



THE UNIVERSITY OF ARIZONA  
GRADUATE COLLEGE

# Undergraduate Research Opportunities Consortium



# UROC

## Abstract Review

August 2015

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UROC: Undergraduate Research Opportunities Consortium 2015



# Summer Research Institute

Executive Director: Andrew Carnie, PhD

Program Director: Donna Treloar, MA

Faculty: Andrew Huerta, PhD

Summer Research Institute, funded by the University of Arizona, is open to juniors and seniors of all disciplines, including social science, humanities, fine arts, and STEM. SRI accepts students from other universities as funding is available.

# IAN EDWARD AVILEZ

SUMMER RESEARCH INSTITUTE



## **N**ORTHERN ARIZONA UNIVERSITY

FLAGSTAFF, ARIZONA

PI: DR. EDUARDO ROZO

### OPTICAL RICHNESS AND LUMINOSITY MASS ESTIMATION OF GALAXY CLUSTERS

**ABSTRACT:** Developing accurate optical mass tracers is important for maximizing the utility of optical cluster surveys like the DES and LSST. The current study compares X-ray galaxy cluster mass estimates with cluster richness and central galaxy luminosity, using a Bayesian analysis framework to measure the scatter in X-ray mass at fixed cluster richness/central galaxy luminosity. When using cluster richness, we find the scatter in X-ray gas mass is  $\sigma_{\ln M} = 0.246$ . We incorporate central galaxy luminosity as a second additional observable, finding a small decrease in the scatter,  $\sigma_{\ln M} = 0.239$ . This model will be extended to additional secondary observables, principally galaxy concentration and satellite galaxy luminosity.

# LINDA CIFUENTES

SUMMER RESEARCH INSTITUTE



**UNIVERSITY OF ARIZONA**

TUCSON, ARIZONA

PI: DR. SUSAN SHAW

## THE EFFECTS OF CULTURAL BELIEFS ON MEDICATION ADHERENCE AMONG MULTI-CULTURAL PATIENTS WITH DEPRESSION

**ABSTRACT:** Minority populations in the United States show lower medication adherence—taking medications as prescribed—rates compared to White populations. This project focuses on the effects of cultural beliefs about depression and psychotropic medications on medication adherence among underserved, multiethnic patients with depression. The purpose of this study is to provide examples of the various cultural perspectives that exist within a small group of American patients for health care practitioners to better communicate medical knowledge to their patients. Data was collected using five semi-structured, open-ended interviews conducted as part of a larger ongoing mixed-methods study in Springfield, Massachusetts. So far, a total of thirty-four interviews explore how patient beliefs about medication influence medication adherence. Themes were identified in the interviews, which demonstrate why patients’ medication beliefs affect how they take and experience their psychotropic medications. Three patients expressed that medication shapes their sense of self, noting that they are not “their true selves” when they are off their medications. This perception encourages medication adherence among these patients. Other factors that affect participants’ medication adherence are their sources of information and their explanatory models—explanations for how a disease or medication works—for depression and antidepressants.

# VANESSA DELGADO

SUMMER RESEARCH INSTITUTE



**W**ASHINGTON STATE

**UNIVERSITY**

PULLMAN, WASHINGTON

PI: DR. REGINA DEIL-AMEN

## FUNDS OF IDENTITY AMONG COMMUNITY COLLEGE STUDENTS IN THE DEVELOPMENT OF THE ACADEMIC SELF

**ABSTRACT:** Identities develop and change as individuals engage with social institutions. In particular, academic identities evolve as students navigate various levels of schooling. Over time, as students, especially students from disadvantaged backgrounds, move into higher education, this identity alters to adapt to strenuous college courses, participation in collegiate activities, and even transitions in enrollment between different academic institutions. Because of the evolving nature of these academic identities, this study explores the development of academic identity as students navigate college. This study borrows from a Funds of Knowledge (FoK) framework, which, rather than highlighting student deficits, foregrounds how students use the resources of their homes along with their lived experience to define themselves academically, and ultimately, use this academic identity to guide their educational trajectory. This research addresses a missing component in FoK by focusing on students' collegiate and self-development and also extends the research regarding the novice lens, Funds of Identity. Nearly 700 semi-structured interviews were conducted in 2012-2013 with students at nine different community colleges in eight states. Student narratives included discussion of their academic identity formation as well as their past and present academic self. Five student typologies were identified to describe those who shifted from a negative to a positive academic self-perception, from a positive to a negative academic self-perception and those whose self-perceptions remained consistent. Emerging analytic themes are further presented as the ways in which students experience their academic identity development and incorporate their lived experiences to help guide their behaviors toward college success.

