Dear Alumni and Friends,

It gives me great pleasure to introduce the 2013 Biological Sciences newsletter. As you will see by reading through the newsletter, we have been busy working to enhance our research capabilities, educational opportunities for our students and community outreach and engagement.

The past year was a good one for our department. We were able to hire a new faculty member, Wendy Beane, whose research and teaching interests are in the area of developmental biology and tissue regeneration. We are currently searching for a new faculty member in the area of fish biology, to help with development of an interdisciplinary Freshwater Sciences and Sustainability major offered through the Environmental Studies Program. We are in the midst of revising our introductory course sequence, having added a new course, BIOS 1600 (Biological Form and Function). This fall we also admitted the first students into our Master of Arts degree in Biological Sciences, a new coursework only degree offered through our department.

Our undergraduate and graduate programs in Biological Sciences are thriving and have seen steady growth over recent years. Our students have received numerous awards from within and outside the university and many students have given research presentations at local and national scientific conferences.

I hope you enjoy this update from your department. As you read through this newsletter do not hesitate to contact me with any comments you may have concerning our successes and failures and I would greatly appreciate any suggestions for ways we may improve the service we provide to our students, alumni and friends.

Finally, I want to thank you, our alumni and donors, for your generous support of our students and programs. Your generosity enhances the teaching and research mission of our department by providing expanded opportunities for student travel to distant research sites, travel to scientific conferences, and supports fellowships and awards for scholarship and research by our outstanding students.

Go Broncos!

John Spitsbergen, Chair
john.spitsbergen@wmich.edu
Faculty Focus: Dr. Sharon Gill

As many students in my classes guess, I am originally from Canada. I received my B.Sc. and M.Sc. from the University of Manitoba, where as both an undergraduate and graduate student I worked with Dr. Spencer Sealy studying behavioral interactions between brood parasites (birds that lay eggs in the nests of other species) and their hosts (those species that care for the parasitic offspring). For my Ph.D., I worked with Dr. Bridget Stutchbury at York University in Toronto, investigating mating patterns and parental investment in tropical birds, research that gave me the unparalleled experience of conducting research in the rainforests of Panama. I enjoyed a brief hiatus while being a full-time mom and then returned to academia for a post-doc. I was awarded a post-doctoral fellowship from the Natural Sciences and Engineering Research of Canada to work with Dr. Michaela Hau at Princeton University to understand hormonal mechanisms underlying year-round territoriality in tropical birds. After teaching as an Adjunct Professor at WMU for two years and as a Visiting Assistant Professor at Kalamazoo College for a semester, I began my current position at WMU as an Assistant Professor in 2008.

I was drawn to biology because of my love of animals, a keen interest in their behavior and ecology, and concern about the natural world due to environmental change. I feel very fortunate that I have been able to explore my interests, beginning as an undergraduate research assistant and continuing to this day with a fantastic group of graduate, undergraduate and high school students who work in my lab. Our main focus over the last several years has been to investigate how human-generated, or anthropogenic, noise influences animal communication during breeding. We study birds and frogs: in both groups, males sing or call to defend breeding territories and attract female mating partners. With increasing anthropogenic noise due to urbanization and land-use changes, the potential exists that this noise may seriously mask or cover up those signals, making them difficult to be heard by potential competitors and breeding partners alike. Our research is conducted in the field, where we make recordings of animal sounds and conduct experiments to understand the causal influence of noise on these vocalizations. We had two great crews this past year, with doctoral candidate Jacob Job, WMU graduate Katie Mulka, undergraduates Josephine Gingerich and Monique Pipkin, and KAMSC high-school student Bethel Mwenze studying birds during the day, and MS student Allister Malcolm and undergraduates Jen Nummerdor, Nicole Schafer, Jamie Smith and Mohammed Tofa studying frogs at night. With two new graduate students, Nina Bartling in my lab and Isaac Veysey-White in the lab of Dr. Maarten Vonhof, we will examine avian microbiomes and patterns of malarial infections in urbanized and undisturbed habitat to understand the influence environmental change on host-microorganism interactions. We have great collaborators at WMU, with Dr. Koorosh Naghshineh (Mechanical and Aeronautical Engineering) working with us on communication in noise, and Dr. Kathryn Docherty (BIOS) lending her expertise on microbiomes.

