



# University of Vermont, College of Arts and Sciences Department of Biology Newsletter

May 2013

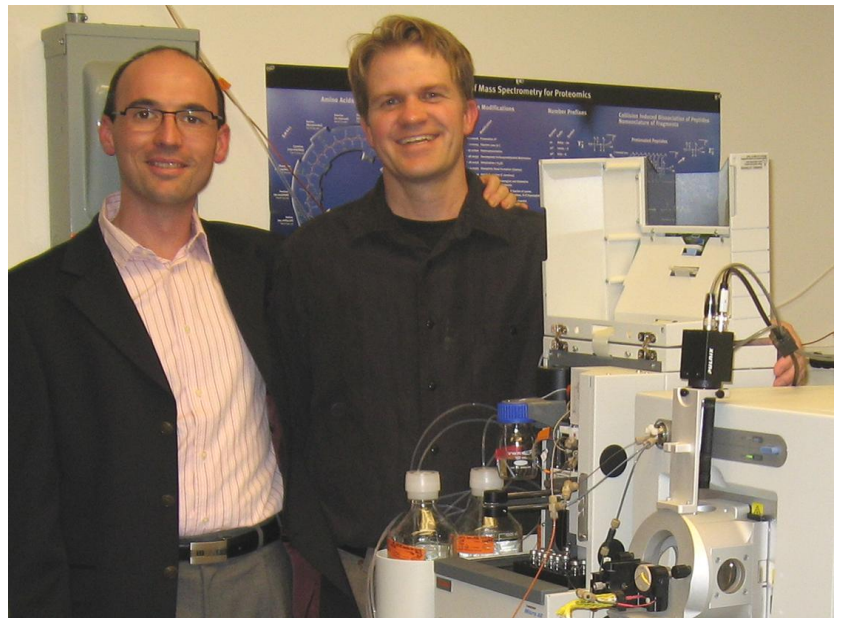
## FACULTY NEWS

### Third Blood Type Mystery Solved using a UVM Mass Spectrometer

Whether you say, “Good things happen in threes!” or “Jamais deux sans trois!” you would be correct if you were discussing the collaborative research of Dr. Bryan Ballif of the University of Vermont, and Dr. Lionel Arnaud of the French National Institute of Blood Transfusion. Together, the two have uncovered the biochemical and genetic bases of three rare blood types in just over a year<sup>1,2,3</sup>. Their latest find was recently posted online at the [EMBO Molecular Medicine](#) journal<sup>1</sup>, solving a 60-year old blood riddle, and promising to provide immediate assistance to health-care professionals should they encounter the rare but vexing blood type called, “Vel-negative.”

In the early 1950’s, “Mrs. Vel” suffered an acute, severe rejection of transfused blood. This rejection was because after a previous transfusion she developed a potent antibody against some unknown molecule found on the red blood cells of most everyone in the world, but not found on her own red blood cells. She developed the antibody because her immune system considered this unknown molecule to be foreign, just as it would any foreign molecule on the surface of a bacterium. Using the antibody made by Mrs. Vel, and antibodies subsequently found in additional Vel-negative patients, clinicians found that Mrs. Vel was not unique. Indeed it is estimated now that over 200,000 people in Europe and a similar number in North America are Vel-negative! This means that 1 in approximately 2,500 people in Europe or North America is Vel-negative and as many as 1 in 50 is a carrier for Vel negative blood!

Until now, the only way to determine if someone were Vel negative or positive would be tests using antibodies made by previously identified Vel-negative persons. Arnaud and coworkers in Paris used such a precious, but highly limited antibody to purify the corresponding protein from the surface of human red blood cells. Although the little protein didn’t reveal its identity easily, Ballif eventually identified the protein using a high resolution mass spectrometer funded by the [Vermont Genetics Network](#). When first identified, the protein was only a predicted protein based on the human genome. It has since been called Small Integral Membrane Protein 1 (SMIM1). Arnaud’s team tested the *SMIM1* gene of 70 Vel-negative individuals and found that the loss of the SMIM1 protein expression on red blood cells was due to a deletion in



*Dr. Lionel Arnaud of the French National Institute of Blood Transfusion (left) and UVM Associate Professor of Biology, Dr. Bryan Ballif (right), stand behind the mass spectrometer used in the identification of the molecular basis of the rare Vel-negative blood type.*

the gene encoding SMIM1. Arnaud's team further developed DNA-based methods that could be conducted in less than a few hours to quickly and precisely identify both patients and blood donors having the Vel-negative blood type. For those rare Vel-negative individuals in need of a blood transfusion, this is a clinically-acceptable and potentially life-saving time frame.

