Research Initiation Program (RIP)
Award Recipients
2015-2016

The Research Initiation Program received an outstanding response to the call for proposals. The quality and quantity of proposals for this year's competition were generally great! The RIP Committee would like to have had sufficient funds available to award everyone, but due to the lagging economy only the following proposals have been selected for FY 2015-2016 funding

Dr. Darina Dicheva
Computer Science
Award Amount: $9,376.00

Project Title: "*Gamification of STEM Courses to Support Student Motivation and Engagement*"

Abstract: While demonstrating success in the corporate world, *gamification* (the use of game design elements in non-game contexts) has only recently received attention in education. Consequently, little research-based knowledge is available yet on how to gamify an academic course. To address this problem, this project proposes to study the effect of applying gamification to a low-level undergraduate computing course and generate empirical evidence for the efficacy of using game mechanics to improve student motivation, engagement, and academic performance. By targeting student motivation and engagement, course gamification has the potential to improve academic performance and contribute to increased retention and graduate rates in STEM disciplines.

Most specifically, the objectives of the project are:

- Develop a course gamification model and corresponding instructional materials and use them to gamify a selected undergraduate Computer Science course – CSC 2231 Data Structures.
- Conduct research to generate empirical evidence on the effect of using game mechanisms on student academic performance.

This project will have a direct impact on improving the academic performance of students in Computer Science and more generally in STEM disciplines. With its focus on increasing motivation, the gamification approach will be especially beneficial for underrepresented minority students, who are reported to have lower STEM graduation rates.

In addition, the research will contribute to understanding where and under what circumstances education gamification works. Studies like this can inform the design of technological platforms that support course gamification and facilitate further research on exploration of the motivational effect of various combinations of game elements in educational contexts.

Dr. Crystal Dodson
Nursing
Amount Awarded: $7,285.00

Project Title: "*Development of a Pharmacogenomics Continuing Education Module"*

Abstract: The purpose of this study is to assess the efficacy of an interactive continuing education module on the role of pharmacogenomics in oncology nursing practice in improving the knowledge of, attitudes towards, and utilization of pharmacogenomics among oncology nurses. The American Nurses Association (ANA) and the Institute of Medicine (IOM) have both identified the need to prepare nurses to take part in genomic health care services. Only a few studies to date have examined knowledge of pharmacogenomics testing among clinicians, the majority found that clinicians felt they had limited knowledge of pharmacogenomics testing. The design that will be used is a pre-test/post-test intervention design. The population will be all nurses in the state of North Carolina who identified themselves as a nurse with a background in oncology. An on-line link to the instrument will be sent via email prior to the implementation of the educational module. One month after the initial survey is sent, a link to the online interactive educational module on the pharmacogenomics testing in the oncology setting will be sent via email, which will include a link to the post-survey. Univariate statistics and a one-way analysis of variance (ANOVA) will be conducted to examine the relationships between the knowledge and attitude scores with the predictor variables. A paired t test will be used to compare the difference in knowledge and attitudes before and after the educational module, as well as regression models will be generated to identify variables associated with knowledge and attitude towards pharmacogenomics testing.

Dr. Megan Edwards
Occupational Therapy
Amount Awarded: $9,552.00

Project Title: "*The Impact of Infertility on Occupations and Roles"*

Abstract: Defined as having trouble conceiving a child after actively trying for at least 12 months, infertility impacts approximately 16% of couples in the United States- roughly 5 million individuals. Experiencing infertility can take a physical and psychological toll on the infertile individual, as well as his/her partner. Research has shown that approximately half of females experiencing infertility rated infertility as the most stressful experience of their life, and 18% of couples reported that infertility has had a negative impact on their marriage. Feelings of anger, guilt, depression, withdrawal, and decreased self-esteem may result from infertility. Furthermore, relationships with friends, family members, and spouses may be strained as those dealing with infertility may feel misunderstood. Little research has been conducted on how infertility impacts an individual's daily occupations and roles. This includes occupations such as hobbies and leisure activities, and roles such as husband/wife, sister/brother, and friend. Being able to successfully participate and engage in daily roles and occupations is a large focus of occupational therapy interventions. The aim of the proposed study is to explore and provide better insight into how infertility might affect an individuals' roles and occupations and how occupational therapy practitioners, as well as other health care professionals, can better assist these individuals. The study will involve interviewing females diagnosed with infertility to examine what their experience has been like, including the resources they have founds and the challenges they have experienced. Participants will also complete a Role Checklist to explore how their roles might have changed.