Funding for our research comes from grants from the National Science Foundation, WMU (Faculty Research and Creative Activity Award and Support for Faculty Scholars Award, Undergraduate Research and Creative Activities Awards, and Graduate Student Research Grants), and scientific societies to graduate students. For more information about our lab, including other research interests and publications, please visit my website (http://homepages.wmich.edu/~sgill/Home.html).

Dr. Sharon Gill
Dr. Christopher Pearl joined the Biological Sciences department in Fall 2009. He teaches courses in human physiology, endocrinology and comparative vertebrate reproduction.

Research in the Pearl laboratory focuses on hormonal regulation of male fertility and infertility, specifically estrogen, using rodent models. Yes, estrogen and male reproduction. While testosterone is traditionally considered a male hormone, and estrogen a female hormone, males (human and animal models) lacking estrogen action are sub-fertile or infertile. In particular, his research investigates how estrogen contributes to sperm production in the testis and maturation in the epididymis.

Students who have worked in the Pearl laboratory have been co-authors on presentations at regional and national meetings such as the Michigan Alliance for Reproductive Technology and Science (MARTS) and the Society for the Study of Reproduction (SSR). After graduation, undergraduates that have worked in the lab have pursued graduate or professional studies in health related fields (e.g. MS in public health at Michigan State, dental school at University of Michigan) or have taken jobs in the biotechnology sector.

A native Californian, Dr. Pearl earned his bachelor’s degree from Saint Mary’s College of California and Master’s degree from the University of the Pacific. In 2000, he joined the Physiology Graduate Group at UC Davis to pursue his doctorate in the laboratory of Dr. Janet Roser. UC Davis is well known for its animal science and veterinary programs, and Dr. Pearl had an opportunity to study large animal reproduction. Specifically, his work investigated the role of estrogen in testicular and epididymal development and function in boars and stallions. After completing his PhD in 2006, he relocated to St. Louis to complete his postdoctoral research at Washington University School of Medicine. As a postdoctoral researcher, he investigated the signals that cause differential sorting and secretion of the gonadotropins (LH and FSH) from the pituitary.

Dr. Pearl resides in Portage, MI with his wife, Renee, who also works at WMU in the Office of Development and Alumni Relations. Dr. Pearl is an avid sports fan and passionately follows the Los Angeles Lakers and Dodgers. He endeavors to play as much golf as possible and has recently begun to kayak. Other interests include reading books by science fiction and action-adventure authors, such as James Rollins and Stephen King.

Faculty Focus: Dr. Christopher Pearl
Distinguished Alumni Award for the College of Arts & Sciences

Our distinguished alumni award in 2013 went to Major General Richard Stone, MD, who is currently serving as the U.S. Army Deputy Surgeon General and Deputy Commanding General for Support. As Deputy Surgeon General, MG Stone assists the Surgeon General of the U.S. Army on health care matters pertaining to the U.S. Army and its military health care system. Dr. Stone gave an inspiring seminar on his life as the U.S. Army Deputy Surgeon General and gave us a unique insight into the healthcare problems and solutions for soldiers in the military. MG Stone discussed how to assess health hazards and how to establish health standards for the military. Stone graduated from Western Michigan University with a B.A. in 1973 from the Department of Biological Sciences. He then graduated from Wayne State University Medical School in 1977. He completed his internship in Internal Medicine and residency in Dermatology at Wayne State University, Detroit, MI, from 1977 to 1981, and is certified by the American Board of Dermatology.

MG Stone is a member of the Department of Defense's Wounded, III, and Injured Task Force and is a chairman of the Army Federal Reserve Force Policy Committee. Before his current role, Stone served as Deputy Surgeon General for Mobilization, Readiness and Reserve Affairs. In 2003-2004, MG Stone served in Afghanistan, and subsequently was selected to serve as Commander for a multinational medical task Force of more than 1000 medical service members from four nations.

