



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

February 2013

FACULTY NEWS

Dr. Kilpatrick's Research on Fluctuation in Mice Populations in Vermont



C. William Kilpatrick, a professor of biology at the University of Vermont, shows some mice that were trapped around the state this fall
(Photo by Glen Russell)

Written by Matt Sutkoski

With winter fast approaching, people may have forgotten how warm and snow-free last winter was.

That is, until the mice start invading.

Mice loved last winter, and the warm spring and dry summer that followed. In such favorable conditions the mice had lots of babies, which may now be trying to get into your house to escape the cold.

In some parts of Vermont, there are signs there might be two or three times the normal number of deer mice running around, said C. William Kilpatrick, a University of Vermont biology professor who studies the rodents.

Kilpatrick monitored mouse trapping sites in five Vermont locations over the summer, two in Addison County, two in the Northeast Kingdom and one in the northern Green Mountains. Typically, when he checks the sites, one in 10 traps has caught a mouse. That was true in two of the sites he studied in the summer. But at three sites, one in Addison County and the two Northeast Kingdom sites, two or three of 10 traps had caught mice, he said.

That's an indication there's plenty of extra mice out there.

People responding to a Free Press inquiry on Facebook told their own stories of battling a mouse population boom.

[LINK TO BURLINGTON FREE PRESS ARTICLE](#)

Inside Ant Nation



Photo: Gary Alpert

What would you call these beautiful ants – in the genus *Pyramica* – with weirdly shaped heads and filmy skirts around their abdomens? They’re called Lady Gaga ants by the authors of a new guide to the ants of New England



Photo: Joshua Brown

Nick Gotelli, a professor in UVM’s Biology Department, looks at pinned ants and range maps

By Joshua E. Brown

When you see a small ant heading for the sugar bowl on your kitchen counter, it’s likely *Tapinoma sessile*, known to myrmecologists everywhere as the Odorous House Ant or, simply, a sugar ant. (Odorous? Give it a squeeze to be sure. Smell like rotten coconuts or over-ripe bananas? Yep, you’ve got yourself *Tapinoma sessile*.) It won’t bite.

But if your ants are larger and black and appear from, say, a hole in the wooden sills in your basement, watch out. It may well be *Camponotus pennsylvanicus*, known to exterminators and dismayed homeowners as the Eastern Carpenter Ant. They subsist on rotting wood. With carpenter ants, pesticides are probably folly. Their nests can be hundreds of yards from the house.

[COMPLETE STORY](#)

Related Links

[A Field Guide to the Ants of New England](#)

[Nick Gotelli’s website](#)

Death and Dying, the Animal Way



Photo by Paul O. Boisvert

By Claudia Dreifus

For much of the year, Bernd Heinrich spends his time at a cabin he built in a remote forest in western Maine. The cabin has no indoor plumbing and no electricity, he says — just a tree growing inside it.

An emeritus biology professor at the University of Vermont, Dr. Heinrich, 72, sees the New England forest as a living laboratory to study nature’s changes. Over the years he has translated his observations into 17 popular books on nature and the animal world, including ones on bumblebees, dung beetles, owls and geese. Also among these works are a memoir and a 2002 book on running, “Why We Run: A Natural History.” (In the 1980s, Dr. Heinrich was a champion marathoner.)

And lately he has been studying how animals die.

Dr. Heinrich’s book “Life Everlasting: The Animal Way of Death” was published last summer by Houghton Mifflin Harcourt.

We spoke at the Trailside Nature Museum on the Ward Pound Ridge Reservation in northern Westchester County, and later by telephone. A condensed and edited version of the interviews follows.

How did you come to write a book about animal death?

I first started thinking about it when a former student, Bill, wrote saying he was terminally ill and what would I think about his having a “sky burial” on my property in Maine? He wanted to leave his body to the ravens. Bill did not want to be cremated or buried in a sealed box. He wanted to be recycled and have his body provide food for other creatures.

