McNair Scholars Research Journal

2013-2016 Volume 6

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McNair Scholars Research Journal

2013 -- 2016 Volume 6

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A Division of Student Services
Mail Stop #0075
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McNair Program Staff
Maritza Machado-Williams: Director
Perry Fittrer: Assistant Director
Nanci Fowler: Program Officer
Heather Williams: Student Success Specialist

The McNair Journal is the official journal of the Ronald E. McNair Scholars Post Baccalaureate Achievement Program at the University of Nevada, Reno. The program is designed to provide research opportunities and other related academic experiences that promote the acquisition of the doctoral degree (Ph.D.) for first generation, low-income, and underrepresented college juniors and seniors. The McNair program is federally funded at $231,000 per year. The program was created by congress in an effort to increase the number of underrepresented persons pursuing teaching, research, and administrative careers in higher education.

Acknowledgments
A very special thank you to the University of Nevada, Reno Graduate School for their generous and invaluable support of the McNair Scholars Program! We are also thankful for faculty and administrators on the UNR campus who support this program. Faculty mentors fill the most important role in guiding scholars to success.
It is my honor to introduce the sixth edition of the University of Nevada, Reno McNair Scholars Journal. The research found in this journal is the culmination of many intensive undergraduate research projects completed by our McNair Scholars from 2013 to 2016. We are very proud of our McNair Scholars!

The purpose of the McNair program is to assist undergraduate students from backgrounds that are traditionally underrepresented in graduate school to prepare for the pursuit of a doctoral degree. The foundation of the program is based on the services provided by our academic mentors who guide scholars through the development, execution, and presentation of a substantive research project. The research papers published in this edition of the McNair Scholars Journal are the product of the strong collaborative relationships between our scholars and their academic mentors. I offer my most sincere thanks to our academic faculty who have given so generously of their time and talent to mentor our scholars. Most importantly, I would like to acknowledge the scholars whose papers were selected for publication. Completing these research projects, and publishing them in this journal, is a critical step in becoming a scholar, graduate student, and contributor to their respective fields.

Our McNair Scholars are preparing to become part of a highly educated generation that will contribute to a prosperous future for our country; they will also serve as role models and mentors for those who follow in their footsteps. As a result of their hard work in the McNair program, our scholars have gone on to earn numerous doctoral and master’s degrees since the inception of the program at the University of Nevada, Reno in 2002. The scholars in this journal are part of that proud tradition with many of them currently pursuing doctoral degrees at institutions across the nation. I have no doubt that the scholars in this journal will be successful in graduate study and bring a new perspective to the research and practice in their discipline.

I would also like to give thanks to the entire McNair and Academic and Opportunity Support Programs staff for their support of our scholars. Congratulations to all who have contributed to the success of our scholars and our program!

Perry Fittrer
Perry Fittrer, Assistant Director
BACKGROUND

Background:
The purpose of the Ronald E. McNair Post-Baccalaureate Program is to encourage undergraduates from backgrounds that have been historically underrepresented in university faculty and research professions to pursue doctoral degrees. The federally funded program is in its thirteenth year at the University of Nevada, Reno. Dr. Ronald McNair, whose journey to become an astronaut inspires all who seek to achieve ambitious dreams, is a fitting namesake for the program. Although Dr. McNair died in the explosion of the Challenger spacecraft, his strong message of self-determination still resonates with those who strive for excellence:

“Whether or not you reach your goals in life depends entirely on how well you prepare for them and how badly you want them.”

-Ronald E. McNair, Ph.D.

Program Overview:
The foundation of the McNair Scholars Program is the summer research institute. For nine weeks, scholars engage in research projects closely guided by academic faculty mentors. For many students, the summer institute provides their first experience conducting original research and their first opportunity to work closely with a faculty mentor. The relationship forged between scholar and mentor can be the most significant academic connection that a scholar makes at the university.