**JAFET DIEGO**

SUMMER RESEARCH INSTITUTE

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**WHITTIER COLLEGE**

WHITTIER, CALIFORNIA

PI: DR. **BARBARA NORRANDER**

**THE INTERSECTIONALITY OF RACE AND GENDER IN LATINO ELECTORAL POLITICS**

**ABSTRACT:** In this study, the concepts of descriptive representation and linked fate are used to examine the intersectionality of race and gender in Latino electoral politics. By using the 2010 Cooperative Congressional Election Survey and the National Database of Non-White Elected Officials, STATA was used to conduct a chi-square test on the relationship between 1) the involvement in political activities, 2) voter contact, 3) turnout among Latino survey participants, and the number of Latino elected officials in the state legislature and note differences based on the gender of the participants. The hypothesis of this study is that Latinos will vote, be more politically involved, and feel more included in states in which there are more Latino representatives.

# DANNYA DESIREE ESQUIVEL

SUMMER RESEARCH INSTITUTE



**UNIVERSITY OF ARIZONA**

TUCSON, ARIZONA

PI: DR. PALOMA BEAMER

## **A COMPARATIVE STUDY OF TRAFFIC DENSITY AND DEMOGRAPHICS IN PIMA COUNTY**

**ABSTRACT:** Motor vehicle emissions contain toxins such as carbon monoxide and nitrous oxides (Grineski et al., 2007). As more automobiles travel in a designated area, the air becomes more contaminated and the hazardous chemicals may be associated with the development of diseases such as asthma (Mantaay, J., 2007). Previous studies classify some groups as being more vulnerable to these circumstances, as they reside in areas neighboring high levels of traffic density. The present research investigated this relationship for Pima County and considered minority status, income per capita, education attainment, unemployment levels and percentage of population under the age of 5, retrieved from the U.S. census bureau as factors that may be associated with traffic density. Annual Average daily traffic (AADT) counts were retrieved from the Pima Association of Governments using ArcGIS, the levels of traffic were divided into the top 25 percentile and the bottom 25 percentile, and were compared against sociodemographic elements for 1980, 1990 and 2000. A spatial regression model was also applied, as it revealed the demographic factors that were statistically significant indicators of traffic density. The most significant results came from income, as it was deemed statistically significant for 2000 and demonstrated the most drastic differences between the percentile groups over time. The comparison between income and traffic density is inverted, meaning more having money is related to lower levels of traffic. The study will continue, as it will provide a more in-depth analysis of the relationship between traffic levels and sociodemographics in Pima County across time.

# ANDREA FULGHAM

SUMMER RESEARCH INSTITUTE

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**UNIVERSITY OF ARIZONA**

TUCSON, ARIZONA

PI: DR. TYLER PETERSON

## **LANGUAGE REVITALIZATION: METHODS, MOTIVATION, AND THE ROLE OF THE LINGUIST**

**ABSTRACT:** This paper explores three aspects of language revitalization, including: revitalization programs which involve teaching and learning methods along with supplemental devices; possible motivational tools to keep existing and attract new language teachers and learners; and examining the role that the linguist plays in the efforts to rehabilitate endangered or dormant languages. Indigenous communities, language professionals and others that are involved in rehabilitation projects continue their endeavors to revive endangered or extinct languages with teaching methods like oral immersion lessons in homes and schools, and programs like the Master-Apprentice program, the American Indian Language Development Institute, the Breath of Life program, and the Sabhal Mòr Ostaig (Scotland). Motivational ideas for current and new language teachers and learners are important for promoting the reclamation of ancestral languages, and should be frequently reevaluated to integrate new and amended concepts. Linguists are able to offer many invaluable and innovative ways in which language rehabilitation can be promoted and advanced, such as through the use of topics like morphology, language documentation, phonetics, and transcription. These processes are multi-functional and accessible methods that can be used to move projects forward successfully. Using observation and interview techniques, research was conducted that shows how people of different Indigenous Language communities address these issues. Results show that participants reported immersion as the most effective method of teaching and learning, cultural identity as the best motivational tool, and that linguists play varied roles in revitalization efforts.