His military decorations and awards are numerous and include the Legion of Merit with Oak Leaf Cluster, Bronze Star Medal, Meritorious Service Medal, Army Commendation Medal, Army Reserve Component Achievement Medal with three Oak Leaf Clusters, National Defense Service Medal, Afghanistan Campaign Medal, Global War on Terrorism Service Medal, Armed Forces Reserve Medal with Silver Hourglass and M Device, Army Service Ribbon, Overseas Service Medal, and the Combat Action Badge. He is a member of the Order of Military Medical Merit. We thank Dr. Stone for his wonderful visit to WMU. It was a pleasure and honor to meet him and to find out about his exciting life as Major General. Go Broncos!
Faculty Research Activities.

The majority of faculty members in our department have active funding for their research programs. Included below is a list of external grants, publications in scientific journals and presentations by faculty and students at scientific conferences. As you can see our faculty and students are active in publishing in top scientific journals and in giving presentations at major national and international scientific conferences. We are convinced that a strong and vibrant research environment enhances our student’s educational experience and adds value to a degree from our department.

Current External Funding.

Dr. Todd Barkman
Title: Ghosts of Evolution Past: Resurrecting an Extinct Ancestral Enzyme to Understand the Origins of Modern-day Biochemical Activities.
Source: National Science Foundation

Dr. Christine Byrd-Jacobs
Title: Olfactory Bulb Cell Genesis and Survival in a Model of reversible Deafferentation.
Source: National Institutes of Health

Dr. Karim Essani
Title: Experimental Oncolytic Virotherapy and Colorectal Cancer.
Source: National Institutes of Health

Dr. Rob Eversole (co-PI)
Title: Flubendazole Efficacy Study
Source: Bill and Melinda Gates Foundation

Dr. Sharon Gill
Title: Integrating approaches from behavior and engineering to explore how male songbirds respond to anthropogenic noise
Source: National Science Foundation

Dr. Pam Hoppe
Title: Molecular genetic analysis of UNC-82 kinase function in *C. elegans* muscle
Source: National Institutes of Health

Dr. Charles Ide
Title: Cell and Molecular Correlates to Neurodegeneration in Multiple System Atrophy
Source: Miracles for MSA Donors Fund

Dr. Don Kane
Title: The Lineage and Clonal Relationships of the Primitive Blood
Source: National Science Foundation

Dr. David Karowe (co-PI)
Title: Biosphere-Atmosphere Interactions in a Changing Global Environment, a research experience for undergraduates (REU).
Source: National Science Foundation
Dr. Cindy Linn
Title: Prevention of RGC loss in an in vitro excitotoxic model and an in vivo model of glaucoma using an alpha7 nACh receptor agonist.
Source: National Institutes of Health

Dr. Yan Lu
Title: Identifying and Understanding Connections between Photosynthesis and Amino Acid Metabolism.
Source: National Science Foundation

Dr. Silvia Rossbach
Title: Biogeophysics for Optimized Mitigation of Hydrocarbon Contaminated Soils: From Theoretical Developments, Laboratory Experiments to Field Validation.
Source: Oklahoma State University and Chevron Corporation

Dr. Reneé Schwartz (co-PI)
Title: Research Driven Innovation for the Improvement of Undergraduate Science Education
Source: Howard Hughes Medical Institute

Dr. Renee’ Schwartz (co-PI)
Title: Collaborative Research: Virtual Laboratory for Engineering and Applied Sciences Education (EASE).
Source: National Science Foundation

Dr. John Spitsbergen (co-PI)
Title: Environmental signal transduction: An interdisciplinary research experience for undergraduates (REU).
Source: National Science Foundation

Dr. Maarten Vonhof
Title: Test of a Biocompatible, Biodegradable, Widely Available and Inexpensive Anti-Fungal Agent on the Growth of G. destructans, the Causative Agent of White-Nose Syndrome, on Experimentally-Infected Bats Under Controlled Laboratory Conditions.
Source: U.S. Fish & Wildlife Service, White Nose Syndrome Program

