University of Vermont, College of Arts and Sciences

Department of Biology Newsletter

Fall 2013

FACULTY NEWS

UVM Receives $2-million NSF Grant

Story and Photo by Joshua E. Brown

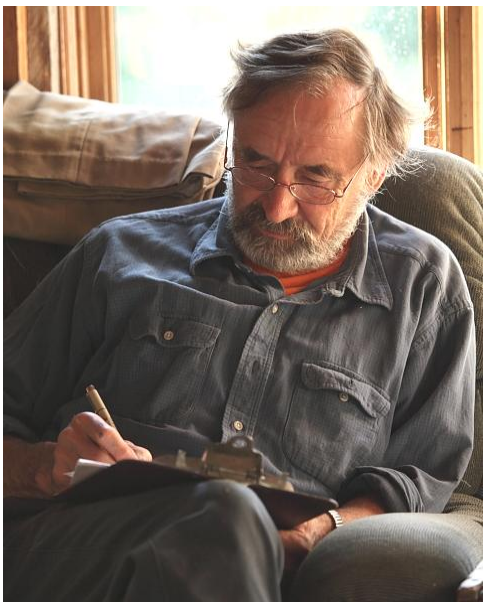
Vermont is the lead state in a new $6-million grant from the National Science Foundation that allows Vermont, Rhode Island, and Delaware to deploy advanced optical sensors that can gather data from underwater and transmit it remotely, giving a moment-to-moment portrait of what is happening across selected watersheds in all three states as storms, droughts and seasons pass.

"Understanding how best to represent high-frequency data for use by those who manage the Lake Champlain Basin and watersheds in Rhode Island and Delaware will be of broad interest beyond our states," says Judith Van Houten, Director of Vermont EPSCoR and UVM professor of Biology, who is the lead investigator for the new project. "A goal is to allow policymakers and managers to accelerate their responses to storm events."

Additional news articles and videos about the project can be found here:

- Complete UVM Story by Joshua Brown
- My Champlain Valley
- NEWRnet

"The Foundation of Wonder" by Bernd Heinrich



The day before yesterday I saw a white bird dropping under a branch of a cherry tree and at the edge of a vernal pool where the wood frogs were having their annual 2-3 day chorus and spawning event. I was excited, thinking: the hawk is back and hunting frogs. Every spring a Broad-winged Hawk pair nest about a quarter mile away in the fork of a sugar maple tree, and come to intercept frogs at the pool. The next day I looked, and there was one of them. It was fluffed out with its rust-brown mottled breast, lemon yellow cere of bill and with his egg-yolk-yellow feet grasping a cherry branch while facing the sun. It was looking down attentively, watching the pool.

For complete story click HERE

Dr. Bernd Heinrich's new book "The Homing Instinct" is coming out in the Spring.

Dr. Kilpatrick Recipient of the 2013 Hartley Jackson Award

The 2013 recipient of the Hartley H. T. Jackson Award for service to ASM is C. William Kilpatrick, Professor of Biology at University of Vermont where he studies population genetics, molecular ecology, and molecular systematics. In the 40+ years that he has been active in ASM, he has been on 6 committees, serving a total of 32 committee-years. His most impressive service was his 10 years on the Grants-in-Aid committee, 7 years as its chair. He has also served on the Education and Graduate Students committee, Program committee, Checklist committee, and Publications committee, and he hosted the 1995 annual meeting of ASM at his university. He is currently an Associate Editor for Mammalian Species and a member of the ASM Board of Directors. Additionally, he serves mammalogy in his state, Vermont, where he works on committees relating to endangered species and other state mammals, making mammals relevant in state planning and raising awareness of mammalogy.