In addition to conducting research, scholars also take part in GRE preparation workshops during the summer institute. During the academic year, scholars participate in McNair seminars that assist them to complete competitive graduate school applications and provide information related to financing graduate education. Scholars attend national McNair conferences where they present their research and connect with other scholars and faculty from across the country.

In addition to receiving a $3,500 research stipend during the summer institute, scholars also benefit from waived application fees at many graduate schools. GRE fee waivers are also available to McNair Scholars. The greatest benefits, though, are not financial. The McNair program enables scholars to form lasting bonds with fellow scholars and with academic mentors. These relationships allow scholars to see themselves in roles they might not otherwise have considered possible such as professors, researchers, and administrators in institutions of higher education.

Eligibility:
Students are eligible for the McNair program if they have completed at least 30 credits, but not more than 92 credits and have a cumulative grade point average of at least 2.9. Students must also meet the federal criteria for selection: neither parent has a bachelor’s degree and the student demonstrates financial need OR the student is a member of a group that is traditionally underrepresented in graduate school: African American, Native American, Hawaiian / Pacific Islander, or Hispanic/Latino. Students must be U.S. citizens or eligible non-citizens (eligible for U.S. federal aid).

Application Process:
Applications are available on the McNair web site: www.unr.edu/mcnair or from the McNair Office located in Suite 450 of the Pennington Student Achievement Center.
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Parents play an important role in their children’s academic success. They may inquire about their student’s academic progress or talk to the teacher or other school representatives if they have any concerns regarding the academic development of their children. However, some parents can feel intimidated by a simple conversation due to their limited or lack of English comprehension. This is the case for many Latino parents who not only have language limitation but also cultural limitation. These limitations create a communication gap between schools and parents. Because parents, guardians, and the community play a vital role in a child’s education, a western region urban school district has instituted liaisons who serve as bridges between the school, the teacher, and the parents to help reduce this gap. These liaisons are known as Parent Involvement Facilitators (PIF). Some of these Parent Involvement Facilitators teach English classes to Latino parents. The purpose of this qualitative study is to look more closely at strategies and curriculum that two parent involvement facilitators have found successful when helping Hispanic parents in their schools learn English.
Elders’ Views Regarding Oral Health

The objective of this research project was to gain an in-depth knowledge of the multifactorial health topic of oral care of the elder population (65+) in Washoe County, Nevada. There are various health reports concerning elders, but there is a lack of research and reports at the community level addressing oral health specifically. As part of the greater public health efforts, qualitative research on Washoe County elders’ perspectives on their oral health was done through the use of focus groups (N = 6) with a total of twenty-eight participants. Through the use of focus groups, participants’ viewpoints were collected, analyzed and summarized with findings reported via this research paper. Findings such as twenty-seven out of the twenty-eight participants agreed that oral health affects general health and all took initiative to take care of their oral health in some manner were concluded. Although all participants stated that they took care of their oral health, a majority still had difficulties in receiving dental care. Most participants are disadvantaged in receiving oral health care due to the cost with or without insurance. Recommendations for the future include large-scale survey research in Nevada and for dentists in the community to be more involved.

Rebecca Bustos
Major: Public Health
Mentor: Dr. Susan Harris & Dr. Judith Sugar
Graduating: 2017
Evaluating the Strength of Faith-based Organizations in Developing Positive Identity in Street Children of Developing Countries

This literature review explores the role of Christian faith-based organizations in aiding orphans and vulnerable youth around the world. Christian organizations have a large presence in providing humanitarian services and are strategically positioned to impact the adverse conditions of orphans and other vulnerable youth. Therefore, the primary question being addressing in this research is what are the advantages of Christian faith-based organizations in aiding orphans and vulnerable youth? In answering this question, this thesis focuses on three distinct advantages: 1) moral standing within the community, 2) stimulation of positive identities, and 3) logistical advantages that include continued operation under budget shortfalls, assimilation to cultural norms, and use of social capital to facilitate projects and distribute services. In addition, this thesis briefly reviews three fundamental weaknesses of Christian faith-based organizations. Evaluating the advantages of Christian organizations in the rehabilitation of vulnerable children identifies contributions these organizations can make beyond their secular counterparts in providing humanitarian services. Highlighting these qualities illustrates how Christian faith-based organizations along with other organizations and governments alike can work together to better meet the needs of the orphaned and vulnerable youth population.
Spin Polarization of Rubidium in a Para-Hydrogen Matrix