[NY Times Article](#)

NSF Award Granted



Sara Helms Cahan

Lori Stevens

Congratulations to Sara Helms Cahan, Lori Stevens and colleagues who were awarded a National Science Foundation (NSF) Behavioral and Cognitive Sciences (BCS) grant for \$2.5 million for research entitled, “Modeling disease transmission using spatial mapping of vector-parasite genetics and vector feeding patterns.” The research is being led by Donna Rizzo from CEMS, along with Leslie Morrissey from RSEN, and collaborators from Loyola University and Universidad de San Carlos.



Donna Rizzo

Click [HERE](#) for full story

Research Highlighted in the Economist



Photo from the field, unrelated to the paper, faculty, post doc, graduate and undergraduate students, and local children sharing a spidery science experience!

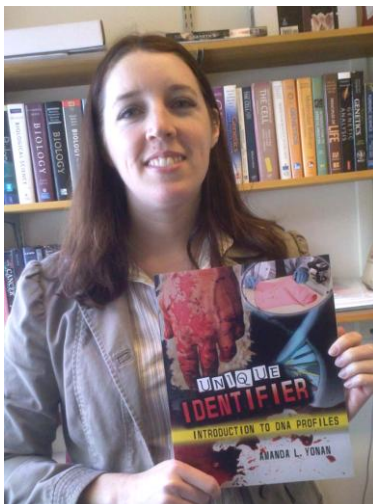
Dr. Ingi Agnarsson’s “web” of international collaborations is growing. His latest research in Naturwissenschaften with a Danish team was highlighted in the latest issue of the Economist, and elsewhere.

It was a study of an interesting system that a Danish graduate student, Lena Grinsted, discovered on Bali. There, two distinct, but related, species of spider live in mixed colonies. Mixed spider species colonies are very rare. When it happens, usually one species is exploiting the other, such as kleptoparasitic spiders that steal from larger spiders. In this system, in contrast, the two species appear to live together quite peacefully, and females would readily adapt eggs and spiderlings from other females in the colony. The fieldwork was done by Lena, and then Dr. Agnarsson’s team collaborated with her advisor Dr Trine Bilde from Aarhus University, in writing the paper.

[ARTICLE](#)

Dr. Agnarsson’s [WEBITE](#)

Dr. Amanda Yonan updates her textbook “Unique Identifier”



Dr. Amanda Yonan spent the summer and fall editing the textbook she wrote for her Introduction to Forensic Biology course (Bio 086). The second edition of “Unique Identifier: Introduction to DNA Profiles” was published in January of 2013. After not finding a textbook that explained how DNA is used to determine an individual’s identity to non-biology majors, Dr. Yonan decided to write one that would fit the needs of her introductory level course. After using the first edition for three years, and asking for feedback from the students using the book in class, Dr. Yonan decided to make substantial changes to the text and images in an effort to improve the textbook and make it even more user-friendly.

ALUMNI NEWS

One Summer of Lizards that Changed a Life



Science teacher Steve Ressel holding a blue-tongued skink in College of the Atlantic's Zoology Lab

By Robin Clifford Wood

In the course of interviewing people for this column, I have discovered that many life histories include a pivotal event that changes everything. I recently heard a particularly unusual “pivotal event” from Steve Ressel, who has been teaching science at College of the Atlantic for nearly 20 years. The glorious summer that changed the course of Steve’s life involved daily outdoor excursions, a pillowcase, and many hundreds of live lizards.

Before that summer of 1984, Steve told me, “I was sort of adrift.” Two years of teaching middle school science had left him uninspired.

“It was not a good fit,” he said. So Steve left teaching with no clear plan. He did some landscaping, painted houses, then got a job at a microbiology lab near his home in Pennsylvania.

Surrounded by medical and graduate students, Steve was reminded of his love for science and intrigued by the idea of graduate study. He knew, however, that hands-on outdoor work had far greater appeal for him than days spent in a laboratory. He looked for a graduate program with lots of field work, and he found it at the University of Vermont.

“Their lab was full of lizards and snakes, which was a good sign,” he said.