# ALBERTO JAVIER HERAS

SUMMER RESEARCH INSTITUTE



**UNIVERSITY OF ARIZONA**

TUCSON, ARIZONA

PI: DR. JONATHAN SPRINKLE

**TITLE: INTERSECTION MANAGEMENT VIA THE OPPORTUNISTIC ORGANIZATION OF PLATOONS BY ROUTE** (Partner: Frank Lykes Claytor w/ CAT Vehicle)

**ABSTRACT:** Traffic congestion is major source of energy, monetary, and time loss (Fajardo, Au, Waller, Stone, & Yang, 2012). Previous research has, through the use of autonomous vehicles, devised formations called platoons to increase traffic efficiency on highways, as well as signalized and un-signalized intersection management systems so that wait time at intersections is minimized (Amoozadeh, Deng, Chuah, Zhang, & Ghosal, 2015; Dresner & Stone, 2008). The intersection management methodology that is proposed in this paper, in order to reduce delay experienced at intersections will combine both platooning of autonomous vehicles and the un-signalized intersection by organizing platoons based on their expected paths through an intersection. To simulate this method of intersection management, the simulators SUMO and OMNET++, in conjunction with another program called PLEXE, will be used (Segata, Joerer, Bloessl, Sommer, Dressler, & Cigno, 2014; Krajzewicz, Erdmann, Behrisch, & Bieker, 2012). The results of this research show the delay of an intersection in relation to the platoon depth. Another foreseen benefit is the reduction of the computational cost of previous methods (Dresner & Stone, 2008) while also increasing the efficiency of traffic flow in comparison to conventional methods.

# ERICA HERNANDEZ

SUMMER RESEARCH INSTITUTE



**UNIVERSITY OF ARIZONA**

TUCSON, ARIZONA

PI: DR. GENE GIACOMELLI

## EFFECTS OF SPECTRAL QUALITY ON PIGMENT PRODUCTION IN RED LEAF LETTUCE

**ABSTRACT:** With the prominence of lettuce as a food crop, evaluating how it responds to changes in environmental conditions is an interest to both commercial agriculture plant physiology studies. Though many varieties of lettuce have been closely studied, variety dependent trials are necessary to quantify variety-specific responses. The methodology for this study was taken from a previous study by Stutte, Edney, and Newsham (2009), but investigated a new variety of lettuce. Using hydroponics techniques, several groups of lettuce were grown under an LED light containing several individually controllable, waveband specific arrays of lights. The objective was to observe how pigmentation responses varied under different treatments consisting of differing rations of red and blue light. Data collected consisted of photo documentation, mass measurements, leaf area index, counts of leaves containing pigment, and estimations of relative amount of pigment per leaf. In the group treated with all red lights for a period of fourteen days, pigment levels were observed to immediately increase upon application of mixed blue – red treatment. Older leaves were observed to contain less pigment on average than newer leaves. Upon removal of blue light from the group grown under mixed red – blue light for fourteen days, pigment levels immediately began to decrease. Mass and leaf area index will be compared to data gathered in future iterations of this study. Further refinement of the computer algorithm analyzing photo data and methodology concerning plant placement under the light are required.

# ROXANNA DARINKA MALDONADO

SUMMER RESEARCH INSTITUTE



**UNIVERSITY OF REDLANDS**

REDLANDS, CALIFORNIA

PI: DR. MARY ALT

**PARENTS AS ACCURATE REPORTERS**

**ABSTRACT:** Previous research has documented the validity of parent report for measuring vocabulary, grammar, pragmatic skills, and assessment of specific emergent literacy skills, in impaired or typically-developing toddlers and preschoolers. However, there is little information on school-aged children. Therefore, we examined the accuracy of parent report for identifying second graders who were typically developing monolinguals, typically developing bilinguals, or impaired in language learning. The two sources we compared were parent report (Profiles of Working Memory & Word Learning for Educational Research (POWVER) parent questionnaire) and objective testing of word reading, speech, language, and cognitive skills. The results will explore how accurate parents are at reporting whether or not their second grade child is typically-developing or has a language learning impairment by looking at how often the sources match. Additionally, the current study will establish if parents are better at identifying children who are typically-developing or impaired and if levels of educational attainment differ for parents who are accurate reporters compared to those who are less accurate.

