BLOOMSBURG UNIVERSITY OF PENNSYLVANIA
UNDERGRADUATE RESEARCH, SCHOLARSHIP, AND CREATIVE ACTIVITY
Putting theory into practice

Effective education is often about more than books and lectures. Doing — putting theory into practice through experiential learning — is an essential part of many disciplines — student teaching for education majors, clinical experiences for nurses, performance for musicians, internships for management majors and labs for chemists and biologists.

At Bloomsburg we’ve embedded experiential learning into our curriculum in a new way in the past two years through the Undergraduate Research, Scholarship, and Creative Activity Awards (URSCA) summer program.

Begun in the summer of 2012 with funding for 18 student projects, the program grew in 2013 with 30 students receiving support for faculty-mentored projects.

URSCA provides summer stipend support to students participating in summer research, scholarship, or creative activities. This year, the variety of disciplines represented in the program grew to include the social sciences, language, art and music as well as the natural sciences. Students gained firsthand experience working with complex laboratory protocols, organizing a community art project, and surveying neighborhoods.

Learn more about the URSCA program at www.bloomu.edu/ursca.

John Hranitz
Professor, Biological and Allied Health Sciences
Director, Research and Sponsored Programs

NATURAL SCIENCES: FROM ESOTERIC TO APPLIED

Many students participating in the URSCA program in 2013 conducted research in the natural sciences including physics, chemistry, biology, geosciences and environmental science. Students made full use of BU’s extensive labs, including a new nuclear magnetic resonance spectrometer (NMR), which is Bloomsburg’s second such instrument. NMR spectroscopy exploits the magnetic properties of certain atomic nuclei to determine the physical and chemical properties of atoms or the molecules in a sample.

Esoteric doesn’t mean the projects won’t have an impact. For example, students Louisa Andrew and Kristie Darrah worked with chemistry professor Toni Trumbo Bell on projects related to developing new blood clot inhibitors, which could have health-care applications.

Mike Jurbala, mentored by Dr. Gregory Zimmerman (shown above)
Extraction of Equilibrium Constants and Limiting Conductivities from Conductance Measurements on Unsymmetrical Electrolytes
Louisa Andrew, mentored by Dr. Toni Trumbo Bell
Clotting Inhibition for LSPR and ISPR
Kristie Darrah, mentored by Dr. Toni Trumbo-Bell
Chromatographic Studies of Thrombin Inhibitors
Conor Flynn, mentored by Dr. Eric Hawrelak
Catalytic Studies for the Production of Cyclic Organic Molecules Using (IC85F)IC5H4C02 as the Catalyst
Sawyer Davis, mentored by Dr. John Morgan
Organometallic Routes to Chemical Derivatives of the Tricyclic Antidepressant, Imipramine
Ariana Winger, mentored by Dr. John Morgan
An Organometallic Four-Step Synthesis of the Tricyclic Core of the Antidepressant Clo mipramine (Anafranil)
Erik Rahner, mentored by Dr. Mike Borland
Correlating Mono-unsaturated Fatty Acid Chain Length to PPAR-Dependent Anti-proliferative Effects in Malignant Melanoma
Adam Kulp, mentored by Dr. Bill Coleman
Localization of Synapsin Proteins in Human Sperm Cells
Chandra Dewar, mentored by Dr. George Davis and Dr. Chris Hallen, Uptake Specificity of Synthetic Phitosidophore Analogas by Graminaceous Plants
Rachel Livingston and Chandlar Lang, mentored by Dr. John Huckans, Ultrasal Bloom

FEATURED PROJECTS:

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Synapsin I is Present in Human Sperm Cells

Researcher: Adam Kulp
Faculty Mentors: Dr. William L. Coleman; Dr. Jennifer J. Venditti

Cell-cell signaling is a widespread process that must be carefully regulated. Fertilization, a process essential to every living organism, is dependent upon cell-cell communication. Proteins known to have functions in neurons and other types of secretory cells have been recently shown to be present in human sperm cells. One such group of proteins, the synapsins, has been well characterized in neurons, but little is known about their function in other cell types. The main focus of this study was to determine whether the protein synapsin I is present in human sperm cells. Many groups of proteins, including the synapsins, have been well characterized in neurons, and some of these groups have been characterized in other types of secretory cells. Recently, research has found that rab3A, RIM, and Munc-13 (proteins found in neurons and other secretory cells) have functions in acrosomal exocytosis in human sperm cells (Bello et al., 2012). The presence of these other groups of proteins led to the hypothesis that synapsins may also be present in human sperm cells. We investigated this hypothesis using fluorescent immunocytochemical techniques on human sperm samples.

Our investigation found two main results. First, we found that synapsin I localizes to the equatorial segment in some sperm cells (Figure 1). Second, we observed that in some cells, synapsin I localized around the plasma membrane of the human sperm head (Figure 2). The function of synapsin in sperm is still unknown. The localization of synapsin at the equatorial segment suggests that synapsin may have an important function in fertility, as the equatorial segment’s function is to fuse with the female egg cell membrane during fertilization (Yanagimachi and Noda, 1970). Synapsin I can localize to different parts of the sperm in different cells, as observed by the equatorial segment staining in some cells, but plasma membrane staining in other cells. This suggests that synapsin I may change distribution in sperm cells that are in different reaction states. The functional distribution and possible roles in fertility of synapsins will be the focus of future research.