Dr. Maarten Vonhof (Co-PI)
Title: Genetic Approaches to Defining Taxonomic and Conservation Units for the Hawaiian Hoary Bat.
Source: U.S. Geological Survey

Papers published in 2013

(Bold = Biological Sciences Faculty, underlined = Biological Sciences Graduate Student, italicized = Biological Sciences Undergraduate Student)

http://dx.doi.org/10.1890/ES12-00196.1


**Presentations by Faculty and Students.**

**Bold** = Biological Sciences Faculty, **underlined** = Biological Sciences Graduate Student, **italicized** = Biological Sciences Undergraduate Student, * = Recipient of Biological Sciences Student Travel Award


**Aiello, S.A., Buehler, B.K., Docherty, K.M.** Variation in Wastewater Treatment Plant Microbial Communities Influences Biodegradability Predictions for Green Chemical Design. 113th General Meeting, American Society for Microbiology. May 2013, Denver, CO.

**Buehler, B.K., Aiello, S.A., Docherty, K.M.** Biodegradation of 1-butyl-3-methylpyridinium bromide and 1-octyl-3-methylpyridinium bromide by microbial isolates from a wastewater treatment plant. 113th General Meeting, American Society for Microbiology. May 2013, Denver, CO.

**Walker, K.A., Adams, C.P., Obare, S.O., Docherty, K.M.** Aggregate size and exposure time influence toxicity of palladium nanomaterials to microorganisms. 113th General Meeting, American Society for Microbiology. May 2013, Denver, CO.

**Bergh, K., Gutknecht, J.L.M., Docherty, K.M.** Long-term nitrogen deposition influences the effects and timing of soil ammonia-oxidizing bacterial responses to fire. Ecological Society of America 2013 Annual Meeting, August 2013, Minneapolis, MN.

**Docherty, K.M.** Understanding Microbial Biodegradability of Green Chemicals. American Chemical Society Fall 2013 National Meeting, September 2013, Indianapolis, IN.

**Jeng, D. and K. Essani.** 2013. The tanapox 15L knockout virus is replicatively attenuated in human endothelial cells. Western Michigan University Medical School Research Day, Kalamazoo, MI.

**Goh, Y.W., Jeng, D., Bejcek, B. and K. Essani.** 2013. Vaccinia virus F11L protein enhances tanapoxvirus replication and improves its oncolytic potential. Western Michigan University Medical School Research Day, Kalamazoo, MI.

**Suryawanshi, Y., Jeng, D. and K. Essani.** 2013. Generation of two tanapoxvirus deletion mutants and their replication in human cancer cell lines. Western Michigan University Medical School Research Day, Kalamazoo, MI.


**Schwartz, R. S., & Bierema, A. M.-K.** (2013, November). *Teaching nature of science, science practices, and biology:*** Presentation to be given at the National Association of Biology Teachers Professional Development Conference, Atlanta, GA.

**Bierema, A. M.-K., & Schwartz, R. S.** (2013, November). *How do biology majors conceptualize the concept of animals?*** Presentation to be given at the 2013 Biology Education Research Symposium, of the National Association of Biology Teachers Professional Development Conference, Atlanta, GA.

**Bierema, A. M.-K., & Schwartz, R. S.** (2013, October). *A literature review on the possible uses of course web sites.*** Presentation to be given at ACUBE (Association of College and University Biology Educators) Annual Meeting, Indianapolis, IN.


Stephanie E. Jerger and John M. Spitsbergen. Age-related changes in GDNF content of skeletal muscle. 27th National Conference on Undergraduate Research (NCUR), 2013.

Amy Morrison Gyorkos and John M. Spitsbergen, GDNF expression in slow- and fast-twitch muscle fibers is dependent on exercise intensity. Annual meeting of the American College of Sports Medicine, 2013.

Alberto F. Cintrón Colón and John M. Spitsbergen. Glial cell line-derived neurotrophic factor expression in hearts of aging and exercised rats. First Student Investigation Symposium, the Microbiology Society of Puerto Rico, 2013.

Amy Morrison Gyorkos and John M. Spitsbergen, GDNF expression in slow- and fast-twitch muscle fibers is dependent on exercise intensity. Research and Creative Activities Poster Day, Western Michigan University, 2013.