# JENNIFER NICOLE DAW

SUMMER RESEARCH INSTITUTE

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**UNIVERSITY OF ARIZONA**

TUCSON, ARIZONA

PI: DR. NATHAN A. ELLIS

## **VALIDATING PCR PRIMERS FOR MICROBIAL BILE SALT HYDROLASES AND 7-ALPHA DEHYDROXYLASES IN DNA FROM HUMAN STOOL**

**ABSTRACT:** The Western diet is the most probable environmental trigger for high incidences of colorectal cancer (CRC) in Western societies compared to other cultures. As other populations take up the Western diet, which is characterized by high amounts of animal fat intake and total calories, the incidence rate of CRC increases in this population. Studies have shown that high consumption of dietary fat stimulates the liver to synthesize increased amounts of conjugated bile acids (BAs), which are metabolized by microbes in the gut, thereby influencing the composition and abundance of species in the gut microbiome (Ridlon et al., 2014). Conjugated BAs can be metabolized to primary and secondary BAs by microbes that contain bile salt hydrolases (BSHs) (e.g., taurocholate is metabolized to taurine and cholic acid). Primary BAs can also be subsequently converted to secondary BAs by BA 7-alpha dehydroxylation. Secondary BAs are pro-inflammatory, have carcinogenic properties, and accumulate in response to a Westernized diet (Huang et al., 2013; Ridlon et al., 2014). The aim of the current study is to develop quantitative polymerase chain reaction (qPCR) assays that will measure the abundance of specific species that carry BSHs and BA 7-alpha dehydroxylases. The specificity of primers that amplify BSH genes from various microbes is being validated through deoxyribonucleic acid (DNA) sequencing using DNA from human stool. Validated qPCRs will be used to compare abundance of species in samples of the human microbiome to test hypotheses regarding association between particular microbes that carry BSHs and BA 7-alpha dehydroxylases, and carcinogenic development.

# LEAH ADRIANNA GUERRERO

SUMMER RESEARCH INSTITUTE



**UNIVERSITY OF ARIZONA**  
TUCSON, ARIZONA

PI: **CORRIE BRINLEY, MSW**

**INTERGENERATIONAL CAREGIVING, ACCULTURATION, AND MENTAL HEALTH WELL-  
NESS IN THE PASCUA YAQUI TRIBE**

**ABSTRACT:** Native American populations have a greater percentage of grandparents that stand in as primary caregivers for their grandchildren. Native American elders have also customarily assumed important roles in maintaining tribal traditions, such as helping to take care of a child and are held with high regard in Native American communities. Studies suggest that children who are in custodial care of a grandparent may show higher behavioral difficulties. Little research has been done on this subject in respect to Native American populations, let alone research that explores factors that may influence behavioral wellbeing of Native children and caretakers. This study focuses on the influence of traditional Native American culture in intergenerational households, where grandparents may find themselves interacting with their grandchildren more frequently than in other households. Native American Acculturation Scale data collected from participants of the Ili Uusim Hiapsi Project—a partnership with Pascua Yaqui Tribe and The Southwest Institute of Research on Women at the University of Arizona--will be analyzed alongside data from the Ages and Stages developmental screeners to examine patterns between culture and resiliency against developmental barriers within the Native children that are sampled. Preliminary findings reveal that although grandparent caretakers often have higher rates of acculturation, there is a smaller chance that an association between highly acculturated grandparent households and resiliency against behavioral difficulties in Native children exists within this sample. However, there are some interesting patterns between data of intergenerational households and non-intergenerational households that are worth exploring in a future study.

# MARIANA MANRIQUEZ

SUMMER RESEARCH INSTITUTE

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**UNIVERSITY OF ARIZONA**

TUCSON, ARIZONA

PI: DR. SUZANNE DOVI

## **ADDING TO THEORIES OF AGONISTIC DEMOCRACY: INTRODUCING INSTITUTIONALIZED RESISTANCE AS A WAY TO PRACTICE AGONISTIC DEMOCRACY.**