For complete story go to American Society of Mammalogists

Article by Dr. Charles Goodnight in the Journal of the Society For the Study of Evolution

In the words of Dr. Charles Goodnight "Natural selection is generally considered to occur by the differential survival and reproduction of individuals, i.e., 'the survival of the fittest". However, there are many behaviors and adaptations that cannot be explained solely by individuals competing with each other. The clearest example of this is "altruism", when one individual helps another even though that helping carries a fitness cost. For altruism and other such traits to evolve, selection must occur at more than one level. That is, groups of individuals, such as family groups, that cooperate must have a higher fitness than groups that do not cooperate. When selection happens at more than one level, such as the group level and the individual level, it is called "multilevel selection". Multilevel selection and its evolutionary consequences is a rapidly developing and controversial topic in evolutionary biology. In this special section of the Journal of the Society for the Study of Evolution I invited authors studying various aspects of multilevel selection ranging from theory (what exactly is multilevel selection and how do we measure it) to experiments using organisms including yeast, insects and birds in laboratory and agricultural populations, and the analysis of historical human populations. Collectively, these papers provide an important snapshot into the state of this developing field."

To read article click HERE

Dr. Gotelli Member of VASE

Dr. Nick Gotelli has been elected to full membership in the Vermont Academy of Science and Engineering (VASE). This is the highest recognition for contributions to science and engineering in the State of Vermont.

The Academy was chartered by the State of Vermont: 1) to honor scientists and engineers for their achievements, 2) to promote the interests of science and engineering within the State, 3) to educate Vermont citizens about the importance of science and engineering, and 4) to help the State of Vermont with regard to problems in science and engineering. They have recently become active in support of STEM education.

Learn more about VASE

Dr. Gene Delay caught a ~5 lb trout in Colorado this summer!

Capturing the Sounds of Biodiversity

In collaboration with researchers at the University of Puerto Rico, UVM Postdoctoral Research Associate Dr. Laura May-Collado is creating a monitoring system to automatically record and analyze soundscapes in marine environments. This system has been proven to be a useful tool to study animal communities in various terrestrial habitats and should be equally useful in aquatic environments. During an interview with NPR's Science Friday, Dr. Mitch Aide (UPR) and Laura May-Collado (UVM) talked about the Automated Remote Biodiversity Monitoring Network (ARBIMON). This monitoring system has recorders in Costa Rica, Puerto Rico, Hawaii, and Brazil. With collaborators, Dr. May-Collado is leading a project to develop a similar monitoring network in marine environment. This project is called CAMBASUN (Central American Marine Biodiversity Acoustic Surveillance Network) and is an initiative to provide scientists and stakeholders in Central America with the necessary tools and information to evaluate the effectiveness of marine protected areas, that can facilitate timely decisions on conservation planning, promote connectivity and research, and enhance awareness and conservation of marine habitats in the region.

Laura May Collado on NPR

Persona: http://www.lauramay-collado.com/

Project Webstites:
http://www.panacetacea.org/central-american-marine-biodiversity-acoustic-surveillance-network.html
http://www.bocasdolphins.com/index.html

ALUMNI NEWS

An Extraordinary Journey

‘Lost Boy’ returns to Sudan using UVM degree to reunite families. Bior K. Bior Jr. earned a PhD in Biology from UVM and returned to South Sudan to teach in a university and to run the only hospital in his home state of Jonglei.

“Bior is a good-hearted young man and a highly driven scientist. Uprooted, and forced to carve out a new life, Bior developed a strong sense of independence and creativity. He knows how to make lemonade when life hands out lemons.” *Bryan Ballif, Advising Professor to Bior K. Bior*

Burlington Free Press Article

Michael Watts Project Development Manager at Atrium

Watts at Quaker Point in Shelburne

In December 2013 I will celebrate my 14th year working for Atrium Medical Corporation of Hudson, NH (now a part of the Maquet/Getinge Group). Atrium was started in 1981 by a fellow UVM graduate, Steve Herweck of the class of 1973. Atrium started manufacturing thoracic chest drains & catheters for thoracic/cardiac/trauma surgeries and now also makes state of the art medical implants for hernia repair, dialysis access, aortic repair, and peripheral/cardiac bypass. After becoming the world market leader in this product sector and building up Atrium into a successful multi-million dollar company, he retired in 2011 for a well-deserved rest. My story with Atrium starts in December of 1999. Initially I was in Marketing with the peripheral bypass/dialysis access grafts and then I moved over to the thoracic drains where I still am today. My role as a product development manager means I work with hospital staff to be their 'voice of the customer' and help the engineers translate the needs of the patient & customer into a next generation medical device. My penchant for long winded lab reports back at UVM has helped me author numerous product instructions for use, develop clinical training computer animations, and training materials for the sales force. My zoology degree awards me the knowledge of the biological & physiological sciences behind our products. And all of the religion & philosophy classes I took showed me the need for compassionate care in this day and age. I am lucky to have attended UVM and learned so many life lessons during the journey to my zoology degree. I wish everyone happiness and good luck on their own journeys.