He began a master’s program in zoology at UVM in the fall of 1983, advised by Dr. Joseph Schall. The following May, Schall sent Steve to a field station in Hopland, Calif., to study lizards.

“That time at the field station was the most special I ever had ... I went out every day in boots, shorts, and a T-shirt, with a pillowcase in my hand for collecting lizards all day.”

Read [MORE](#)

Alumnus Dilhan Weeraratne Reports on Medulloblastoma Exome Sequencing in Nature



Dilhan Weeraratne, PhD just completed a postdoctoral fellowship at Harvard Medical School and Children's Hospital Boston in pediatric oncology. Dilhan, an alumnus of the Biology Department at UVM, completed his PhD in 2007 under the supervision of Dr Judith Van Houten. Following his PhD, he has been working on understanding the genomic complexity of medulloblastoma, the most common malignant brain tumor in children, in Scott Pomeroy's laboratory at the Harvard Medical School.

Medulloblastoma is a tumor of the cerebellum that affects 1 in 200,000 children in the United States. Despite an aggressive multi-modal treatment regimen comprising surgical resection, chemotherapy and radiotherapy, 30-40% of the patients succumb to the disease. Part of the problem is that medulloblastoma is a very heterogeneous tumor with at least 4 different subtypes which are genetically and clinically very distinct. The current consensus among medulloblastoma researchers is that targeted therapy directed at genetic lesions in each subtype of the disease will markedly improve patient outcome. To understand the heterogeneity of this disease, we had previously carried out gene expression profiling, high density SNP profiling and microRNA expression profiling in over 200 primary medulloblastoma tumors and had identified a particularly robust transcriptional and copy number signature for each of the subtypes.

In this work, to better understand the heterogeneity at a single base level, we used whole-exome hybrid capture and deep sequencing to identify somatic mutations across the coding regions of 92 primary medulloblastoma tumors. Overall, medulloblastomas have a low mutation rate with a median of 16 non-silent somatic mutations per genome, which is consistent with the mutation rate for other pediatric tumors. We identified 12 genes mutated at a statistically significant frequency across our cohort. Our results reveal previously reported mutations in genes such as CTNNB1 (β -catenin), PTCH1, and MLL2 as well as previously unrecorded mutations in genes including DDX3X, BCOR, LDB1 and GPS2.

We report for the first time recurrent somatic mutations in DDX3X, an ATP-dependent RNA helicase with functions in transcription, splicing, RNA transport and translation. Mutations in DDX3X usually co-exists with mutations in β -catenin or hedgehog pathway mutations. We establish that mutations in DDX3X potentiates β -catenin mutations to enhance cell proliferation and nominate DDX3X as a candidate component of pathogenic WNT signaling. In addition to DDX3X we found mutations in chromatin modifiers and epigenetic machinery to be a recurrent theme in medulloblastoma.

We envisage that our integrated genomics efforts to map the genetic landscape of medulloblastoma will result in the development of therapy specifically targeted towards genetic lesions in each of the subtypes of the disease.

[NATURE ARTICLE](#)

Remembering Professor Dean Finley Stevens



Professor Dean Finley Stevens, a long-time member of the Zoology (now Biology) Department faculty, passed away in November, 2012 at the age of 89. Dean received his undergraduate and graduate training at Boston University and Clark University, and taught and conducted research both at universities and major research laboratories including Boston University, the Worcester Foundation, and the famous Karolinska Institute in Sweden. While at UVM he conducted important research on tissue and cell culture during the founding days of that important research effort, and was respected as a skilled microscopist and cell biologist. Dean's love and skill in teaching were appreciated by generations of students in our courses in physiology (Biology 104 was required of all majors, but was made a must-see during Dean's tenure in that course), and the Human Anatomy and Physiology courses for the nursing students. Dean was a gentle and scholarly man, and almost never spoke of his heroics during WW II when he fought through France, Germany, and central Europe and earned three battle stars for his bravery. For many years he was an avid skier and fly fisherman, and teased his fellow faculty members with stories of the best fly fishing spots in Vermont that he held as close secrets. Along with his colleagues in the department, Dean will be remembered with respect and fondness by hundreds of students. Indeed, one of our faculty has a beautiful display of ferns that Dean brought to his home as a house-warming gift 25 years ago, that brings back those found memories every spring.