**ABSTRACT:** Political theorists, who acknowledge the limitations of liberal democracy, have dedicated their work to presenting alternative political frameworks. Among these theorists are proponents of agonistic democracy, who primarily emphasize the importance of conflict to political life, detaching from the unreachable ideal of neutrality previously proposed in liberal democracy. The aim of this paper is to explore the dynamics between conceptualizations of agonistic democracy and institutionalized exit, in order to present a potential democratic tool to practice agonistic democracy. This literature review draws from the theories of agonistic democracy proposed by Chantal Mouffe, William Connolly and Bonnie Honig and extracts three central themes: the presence and importance of conflict in political life, the process of converting antagonism into agonism, and the vitality of counter-hegemonic projects to democracy. The second part of the paper aims to illustrate the dynamics between the conceptualizations of agonistic democracy presented by the aforementioned theorists and institutionalized resistance, particularly the example of exit-empowerments. By connecting literature of agonistic democracy and institutionalized exit this paper concludes that exit-empowerments serve as a democratic tool to aid individuals and powerless groups to navigate in the conflictive space of political life, as a mechanism to convert antagonism into agonism and as a way to reproduce counter-hegemonic projects.

# LAURA MOEDANO

SUMMER RESEARCH INSTITUTE



**UNIVERSITY OF ARIZONA**

TUCSON, ARIZONA

PI: DR. MICHAEL GILL

## **ETHICAL CONSIDERATIONS REGARDING THE TREATMENT OF NON-SUICIDAL SELF-INJURIOUS (NSSI) BEHAVIOR**

**ABSTRACT:** Non-suicidal self-injury (NSSI) refers to the phenomena of causing recurrent and intentional harm to one's body without suicidal ideation. The categorization of NSSI differs from both malingering and Munchausen's Syndrome, both of which refer to individuals who exaggerate or invent physical or mental illness. Ethical challenges arise regarding the treatment of patients who repeatedly present to the healthcare system after engaging in self-injurious behavior; including, the duty to treat, futility of treatment, and the scarcity of resources. Due to studies that suggest an increase in the prevalence and pervasiveness of NSSI cases and the disproportional allocation of medical resources on patients who engage in NSSI behavior, it is imperative to engage in a discussion of these ethical considerations that arise when treating NSSI patients. I conducted a cross-disciplinary literature review on NSSI, focusing on its distinctive characteristics, its presentation beyond the populations typically thought to engage in NSSI behaviors, and discussions about possible ethical concerns when treating NSSI patients. The ethical discussions about non-compliant dialysis patients and about the allocation of organ transplantation are both compared to patients who repeatedly engage in self-harming behavior. The connections drawn suggest that cases of treating patients who engage in NSSI behaviors may arise where treatment could be deemed futile, a physician's duty to treat diminishes, and/or the cause of the injury becomes relevant when determining which patient(s) to allocate medical treatment.

# KRISTEN MARIE NATONIE

SUMMER RESEARCH INSTITUTE



## **N**ORTHERN ARIZONA UNIVERSITY

FLAGSTAFF, ARIZONA

PI: DR. MARY KOITHAN

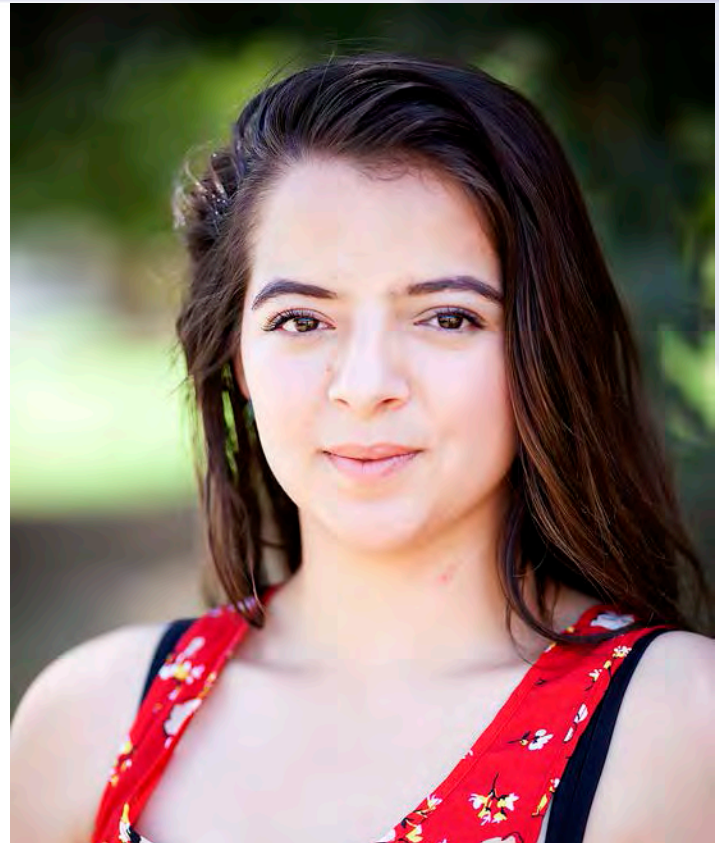
### **EVALUATING SELF-EFFICACY IN VOLUNTEERS WORKING WITH SPECIAL NEEDS CHILDREN**