Matrix isolation experiments have proven an effective means in which to study unstable atoms in a stable environment. In these matrix isolation experiments, we have implanted rubidium atoms into a para-hydrogen matrix with the intent of inducing a spin polarization in the rubidium atoms. Potential outcomes of these experiments can lead to improvement of modern day magnetometers and may have other potential applications in quantum computing; however, these applications are contingent upon the ability to manipulate the spin polarizations of atoms. To start, parahydrogen/rubidium crystals are slowly grown at 4 K. Thin film interference is used to monitor the crystals thickness and laser spectroscopy is used to confirm the presence of rubidium atoms. White light spectroscopy is used to monitor the overall optical characteristics of the crystal during its growth and also during the optical pumping experiments performed. With the crystal grown, polarization is induced with a laser (optical pump) and detection of this polarization is done via laser spectroscopy. Initial data appeared to suggest the presence of a small polarization while several experiments afterward have suggested that a longer polarization time has occurred than anticipated. The T1 relaxation time appears to be longer than prior matrix isolation experiments performed with alternative host atoms, although further experiments are required to conclusively measure the lifetime of polarization observed.
Heroin Overdose:
The Knowledge and Reactions to Administering Naloxone Among People Who Inject Drugs

Opioid overdoses have increased among the United States population. Heroin use is common among men, and the rate of women using heroin is increasing. Heroin usage is especially common among the homeless population. In the past three decades, opioid overdoses have become the leading cause of injury death in the United States (Davis et al., 2014). Forms of opioids include heroin, methadone, and buprenorphine (used in medication-assisted treatment), and prescription painkillers. This is significant to public health because people who inject drugs (PWIDs) are at elevated risk for dying of drug-related overdoses. Naloxone, also known by the brand name Narcan, is a medication that reverses opioid overdoses. Naloxone can be administered into the body intramuscularly or intranasally. Providing training through overdose prevention programs (OPPs) is useful to educate and train drug users to recognize and respond to overdose using naloxone. In this study, a secondary analysis of qualitative data was conducted using a sub-sample of data from a study that included transcripts from six people who were a subset of thirty trained people who participated in an OPP in Los Angeles. Many of the participants experienced reactions relating to fear or heroism after responding to overdoses. The participants in the study felt it was necessary to attend an OPP because of past experiences of not being able to assist a victim in an opioid overdose. People in the community utilize the participants in the OPP for opioid overdose assistance, and the participants felt knowledgeable when they administered naloxone to victims.
Feasibility of an Economical Laser Induced Fluorescence Imaging System at the Nevada Terawatt Facility

Of all the loads used on the Zebra 1MA/100 ns pulsed power generator at the Nevada Terawatt Facility (NTF) the one that presents the most logistical challenges is the gas puff. Repeatability, timing, and unknown initial conditions are just a few of the troubles that arise when using gas puffs, but their success in neutron production and other experiments warrants their continued use. Laser induced fluorescence (LIF) is the primary technique used at the NTF to characterize these gas puff targets. LIF works by mixing a fluorescent tracer gas in with the gas puff and exciting it with a UV laser pulse. The fluorescence is captured with a fast CCD camera, and, assuming repeatability of the nozzle and azimuthal symmetry of the gas of interest, a spatial and density profile can be constructed through analysis of these images. In this experiment we test the moderately priced (~$700) Sony XC-HR50 camera for LIF use at the NTF. Photoluminescent excitation of acetone is traced in time by the XC-HR50 camera and acetone densities necessary to produce enough light for the camera to detect are estimated.