*John-Mary Vianney and John M. Spitsbergen, Electrical stimulation has opposing effects on glial cell line-derived neurotrophic factor expression in voluntary and involuntary muscle. Annual Meeting of the Society for Neuroscience, 2013.


Warburton, Elizabeth, Maarten Vonhof. Does Host Exposure or Parasite Establishment Determine Helminth Burdens of *Eptesicus fuscus* (Chiroptera: Vespertilionidae)? Annual Midwestern Conference of Parasitologists. West Layfette, IN.

*Buchalski, Michael, Gloriana Chaverri, Maarten Vonhof. Demographic and genetic estimators of effective population size suggest high male reproductive skew in Spix’s disk-winged bat. 16th International Bat Research Conference, San Jose, Costa Rica

Vonhof, Maarten, Timothy Carter, Kevin Keel, Joseph Johnson, and DeeAnn Reeder. Does chitosan combat growth of *Geomyces destructans* and prevent White Nose Syndrome? An experimental test. Annual White Nose Syndrome Symposium, Boise, ID

**Teaching Awards:** Besides active interest in research, each faculty member is dedicated to teaching excellence at the undergraduate and graduate level. This year, the Dr. Darrell R. Latva Biological Sciences Teaching Excellence Award was issued to Dr. Leonard Ginsberg, a professor in the Department of Biological Sciences. Dr. Ginsberg retired at the end of the spring semester after over 30 years of service at Western Michigan University. We will miss Dr. Ginsberg as a colleague and students will surely miss his outstanding teaching.
**Student Activities.**

The past year has been an outstanding one for students in our programs in Biological Sciences. Fifteen students were included as co-authors on papers published in peer-reviewed scientific journals (see above), students gave 39 presentations at scientific conferences (see above) and received numerous grants and awards (see below).

**Student Grants and Awards.**

**American Society for Microbiology Undergraduate Research Fellowship.** Oliva Walser will receive up to a $4,000 stipend, a two-year ASM student membership, and funding for travel expenses to the ASM Capstone Institute and 114th ASM General Meeting.

**American Society of Parasitologists Student Travel Grant 2013**
Elizabeth Warburton received $500 to attend the American Society of parasitologists meeting in Quebec City, Canada this past June.

**LaRue Platform Paper Award 2013**
Elizabeth Warburton received the LaRue Award ($200) for the best graduate student platform presentation at the Annual Midwestern Conference of Parasitologists (AMCOP). Her talk was also judged the best student presentation overall and she will serve as AMCOP’s nominee to the next American Society of Parasitologists annual meeting. This honor comes with a paid trip to New Orleans for the meeting in July 2014.

**Dissertation Completion Fellowship 2013-2014**
Elizabeth Warburton received a year-long dissertation completion fellowship ($21,106) from the Western Michigan University Graduate College.

**Travel Award from Association for Chemoreception Sciences (AChemS)** Amanda McKenna received a travel award from the Association for Chemoreception Sciences to attend the annual meeting for this association.

**Michigan Branch of the American Society for Microbiology Fall Meeting**
Ee Leng Choong, Best Graduate Student Poster Award
Carol Beaver, Best Graduate Student Oral Presentation Award
Olivia Walser, Best Undergraduate Student Poster Award

**WMU Research and Creative Activities Poster Day - Western Michigan University, 2013**
Amy Morrison Gyorkos – Best Overall Presentation
Amanda McKenna – Best Poster Presentation
James O’Donnell – Honorable Mention for Best Poster

**Hazel Wirick Scholarship** - Department of Biological Sciences, Western Michigan University, 2012-13
James O’Donnell
Andrew O’Donnell
Leo C. VanderBeek Graduate Student Plant Biology Award - Department of Biological Sciences, Western Michigan University, 2012-13
James O'Donnell
Andrew O'Donnell

Distinguished Biological Sciences Graduate Student - Department of Biological Sciences, Western Michigan University, 2012-13
Teresa Clark

MPI Outstanding Graduate Research Award – Master’s Level - Department of Biological Sciences, Western Michigan University, 2012-13
David Mata

