A special thank you to all who have taken part and helped organize the Spring 2015 College of Science & Technology Research & Scholarship Day

Dr. Jonathan M. Lincoln, Acting Dean
Dr. Patricia Beyer, Assistant Dean

BLOOMSBURG UNIVERSITY
COLLEGE OF SCIENCE & TECHNOLOGY

Research & Scholarship Day

Friday, May 1, 2015
Hartline Science Center
Thank all of those individuals whose contributions make these research experience possible for our students. The research presented today is the result of many hours of hard work by our students. However, these students were also supported by dedicated faculty, staff, and sponsors who contributed many hours of their time or financial resources. I sincerely thank all of those individuals whose contributions make these research experience possible for our students.

Discovery and Science

I am pleased to welcome you to our Spring Research and Scholarship Day.

Discovery is the cornerstone of knowledge in science. Undergraduate and graduate research experiences in science, mathematics and technology engage students in ways that allow them to discover new knowledge and to evaluate existing knowledge critically and rigorously. Research experiences allow our students to pursue personal interests related to their disciplines, to hone problem-solving skills and to challenge themselves in new ways. Research experiences remind students to keep an open mind and to be ready to absorb, process and analyze new information. Students learn about more than just their research topic through these experiences: they develop time management skills; they learn how to bridge classroom learning and application; they learn patience; and they develop the ability to adjust and work through unforeseen events or outcomes. Undergraduate and graduate research experiences help prepare our students for future success, whether they intend to pursue graduate work or to enter the work force.

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Differential Methylation of Gng7 in Normal B6 Mouse Tissues
Ali Hussain
Dr. William Schwindinger; Biological & Allied Health Sciences Department

Gng7, observed in both humans and mice, is a gene with roles in cell-to-cell communication. Methylation leads to decreased expression of genes and in this case may be linked to certain cancers (head and neck) and diseases such as Huntington’s disease.

PPARβ/δ and PPARγ Modulate UV-induced Apoptosis and Cytokine Secretion in a Human Melanoma Cell Line
Ashley Wagner
Dr. Michael Borland; Chemistry & Biochemistry Department

Everyday, individuals are exposed to ultraviolet (UV) radiation in the UVA and UVB ranges, which causes direct DNA damage and can lead to development of melanoma. Melanoma, a cancer of the pigment-producing melanocytes, remains one of the few cancers in which incidence rates continue to rise. This research was sponsored by a BU Research and Scholarship Grant (M.G.B.). This research was presented at the Society of Toxicology International Conference in San Diego, California on March 24, 2015.

A look at the Effectiveness of Scarlift 15 Acid Mine Drainage Treatment System on Discharge into Shamokin Creek Near Ranshaw (Northumberland County), Pennsylvania
Kyle Halat
Dr. Cynthia Venn & Christopher Hallen; Environmental, Geographical & Geological Sciences and Chemistry & Biochemistry Departments

This research shows the efficacy of the Acid Mine Drainage (AMD) treatment system, Scarlift 15. During the sampling period, we looked at how well the AMD passive treatment system worked at filtering out dissolved solids. It was only working at 44% efficiency. The remaining solids, predominately iron, aluminum, and manganese flow through Shamokin Creek affecting towns and people downstream. The aluminum levels exceed water quality criteria established as protective of aquatic life by the Environmental Protection Agency. This research was sponsored by the BU Environmental, Geographical & Geological Sciences Department and was presented at the Northeast Section Meeting for the Geological Society of America.

Geochemical Analysis of Streams in the Sullivan Branch Watershed: Eastern Source Waters of the East Branch of Fishing Creek, Sullivan County, Pennsylvania
Daniel Tompkins, Kody Bond & Frank Napkora
Dr. Cynthia Venn; Environmental, Geographical & Geological Sciences Department

This study shows the basic composition and quality of headwater streams that feed the streams near BU. Also, this gives a baseline data for any kind of hydraulic fracturing or contamination in our streams in Pennsylvania. This research was presented at the Northeast Section Meeting for the Geological Society of America.