This paper will examine the correlation between women’s rights and HIV/AIDS to determine whether or not women’s rights relates to HIV/AIDS prevalence in sub-Saharan Africa. Utilizing data from the Joint United Nations Programme on HIV/AIDS and the CIRI Human Rights Data Project to measure women’s rights from 2001-2011, this paper will analyze how women’s rights, or the lack there of, has exacerbated the pandemic in the sub-Saharan region. The Joint United Nations Programme on HIV/AIDS (UNAIDS) was created with the explicit intent of reducing, preventing, and providing aid to those affected by HIV/AIDS. The data from their website will be utilized for a quantitative analysis of the proportion of individuals that are affected by HIV/AIDS in sub-Saharan African states (UNAIDS). The CIRI Human Rights Data Project was created by Dr. David Cingranelli and Dr. David L. Richards in an attempt to highlight human rights across the world in fifteen categories. This research will be using three of the categories illustrated by CIRI: (1) women’s economic rights, (2) women’s political rights, and (3) women’s social rights. Individual states are ranked in these three subcategories between 0-3, with 0 meaning women have no rights in said category and there might be laws in place to enforce that and 3 representing women having guaranteed rights by law that are enforced. Their scores in these three categories are then averaged, giving each state their overall score which will then be tested for a correlation with HIV/AIDS prevalence. Applying the data gathered from both the CIRI Human Rights Data Project and UNAIDS, this paper will graph and analyze the correlation to determine whether women’s rights has a statistical correlation to the prevalence of HIV/AIDS in sub-Saharan Africa.
Annotation and Expression Profiling of circRNAs in the Aging Honeybee

Apis mellifera, more commonly known as honeybees, are rising as a model organism for aging research due to their flexible yet strict lifespans that are interlinked with their specific roles in the hive. These changes in lifespan that are not due to genetic alterations likely involve regulation of gene expression. Circular RNAs (circRNAs) have recently been found in many organisms. Recent studies have shown that the accumulation of circRNAs is age-dependent (Westholm et al, 2014). Although circRNAs have been annotated in Drosophila melanogaster (Salzman et al. 2013; Ashwal-Fluss et al. 2015; Westholm et al. 2014), Caenorhabditis elegans (Memczack et al. 2013; Ivanov et al. 2015), humans (Salzman et al. 2012; Memczack et al. 2013; Conn et al. 2015) and mice (Memczak et al. 2013; Rybak-Wolf et al. 2015), they have not yet been studied in A. mellifera. Here, we searched for genes in A. mellifera that express circRNAs and tested whether accumulation of circRNAs is age-dependent as previously observed in D. melanogaster. We searched for protein homology between circularized exons in D. melanogaster and orthologous genes in the A. mellifera genome. Using bioinformatic approaches, we designed oligonucleotide primers to detect putative circRNAs in the heads of A. mellifera by RT-PCR. Several circRNAs were confirmed through analysis of published RNA-seq data and by sequencing of circularized PCR products, including circRNAs from foxo and muscleblind genes. Accumulation of these circRNAs in the heads of newly emerged bees and foragers were measured by qRT-PCR. In future studies, we will profile circRNAs in brain regions of bees from different life stages genome-wide using total RNA-seq.
Skeletons in the Closet