My two favorite quotes:

"Knowledge is knowing the tomato is a fruit, wisdom is not putting it in your fruit salad." by Miles Kington

"Try not to become a man of success but rather try to become a man of value." by Albert Einstein

Alumni Update – The UVM Connection

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

GRADUATE STUDENTS

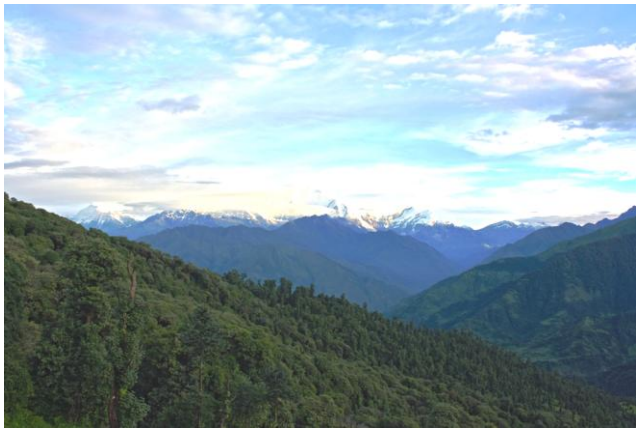
Nelish Pradhan's Summer Project in Nepal

Obtaining tissue from *A. gurkha*

I am studying the phylogenetic relationships and biogeography of the wood mice (Genus *Apodemus*) in the Kilpatrick Lab at UVM. Species of the genus *Apodemus* are murid rodents that are widely distributed throughout the temperate zones of Eurasia. Examination of allozymic and DNA sequence data has resulted in the placement of the taxa of *Apodemus* into four groups. The *Apodemus* group consisting of 7 species distributed from Central Europe to Eastern Asia (most species have an Asian distribution) with endemic species in Taiwan and Japan. The *Sylvaemus* group consists of 11 species that are distributed throughout most of Europe and the Middle East eastward to Central Nepal. The *Karstomys* group is composed of a single species *A. argenteus*, endemic to Japan, and the fourth group consists of the Nepalese endemic *A. gurkha*.

The summer field work I conducted was to mainly obtain tissue samples from the Nepalese endemic, *A. gurkha*. *A. gurkha* is an ancient lineage that currently occupies its own group within the genus. It was important to obtain additional samples of *A. gurkha* because all of the genetic data for *A. gurkha* presently available was obtained from a single specimen and the diversity within the species needed to be examined.

The summer project was funded by the Grants in Aid from the American Society of Mammalogists and the Kilpatrick Lab. I travelled to the Annapurna Conservation Area located in the Western Development Region of Nepal. The sampling area was located in the mountainous region nestled between the Annapurna Range and the Dhaulagiri Range. The foothills next to these mountains are covered with mixed rhododendron-coniferous forest which is prime habitat for *A. gurkha*. I now have tissue from 32 more individuals for sequencing and I plan to widen my sampling area to include the very poorly sampled Manaslu Conservation Area in Nepal.



Dhaulagiri Range with the rhododendron forest Habitat sampled for *A. gurkha* in the foreground

Field Assistant Saurav Chettri and Nelish Pradhan

Upward Bound Biology Class on Arachnids of Vermont

During the month of July, Anne McHugh (graduate student in the Agnarsson lab) Carol Yablonsky (Agnarsson lab technician and UVM alum) and Lisa Chamberland (Agnarsson lab field assistant and UVM alum) taught an Upward Bound biology class on the Arachnids of Vermont. As part of the class, all 17 high school students field collected spiders at three different locations in Vermont. The students also designed projects surrounding arachnid biodiversity. The summer culminated with the students looking through microscopes to identify the spiders and finally in data analysis and presentations of results. For many students, it was the first time they had been hiking in the woods and certainly the first time any of them had field collected. One student wrote, "The best part of the class was sorting the spiders and learning about the history of evolution. … I like finding out what the spiders are because it seems like I have given them a name." All three instructors enjoyed helping the students transition from arachnid skeptics to confident junior archeologists over the course of the month. If you would like to learn more about this project and see photos, check out the course website: http://uvmupwardboundarachnids2013.wordpress.com/