The Importance, Genesis, and Spatial Extent of Transient Islands within the Susquehanna River in the Ridge and Valley Province of Pennsylvania
Brett Diehl
Dr. Matthew Ricker; Environmental, Geographical & Geological Sciences Department

Forested riparian areas have beneficial water quality improvement functions, such as the ability to remove contaminants and nutrients from flood waters. There are a large number of islands in the Susquehanna River that likely perform these functions, but little research has been done on these landscapes.
Cobalt Catalyzed Cyclotrimerization Alkynes: A Comparison Between Using a Microwave Reactor and Traditional Methods

Jocelyn Legere
Dr. Eric Hawrelak; Chemistry & Biochemistry Department

A previously prepared cobalt compound, pentadfluorophenylcyclopentadienyldicarbonyl cobalt ([C6F5]C5H4)Co(CO)2), has been shown to catalytically produce substituted aromatics. Catalytic reactions were initially performed via refluxing in Schlenk glassware. Using a microwave reactor, the reaction time can be significantly reduced. Catalytic production of aromatics with 1 versus a literature prepared catalyst, (C5H5)Co(CO)2, was compared. It was determined that using the fluorinated catalyst the reaction rate was improved versus 2. All compounds were analyzed via 1H NMR. This research was presented at the National American Chemical Society Spring Conference in Denver, Colorado.

The Calculation of Equilibrium Constants and Equivalent Conductivities of Aqueous Lanthanide Solutions

Frank Rodemer
Dr. Greg Zimmerman; Chemistry & Biochemistry Department

This research results in the calculation of two critical fundamental quantities: equilibrium constants and limiting equivalent conductivities. An equilibrium constant gives the proportion of the dissolved chemical species that exist in an aqueous solution for a given salt, and the limiting equivalent conductivity gives how fast the species will move in an electrical field. These quantities are a necessity to the understanding and advancement in a very broad range of fields, from industrial to geochemical processes. This research was sponsored by the BU Honors Program and will be presented at the 2016 American Chemical Society National Meeting in San Diego, California.

Examining the Clinical Utility of Subjective Visual Horizontal (SVH) Testing During Unilateral Centrifugation (UC) Testing

Alyssa Whinna
Dr. Jorge Gonzalez; Audiology & Speech Pathology Department

Examining the clinical of SVH during unilateral centrifugation will be the expansion of current knowledge regarding the assessment of otolithic function. Assessing otolithic function has historically been a limitation of traditional balance testing, as traditional balance testing primarily assesses the horizontal semicircular canals. Examining SVH of individuals with normal vestibular function during unilateral centrifugation will enable the creation of more clinical tools to evaluate otolithic function, thus allowing a proper diagnosis of individuals with vestibular dysfunction. This research was presented at the American Balance Society on March 4, 2015, and was well received with interesting questions regarding the clinical utility of SVH during UC testing.

The Relationship between Low-cost Estimates of Airflow vs. Pneumotachograph Measured Airflow

Laura Kocsis & Eric Smith
Dr. Shaheen Awan; Audiology & Speech Pathology Department

The research study contributed to further knowledge regarding the use of the phonation quotient (a low-cost estimate of airflow often used in voice analysis).

Association of Patient Genotypes and Phenotypes

David Strawn
Drs. Carl Hansen & Janet Robishaw (Geisinger Health System); Biological & Allied Health Science Department

Personalized healthcare is a promising medical model that is currently undergoing intense study, which aims to tailor medical decisions, practices, and/or products to individual patients on the basis of genetics. "The mission of the Translational Medicine Initiative (at Geisinger) is to discover the genetic and molecular bases of human disease and to translate this new knowledge into clinical practice."