Dr. Chad Markert
Exercise Physiology
Amount Awarded: $9,974.00

Project Title: "*Circulating Mitochondrial Damage-Associate Molecular Patterns (mtDAMPs) Following Skeletal Muscle Contraction-Induced Injuries*"

Abstract: We've all experienced soreness and inflammation after intense exercise. This feeling of being run down reminds of a similar situation – how we felt after a severe bacterial infection. However, after exercise, no bacteria are suddenly present. The exercise doesn't cause an infection. You may have just lifted a lot of weight, or run far, or used muscles you weren't used to using.

Why did you feel sore, the same way you would feel if you were fighting a severe bacterial infection?

Inside the cells of your body are organelles called mitochondria. Mitochondria help us to create energy, from the food we eat and the oxygen we breathe.

However, mitochondria evolved from bacteria.

So when you exercise, and damage the membranes of your muscle cells, the muscle mitochondria are no longer protected from the vigilant surveillance of your immune system. Instead, they seep out of the damaged muscle cells, into the blood, and are recognized by your body's own immune cells as if they are the bacteria from which they evolved. Some scientists might say this is a tragic misunderstanding that evolution has not resolved yet.

This study will used quantitative PCR to test the hypothesis implicit stated above:
that mitochondrial damage-associated molecular patterns (mtDAMPs) are elevated in the blood following intense exercise.

RIP Funds will be used to address Hypothesis 1A (Research Plan)

Subjects provide blood samples before/after exercise.
Blood will be drawn (venipuncture) by an experienced researcher.
The entire procedure takes less than ten minutes each time.

Dr. LaKeisha Rogers
Rehabilitation Counseling
Amount Awarded: $9,974.00

Project Title: "*Improving Human Service Professionals Knowledge of Co-Occurring Disorders, Screening, Brief Intervention, and Referral to Treatment Practices*"

Abstract: The purpose of this study is to evaluate the impact of Screening, Brief Intervention, and Referral to Treatment (SBIRT) training on human services professional's core knowledge of co-occurring (mental health and substance use) disorders and on their professional practices to include a formal screening used to identify consumers at risk for

alcohol and substance abuse use, misuse, and dependency. The use of formal screening tools will provide a systematic way to ask about alcohol and substance abuse problems with consumers who come for treatment. Training human service professionals on the use of SBIRT practices can help them determine if the consumer is a social user, at risk user, a substance abuser, or is dependent on substances and develop appropriate referral to treatment. If human services professionals possess the skills to screen and assess for undiagnosed substance abuse, a prevention approach can be used with consumers. Early identification and prevention with "at risk" consumers can prevent future negative consequences, as well as reduce barriers that would impede positive outcomes when consumers work collaboratively with human service professionals. Early detection and intervention using a secondary prevention model like SBIRT requires that human service professionals receive training on this approach. Human service professionals will attend a one-day practice oriented workshop on SBIRT. Knowledge and practices will be measured before and after the program and 6 months later.

Dr. Teresa Singleton
Biological Sciences
Amount Awarded: $9,770.00

Project Title: "*Analyzing RNA Inference (RNA) During Tf1 Integration in the Fission Yeast Schizocaccharomyces Pombe"*

Abstract: The ability of a virus to infect a host is a phenomena observed among many classes of retroviruses. Retroviruses are able replicate by reverse transcription of an RNA intermediate producing a cDNA copy. The resulting cDNA becomes a part of the host genome. The host genomes consist of silent and active regions for protein production. Viruses have developed strategies to invade the host genome and remain silent and undetectable. Tfl is an active LTR retrotransposon found within the genome of the fission yeast *Schizosaccharomyces pombe.* With a life cycle very similar to HIV (the virus that causes AIDS), Tfl can infect and hide within the genome of the host. The proposed research is innovative because *S. pombe* is a key eukaryotic model organism for studying viral infections. *S. pombe* has several biological similarities to humans, and animals, making it more "mammalian-like". To study integration patterns of Tfl within *S. pombe,* Dr. Singleton's lab have identified a populations of Tfl integration events capable of "hiding" within the genome of *S. pombe.* To understand how Tfl infects *S. pombe* we will utilize Chromatin Immunoprecipitation-Polymerase Chain Reaction (ChIP-PCR) to analyze silent Tfl integrations. These findings will determine interactions of Tfl with silent regions of the chromatin, thereby revealing mechanisms used for integration. Lack of such knowledge is an important problem, because until the process of viral integration is better understood, the scientific community lacks the ability to devise new strategies that will control or prevent integration of these viral agents.