthier population that is capable of efficient progress and compromise.

HAILEY PECK
“Abroad in Nepal: Why International Travel is Valuable and Beneficial”
Major: Wildlife Science
Faculty Advisor: Dr. Brook Milligan, Department of Biology
Center for Molecular Dynamics Nepal (CMDN)
The benefits of traveling are more pronounced now since international travel has increased. Our experiences in Nepal allowed us to personally recognize the benefits of international travel. Travel nurtures societal ideology and affects individual perception of the world. If people traveled more, society would benefit from the increase in global health, higher economic output, and a calm political scene. Individuals can nurture their network, grow as an individual, and empathize with anyone on the planet. International travel will foster a healthier population that is capable of efficient progress and compromise.

ALISHA PORTER
“The Effects of Lossy EEG Compression on ERP Analysis”
Major: Gender/Sexuality
Faculty Advisor: Dr. Manal Hamzeh, Gender/Sexuality
Revolutionary Women’s Class
This presentation is a multi-media testimonio of a revolutionary “queer in queer spaces.” It is a testimonio of a queer woman of color negotiating normative preassigned identities. Drawing on Chicana feminist theories of the flesh (Moraga/Anzaldúa, 2001), I build my testimonio by employing personal journal entries and essays, as well as, using the feminist tool of critical self-reflexivity. I expose the injuries I experienced living within the “walls of institutions” (Ahmed, 2017) and theorize how I persevered living in the margins, resisted violence, defied the normative/oppressive systems of power, and reclaimed my queer identity.

JENNA RABE
“Queer in Queer Spaces: A Revolutionary Woman”
Major: Geography- Human Environment Relationships
Faculty Advisor: Dr. Manal Hamzeh, Gender & Sexuality
Revolutionary Women’s Class
This presentation is the testimonio of Samira Ibrahim, a revolutionary woman who fought against the injustice enacted by the Egyptian military after January 25th revolution. Samira experienced state-sanctioned gendered violence a day after Women’s International Day, 2011. The testimonio brings light to the resistance and courage of those revolutionary women fighting against the military “virginity test” and the complicity of counter-revolutionary governments.

PRISILA RAMIREZ
“Assessing the role of DNA-PKcs in R-loop formation”
Major: Genetics and Biotechnology
Faculty Advisor: Dr. Amanda Ashley, Chemistry and Biochemistry (HHMI)
Impediments to transcriptional progression and DNA damage can increase R-loop formation. These DNA-RNA hybrids form when nascent RNA invades the replication bubble, hybridizes with one strand of DNA, thus displacing the other, leaving this ssDNA vulnerable to DNA damage and activating the DNA damage response. The DNA repair protein DNA-PKcs has an established role in DNA double strand break repair, promotes replication fork restart, interacts with RNA Pol II, and associates with known R-loop regulatory proteins, but whether it regulates R-loop biology remains unknown. Here, we focus on the role DNA-PKcs may have in R-loop formation and resolution.

JOVANNAH RAMIREZ
“Investigating the Transition Phase Within Push Pull Systems Induced Starvation of Horn Flies (Haematobia irritans)”
Major: Animal Science
Faculty Advisor: Dr. Brandon Smythe, New Mexico State University Veterinary Entomology Research Laboratory
The use of push-pull strategies for horn fly control may provide alternative approaches to help alleviate on-going issues with insecticidal control methods. However, the current push-pull model assumes that pest species can be deterred (pushed) into a state of attraction (pulled) with little attention given to costs associated with transitioning between the two stimuli. As an obligate hematophagous pest, horn flies require multiple blood meals throughout the day. Therefore, the objective of the current study is to determine the fitness cost associated with extended states of starvation of the horn fly as measured by insecticide tolerance.

PAIGE RAMSEY
“Spatial distribution of conservation easements in the United States: drivers and implications”
Major: Geography
Faculty Advisor: Dr. Michaela Buennemann, Geography Honors Thesis
We characterized, explained, and predicted the current spatial distribution of conservation easements in the United States to help land trusts identify landowners for future conservation easement development. We did so by integrating a diversity of potential human and environmental explanatory variables in spatial maps and models. Our results indicate hot spots of conservation easements in California, the Rocky Mountains, and the North-East and cold spots of conservation easements in the Great Basin, the Great Plains, and the Upper Midwest. Our findings also show that human variables, especially population age and density, are stronger predictors of conservation easement than environmental variables.