MPI Outstanding Graduate Research Award – Doctoral Level - Department of Biological Sciences, Western Michigan University, 2012-13
Monica McCullough

WMU Graduate Research and Creative Scholar Award
David Jeng – Doctoral Level
Amanda McKenna – Master’s Level

WMU Graduate Teaching Effectiveness Award
Monica McCullough – Doctoral Level
Michael Clarke – Master’s Level

WMU Graduate College Travel Grant
Amanda McKenna, 2013

WMU Graduate College Research Grant
Elizabeth Warburton

The Theodosia Hadley Hamilton Lecture Series:

On March 12, 2013, Dr. Gabrielle Nevitt presented a talk in the Fetzer Center as part of the Theodosia Hadley Memorial Lecture entitled: “The road less travelled: Investigations into the chemical ecology of petrels and albatrosses.” Dr. Nevitt is a professor of neurobiology, physiology and behavior at the University of California-Davis. Her research seeks to better understand the sensory ecology of other organisms, and how sensory systems are shaped by evolution. Dr. Nevitt’s specialty is olfaction - the sense of smell - and much of her research has focused on exploring how marine birds and fishes use smell in the natural environment.
Dr. Nevitt’s research talk specifically discussed olfactory foraging, navigation and individual recognition in petrels and albatrosses. We thank Dr. Nevitt for her wonderful visit to WMU. It was a pleasure and honor to meet her and to find out about her exciting research.

The annual Hadley Memorial Lecture was endowed in 1984 by Dorothy E. Hatch in honor of her cousin, Theodosia H. Hadley. Theodosia Hadley was a faculty member from 1917-1946 in what is now the Department of Biological Sciences at Western Michigan University. She taught courses in botany, agriculture, bird and tree studies, but most consistently taught nature study with the hopes of increasing a student's understanding of nature and joy of living.
The Department of Biological Sciences is launching a new program this year and we need your help to make it a success!

Summary: The Students Advancing Biological Research and Engagement (SABRE) program will provide several of our undergraduate students with an opportunity for an intensive summer research experience at WMU, while building connections between the university and the Kalamazoo community through volunteer activities. [http://www.mywmu.com/sabre](http://www.mywmu.com/sabre)

The SABRE program was created by Biological Sciences faculty Dr. Kathryn Docherty and Dr. Sharon Gill and the WMU Office of Development and Alumni Relations. At its core, SABRE is a crowdsourcing funding program. You may have heard of crowdsourcing before: websites like Kickstarter.com provide people from around the world with a platform to obtain monetary support for everything from art and music projects to travel to video game design. Director Spike Lee even used crowdsourcing to fund production of an entire movie!

We have taken this basic idea and applied it to an important educational and community outreach opportunity for WMU’s Biological Sciences students. Undergraduate student researchers at WMU are a valuable resource to our faculty research programs. In turn, it is through hypothesis-driven hard work and dedication to a particular question that students of the sciences truly achieve mastery and understanding of the scientific process. Students who have the time and energy to focus on a project and work closely with a faculty mentor have found this to be one of the most rewarding experiences of their undergraduate careers at WMU. In addition, undergraduate research opportunities often lead to presentations at national conferences and authorship on publications, which are excellent resume builders for any future career in the sciences.

Here’s what past students have said about their research experience at WMU:

“While classroom experiences were certainly helpful in preparing me for life post-grad, I believe the single most impactful experience I had at WMU was working in a research lab... This research opportunity was a key component in teaching me what it really meant to “study science” and, more importantly, how to think like a scientist. I believe that it is paramount for our communities to engage students in as many research opportunities as possible.” – Barbara Buehler, Class of 2012, currently at Central Michigan University College of Medicine.