It is common in today's "post-genomics era" to discuss the concept of "personalized medicine" where doctors treat us based on our individually-unique biological makeup. Interestingly, the science of blood transfusion has been attempting personalized medicine since its inception given that its goal to personalize a transfusion by making the best match possible between donor and recipient. Identifying and making available rare blood types such as Vel-negative blood brings us closer to a goal of personalized medicine; even if you are that rare one person out of 2,500 that is Vel-negative we now know how to rapidly type your blood and find blood for you should you need a transfusion.

Click on the link to read more: [Baffling Blood Problem Explained](#)

<sup>1</sup>Ballif BA, Helias V, Peyrard T, Menanteau C, Saison C, Lucien N, Bourgouin S, Le Gall M, Cartron JP and Arnaud L. Disruption of *SMIM1* defines the Vel- blood type. *EMBO Molecular Medicine* (in press)

<sup>2</sup>Saison C, Helias V, Ballif BA, Peyrard T, Puy H, Miyazaki T, Perrot S, Vayssier-Taussat M, Waldner M, Le Pennec PY, Cartron JP, Arnaud L. Null alleles of *ABCG2* encoding the breast cancer resistance protein define the new blood group system Junior. *Nature Genetics*. 2012 Jan 15;44(2):174-7.

<sup>3</sup>Helias V, Saison C, Ballif BA, Peyrard T, Takahashi J, Takahashi H, Tanaka M, Deybach JC, Puy H, Le Gall M, Sureau C, Pham BN, Le Pennec PY, Tani Y, Cartron JP, Arnaud L. ABCB6 is dispensable for erythropoiesis and specifies the new blood group system Langereis. *Nature Genetics*. 2012 Jan 15;44(2):170-3.

## Dr. Bernd Heinrich Wins the PEN New England Award



**Bernd Heinrich**

PEN New England announced the winners of their 2013 awards celebrating the best works of fiction, poetry and nonfiction by New England authors with University of Vermont faculty receiving the honor in two of the three categories.

Bernd Heinrich, professor emeritus of biology, won the nonfiction award for *Life Everlasting: The Animal Way of Death* published last summer by Houghton Mifflin Harcourt. His book is an investigation not of how animals die but, as he tells *The New York Times*, "the different ways animals are recycled in natural ecology and how scavengers cleanse the world so there's room for new life."

Heinrich is a wildlife biologist who, in addition to his scientific books has written nearly 20 popular books on subjects ranging from ravens (for which he has a particular fondness) to bumblebees, dung beetles, owls and geese. As a former champion marathoner he has also explored the natural history of running.

For complete story click [HERE](#)

## GRADUATE STUDENTS

### Dr. Bior Bior Publishes Signaling Study



Recently-defended Biology Ph.D. student, Dr. Bior K. Bior Jr., has published part of his dissertation in an international biochemistry journal, *FEBS Letters*.<sup>1</sup> Bior's research focused on signaling mechanisms governing important protein regulators of brain development. Bior identified a novel phosphorylation-dependent regulatory mechanism which governs the physical interaction of Cin85 with the protein Disabled-1, a protein essential for proper brain development. Before continuing postdoctoral studies in the US, Bior has returned to South Sudan where he is teaching Biology as an Assistant Professor at John Garang Memorial University—we know they are lucky to have you! There's a good chance Bior will make it back for his hooding this May. We hope to see you soon. Congratulations Bior!

<sup>1</sup>Bior BK, Ballif BA. Dab1 stabilizes its interaction with Cin85 by suppressing Cin85 phosphorylation at serine 587. *FEBS Letters*. 2013 Jan 4;587(1):60-6.