ASHLEY REYNOLDS
“Rainforests of the Sea: Preserving Biodiversity of Hawaiian Reefs”
Major: Wildlife Science
Faculty Advisor: Prof. Michelle Nishiguchi, Biology
Department of Biology
Corals are the foundation of the Hawaiian reefs, which are home to a wide variety of marine life. Humans are major contributors of greenhouse gases, which are causing atmospheric and ocean temperatures to rise. Continued pressure from such anthropogenic factors will not only affect corals, but also the many species of organisms that live on or around the reef, leading to a decline in the ocean’s biodiversity. We are investigating the effects of coral bleaching on reef biodiversity. Preserving Hawaiian reefs is not only crucial for maintaining this biodiversity, but also Hawaii’s economy, culture, natural resources, fisheries, agriculture, and tourism.

ANA REYNOLDS
“Tension in Classical Conservatism: Can a compromise be reached to address climate change?”
Major: Government
Faculty Advisor: Dr. Neil Harvey, Government Honors Thesis
Climate change is an extremely complex issue, and the two major political parties have politicized the issue so much that a compromise would be difficult to reach. The possible world that I put forward is one where the Classical Conservatives address the problem of climate change. The difficulty is that the ideology is complex and it does not provide a straight
answer to the problem but in-depth analysis by classical conservatives, like Michael Oakeshott, offers a genuine solution that can lead to positive effects on performance later in life, termed hormesis. In this study, we used x-ray radiation condition horrendous as a pretreatment in transgenically modified Drosophila melanogaster to not only lessen the severity of their symptoms but also improve their lifespan. Parkinson’s disease (PD) is the world’s second leading neuro-degenerative disease and the number one movement disorder characterized by the loss of dopaminergic neurons. Early life stress events can have consequences on organismal performance later in life and these effects vary with exposure severity. If the severity is mild enough it could lead to positive effects on performance later on in life, termed hormesis. In this study, we used x-ray radiation conditioning horrendous as a pretreatment in transgenically modified Drosophila melanogaster in order to not only lessen the severity of their symptoms but also improve their lifespan and healthspan.

JADZIA RODRIGUEZ

“Influence of Local and Landscape Factors on Burrowing Owl Artificial Habitat Site Occupancy in Arizona”
Major: Wildlife Science
Faculty Advisor: Dr. Martha Desmond, Department of Fish, Wildlife and Conservation Ecology
Wilson Ornithological Society 2018 Jed Butt Undergraduate Mentoring Grant ($1000)

The Western Burrowing Owl (Athene cunicularia hypugaea) is declining throughout its range. One common conservation and mitigation strategy involves the relocation of owls to artificial habitat. However, few studies have examined the influence of local and landscape factors on artificial burrow occupancy. We will assess how factors such as the site size, number of burrows, date of establishment, time since last maintenance and dominant land-use type influence occupancy of artificial habitat in the Phoenix, AZ area. Findings will allow us to provide recommendations for site selection to improve the methods of creating viable habitats.

DAVID RODRIGUEZ

“Fluorescence-Lifetime Measurements by Flow Cytometry: Revealing Altered Metabolism in Tamoxifen-treated Breast Cancer Cells”
Major: Chemical & Materials Engineering
Faculty Advisor: Dr. Kevin Houston, Chemistry and Biochemistry (HHMI), (CAMP)

Nicotinamide adenine dinucleotide (NAD) is a fluorophore involved in metabolic processes in living cells. It is critical for biochemical exothermic reactions. Intrinsic fluorescence properties can be used to measure changes in metabolic states that are associated with cancer cells compared to normal cells. Fluorescence-lifetime is measured by time-resolved flow cytometry. We hypothesize that tamoxifen treatment alters breast cancer cells’ metabolism. Treatment resulted in an increase in fluorescence-lifetime (1.3-2.7 ns) in a dose-dependent manner while tamoxifen-resistant cell line has significantly reduced fluorescence-lifetime (0.62 ns). Changes in fluorescence properties can be used to measure the effect of tamoxifen treatment in breast cancer cells.