GRADUATE STUDENTS

Project CarBio Takes to the Sea



As snow settles in again in freezing -20C Burlington, our new graduate student Zamira Yusseff, and UC Berkeley post doc Lauren Esposito, both members of the Agnarsson CarBio team, head to the tropics. They are kicking off what will be a five month cruise among the tropical Caribbean Lesser Antilles islands to catch arachnids! Our project on Caribbean [Biogeography](#) aims to reveal the processes that have generated the amazing biodiversity found in the Caribbean region. To do so we will sample spiders and other eight legged critters on over 50 islands in the region. We could fly between islands, but when offered a ride on the sailboat ['Reboot'](#), we could not say no. This is all made possible by Captain Roger John Jones, USN retiree and owner of Reboot, and the magic cat XO. Roger has kindly offered to sail us around the Caribbean for the next several months. The benefits of traveling by sail are many, lower cost, more flexibility, and living aboard means no need for hotels – this is fieldwork on a shoestring. Zamira and Lauren are but our first crew, every two weeks we will rotate people on boat. Future crew members include our graduate student Anne McHugh, as well as several undergraduate students from Lewis and Clark College and the University of Puerto Rico, and perhaps some of us cranky older professors involved in the project. This rotation of team members mean we have fresh hands in the field at all time (collecting spiders is hard work!), and also means that every two weeks, the Ingi Agnarsson lab will receive a package containing hundreds of spiders, to sort and process for inclusion in our project – many of them will be new to science.

Follow our adventure through our blogs on our website and on Facebook (<http://www.facebook.com/CaribbeanIslandBiogeography>). *Fair Winds and following seas!*

Biology Department Collaboration with the Department of Molecular Physiology and Biophysics



Jonathan Vick recently worked on a collaboration with Dr. Bradley Palmer in the Department of Molecular Physiology and Biophysics. Ting Yi, a doctoral student in the lab, was working on identifying the effects of zinc on the contractility and calcium handling of cardiac muscle cells. One of their hypotheses was that zinc interfered with calcium handling by affecting the L-type calcium channel, a major player in excitation-contraction coupling. Jonathan performed whole-cell patch clamp with isolated cardiac muscle cells and recorded L-type calcium channel currents in the presence and absence of zinc. He found that zinc reduced the total L-type calcium channel current, thereby decreasing the total increase in intracellular calcium. They proposed that zinc blocks the pore or competes with calcium for the pore, since they showed that the biophysical properties of the channels were unaltered. The results were included in a recent submission to AJP-Heart ("Identifying cellular mechanisms of zinc-induced relaxation in rat cardiomyocytes." Ting Yi, Jonathan Vick, Marc Vecchio, Kelly Begin, Stephen Bell, Rona Delay, and Bradley Palmer).

Nicholas Reif Co-authors paper in Biological Invasions



In December Nicholas Reif co-authored a paper that was published in the journal, *Biological Invasions*. Brett Mattingly (Eastern Connecticut State University), John Orrock (University of Wisconsin) and Reif examined how a non-native, nitrogen-fixing legume affects annual growth rates of adult longleaf pine trees (*Pinus palustris*) over a thirty year time-frame. [READ MORE](#)

New Staff Members

Carol Yablonsky, Lab Research Technician and Laura May Collado, Post doc Associate will be working in Dr. Ingi Agnarsson's lab; and John Stanton-Geddes, Post doc Associate, will be working in Drs. Nick Gotelli and Sara Helms Cahan's labs.

Welcome to the Department!

Donations Made to the Department of Biology in 2012

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



Mrs. Jennifer Hollister-Lock and Mr. Michael Damian Lock
Ms. Wendy Sara Rosenblum

Thank you all very much!

Alumni Update – The UVM Connection



Check out the online connection to communicate with classmates from the past:

<http://www.alumni.uvm.edu/>

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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