Nabil Nasser has received the Sigma Xi Grants-in-aid of Research for his work on ant-hemipteran mutualisms. His research is being conducted at the Welder Wildlife Foundation Refuge in south Texas. His work is focused on the community-level effects of ant-hemipteran mutualisms. Nabil conducts research in Dr. Alison Brody's lab.

### Alli Neal Receives Doctoral Dissertation Improvement Grant from NSF



Allison Neal has been awarded a Doctoral Dissertation Improvement Grant (DDIG) from the National Science Foundation (NSF) to conduct research on the transmission biology of a malaria parasite and how it relates to the parasite's investment in male and female sexual cells (its sex ratio). The DDIG provides \$13,000 plus overhead to conduct research that expands on an existing dissertation project. Alli is a fourth year PhD student working with Dr. Joseph Schall. She studies sex ratio evolution in the lizard malaria parasite *Plasmodium mexicanum*, and during the course of her work has started to develop an extension to sex ratio theory for malaria parasites. Malaria parasites are transmitted between hosts by blood-feeding insects. She believes that the amount of parasite mortality during their development in these insects may affect the sex ratios favored by selection. This summer, with funding from the DDIG and help from undergraduate field assistants, Alli hopes to collect hundreds of these insects and monitor the number of parasites surviving in them at multiple times after the insects have fed on blood containing the parasite. She will also monitor changes in the relative abundance of different parasite strains. The data collected from this project will not only be useful in understanding malaria sex ratio evolution, but will also provide important information on the transmission biology of these parasites. Currently, little is known about within-insect development for any lizard malaria parasite, and the species Alli studies has the fastest known within-insect development of any malaria parasite, making these data particularly important.

Alli was featured recently in an article by the Graduate College in recognition of receiving a total of 3 grants from the NSF during the course of her PhD work in the biology department. In addition to the DDIG, Alli was awarded a Graduate Research Fellowship Program (GRFP) fellowship, which pays graduate students a stipend over 3 years, and an East Asia and the Pacific Summer Institute (EAPSI) grant, which allowed Alli to spend a summer doing research in New Zealand in the lab of Dr. Robert Poulin, an internationally recognized ecological parasitologist.

The Graduate College article can be found [HERE](#)



## UVM Students and Alumni Receive NSF Graduate Research Fellowships



*By Britten Chase*

PhD. student Allyson Degrassi in UVM's Department of Biology has received a National Science Foundation (NSF) Graduate Research Fellowship Award. This lucrative and prestigious fellowship is awarded to graduate students who demonstrate outstanding intellectual merit and who have the potential to have a broad and significant impact in their respective fields.

Degrassi has been conducting research on population and community ecology since beginning her doctorate work at UVM in 2011. Under her advisor, Professor Nick Gotelli, Degrassi is examining the effects of eastern hemlocks and their decline on small mammal (rodent and shrews) population and community dynamics. Specifically, she is examining how hemlocks support small mammal diversity and foraging behavior and what the loss of hemlocks mean to the small mammal populations.

"Ally is a non-traditional student with a passion for conservation biology and considerable expertise in the ecology of small mammals," Dr. Gotelli said. "She is also an inspirational teacher in the classroom who has served as a role model and mentor for the many students who do field work with her."

The NSF Graduate Research Fellowship is a prestigious and lucrative award for graduate students, and will ensure that Degrassi has adequate funding to continue her studies for the next three years. NSF Graduate Fellows receive a yearly living stipend of \$30,000, as well as a cost-of-education allowance that goes toward university tuition and fees.

Sam Parker, a graduate student in the Rubenstein School for the Environment and Natural Resources, also received Honorable Mention recognition in this year's competition. After graduating with an environmental sciences degree from UVM's Rubenstein School for the Environment in 2009, Parker returned to the university to work on his PhD in natural resources. He is working under Professor Breck Bowden and is currently conducting research as a part of the Scale, Consumers, and Lotic Ecosystem Rates (SCALER) Project on the North Slope of Alaska.

In addition to Degrassi, Sam Parker, a graduate student in the Rubenstein School for the Environment and Natural Resources and several UVM alumni also received recognition in the 2013 NSF Fellowship Competition.



I am a new graduate student in the department, and I have been working in Dr. Agnarsson Lab for almost three years. My research focus is on the evolutionary history of blow flies (Diptera: Calliphoridae) in the Caribbean Islands.