NATURAL SCIENCES: LOOKING AT THE ENVIRONMENT

Bloomsburg students spent a lot of time over the summer with projects that focused on the environment — particularly water quality and wildlife.

Sarah Dodgin and Paola Lunardi spent several weeks on Assateague Island at the Chincoteague National Wildlife Refuge in Virginia. Mentored by biology professor John Hranitz, the two students lived at the nearby Marine Science Consortium facility on Wallops Island while studying the populations of various species of frogs and toads and mapping their habitat.

Chemistry professor Chris Hallen mentored students Amanda Pritzlaff and Franklin Rodemer on projects related to the water quality of area streams and rivers.

Pritzlaff (whose project is featured on page 5) took water samples from various sites on the Susquehanna River to assess water quality. Rodemer has brought such a sustained focus to acid mine drainage remediation during his career at Bloomsburg that he has been called on by other universities and organizations for his insights.

Two students, Robert Kresch and Lynette Eichenlaub, spent time in Pennsylvania’s northern tier with several projects related to water quality. There were mentored by Hallen and Cindy Venn, from the department of environmental, geological and geographical sciences.

PHOTOS: Iron oxides turn the water orange in an acid mine drainage treatment system monitored by Franklin Rodemer. Amanda Pritzlaff, above right, collects and analyzes samples from the Susquehanna River.
Susquehanna River Water Chemistry at Danville, Watsontown and Shady Nook

Researcher; Amanda Pritzlaff
Mentors: Dr. Chris Hallen and Dr. Cindy Venn

This project was an assessment of overall water quality of the Susquehanna River at three different locations. Samples were collected from transects of the river at the North Branch (Danville), the West Branch (Watsontown), and after the two converge (Shady Nook). Samples were collected on May 29 and June 29, to contrast the differences in water chemistry that can occur after a month has passed. Specifically, the water chemistry was analyzed using in situ methods, by taking metered measurements of two pH’s, conductivity, dissolved oxygen, percent saturation, and four different temperature readings, while on the river. In vivo methods were also implicated, specifically, running acidified filtered and unfiltered samples on the ICP to determine heavy metal concentrations in ppm and ppb; as well as using ion chromatography of filtered, acidified samples to determine concentrations of eleven different cations and anions.

Cadmium, nickel, copper, and lead were below detectable limits. Barium, arsenic, and iron were found in trace amounts (under 0.1 ppm) at all sites. Arsenic was slightly higher at Danville and remained so past the confluence with North Branch water. Total iron concentration at Danville was almost twice as high as it was at most other sites. Higher amounts of both dissolved zinc and dissolved iron on the site nearest the Western shore of the Watsontown transect indicate a possible point source upstream. Trends of acidity, alkalinity, and pH were comparable to those of previous years.

This research was presented at the 2013 Geisinger Henry Hood Undergraduate Research Symposium, and informally, at a meeting of the Susquehanna River Heartland Coalition at Lycoming College. In the future (March 2013), these results (perhaps with macroinvertebrate bioaccumulation data) will be presented at the 48th Geoscience of America Meeting in Lancaster. The results of this research will also be incorporated in a larger study that includes data from the past four years.
Jose Calvo, mentored by Dr. Jennifer Johnson, Perceptions of Cyber Security: Personal Computers

Lauren Heller, mentored by Dr. Eric Stouffer Examination of the Ability of Voluntary Physical Exercise

Ashleigh Wells, mentored by Dr. Kevin Ball Effect of Chronic Stress on Relapse to Palatable Food Seeking: Role of Dopamine D1-like Receptors

Jacqueline Zeiber, mentored by Dr. Winona Cochran Effects of Color and Type on Gender Classification of Children’s Toys

Brandon Hartman and Michael Otto, mentored by Dr. Heather Feldhaus Developing a Regional Economic Impact Plan

Caleb Meyers, mentored by Dr. Heath Feldhaus Revitalization of Elm Street Community, Berwick Pennsylvania

Christina Irzinski, mentored by Dr. Pamela Smith, The Use of Technology with Unfamiliar Communication Partners by Persons with Aphasia: Video Conferencing vs. Email

Social Sciences: A Focus on Behavior

In the social sciences, such as psychology and sociology, Bloomsburg students brought an analytical eye to human issues. Student Jose Calvo, mentored by psychology professor Jennifer Johnson, conducted a study that showed people were less careful about cyber security while using mobile devices than they are on personal computers, even though mobile devices have cyber security risks. Psychology students, Lauren Heller and Ashleigh Wells conducted classic conditioning experiments with lab rats. The experiments may help in understanding how humans respond to exercise and stress respectively.

Ashleigh Wells, left, researched the effects of stress on lab rats with mentor Kevin Ball. Jose Calvo’s project focused on the perceptions of cyber security on personal computers versus mobile devices.