ALEJANDRO SALAS

“Sequestration of Arsenic in Drainage Canal”
Major: Chemical Engineering-Water Resources
Faculty Advisor: Dr. Saim Bawazir, Civil Engineering (AMP)

The purpose of this research is to assess the absorption of arsenic by cattails (Typha latifolia) in drainage canals. The goal is to determine if cattails can reduce concentrations of arsenic before reaching larger streams, rivers, and lakes. Long-term exposure of certain forms of arsenic can be detrimental to human health. Samples of water, soil, and plant tissue are collected and tested for arsenic following testing standards. The detection limit of the instrument has a ~0.10 ppb and a linear calibration curve used as reference (0.5 ppb, 1 ppb, 10 ppb, 25 ppb, 50 ppb, 100 ppb).

JORDAN SALAS

“Se level of Confinement on the kinetics of of coordinated thiosulfate on Thiosulphato-pentaamine Cobalt Chloride”
Major: Biochemistry
Faculty Advisor: Dr. Michael Johnson, Chemistry & Biochemistry (MARC)

The properties and influence of water in confined environments is vital in biological systems. In particular, its ability to provide protons and a salvation media should influence reactivity. To address water’s changing properties at interfaces, we studied the monoperoxysulfate, HS(O)₃-, oxidation of sulfur ligands confined within AOT/isooctane/water reverse micelles. We observed that the rates of oxygen addition to a coordinate thiosulfate, SO₃S₂O₃²-, took place in two steps that correspond to the addition of two oxygens, i.e., the stepwise formation of metabisulfite, SO₂S₂O₃²-. Compared to rate constants in aqueous medium, the first step (addition of first oxygen) was accelerated & the second step (addition of second oxygen) was decelerated. Both reactions were readily determined using stop-flow techniques. The effect of varying sizes of reverse micelles is also reported.

ANDREA SALAZAR

“Berta Caceres: Hondureña Revolucionaria”
Major: Chemical Engineering
Faculty Advisor: Dr. Judith Flores Carmona, Curriculum & Instruction

This presentation is the testimonio of Berta Cáceres, an indigenous Lenca leader of Consejo Civico de Organizaciones Polulares e Indigenas de Honduras (COPINH). Through this testimonio, a Chicana feminist methodology we will bear witness to the systemic violence, attributed to U.S. globalization, imperialism, and capitalism endured by indigenous communities in occupied Honduras. Berta Cáceres’ resistance imperialism and genocide lead her to assassination. Interviews with Bertha Zongo Cáceres, her daughter, and the Honduran environmental justice movement will be part of the data utilized.

RIGO SALAZAR

“Total Focusing Method (TFM) Development for Lamb Wave based Structural Health Monitoring”
Major: Civil Engineering and Mathematics
Faculty Advisor: Dr. Elson Dalghani Niri, Civil Engineering (AMP)

Using a Lamb wave based total focusing method (TFM) with two clusters of sensors each consisting of seven embedded piezoelectric discs, the research is to detect and image oriented cracks in plate-like structures for the purpose of structural health monitoring (SHM). Structural health monitoring is a growing field and is the next logical step from non-destructive testing (NDT). Its ultimate purpose is to monitor a structure (such as a building) or a vehicle (such as an airplane or space shuttle) and determine any fatigue problems in real time so as to prevent a major disaster. The project is an attempt to perfect a method for a small aluminum plate and use that to build on finding feasible options on a larger scale.