Since 2002 I have worked with insects that develop on carrion, contributing little by little information to strengthen forensic entomology. In Colombia I did my undergraduate thesis on the identification of insects that are linked to body decomposition in the city of Tunja. Later in my graduate studies, I investigated the life cycles of the most important flies associated with carrion in Puerto Rico. Now my interest is to focus on the taxonomy and systematic and evolutionary processes of Calliphoridae

Now I want to study the taxonomy, distribution, phylogeny and systematics of Calliphoridae, filling the gaps that exist with respect to this group in the Caribbean. I will use these data to examine the biogeographical history of Calliphoridae in the Caribbean, in the context of ongoing biogeographical studies in the Agnarsson lab on other Caribbean arthropods. In addition, my goal is to understand the importance of these organisms and their role in the field of forensic science. I think that with this research and future experiences focused on the systematics and evolution of the Calliphoridae can be enough to work together with organizations to integrate forensic entomology in cases where it is impossible to determine the postmortem interval based on physical characteristics of the body.



## GRADUATES 2013

*Congratulations to the following graduate students who completed their degrees!*



**Dr. Ballif, Dr. Van Houten, Nabanita Mukherjee, Dr. Gene Delay, Dr. Vigoreaux, Samya Chakravorty, Bior Bior, Dr. Rona Delay**

**Bior Bior, PhD** –Biochemical and Proteomic Characterization of CIN85-Interacting Proteins: Signaling Implications in Neuronal and Non-Neuronal Mammalian Cells  
Advisor: Dr. Bryan Ballif

**Samya Chakravorty, PhD** –The Role of the *Drosophila melanogaster* Indirect Flight Muscles in Flight and Courtship Song: Studies on Flightin and Myosin Light Chain-2  
Advisor: Dr. Jim Vigoreaux

**Heather Czapl, MS** – Cycle Adenosine Monophosphate Receptors in *Paramecium Tetraurelia*  
Advisor: Dr. Judith Van Houten

**Nicholas de la Rua, MS** – Molecular Evolution of the North and Central American *Triatoma*  
Advisor: Dr. Lori Stevens

**Nabanita Mukherjee, PhD** - Cyclophosphamide-Induced Taste Disruptions in Mice and Use of Amifostine to Alleviate the Disruptions  
Advisor: Dr. Eugene Delay

**Mallory Romanovitz, MS** - The L-Glutamate Receptor in *Paramecium Tetraurelia*  
Advisor: Dr. Judith Van Houten

### Allison Neal and Allyson Degrassi were Judges at the Vermont State Science and Math Fair at Norwich University in April



Alli Neal is studying sex ratio evolution in malaria parasites in Dr. Joseph Schall's lab and Ally Degrassi is studying the effects of eastern hemlocks on small mammal communities in Dr. Nick Gotelli's lab.



Anne McHugh is the 2013 recipient of the Ronald Suiter Award and a Mini Grant to travel to Taiwan for the International Congress of Arachnology.

*Congratulations Anne!*

### Marion Weir in the New Zebrafish Room



Graduate student Marion Weir is currently collaborating with one of the Biology Department's newest faculty members, Dr. Alicia Ebert. Marion will be studying the expression of players in the neuronal growth cone collapse pathway in this model system. In the photo above, Marion is conducting research in their new Zebrafish Room.

### Samya Chakravorty Invited to Talk in Philadelphia



In February, Samya Chakravorty gave an invited talk in the recently concluded Biophysical Society 57th Annual Meeting in Philadelphia, Pennsylvania. The title of his talk was "N-terminal Truncation of Flightin Reduces Oscillatory Power Output without Affecting Cross-Bridge Kinetics in *Drosophila* Indirect Flight Muscles".

**2013 Department of Biology Graduate  
Teaching Assistant of the Year  
Awarded to Allyson Degrassi**



Allyson was a scholar in the NSF Undergraduate Mentoring in Environmental Biology project at CSUF, called the Southern California Ecosystems Research Program before she came to UVM. Allyson started as a TA in 2011 and has taught BCOR 11 and 12. In addition she has displayed a versatility and willingness to take on new challenges and is a well-liked and appreciated GTA. Allyson sets a high standard among her students and leads by example. In the words of her Advisor Dr. Nick Gotelli “Her enthusiasm for Biology and for her students is infectious.”