**ABSTRACT:** People with special needs encounter a number of social difficulties. Studies have shown that children with special needs are more likely to experience bullying than others. Bullying is often the result of a lack of comfort or confidence in a person's ability to interact positively with someone who is different. Increased social interaction with special needs children can improve self-confidence and thus facilitate respect and understanding towards individuals who are different. Integrative Touch for Kids (ITK) provides opportunities for volunteers to spend time interacting with children and families with special needs, seeking to "break down social barriers and engage communities in support of families." This project evaluates whether ITK volunteers have improved confidence in their ability to interact with special needs children. Over a period of two years, adult and adolescent volunteers (n=200) completed pre and post self-efficacy surveys that were self-administered and scored on a 5-point Likert scale. Demographics were also collected. We hypothesized that there would be a relationship between time spent/week and positive change in confidence. We also hypothesized that returning volunteers have a more positive pretest score and lower total score change. Preliminary analysis confirms these hypotheses, suggesting a possible ceiling effect and sampling bias. Consistent with the literature, findings suggest volunteers are often motivated by previous experience and past behaviors as well as positive self-efficacy. As we continue to analyze data, we will provide additional program recommendations.



# YADIRA GISELLE OREGON

SUMMER RESEARCH INSTITUTE



## **W**ASHINGTON STATE **U**NIVERSITY

PULLMAN, WASHINGTON

PI: DR. JEFFREY MILEM

### **FAMILY SUPPORT AND CAMPUS CLIMATE RELEVANCE TO URIM EXPERIENCES IN A PRE-MEDICAL PROGRAM**

**ABSTRACT:** The purpose of this study is to understand family support and campus climate relevance to Underrepresented Minorities in Medicine pre-medical program participants' experiences during the commencement and intermediate time frame of the yearlong program. A cohort of ten URiM students participated in yearlong semi-structured interviews held at the start of the program, during the middle, and at the end; for the purposes of this study only three participants and their first and second interviews were selected based on the diversity of these participants' experiences. The data was then analyzed through Atlas.ti software with open coding formulated through general themes found in literature. Family support was prominent in both sets of interviews from the beginning and the middle of the program, while campus climate was briefly touched in the first set of interviews while in the second interviews its presence became more evident. On one hand the preliminary findings show that family support relevance stays constant. Campus Climate on the other hand becomes more evident during the middle of the pre-medical program, which could signify that students don't become aware about campus climate until prolonged participation in the pre-medical program. Further research, needs to focus on a larger pool of interviewees and on interview questions that stay constant throughout the entirety of the interviews to provide a mode of comparison.

# JOSHUA RUFUS OWL

SUMMER RESEARCH INSTITUTE



**UNIVERSITY OF ARIZONA**

TUCSON, ARIZONA

PI: DR. BIJAN NAJAFI

## **LACED WITH UNCERTAINTY: THE IMPACT OF SHOE GEAR FASTENING ON DORSAL SHEAR STRESS**

**ABSTRACT:** Shear stress in footwear is known to result in a higher average foot temperature, and in diabetic patients, this results in a high risk for foot-related injuries (Armstrong et al., 2007). The current study aims to demonstrate that BOA shoelaces can reduce shear stress and, consequentially, lower the average temperature of the foot. To test this hypothesis, fifteen healthy patients had an infrared image taken of their feet to establish a baseline temperature. Then, patients were tasked with walking 200 steps in three trials: in shoes that are too loose, too tight, and with orthopedic shoes that fit correctly. All fits were classified by an ankle displacement test. Another infrared image was taken of each patient's bare feet after each instance. The first two trials were used as a Proof of Concept to demonstrate that a correctly-fitting shoe produces a lower shear stress than a loose- or tight-fitting shoe. When the images were compared, it was clear that the Proof of Concept held true. The last trial was main goal of the current study, which was to prove that the BOA shoelaces being tested in the correctly-fitting orthopedic shoes would induce lower shear stress, resulting in a lower average foot temperature than regular shoes with conventional laces. This was proven to be true, with an average 1.15 °C decrease in thermal response across the fifteen patients.

