

Research Initiation Program (RIP)
Award Recipients
2016-2017

The Research Initiation Program received an outstanding response to the call for proposals. After thorough review by the assigned reviewers, the following were awarded.

Dr. Scott Betz
Art + Visual Studies
Award Amount: \$8,616.00

Project Title: “Research in Color: Traditional, Global and Digital Applications for Contemporary Use”

Brief Introduction: I am asking for research funding to perform experiments, document and debate the origins of color application and how the evolution of this application into digital media can be best understood. The results of this research will be disseminated in a proposed Thames and Hudson book, in my own professional creative production as both art works and presentations at professional conferences and through WSSU student learning in existing courses “2D Design”, “Painting I” and a proposed experimental online course “Color Now”.

Dr. Debzani Deb
Computer Science
Amount Awarded: \$9,690.00

Project Title: “Utility-Based Resource Provisioning of Big Data Applications on Cloud Environment”

Abstract: Big Data and business intelligence-based applications are supported by the MapReduce programming model while, at the infrastructure layer, cloud computing facilitates cost effective allocations of on-demand large clusters. These infrastructures typically process multiple concurrent MapReduce workloads where each workload has specific performance targets and business importance expressed in terms of services level objectives (SLOs). Managing concurrent workloads with heterogeneous requirements in a dynamic cloud infrastructure requires on assuring that the systems meets the entire infrastructure. Existing cloud solutions are unable to meet this requirement, as either they require customer to manually decide on resources to be utilized for the workloads or provision resources instantly to a workload as needed. The proposed research envisions an infrastructure where users only submit jobs and SLOs (in terms of priority, deadline etc.) and cloud provider performs a globally optimized resource provisioning that meets the workload SLOs and utilizes the cloud in the most cost effective way. The proposed research aims to leverage a novel technique based on utility functions in order to effectively multiplexing the available cloud resources among the wide range of MapReduce workloads based on their requirements and consequently achieve global resource optimization to utilize cloud in the best possible way.

Dr. Nickolay Hristov
Occupational Therapy

Amount Awarded: \$9,950.00

Project Title: “Investigating Multimodal Strategies in Bat-Moth Interactions – A New Take on a Classic Model of Predator-Prey Coevolution”

Abstract: Bats and moths have been engaged in a dog-fight that has spanned millions of years. As one of them developed a novel adaptation that outsmarted the other, it was inevitably matched by a counter-adaptation that leveled the game. Our present-day ability to peek into a system shaped by millions of years of co-evolution gives us a unique opportunity to understand how sound-producing in the often distasteful Tiger Moths (Family Arctiidae) deter attacks from insect-eating bats to give the prey a “temporary” upper hand. This is a complex and continuously evolving system that does not cease to fascinate and puzzle scientists. We will use live-caught bats and moths, pitted against each other in a semi-natural experimental arena at a field-site in TX to study how bats interpret and cope with their sound-producing prey. We will utilize quantitative video and sound-recording combined for the first time with real-time measures of heart rate to elucidate sensory awareness to sound-stimuli and the resultant response by bats to these antagonistic interactions. The project will allow us to understand how sound production and unpalatability (chemical defense) shape the immediate and long-term pressures faced by insect-eating bats. These interactions in turn, ecologically speaking, setup and perpetuate mimicry relationships for many other night-flying insects that don’t necessarily have the costly chemical defenses. These are important considerations in the coevolution of predators and their prey as explored through one of the most celebrated model systems.

Dr. Keith Irwin

Computer Science

Amount Awarded: \$7,686.00

Project Title: “Dynamically Generation of Practice Problems for increased Student Learning”

Abstract: In this project, we wish to study whether or not students will increase their computer science skills more quickly when they are given computer science problems which are both randomly-varied and automatically graded. This is in contrast to the existing approach which generally has students submit assignments and not discover their correctness for a week or so. Shortening this loop will likely lead to students increasing their ability to assess their own abilities and correct gaps in them more quickly. Similar approaches have proven fruitful in other disciplines, but are not well studied in computer science.

Dr. Lisa Maness

Clinical Laboratory Science

Amount Awarded: \$9,981.00

Project Title: “Single Nucleotide Polymorphism Analysis of African Americans with and without Type 2 Diabetes Mellitus”

Abstract: The advancement of personalized medicine has been an important scope of healthcare over the past decade. One factor involved in optimizing an individual’s

healthcare is genetic makeup, including specific genes called single nucleotide polymorphisms (SNPs), which make some more prone to developing various diseases than others. The prevalence of Type 2 Diabetes Mellitus (T2DM) among African Americans (AA) in the eastern Winston-Salem region is alarmingly high, with preliminary studies indicating that levels are even higher than the general US population. Our overall goal is to identify genetic markers that are linked to T2DM within this population that has high morbidity and mortality to the disease. The specific aims of the proposed research are: 1) to identify individuals from the RAMS Know How Mobile Clinic with and without T2DM and calculate a Homeostatic Model Assessment of Insulin Resistance (HOMA-IR) level for each individual; 2) To determine if there are single nucleotide polymorphisms present in African American participants with Type II Diabetes Mellitus compared to those without. This research will focus on determining SNPs present in diabetic participants as well as those present in participants that do not have the disease. A sample of 13 AAs with T2DM and 13 AAs without T2DM will be obtained from our mobile health care clinic that serves the East Winston-Salem region. Participants will each have patient history assessed along with diabetes parameters, such as glucose, glycosylated hemoglobin, and insulin levels. A sample will also be collected for DNA extraction and microarray analysis will be performed for each sample. We hypothesize that at least one SNP will be present in the group with T2DM compared to the group without the disease. Any SNP that varies among the two groups will have their functions explained if information exists for these genes. The proposed research has not been performed in our geographic region and thus, can add to the pool of data already discovered about specific genes that link AAs with T2DM. This study will allow us to collect preliminary results needed to seek future funding. This study and future work will enable us to mentor undergraduate students in both clinical and laboratory research. A larger study will allow a greater number of participants and a better understanding of SNPs that may be important to T2DM in AAs. These studies will lead to the improvement of approaches in preventing and treating T2DM.

Dr. Russell Smith
History, Politics & Social Justice
Amount Awarded: \$8,500.00

Project Title: “Exploring Urban extensions in the United Kingdom: Sustainable Urban Development or Sprawl?”

Abstract: Urban planning professionals around the globe are confronted within a latitude of challenges and problems as a result of economic, environmental and social issues impacting cities. To address these challenges sustainable urban development has been highlighted as a potential solution. To date, much of the work on sustainable urban development has been focused on urban regeneration efforts within the city through infill and redeveloped projects (i.e. brownfield sites, adaptive reuse, etc.). However, planners in the United Kingdom have been increasingly interested in promoting sustainable urban developments through urban extensions. Urban extensions are similar to municipal annexations in the United States in which land that is currently not included within the corporate limits of a municipality is attached to the city and developed. However, often the results of this extension/annexation has been the creation of a sprawling pattern of

development. This research proposal seeks to explore the concept of sustainable urban extensions in the United Kingdom through site visits to proposed as well as constructed SUE's and surveys of practicing urban planning professional in the UK. Specifically, this research will explore the characteristics and requirements of SUE's. Through this analysis it is anticipated that a better understanding of SUE's will be achieved. Additionally, the potential for implementing this type of urban development in the United States will also be explored.