*Congratulations Ally!*

**Join the Hurling Club!**



Luc Bernacki, Pedro Alvarez-Ortiz, and Jeff Budzik (formerly of the Vigoreaux Lab) are all members of the Champlain Valley Hurling Club. In addition to pursuing degrees or careers in science these athletes also participate in one of the oldest games of Western Civilization: Hurling. This 3000 year old sport combines skills and rules commonly found in hockey, soccer, baseball, and lacrosse yet predates all four of these sports. Hurling is the national sport of Ireland and is played on a grass pitch using an ash-wood club and a ball similar in size and construction to a baseball. This sport has been named “the fastest game on grass” as it includes play both on the ground and in the air, has goals and upright, and is played on a pitch that is more than time and a half the length of a football field.

If you want to learn more about this exciting sport visit [www.ChamplainValleyHurlingClub.com](http://www.ChamplainValleyHurlingClub.com) for more details.

## UNDERGRADUATE STUDENTS

### 2013 Recipients of APLE Funding

The following students, working with Biology Department faculty, were among the recipients of the Fall 2013 College of Arts & Sciences Academic Programs for Learning and Engagement (APLE) awards: Alexandra Beattie, Vanessa Crain, Katherine O’Shea, and Devon Sadloski



Awards are made on a competitive basis to grant proposals submitted by undergraduate students and evaluated by a committee of College Faculty. Students work with a faculty research advisor to design a research project that the student then writes up as a mini-grant proposal. *Congratulations to all!*

## Biology Senior Peter Doubleday Granted Prestigious Fulbright Scholarship

Peter Doubleday was recently awarded a 2013-2014 academic year Fulbright scholarship to study at Cardiff University in Wales. As the UK is busy getting ready for Peter to arrive this fall, Peter is in the final throes of his last semester as a UVM Biology undergraduate, which includes writing and defending his honors thesis. As part of a NSF-funded study in the laboratory of Dr. Bryan Ballif, Peter has been conducting large-scale phosphoproteomic research using quantitative mass spectrometry to identify and quantify orchestrated regulatory mechanisms across mouse brain development.

At Cardiff, Peter will be delineating the aberrant signaling mechanisms regulating distinct cancers under the mentorship of Dr. Andy Tee at Cardiff's Institute of Medical Genetics. The Fulbright program is one of the most respected and well-known scholar exchange programs, initially championed by Senator J. William Fulbright in 1945 for the "[promotion of international good will through the exchange of students in the fields of education, culture, and science.](#)"

Peter will no doubt be an excellent ambassador of the UVM Biology Department and although he will be sorely missed, we know he will find great success in Wales. Congratulations Peter!



*Peter Doubleday (left) loads samples for mass spectrometry analysis. Peter will study at Cardiff University (below) [Wiki stock photo.](#)*



Photo by Sohath Zamira Yusseff

### The Office of Undergraduate Research (OUR) Mini Grant Recipients

*Congratulations to Cristine Lanoue and David Viscido, Biological Science Majors and 2013 OUR Mini Grant recipients!*

The Office of Undergraduate Research housed in the Honors College, offers an array of valuable resources for all undergraduate students promoting mentored research, creative works, and scholarship.



# STUDENT HONORS AWARDS 2013

Each year the Department of Biology recognizes and awards undergraduates who have made outstanding contributions to research. Dr. Jim Vigoreaux, Chair of the Biology Department, presented the awards. Congratulations to all!



Jenny Klein, Jonathan Gonzalez, Samuel Hart, Alexandra Beattie, Willard Gove, Dr. Jim Vigoreaux

## Willard N. Gove

### Received the *George Perkins Marsh Award in Ecology/Evolution*

**Thesis Title:** Secretin in Different Areas of Cerebellar Cortex: Role in Motor Learning

"Here at UVM, I majored in Biology (BA) with a minor in Psychology. I have always been intrigued by the life sciences, so it was an easy choice to declare a Biology major as I entered college. I also wanted to diversify my studies, and so I chose a Bachelor of Arts and declared a minor in Psychology, another topic interesting to me. My interest in psychology and neuroscience has continued to grow since I first started attending UVM. I have been working in the neuroscience lab of Dr. John T. Green since February of 2012, and it was a great opportunity to become proficient in several skills that could be put to use in a neuroscience or biology laboratory. These skills, many of which involve live non-human animals (rats), have also been supported by my course training in biology. After I graduate, I am moving to Maryland to work at the University of Baltimore as a neuroscience lab technician. It's very exciting, as I have never lived in a city larger than Burlington before! I plan to work there for a year or two, then move on to new ventures."