Researcher: Christa J. Irzinski
Faculty Mentor: Dr. Pamela Smith

Aphasia is a language disorder resulting after a stroke or traumatic brain injury that affects a person’s everyday use of communication. Oftentimes, aphasic clients work on goals that improve their daily interactions with communication partners and regaining their ability to hold an impromptu conversation with a stranger. The focus of this study was to determine the acceptance, preference, and ease of use for video conferencing versus emailing by persons with aphasia.

After the participants attended two sessions a week for three weeks of video conferencing and three weeks of emailing, or vice versa, the data from questionnaire responses were analyzed. At the end of the study, all eight participants confirmed that they would like to continue to use the video conference or email applications and seven out of the eight indicated a desire to continue communication with their pen pal. These data signify the ability for those with aphasia to socialize and communicate effectively with familiar communication partners as well as with strangers through iPads. Within this era of technology, iPads are increasingly being integrated in to therapy sessions by Speech-Language Pathologists and can be personalized accordingly for clients.

The post-assessment was administered verbally and the data extracted can be analyzed as a whole or individually. The most intriguing fact was that 80% of the participants ended up having no preference for either the video conferencing or emailing. One participant preferred the video and one preferred the emails. All eight participants answered positively when asked if they wanted to continue to use this technology while 90% said that they would like to keep in touch with their pen pal.

Christa Irzinski, above, presented her research at the annual American Speech-Language, and Hearing Association (ASHA) Convention this November in Chicago. She has been invited to join the PROGENY (Promoting the Next Generation of Researchers) program in which she will be paired with a faculty researcher to discuss the study and possible expansions of the research.
Data Driven Community Development Project: The Development of a Revitalization Plan for One Struggling Rural Community

Researcher: Caleb Meyers
Mentors: Dr. Heather Feldhaus & Dr. Neal Slone

The goal of this project was to develop a plan for the revitalization of a struggling community in rural Pennsylvania. In 2008, the Columbia County Housing and Redevelopment Authority started the Blueprint Community Project in the LaSalle Street Neighborhood in Berwick. This Blueprint Community was designed to revitalize the community through homeowner rehabilitation assistance, neighborhood crime prevention, beautification, and redevelopment opportunities. Community leaders and law enforcement report a reduction in crime and community members' satisfaction as a result of this work.

The success of the Blueprint Community in the LaSalle Street Neighborhood laid the groundwork for its expansion to the Elm Street Community in 2013. In order to assess the needs of this specific community we used a survey of residents that targeted community members' perceptions of the current state of the community. We also hosted an informational meeting for residents and officials to discuss current strengths, weaknesses, and solutions of the community. I also canvassed and catalogued the physical space by taking pictures of and notes of various areas within the Elm Street Community that need attention.

There were 56 total responses from residents. The main conclusions of this project were a need for improvements in environmental design (specifically crime prevention through environmental design), community cohesion through social interactions, and communication among and with the residents. While conducting this research we were able to identify several areas that could be prime locations for criminal activity. These areas need to be improved to build upon the quality of the neighborhood. Many residents report that the sidewalks, roads or/and street lighting need improvement.

Survey Highlights

Feel safe walking during the day (91.1%)
Feel safe walking at night (35.7%)
Disagree with statement (51.8%)
Less than half of the residents reported that they do not communicate with their neighbors on a regular basis.
Willing to report suspicious activities (78.6%)
Share information about community problems or other issues (48.2%)
Would recommend my neighborhood to anyone as a good place to live (62.5%)
Willing to work together to make this a better place to live (66.1%)
Feel good about being part of this neighborhood (82.1%)
Suggestions to make the neighborhood a better place to live?
- Street repairs
- Caution, kids playing [sign]
- More lights
- Slow Traffic signs
- Trees in park for shade
- Houses [need] kept up a little more

Caleb Meyers was honored for having the best poster in the social sciences at The Susquehanna Valley Undergraduate Symposium held at Geisinger Medical Center.

ARTS AND HUMANITIES: CULTURE, LANGUAGE AND ART

Many Bloomsburg students spent the summer engaged in projects that explored and, sometimes, celebrated culture and heritage.

Three students, Ashley Brown, Shannon Sursely and Shelley Fought, mentored by Susan Dauria, worked with dozens of elementary students for a week-long archaeology summer camp. The children participated in an excavation at a nearby farm field where they found and documented stone artifacts dating from the Lithic era (more than 10,000 years old).

Chinese major and avid guitar player Dan Copes traveled through the Chinese countryside to learn about regional music traditions.

And in the most visible fashion, art major Jo Pennypacker celebrated the heritage of Danville, Pa., by designing a giant outdoor mural in the town and organizing volunteers to help paint and install it.

Ashley Brown, Shannon Sursely and Shelley Fought, mentored by Dr. Sue Dauria, Anthropology and Education: An Ethnographic Field-School Teaching Anthropology

Kimberly West, mentored by Dr. Stephanie Schlitz, Pennsylvania Dialects Project

Dan Copes, mentored by Dr. Jing Luo and Dr. Matthew Slotkin, Effects of Music on Language and Culture in China

Jo Pennypacker, mentored by Dr. Vincent Heon, Downtown Danville Mural Project