AMANDA SCHMIDT

“NMSU Contributes to Nepal Tiger Genome Project”
Major: Biology
Faculty Advisor: Dr. Brook Milligan, Biology

Nepal, a biodiversity hotspot, is home to dwindling populations of Bengal tigers. CMDN uses noninvasive genetic techniques for research to estimate tiger populations, ID individuals, and aids in anti-poaching efforts. NMSU interns collected scat samples at Chitwan National Park using a DET buffer and silica gel. The scat samples were used for DNA extraction, and PCR and gel electrophoresis for carnivore identification to positively identify species and sex of the samples collected. Of 10 scat samples processed, nine were positively identified as tiger. These genetic based tools
**Galen Skibyak**

"Ikebana’s Journey to the West: History, Symbolism, and the Post World War II Rise in America"

Major: History
Faculty Advisor: Prof. Elvira Masson, History
Honors Thesis

The art of Japanese floral design, or Ikebana, can be traced back over 1500 years and continues in Japan and America alike. The art stemmed from the Buddhist practice of placing flowers in vases as prayers and evolved into a precise and mathematical art as it was practiced throughout China and into Japan. From there, Ikebana took America by storm in the mid 20th century with the development of the educational group Ikebana International in 1956. This paper discusses the origins, principles, meaning, and expansion of Ikebana from its Buddhist roots to its introduction into the United States of America.

---

**Sierra Strebe**

"Functional Characterization of Two Highly Expressed Genes in Caulobacter crescentus"

Major: Genetics & Biotechnology
Faculty Advisor: Dr. Paola Mera, Chemistry and Biochemistry (MARC)

Caulobacter crescentus utilizes chemotaxis that enables cell motility to respond to external chemical signals. The genes, cagA and cagA1, are highly expressed in the C. crescentus lifecycle (Schrader et al. 2016). Since the gene, cagA, is surrounded by genes associated with chemotaxis, we hypothesize that the protein encoded by this gene is involved in chemotaxis. Our results indicate that CagA and CagA1 are membrane proteins and their localization is favored at the poles of the cells. We will determine if they are outer or inner membrane proteins and their specific role in the chemotaxis apparatus.

---

**Tylan Tapley**

"An Honest Discussion Regarding Immigration"

Major: Government
Faculty Advisor: Dr. Gregory Butler, Government

This paper is written from the perspective of a student that directly studied the plight of the refugees within Germany from the war torn regions of far eastern nation-states. Many of the talking points and observations within are based off of experience gained from direct work with NGO’s and satellite organizations of the German government. This paper will discuss the ethical and practical questions revolving around the debate of the duties of other nation-states in regard to allowing in refugees from war zones.

---

**Alexis Torres**

"Therapeutic Interventions for Glioblastoma"

Major: Psychology
Faculty Advisor: Dr. Elba Serrano, Department of Biology (AMP)

Glioblastomas are among the most intractable of cancers, with a 5% five-year survival rate. We aspire to identify new treatments against brain cancers by evaluating the anti-neoplastic efficacy of drugs targeted against non-cancer disorders (drug repurposing). This pilot study initiates efforts to establish an experimental paradigm by evaluating the effects of an established anti-neoplastic agent, methotrexate, on cultured cell lines derived from human brain cancers. Nephrotoxic side effects of methotrexate treatment are assessed with the A6 kidney cell line. Preliminary results show our ability to quantify cell growth using canonical and inexpensive reagents in conjunction with open source software.

---

**Kristal Vargas**

"In Search of “Nutri-chemicals” in Yellow Capsicum Fruits"

Major: Horticulture
Faculty Advisor: Dr. Ivette Guzman, Plant and Environmental Sciences

Cauliflowers are rich in carotenoids, like lutein, that may be used to increase health promoting compounds in our diet.

---

**Sofia Villa**

"Impact of Joining Educators Rising"

Major: Bilingual/TESOL Elementary Education with a focus in Math
Faculty Advisor: Dr. Karen Trujillo, Curriculum and Instruction

In order to decrease the teacher shortage, we must "grow-our-own" by exposing, cultivating and transitioning students into the teaching profession. Educators Rising is a program which aims to accomplish this by placing high school students in the classroom and offering competitions related to education. While in college, students are able to build their resume and actually judge competitions. At the high school I attended (Gadsden High School), it was mandated to be in a career pathway in order to graduate. At the time I wanted to be a speech therapist and the closest career pathway was teaching. During my senior year, I participated in Educators Rising and after shadowing a speech therapist for my competition, I realized that teaching was my actual calling.