# VICTORIA RENE RAMIREZ

SUMMER RESEARCH INSTITUTE



**UNIVERSITY OF ARIZONA**

TUCSON, ARIZONA

PI: DR. ANITA KOSHY

## THE EFFECT OF CHRONIC TOXOPLASMA GONDII INFECTION ON HIPPOCAMPAL NEURODEGENERATION

**ABSTRACT:** Alzheimer's disease (AD) is a neurodegenerative disease, the pathology of which disproportionately affects an elderly demographic. AD pathophysiology is driven in large part by neuroinflammation and dysfunction of the immune response in the Central Nervous System (CNS). *Toxoplasma gondii* is an obligate intracellular parasite that is estimated to be latently present in approximately 30% of the world's population. A unique characteristic of *T. gondii* is its ability to persist in the CNS by evading the host immune response. In this study the CA1 region of the hippocampus was analyzed in order to assess the best analytical method for a study of the effects of three genetically distinct strains of *T. gondii* on neuronal degeneration and intracellular health in an AD mouse model. Accurately assessing the best methodology in order to obtain consistent results in infected and uninfected tissue is imperative in order to compare the differences in neurons in AD mice tissue sections. Nissl stain and a Neuronal nuclei (NeuN) protocols were applied to infected and uninfected, non-AD mice tissue samples. A mean greyscale (MGS) value test and threshold test were performed using ImageJ software. For both staining techniques, no statistically significant difference was found in neuronal degeneration between infected and uninfected tissue in the CA1 region. These imaging methods will allow for further analysis of AD mice tissue infected with *T. gondii*. The presence or absence of degenerating neurons in such tissue could offer implications into parasitic influences on host immune response mechanisms which prevent the progression and potential onset of this debilitating disease.

# NATALYA CANYON ROBBINS SHERMAN

SUMMER RESEARCH INSTITUTE



**UNIVERSITY OF ARIZONA**

TUCSON, ARIZONA

PI: DR. LAURA LOPEZ HOFFMAN

**URBAN GREEN SPACES AS A HUMAN HEALTH RESOURCE IN CITIES**

**ABSTRACT:** In large cities dominated by artificial environments, green spaces have the potential to provide ecological services that are critical to humans who inherently have a biological need to be connected with nature. These ecological services range from the obvious, contributing to cleaner air, cooler temperatures, and reduced noise pollution, to services that are more subtle in their manifestation such as healing spaces for relaxing, recreation, lowering stress, and providing psychological restoration. In the present study, this relationship between urban green space quality and derived human benefits and well-being outcomes is examined. The goal of study is to establish the best methodology for synthesizing data from individual case studies to be interpreted in a meta-analysis. This meta-analysis will be used to identify key factors that contribute to understanding the qualities of a productive urban green space and evaluate its feasibility as a human health resource in large urban areas. The current study does not include statistical analysis of data, but did successfully develop an efficient and thorough methodology for gathering and organizing information relating to urban green spaces and the associated human health and well-being outcomes that will be used in the forthcoming meta-analysis.

# SIERRA RAE YSLAS

SUMMER RESEARCH INSTITUTE

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RI



**UNIVERSITY OF ARIZONA**

TUCSON, ARIZONA

PI: DR. BRUCE J. ELLIS

## THE EFFECTS OF FATHERING QUALITY ON DAUGHTERS' ADULT SEXUAL OUTCOMES AND ADOLESCENT EMOTIONAL AND CONDUCT PROBLEMS

**ABSTRACT:** Paternal investment theory posits that father exposure is associated with daughters' onset of menarche and relationships with male partners. Previous research using a genetic and environmentally controlled sibling design (Ellis et al., 2012; Tither & Ellis, 2008) provided support for this theory, finding that fathering quality is associated with daughters' age of menarche (Tither and Ellis, 2008) and risky sexual behavior (Ellis et al., 2012). The current research used the same genetic and environmentally controlled sibling design to investigate the associations between exposure to fathering quality and daughters' adult sexual outcomes and adolescent emotional and conduct problems between biological sister pairs from divorced homes (N= 49). Results indicated that older sisters were more strongly influenced by fathering quality than younger sisters. The findings imply that fathering quality is associated with daughters' adult sexual outcomes and adolescent emotional and conduct problems.