The Differences in Foraging Behavior and Predation of Small Mammals in Human Populated Environments Compared to Natural Environments

Bryce Foster
Dr. Marianna Wood; Biological & Allied Health Science Department

As residents of Pennsylvania, we live alongside eastern gray squirrels and eastern chipmunks as they search for food during much of the year. This study sought to answer the question of how human proximity affects their foraging behavior so that we may better understand our relationship with these familiar creatures.

Genetically Modified Immune System Cells for Cancer Treatment

Neil Breskiewicz
Dr. Carl Hansen; Biological & Allied Health Science Department

The use of genetically modified cells from a patient’s own immune system would allow for a more specific targeting of cancer treatment to increase effectiveness and decrease side effects.

Relative Population Density and Behavioral Time Budgets of Seaside Dragonlets (Erythodiplax bernice) in Impaired and Intact Saltmarsh Habitats

Alan Newnham
Dr. Clay Corbin; Biological & Allied Health Sciences Department

Through statistical analysis of our latest study, Summer 2014, we determined males are less dense than females in both intact and impaired salt marsh habitats. While there is no difference in density with respect to the relative impairment of the environment, dragonlets may be quick to colonize or respond to the restoration efforts. We do not have historical data on dragonet population densities during the oyster harvesting years, but we assume, given the amount of human activity in the area and a lack of suitable habitat, dragonet densities were lower. However, males and females both are relatively quiescent in the impaired habitat suggesting this habitat may be an ecological sink. For future studies an incorporation of wider sampling of sites with increased life history scope will help to elucidate environmental factors affecting dragonet density and source-sink dynamics. This research was presented at the Fall 2014 BU College of Science & Technology Research & Scholarship Day.
Effects of Neuropeptide Y on Sexual Behaviors of Female Hamsters
Samirah Boksmati
Dr. Candice Klingerman; Biological & Allied Health Sciences Department
Understanding how specific proteins of the brain effect eating habits and therefore sexual behavior is especially important, and may one day lead to a cure for obesity. Maintaining proper nutritional uptake is essential for achieving reproductive success, thus overeating has evolved over time in order to ensure and increase success rates. This research is sponsored by a BU Research and Scholarship Grant.

Effects of Specific Neuropeptide Y Subtypes (Y1, Y5) on the Sexual and Ingestive Behavior of Female Hamsters
Shandna Burroughs
Dr. Candice Klingerman; Biological & Allied Health Sciences Department
Overeating has improved reproductive success but in a developing world this mechanism has resulted in obesity and other health complications. Understanding how certain neuropeptides influence ingestive and sexual behavior might give us insight on how to combat obesity. This research is sponsored by a BU Research and Scholarship Grant.

Missed Departure: the Potential Role of GNG4 in Kallmann Syndrome
Andrew King
Dr. William Schwindinger; Biological & Allied Health Sciences Department
Kallmann Syndrome is a genetic disorder caused by a defect in cell migration which in some cases is linked to mutations in G-protein coupled receptor signal transduction. By modeling the condition in vitro using cell culture and genomic editing we can gain a greater understanding of the mechanisms behind the condition.

Reassessment of Eastern Hellbender Distribution in the Greater Susquehanna River Drainage
Jamie Shinskie
Drs. Amber Pitt, Steven Rier & Tina Delahunty; Biological & Allied Health Sciences and Environmental, Geographical & Geological Sciences Departments
Populations of Eastern Hellbenders, the largest salamander in North America, were once prevalent in the greater Susquehanna River drainage, and have since declined here and throughout their native range. We used eDNA surveying methods to assess the current distribution of hellbender populations within the greater Susquehanna River drainage. This research is sponsored by a BU Research and Scholarship Grant, and a Pennsylvania Department of Conservation and Natural Resources Wild Conservation Grant. This research will be presented at the Hellbender Symposium in St. Louis, Missouri on June 14, 2015.