“I learned a wide range of experimental techniques, improved upon my critical thinking skills, learned about effective experimental design, and strengthened my science communication skills by presenting my research during lab meetings or conferences....I see my experience of working in the laboratory at WMU as the most influential factor in my decision to pursue a career as a research scientist.” – Olivia Walser, Class of 2013, currently applying to graduate programs.
Our goal is to raise sufficient funds through crowdsourcing to support four talented Biological Sciences students during our pilot year (Summer 2014). This stipend will provide these students with an opportunity to focus on developing their skills in scientific inquiry without coursework and part-time jobs competing for their time and attention. We plan to continue and expand the program in future years, but our goal this year is to reach a total of $20,000, providing a stipend of $4000 for each of four students to work with a Biological Sciences faculty mentor and funds for research supplies and travel. One of the most exciting aspects of this program is that it is also designed to connect our students with the Kalamazoo community. Each of the students will spend at least 10 hours a week volunteering for a Kalamazoo-area organization of their choice. In September 2014, WMU will host a reception for all donors, where the SABRE scholars will discuss their research and volunteer experiences.

Please consider donating toward the SABRE program this holiday season. You can donate online through WMU’s Office of Development and Alumni Relations, and click on “Make a Gift”

www.mywmu.com/sabre

Meet the Summer 2014 SABRE candidates and learn about their research plans:

**SARA KALISZAK:** Sara will work with BIOS faculty member Dr. Cindy Linn using a rat model to study glaucoma. Glaucoma is caused by increased pressure on the optic nerve and is a leading cause of blindness for which there is no cure. Sara’s project analyzes the effects of a specific type of chemical that has been shown to prevent neurons in the retina from dying under glaucoma conditions. These studies can lead to development of new treatments for glaucoma that are not currently utilized. Sara plans on volunteering at Bronson Methodist Hospital in the Trauma and Emergency Care Department.

**KATIE WALKER:** Katie will work with BIOS faculty member Dr. Kathryn Docherty to examine the biological effects of novel engineered chemicals. Newly designed green chemicals, such as ionic liquids, are meant to have a lower environmental impact than more toxic predecessors. However, much work is needed to predict the ability of these chemicals to be broken down by microorganisms in a wastewater treatment plant. Katie’s work shows that, given the right microorganisms, it is possible to biodegrade these important chemicals in a matter of weeks and provide non-traditional clean-up solutions. Katie plans on volunteering at the Kalamazoo Youth Development Center.
**NICOLE CARPP:** Nicole will work with BIOS faculty member Dr. John Spitsbergen to examine how certain types of proteins, called neurotrophic factors, influence neuron survival and development. Glial cell line-derived neurotrophic factor (GDNF) is a type of neurotrophic factor expressed in skeletal muscle that is important for survival and health of motor neurons. Motor neurons are the neurons that innervate skeletal muscle and are responsible for physical activity. The goals of Nicole’s studies are to understand the processes controlling expression of GDNF in skeletal muscle and to determine the consequences of altered GDNF expression with age or neurodegenerative disease. Nicole plans to volunteer at the Kalamazoo Youth Development Center.

**DEIRDRE COURTNEY:** Deirdre will work BIOS faculty member Dr. David Karowe to investigate the potential effects of rising atmospheric carbon dioxide (CO₂) on the relationship between carnivorous pitcher plants (*Sarracenia purpurea*) and both the prey and non-prey communities that live inside them. Carnivorous plants are organisms that are particularly vulnerable to changes in atmospheric CO₂ composition and can act as an early indicator species in examining the effects of climate change. Deirdre’s studies will focus on the effects of pitcher plant (*Sarracenia purpurea*) nectar, color and leaf shape on prey capture, using a combined field and laboratory approach. Deirdre plans to volunteer for the Clements for Congress campaign to prepare for the upcoming November 2014 election.

---

**Support other Biological Sciences Initiatives**

In times when state funding is decreasing, the support we receive from friends and alumni is vitally important. To help support the mission of the department, you can donate online (via credit card) by using the following link.

[http://www.mywmu.com/givetobiology](http://www.mywmu.com/givetobiology)

To donate by mail, send a check to the following address:

Gift Processing  
WMU Foundation  
1903 W. Michigan Ave  
Kalamazoo, MI 49008-5403

Please make your check payable to the WMU Foundation and indicate Biological Sciences department in the memo line. Thank you for considering a gift to the WMU Department of Biological Sciences.