## Jenny A. Klein

### Received the *Joan M. Herbers Award in Biology*

**Thesis Title:** Biochemical Model of Crossover Control

"It proposed that the helicase is the component of the Homology Directed Repair mechanism that directs the process down one of two pathways. My project used the proteins from the T4 Bacteriophage and a constructed D-loop, the DNA structure where the choice of pathways is made, to illustrate this model. After graduation I will be working as a lab technician at Brandeis University studying RNAi in germ cells. I eventually plan on pursuing my doctorate."

## Samuel F. Hart

### Received the *Bernd Heinrich Award In Physiology or Evolution*

**Thesis Title:** Differential MHC class I allelic expression between tissues in dairy cattle

"During my four years of working in the Barlow lab in the Animal Science Department, the research I have participated in the lab has been mainly focused on dairy cow mastitis pathology and MHC allelic typing. I have found this to be an amazing experience and would like to work in a research position following my graduation. I expect to go to graduate school at some point down the road once I figure out what specific area I would like to go into."

## Alexandra E. Beattie

### Received the *Paul A. Moody Award in Biology*

**Thesis Title:** An analysis of the effect of beta-hydroxy-beta-methylbutyrate on *Drosophila melanogaster* flight ability and lifespan

"I am interested in exploring the molecular basis of nutrition and exercise in physiological performance and quality-of-life enhancement in biological systems. I am thrilled to have the opportunity to continue to examine the effect of HMB on *D. melanogaster* flight ability and lifespan as a part of my Masters thesis at UVM (through the Biology Department's accelerated masters program) starting this fall. My ultimate goal is to get involved in a profession that will allow me to pursue my interests in public health and medicine, research and teaching."

## Jonathan B. Gonzalez

### Received the *Kurt Milton Pickett Award*

**Thesis Title:** The influence of mycorrhizal fungi on plant response to simulated herbivory

"Like many others, I believe that the burgeoning human population and its impacts on the environment have led to an urgent need for scientists to contribute to the fields of sustainable agriculture and ecological restoration. I am most interested in symbiotic soil fungi collectively known as "mycorrhizal fungi". These fungi colonize plant roots and extend hyphae out into the surrounding soil. These hyphae effectively act as extensions of the plant root by gathering nutrients to exchange with plants for photosynthetically derived carbohydrates. This symbiosis has the potential to be employed in agriculture as well as in bioremediation. As an undergraduate in Dr. Alison Brody's laboratory, I conducted two investigations involving mycorrhizal fungi. I now have the opportunity to continue that work here at UVM as a student in the Accelerated Master's Degree Program in Biology. I am excited and I look forward to applying to a Ph.D. program in the field of plant and microbial interactions. My long-term objective is to research the employment of the mycorrhizal symbiosis in agriculture and ecological restoration as a university research professor."

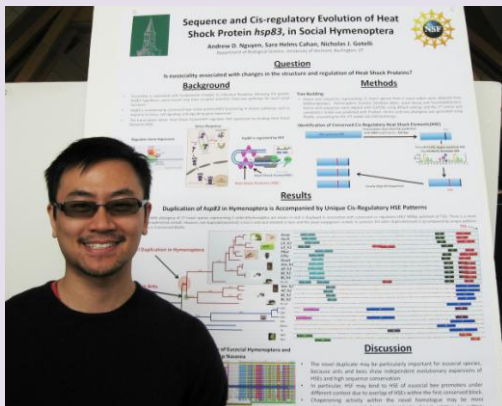
## Student Research Conference

The UVM Student Research Conference on April 23 was a daylong event highlighting the quality and breadth of undergraduate, graduate, and medical student research being conducted at the University. The purpose of the conference is to promote and facilitate the exchange of interdisciplinary perspectives and to encourage student intellectual growth. Below is a list of the Biology Department's participants and their research titles