Ecological Feeding Niche Overlap Between Three Species of Sea Cucumbers; Sclerodactyla briareus, Thyonella gemmata, and Leptosynapta tenuis
Jessica Baker
Dr. Thomas Klinger; Biological & Allied Health Sciences Department
Two evolutionary similar species cannot occupy the same ecological niche. Resource partitioning studies will help to understand niche overlap and species co-occurrence between three species of sea cucumbers found near Wallops Island, Virginia. This research will be presented to the Chincoteague Bay Field Station.

Application of Research-based Instructional Design Techniques in Designing a Model of a Multimedia Instructional Product Intended to Improve Instructional Effectiveness
Ngao Kitonyo
Dr. Mary Nicholson; Instructional Technology Department
This research helps in understanding the importance of including learning theories in multimedia designs.

Bringing Cybersecurity to Cameroon
Michael Grube
Drs. Scott Inch & Helmut Doll, & Mr. Brian Seely; Instructional Technology and Mathematics, Computer Science & Statistics Departments
Instructional Technology and Digital Forensics are currently two of the most sought out fields in science and technology. Here at Bloomsburg, we have two of the best programs and this project brings those two together in collaboration with the country of Cameroon.

Comparing Canonical and Non-Canonical Link Functions in Generalized Linear Models
Thyme Greenfield
Dr. Mehdi Razzaghi; Mathematics, Computer Science & Statistics Department
Generalized Linear Models (GLM) are an important statistical tool used in modeling and prediction. GLMs are used extensively in data mining in order to categorize response variables based on predictors. This research was sponsored by a Faculty Professional Development Council Grant and was presented twice this spring. Once at the Eastern Pennsylvania and Delaware section of the Mathematical Association of America at Franklin and Marshall College, Lancaster, Pennsylvania in March, and again at the Pennsylvania State System of Higher Education (PASSHE) Mathematics Association in April.

Building a Partial C Compiler
William Evans
Dr. William Calhoun; Mathematics, Computer Science & Statistics Department
Compilers are a complicated piece of software that allow computer programmers to create other pieces of software in their programming language of choice. In this talk we will walk through the basics of creating key parts of a compiler for the C programming language.
An Investigation of Radiation Levels from the Misuse of Handheld X-ray Fluorescence Devices
Robert Riley
Dr. David Simpson; Physics & Engineering Technology Department
Handheld X-Ray Fluorescence (XRF) devices have rapidly become widely used in many different industries including the identification of the metal composition of jewelry. Due to the use of such devices in pawn shops and metal assay centers, a study of the potential radiation levels to the user caused by the improper use of such devices was conducted. This research will be presented at the annual Health Physics Society Meeting in Indianapolis, Indiana on July 15, 2015.

The Effects of Scattered Radiation on Medical Personnel Wearing Lead Aprons
Austin Olson
Dr. David Simpson; Physics & Engineering Technology Department
This research is currently just looking at the safety of medical personnel in regards to the aprons they wear to protect themselves from radiation. This in itself is important, but steps are also being taken to expand this into changing the way that all lead aprons are examined and tested for effectiveness. This research will be presented at the annual Health Physics Society Meeting in Indianapolis, Indiana on July 15, 2015.

LabVIEW Control of Ultra-cold Atomic Instrumentation
Angela Hess
Dr. John Huckans; Physics & Engineering Technology Department
Central to a modern ultra-cold atomic physics laboratory is precision control of the timing and voltages or currents of the myriad pieces of equipment required to create a cloud of atoms. This talk focuses on synchronization of the digital and analog control lines which run the rubidium-87 ultra-cold atomic physics laboratory.

Bloomsburg Kepler Viewer - Toward a K2 pipeline
Collin Shoop
Drs. Nada Jevtic & Peter Stine; Physics & Engineering Technology Department
The Kepler Space Telescope was launched in March of 2009 with the mission of searching for and identifying exoplanets by collecting data. Our research explores ways of using that data to give a better understanding of star behavior, which will then aid in the search for earth-like planets. This research was presented at Dickson College, Carlisle, Pennsylvania on April 25, 2015.