The following paper attempts to address a philosophical problem that concerns the value of mentalistic explanations of behavior as being rather circular and superfluous as proposed by a philosophy of behaviorism developed by B.F. Skinner. This paper builds on what the philosopher Gilbert Ryle called a category mistake to challenge Skinner’s behaviorism when discounting the explanatory value of mental conduct concepts like ‘anger,’ ‘sad,’ and so on as valid explanations of behavior. The challenge I propose comes in the form of not assuming a commitment to philosophical dualism inherent in the use of mental conduct concepts, as Skinner does not make clear whether the objectionable features of dualism belong to either substance or property dualism. Much of the second part of the paper is devoted to showing how mental conduct concepts (anger, for example) can be distinguished according to two distinct types of dispositional explanations: single-track and multi-track dispositions. Finally, the last part of this paper attempts to challenge what Skinner sees as a deep flaw when psychology borrows common sense language into its technical vocabulary by pointing out that we need not consider a diametrical opposition between common sense explanations and scientific explanations when attempting to explain behavior.
Mechanistic Investigation of the Reversible Photohydration of Steroidal Contaminants Found in Ecological Systems

In this project, the reversible photohydration of trenbolone acetate, a steroidal triene, is investigated. Trenbolone acetate is used as a growth hormone for cattle and is found as a contaminant in rivers in various ecological systems. It was widely believed that this compound was not harmful to the environment due to its fast rate of degradation. But further studies have proved that trenbolone acetate undergoes a mechanism in which it is degraded with exposure to sunlight to a new form, but then is quickly regenerated at night. The exact mechanism and structure of this is not known. This unexpected behavior not only increases the presence of anabolic contaminants in ecological systems but also has implications in human health as well due to its consideration in androgenic pharmaceuticals. Experimental methods we be performed to discover how this compound is able to transform and what it looks like structurally. This will be done by conducting hydration reactions using various solvents and conditions. After the major photoproducts are isolated and identified, synthetic studies will be conducted by comparing the product to similar, already known steroidal compounds. This will be used to help us provide access to milligram samples of the major and minor transformation products. Our results found on this steroidal containment can provide the framework for engineers and regulators to effectively protect vulnerable aquatic ecosystems by improving the assessment of this containment.
Examination of Neighborhood Level Crime Hot Spots

Crime hot spots have been central to the study of crime and place. Hot spot studies examine if there are specific areas that may be more problematic for law enforcement and where these might be. Hot spots indicate that a particular region has an above average level of crime in comparison to surrounding areas. Studies often show that hot spots correlate with heavily populated areas. Focusing on areas with an increased crime level, or certain types of crimes, allows for more effective law enforcement. The purpose of this study is to not only look at areas with a higher frequency of crimes, but to establish a ratio per population. For this study, service calls and population were analyzed for the city of Reno, Nevada. This was done by taking calls for service and mapping them according to crime type and by census tract. (From there, differences in the population based maps and the non-population based maps were seen.) The top three census tracts for each crime type were then made into a density map, revealing a neighborhood-level distribution of crime. Satellite images of the problem areas were then used to show what specific structures might be the cause of the calls. From there, a better approach can be used for the relevant crime problem.
Minority College Students’ Response to a Mindfulness-Based First Year Seminar (FYS): Acceptability and Perceived Usefulness

College students suffer because of various stressors that affect psychological wellbeing. Given that counseling is not always pursued, especially by minority students, it is important to investigate ways to reach college students outside of therapeutic environments. This study examined data from freshmen students who took a First Year Seminar (FYS) delivering psychological content. Specifically, we investigated the acceptability and perceived usefulness of a mindfulness-based FYS (Acceptance and Commitment Therapy or ACT) versus a more typical FYS (Psychodidactic) in terms of students’ ethnic or racial minority status. We used the Student Evaluation of Educational Quality Questionnaire (SEEQ, Marsh, 1986) to receive feedback from the students about the effectiveness and acceptability of the course. We used the Perceived Usefulness Scale, a locally developed measure, consisting of five Likert-like questions to evaluate how helpful the students perceived the class to be in terms of dealing effectively with mental health issues during college. We focused on the impact of students’ ethnicity, race, and primary racial identification on class satisfaction and perceived usefulness. This study showed that an ACT FYS was as acceptable to ethnic and racial minorities as it was to Caucasian students, and that an ACT-based FYS was as acceptable to minorities as a more main-stream adjustment to college class. Findings are discussed in terms of applied implications and future directions.
English Communication Abilities and Challenges of International Students Studying Abroad