Anne McHugh (right) with Upward Bound Biology Class Members

Allyson Degrassi and Allison Neal
Invited Panelists at Workshop in Burlington

Allyson Degrassi and Allison Neal were invited panelists for a break out session addressing graduate student support from NSF and NIH at a grant writing workshop co-sponsored by the Vermont Genetics Network (VGN) and Vermont's branch of the National Science Foundation Experimental Program to Stimulate Competitive Research (NSF EPSCoR). The workshop was held at the Sheraton Hotel in Burlington on September 7, 2013 and focused on tips and strategies for successful grant writing. Allyson Degrassi is a third year PhD student working with Dr. Nick Gotelli who studies small mammal communities and their interactions with different forest types. Allison Neal is a fifth year PhD student working with Dr. Joseph Schall who studies the evolution of sex ratios in malaria parasites. Both are currently funded by NSF Graduate Research Fellowships and spoke on the application process for the Graduate Research Fellowship Program (GRFP) and their tips for succeeding.

Symposium Talk by Allyson Degrassi

Allyson Degrassi was invited to give a symposium talk on replication standards in long-term research at the Ecological Society of America this summer. Ally's talk was focused on problems with data collection and analysis from field studies with examples from primary literature and her dissertation work. The title of her talk was, "A mammal's tale: fine scale trapping events over time."

Maxwell Ross, Biology Major in Dr. Joseph Schall's lab, saw this stump while hiking in CO limbing trees to protect them from potential fires. *Photo by Maxwell*

UNDERGRADUATE STUDENTS

Maxwell Ross's Conservation Work in Colorado

Chainsaw Crew on the top of Mt. Quandary (14,000 footer). Max Ross in Front

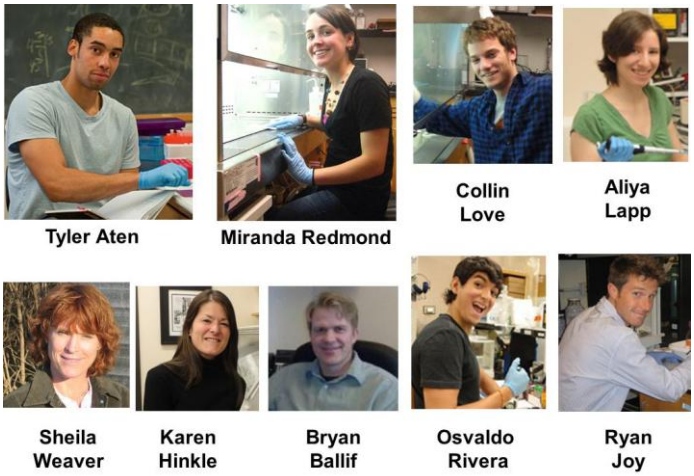
I'm from the suburbs of Chicago, but I ended up here at UVM because a friend told me about it, and mentioned it was on the Common App. I applied and later visited, and fell in love with the campus and the state pretty much immediately. Burlington was just so beautiful and different from places I'd lived in the past; the fact that you can see mountains everywhere you look was amazing. I like to go for hikes and bike rides when it's warm out, and I snowboard in the winters. I'm the captain of the Mens part of our Club Gymnastics team here at UVM, and that has allowed me to travel all over the northeast, as well as out to Salt Lake City, Minneapolis, and Richmond. I also have a pet Sugar Glider named Momo who I take with me to classes on nice days during the year, and I think she's given me a bit of a reputation around campus.