# BRIAN ZAMARRIPA ROMAN

SUMMER RESEARCH INSTITUTE



**UNIVERSITY OF TEXAS,  
EL PASO**

EL PASO, TEXAS

PI: DR. WEIGANG G. WANG

**TRANSPORT PROPERTIES OF MAGNETIC TUNNEL JUNCTIONS WITH PERPENDICULAR MAGNETIC ANISOTROPY**

**ABSTRACT:** Magnetic Tunnel Junctions with Perpendicular Magnetic Anisotropy are promising candidates for next generation of magnetic random access memories. Room-temperature tunneling magnetoresistance behavior has been analyzed in CoFeB/MgO/CoFeB perpendicular magnetic tunnel junctions with different buffer layers for annealing at 340°C and 380°C. Transport properties have been studied in these junctions. The TMR rapidly increased to a maximum within the first few minutes, up to 135%, followed by a steady decline afterwards. These results highlight the importance of proper buffer/capping layer in perpendicular tunneling junction.



# Undergraduate Research Opportunities Consortium

## PROGRAM STAFF AND SPONSORS • 2015

### **SUMMER RESEARCH INSTITUTE (SRI)**

Coordinator: Donna Treloar, MA  
Instructors: Andrew Huerta, PhD, Renee Reynolds, ABD,  
Joanna Sanchez-Avila  
Sponsors: University of Arizona; Graduate College; The Partnership for Native American Cancer Prevention (NACP) training program, a collaboration between Northern Arizona University and the University of Arizona Cancer Center, funded by the National Cancer Institute; College of Medicine – Office of Diversity and Inclusion, Health Resources and Services Administration (HRSA) Centers of Excellence; Western Alliance to Expand Student Opportunities (WAESO); Department of Physics.

### **MINORITY HEALTH DISPARITIES SUMMER RESEARCH PROGRAM (MHD)**

Coordinator: Stephanie Adamson, Holly Lopez  
Sponsors: University of Arizona; Graduate College; Western Alliance to Expand Student Opportunities (WAESO).

### **MAXIMIZING ACCESS TO RESEARCH CAREERS (MARC)**

PIs: Megan McEvoy, PhD; Marc Tischler, PhD, Maria Teresa Velez, PhD  
Coordinator: Cindy Neal, MEd  
Sponsor: NIGMS/TWD Division GM 08718

### **HOOKED ON PHOTONICS RESEARCH EXPERIENCE FOR UNDERGRADUATES (HOP)**

PIs: Nasser Peyghambarian, PhD  
Sponsors: University of Washington/National Science Foundation (NSF). Funding for this research was provided by NSF Grant No. CHE-1156598.

### **CIAN INTEGRATED OPTICS FOR UNDERGRADUATE NATIVE AMERICANS (IOU-NA) RESEARCH EXPERIENCE FOR UNDERGRADUATES**

PI: Allison Huff Mac Pherson, DHEd, Robert Norwood, PhD  
Coordinator: Ameé J. Hennig, Daniel Lamoreaux  
Sponsors: National Science Foundation (NSF) Engineering Research Center for Integrated Access Networks (ERC CIAN).

Funding for this research was provided by the NSF Engineering Research Center No. EEC-0812072.

### **BIOSPHERE 2**

PI: Katerina Dontsova, PhD  
Sponsors: National Science Foundation Research Experiences for Undergraduates Program.

### **STUDENT AFFAIRS RESEARCH PROGRAM (STAR)**

Coordinator: Nura Dualeh, MA  
Instructors: Andrew Huerta, PhD, Renee Reynolds, MA, Joanna Sanchez-Avila  
Sponsors: University of Arizona; Graduate College; Division of Student Affairs; Western Alliance to Expand Student Opportunities (WAESO).

### **UROC-PREP**

Coordinator: Donna Treloar, MA  
Instructor: Andrew Huerta, PhD  
Sponsors: University of Arizona; Graduate College, Western Alliance to Expand Student Opportunities (WAESO).

### **CAT VEHICLE PROGRAM/ ECE REU**

PI: Jonathan Sprinkle, PhD  
Coordinator: Nancy Emptage  
Sponsor: National Science Foundation Research Experiences for Undergraduates Program

### **RESEARCH IN OPTICS (RiO)**

PI: R. John Koshel, PhD  
Coordinator: Melissa Sarmiento Ayala, MEd  
Sponsor: National Science Foundation (NSF)  
Award No. 1460723.





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