This study examines two major contributing factors for University of Nevada Reno’s (UNR) international students: language barriers and UNR’s Intensive English Language Center’s (IELC) program. A survey study was conducted and evaluated international students at UNR to comment on their previous English exposure, English language proficiency testing, English proficiency skills, the IELC program, and academic coursework. A total of 12 participants were recruited for this study. Results from this survey showed that international students came to UNR from a total of 9 different countries with different forms of exposure to the English language. After at least one semester at UNR, international students who took IELC showed the same level of comfortableness in their English language ability as students who only took academic classes. This may suggest that IELC allows international students to feel as proficient in English as their peers.
Galectin-1 Protein Therapy for the Treatment of Duchenne Muscular Dystrophy

Duchenne Muscular Dystrophy (DMD) is an X-linked congenital neuromuscular disease that affects 1 in every 3,500 new born boys. Patients affected by the disorder have a mutation in the gene for dystrophin which is essential to the strength and stability of muscle cell sarcolemma as it is a key component of the dystrophin glycoprotein complex (DGC). A mutation in any part of the complex will lead to disease pathology characterized by the degradation of skeletal muscles. There is currently no cure or effective treatment for DMD. Patients affected with the disease have a shortened life expectancy and decreased life quality. Galectin-1 is a protein of the lectin family found to be involved in skeletal muscle differentiation and proliferation. It also interacts with the α7β1 integrin as well as extracellular laminin 5,7. In this study, we explore whether intraperitoneal (IP) treatment of mdx mice with 20 mg/kg recombinant mouse Galectin-1 (rMs Gal-1) will enhance key sarcolemma stabilizing proteins and increase muscle repair/regeneration in the mdx mouse to rescue the disease phenotype. Functional tests show that rMs Gal-1 treated mdx mice have improved muscle strength and activity. Histology and Western blot analysis also show muscle fiber improvements with increased concentrations of key ECM and transmembrane proteins in treated mdx mice. Together, this suggests that Galectin-1 could serve as an effective treatment for DMD.
Mechanisms of Propaganda in Contemporary Street Art

From the slums of Brazil to the skyscrapers of Manhattan, one will find art in the streets. In this research, street art will be viewed through the following perspective: art that is created in the streets. This simple definition allows the research to answer the social question of why art is created in the streets and how creating art in public spaces is a form of propaganda. The research will elaborate on how artwork hosted in a public domain has the power to engage and influence an audience to think differently. Street art and propaganda are seemingly extraneous, but their unconventional relationship will be thoroughly discussed through analysis of style, artist, and social influence and present how pertinent these two topics actually are to one another. Street art has been historicized as an artistic movement that expands many subcategories, but the scholarship of propaganda’s role within the street art movement and its varying styles has yet to be fully developed. Interviews with street artists and museum curators in two cities: Reno, Nevada and Los Angeles, California will exemplify the function propaganda has within the spectrum of street art and how its role is directly related to regional culture and adds validity to the observation that mechanisms of propaganda are present in contemporary street art. The connection between how propaganda is used in street art further enforces the idea that street art is able to promote messages that become influential through the artwork itself and can lead to public action within a society.
Determining Factors that Influence Latino Males' Educational Persistence

The complex situations of the language barrier, minimal parent involvement, and peer pressure to not “act white” undergone by Latino/a students have a fundamental effect on their academic aspirations, perceptions, and persistence. The purpose of this qualitative study is to investigate whether or not there are characteristic factors present among Latino/a students demonstrating academic persistence. High school is a pivotal time for the retention of students, more specifically for Latino/a students, because this is when the possibility of dropping out increases. Interviews conducted with Latino/a high school seniors on track to graduate, Latino/a students enrolled at a community college, and Latino/a students enrolled at a university on the West Coast might reveal whether there are commonalities among Latino/a students at various levels of education.
Acceptance of Rape Myths