### Poster Presentations



**Cristian Dambros, Ant predators control phylogenetic structure of termite assemblages in an Amazonian rainforest**



**Andrew Nguyen, Sequence and cis-regulatory evolution of heat shock protein hsp83, in social Hymenoptera**

Nabil Nasser, Ant-Hemipteran Mutualisms: Plant Antagonist or “Budding” Mutualist

Gretel Clarke, Effects of pollinators, seed predators, and vertebrate herbivores on female and hermaphrodite sex morphs and demography of the gynodioecious plant, *Polemonium foliosissimum*

Allyson Degrassi, The effects of eastern hemlock removal on rodent community composition

William Hedden, Differences in Fungi Infection Frequency in *Pogonomyrmex*

Michael Herrmann and Cristine Lanoue, The Chemical Basis of Social Interactions Among Ants

Jordon Tourville, Population Genetics of White Perch (*Morone americana*), an Invasive Species: Using Microsatellite Loci to Identify Source of Invasion in Lake Champlain

Emily Eck, Can Meditation Modulate the Experience of Pain? A Neuroimaging Study

Jen Grauer, Dietary Niche of Carnivores in Vermont

Jonathan Karp, Identification of Novel RSK-Dependent 14-3-3 Binding Proteins and Their Potential Role in Ras-MAPK Signaling

Chelsea Mitchell, Divergent diel vertical migration in *Mysis diluviana*: is it a plastic or fixed behavior?

### Oral Presentations:

Marion Weir, Retinal Expression of key players in the growth cone collapse pathway

Lynda Menard, The structural and biomechanical properties of insect thick filaments expressing flightin and cardiac myosin binding protein-C

Matthew Rosenthal, Flight and Mating behavior of a Dual Heterozygote *Drosophila* expressing Flightin NH<sub>2</sub>-Terminal and COOH-Terminal Truncated Proteins

Jonathan Gonzalez, Plant sex and size influence nutrient content and mycorrhizal colonization of the gynodioecious plant *Polemonium foliosissimum*

Alexandra Beattie, An analysis of the effect of B-Hydroxy-B-Methylbutyrate on *Drosophila melanogaster* flight ability and lifespan

Peter Doubleday, A large-Scale Phosphoproteomic Comparison of the Developing Mouse Brain



## NEW STAFF MEMBERS

Ricardo Burgos-Muniz, Lab Research Technician, and Andrew Mead, Post Doc Fellow will be working in Dr. Jim Vigoreaux's lab.

*Welcome to the Department!*

## TRI BETA



**TRI BETA** is the National Honor Society for students who major in Biology. The society has a three-part mission: stimulation of scholarship, dissemination of scientific knowledge, and promotion of biological research. It is primarily designed for undergraduates, with the goal of recognizing students with outstanding scholarly achievement in the life sciences and actively promoting undergraduate participation in research.

**NEW ASSOCIATE MEMBERS:** Kyleigh Lavigne, Sonya Shafique

**NEW REGULAR MEMBERS:** Lindsay Gabel, Shae Rowlandson, Jordon Tourville, Christopher Veal

**We are proud to recognize our graduating seniors:** Christopher Cason, Lindsay Gabel, Jen Grauer, Megan Hess, Harrison Keyes, Chelsea Manning, Rhys Niedecker, Samantha O'Dwyer, Luke Soelch, Jordon Tourville

For information on Tri Beta click [HERE](#)

**Yes! I am pleased to support the UVM Department of Biology and its commitment to excellence in education and research!**

*We are grateful for your contribution to the Biology Department of any amount*

**Please click the following link to make your donation. Scroll down, choose "Other" and type in "Department of Biology"** <https://alumni.uvm.edu/foundation/giving/online/>

Or send a check in the amount of \$\_\_\_\_\_ made payable to the University of Vermont Foundation. On the memo line of the check write "Department of Biology". Cut this box out and send it with the check.

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**Thank you for your support!**

## Alumni Update – The UVM Connection



Check out the online connection to communicate with classmates from the past:  
<http://www.alumni.uvm.edu/>



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