I joined the Rocky Mountain Youth Corps this summer and was on a 10 person chainsaw crew. We did conservation work, such as thinning trees in an area where logging had been done years earlier. The logging causes the trees to grow back too close together, which made them susceptible to parasites and diseases. We would choose the strongest and healthiest trees, and remove other trees in a radius around the healthy ones. We also did lots of clearing of dead lodgepole pines that had been killed by a fungus spread by a beetle. We worked closely with the wildland fire fighters, and most of our projects were directed by them. We camped every night, went into town for one day on the weekends to resupply on food and gear, (and to shower!) but other than that we were pretty much constantly away from other people and civilization. We would go for day hikes and overnight hikes on the weekends, including Quandary, a Fourteener. It was undoubtedly one of the most rewarding and invigorating experiences of my life, and something I would recommend to anyone looking to do something different with their summer. The pay was good, and everyone also receives a $1,500 Education Award that can be applied to school and many other things.

I'm a Biology Major and am working in Dr. Joseph Schall's lab on a project measuring genetic differentiation in Lutzomyia vexator, a sand fly that is the vector for Plasmodium mexicanum, a type of lizard malaria parasite. I do a lot of dissections, extractions, polymerase chain reactions, and running of gels.

Everyone all geared up!

Undergraduate Honors Theses Lead to Collaborative Publication



Undergraduates Tyler Aten ('10) and Miranda Redmond ('12) are co-first authors on a recent publication in an international biochemical journal (*FEBS Letters*).[1] The publication centers around results they obtained while conducting Honors Biology research in the laboratory of Dr. Bryan Ballif, associate professor of Biology. The paper describes regulatory mechanisms and interacting partners of an orphan transmembrane receptor which plays roles in the migration of neurons. Also contributing to the work were undergraduates Collin Love ('13) and Aliya Lapp ('13), Biology Ph.D. student Ryan Joy, pre-College student Osvaldo Rivera (Puerto Rico), UVM Visiting Scholar and Norwich Professor Karen Hinkle, and UVM Senior Lecturer in Statistics Sheila Weaver. Multiple funding sources made the project possible including a NSF award to Dr. Ballif, a NSF Math-Biology award to Biology Professor Dr. Lori Stevens, the Vermont Genetics Network NIH INBRE award to Biology Professor Dr. Judy Van Houten, a NSF award to Dr. Juan Arratia (Ana Mendez University), as well as UVM URECA! and UVM College of Arts and Sciences APLE undergraduate research awards.

[1]Aten TM*, Redmond MM*, Weaver SO, Love CC, Joy RM, Lapp AS, Rivera OD, Hinkle KL, Ballif BA. Tyrosine phosphorylation of the orphan receptor ESDN/DCBLD2 serves as a scaffold for the signaling adaptor CrkL. FEBS Lett. 2013 Aug 2;587(15):2313-8. *Equal Contribution.

The Department of Biology Hosts High School Summer Research Interns from Puerto Rico

Front: Alondra Baez Nieves & Andrea Vazquiles. Back left to right: Jose Luis Marrero Rosado, Whitney Stevens-Sostre (University of Puerto Rico Mayagüez), Ricardo Santana Santini, Kathyana Santiago Mangual, and Nydiana Benitez Mangual

Six high school students from Puerto Rico participated in an 8 week summer research internship in the Department of Biology. The students are participants of the Saturday Academy, a program administered by Universidad Metropolitana (UMET) in Puerto Rico. Through this program, students gain research experience during the academic year at colleges throughout Puerto Rico and have the opportunity to complement that experience with summer internships at US institution. Now in its third year, the UVM-UMET partnership has served nearly 15 students. In addition to their research projects, students take part in a variety of social activities including hiking, canoeing, and day trips to Shelburne Farms, Six Flags, and other venues. This year's participants include (Biology research mentor in parenthesis): Nydiana Benitez Mangual (Heather Axen), Andrea Vazquez Quiles (Rona Delay), Alondra Baez Nieves (Bill Kilpatrick), Kathyana Santiago Mangual (Alicia Ebert), Jose Luis Marrero Rosado (Bryan Ballif), and Ricardo Santana Santini (Jim Vigoreaux). The students presented their research at a department Symposium held on July 24, 2013 and at the 2013 AGMUS Research Symposium, held in San Juan, Puerto Rico in September 2013.

Donations Made to the Department of Biology in 2013

The Department of Biology would like to thank the generous contributions made by the following. Your donations are very much appreciated!

Mr. and Mrs. John Glass

Thank you very much!

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/

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