The aim of this study was to determine whether or not four factors (social desirability bias, gender, student-athletic status, and fraternity and sorority membership) contribute to rape myth acceptance among college students. The existence of such myths is harmful to society as a whole, as they perpetuate the acceptance of sexual violence against both men and women. An anonymous survey was used to collect data to investigate how prevalent the acceptance of these rape myths are among undergraduate students, specifically among student athletes, fraternity and sorority members, and students who were not involved in either subgroup. The findings were examined in the context of the United States criminal justice system and how social desirability bias may affect college students’ views of rape, and consequently, their level of rape myth acceptance. The study yielded surprising results; although all students—regardless of affiliation—are generally low on rape myth acceptance, fraternity and sorority members are significantly less accepting of these myths than non-affiliated students and athletes. Social desirability bias seemed to play no role in the way in which students responded to the survey.
The Effects of Corrosion on the Mechanical Characteristics of Alloy 22

The goal of this work is to provide insight into the effects of corrosion on the mechanical properties of the austenitic alloy, Alloy 22. This engineering alloy is resistant to localized corrosion but is still susceptible to environmental degradation. [1] This work investigated the effects of corrosion under both ambient temperature and 80°C on the mechanical characteristics of Alloy 22. Tensile specimens were subjected to potentiodynamic accelerated corrosion experiments in a corrosive environment of 0.05M NaCl while the samples underwent slow strain rate of 1.5 10^-4 s^-1 to determine the alteration to its mechanical characteristics that occurred as a result of the accelerated corrosion. The oxide surface films formed during the experiments were characterized by Raman Spectroscopy.
A Program Evaluation of Fit Learning Using AIMSweb

This research study is a program evaluation of Fit Learning. Fit Learning uses Precision Teaching and Direct Instruction in order to increase students' reading, mathematics and relational skills. The subject that will be focused on in this study is reading. The two specific measures of reading are reading comprehension and oral reading skills. Crucial to the evaluation is the introduction of a program called AIMSweb into Fit Learning. AIMSweb will be used to track the progress of the students, give a visual representation of progress to the clients, and compare the progress of Fit Learning to district standards. The progress monitoring aspect of AIMSweb will measure program performance in order to establish, and strengthen, concurrent validity for Fit Learning's existing measures of student progress. The program evaluation will include aspects such as client satisfaction, standardization of measurement techniques, and overall effectiveness of the program.
Food Allergy Awareness Among College Students at the University of Nevada, Reno, College of Agriculture, Biotechnology and Natural Resources

Overview
Food allergies are complicated disorders affecting approximately 1 – 2% of the adult population and up to 8% of children. Although these numbers are relatively low, there seems to be a growing number of those diagnosed with food allergies. Young adults and adolescents are disproportionately at higher risk for allergic reactions to food than any other age group. The purpose of this study is to identify strengths and weaknesses of food allergy related knowledge, attitudes, and perceptions in non-allergic college students.

Methods
An internet-based pilot survey was designed and piloted to McNair Scholars Program (MSP) students to identify issues existing in the design and understandability of the developing survey about food allergy awareness among college students. Components of The Chicago Food Allergy Research Survey for the General Public were employed and modified to specifically target the college population. By melding this validated instrument and questions pertaining specifically to the college population, correlations between previous studies and this study can be made with a level of consistency in the language and method used.

Results
Percentages and frequencies were calculated to give an overall picture of knowledge, based on gender, class-level, major, and relationships. Chi-square analysis was used to determine degree of significance in all comparisons. There were 170 total participants, which is approximately 12% of the undergraduate student population within the College of Agriculture, Biotechnology and Natural Resources at the University of Nevada, Reno.

Conclusion
This study sought to identify food allergy awareness among college students. No previous studies have been identified that target this specific population, yet young adults are the group most at risk for experiencing an allergic reaction to food. While the data is inconclusive based on the modest number of participants, there are areas especially related to the degree programs that illustrate some interesting trends in this data.
Identification of Anti-fungal Compounds Isolated from Piper holdridgeanum that Cause Inhibition of Saccharomyces cerevisiae Cells

Natural products isolated from an array of organisms have served as templates for medicine and many other applications. *Piper* is a phytochemically diverse genus, which has not been fully chemically explored. One major challenge lies in identifying bioactive molecules from crude extracts. To identify possible bioactive compounds found in species of *Piper*, a series of assays were performed to determine which species crude extract demonstrated growth inhibition on *Arabidopsis thaliana* Col-0 root length, and cells of *Saccharomyces cerevisiae* S288c, and *Escherichia coli* DH5α. We combined these screens with NMR based metabolomics analysis to determine possible candidates for further isolation of bioactive compounds. From the 31 species screened in triplicate we found high inhibition levels of cell growth of *S. cerevisiae* S288c grown in the presence of *Piper holdridgeanum* extract. This extract was partitioned into an aqueous, hexanes, and chloroform partition by liquid-liquid extraction. Activity was retained in the chloroform partition, which was further fractionated on a Sephadex LH-20 column and produced fractions 14-18 and 19-24 with the growth inhibition activity. Current work is using bioassay guided fractionation to identify active metabolites and more comprehensive bioassays of isolated compounds to determine if synergistic effects are resulting in enhanced activity.
Testing Gravity up Close: A New Method

There is an outstanding puzzle in high energy physics: why is gravity so weak compared to the other Standard Model forces? Finding an answer can lead to new interesting physics, and by measuring gravity “up-close,” it is possible to find an explanation for this mystery [1]. At the University of Nevada, Reno, Dr. Geraci is developing an experiment using levitated silica beads in vacuum to test gravity at short distances [2]. Theoretically, this experiment will exceed the sensitivity of current systems by 6 orders of magnitude, allowing new searches for non-Newtonian gravitational forces [2]. In particular, a MEMS-actuator (Micro-Electro-Mechanical System) has been designed, built, and characterized to assist in the experiment and its details of theoretical preparation, manufacturing details, and calibration are explained. The actuator serves to modulate the distance of a source mass from the silica bead, which acts as the test mass in the experiment. The MEMS device has a goal objective of capacitively oscillating a cantilever with an amplitude of ~2.6 um and at 2 kHz. The cantilever oscillates promisingly at its resonance frequency of 1.99 kHz for the fundamental flexural mode, and the higher order resonant modes of the cantilever match well with Bernoulli-Euler Theory. The amplitude of motion is compared with theoretical expectations. The amplitude was measured to be 172 nm at a nominal value of driving voltage, suggesting a maximum amplitude of 19 um at maximum applied voltages, greatly exceeding the requirements. Thus, this system shows substantial promise for use as the driving mechanism for the source mass in the gravity experiment.
Disparities in Infant Mortality Rates Among Races in Nevada

Infant death is a troubling event happening all over the world. Even in the most developed countries, such as the United States of America, there is a significant rate of infant mortality, with 24,000 infant deaths in the U.S. in 2011. This study displays the inconsistencies in infant mortality rates among different races in Nevada in years 2011-2013. Our data came from the birth and infant death data set from the Nevada Department of Public and Behavioral Health. The data in this study were analyzed using logistic regression models. The models tested for variables that were associated with infant mortality. The results were compared to national findings as posted by the United States Centers for Disease Control and Prevention for infant death in years 2010 to 2012. Infant mortality rates for Nevada are found to be approximately 4.6 deaths per 1,000 infants. However, the average infant mortality rate for Blacks in years 2010-2012 was 7.9 compared to 4.0 among Whites, 4.5 for Hispanics, and 2.4 for Asian/Pacific Islanders. Thus, this study found that race contributes to disparities in infant mortality rates.