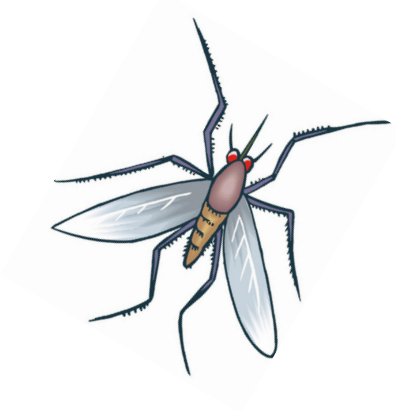
Virginia Tech
Fralin Life Science Institute

spring 2013

the FRALIN EXPLORER



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WELCOME TO FRALIN

Dennis R. Dean
Director, Fralin Life Science Institute
and Virginia Bioinformatics Institute
Stroobants Professor of Biotechnology

Thanks for taking a moment to take a look at the Fralin News Magazine. The past year has been a busy one for the Fralin Life Science Institute and we continue to work collaboratively with a variety of other Institutes, Colleges and Departments.

We are particularly pleased with the launching of the Virginia Tech Center for Drug Discovery and the Fralin Translational Obesity Research Center. Both of these centers have now been officially approved by the research division and represent lively collaborative activities. This year we have also partnered with the Virginia Bioinformatic Institute to support seed funds for genomics and transcriptomics based research.

These activities represent only a few aspects of what is going on within the institute. I invite you to take a look at our web site to become more familiar with these and our many other activities involving research, education and outreach. If you are a faculty member that is new to Virginia Tech, we would love to get to know you and find out about your research.

There is so much going on at Virginia Tech it is hard to keep up. All of the institute directors meet regularly and enjoy a high level of interaction. Chances are that if the Fralin staff does not know the answer to your specific questions about resources and available expertise we will know how to find the information you are looking for.

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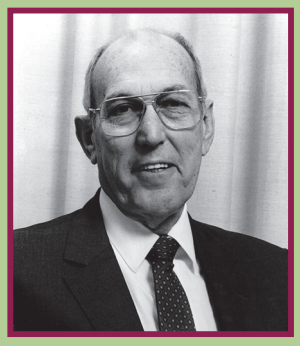
EDITOR: Lindsay Key
WRITERS: Lindsay Key, Cecilia Elpi

About Fralin



Horace Fralin

The Fralin Life Science Institute is an investment institute committed to supporting research, education, and outreach in Virginia Tech's life sciences community. Residents of the institute's four flagship buildings are automatically considered affiliated faculty members and all other life science researchers on campus are invited to become affiliated faculty members.

Affiliated faculty members are given resources necessary to explore new, innovative science that benefits people in the New River Valley, the Commonwealth of Virginia, and the world.

Through seminars, conferences and research group support, the institute serves as a meeting point for progressive ideas involving multidisciplinary research. It is closely aligned with Virginia Tech's other six research institutes, which include the Virginia Tech Carilion Research Institute, Virginia Tech Transportation Institute, the Institute for Critical Technology and Applied Sciences, the Virginia Bioinformatics Institute, the Institute for Society, Culture and Environment, and the Institute for Creativity, Arts and Technology.

Research initiatives within the life sciences receiving the highest priority for support include vector-borne disease, infectious disease, plant sciences, ecology and organismal biology, obesity, and cancer biology. The Fralin Life Science Institute is also actively engaged in cooperative partnerships with colleges, departments, and other institutes that also support the life science community.

the science of obesity

Photo: Researcher Kevin Davy performs a muscle biopsy while researcher Paul Estabrooks looks on.

By Lindsay Key

In January 2013, the Fralin Translational Obesity Research Center at Virginia Tech was officially approved by the Office of the Vice President for Research as a center under the Fralin Life Science Institute.

Serving as co-directors are **Kevin Davy** and **Paul Estabrooks**, both professors of human nutrition, foods, and exercise, in the College of Agriculture and Life Sciences. Estabrooks is also a professor of Family Medicine in the Virginia Tech Carilion School of Medicine.

In line with the land-grant mission of Virginia Tech, the center's aim is to improve health and quality of life in the Commonwealth of Virginia and the nation. More than one-third of adults in the United States are obese, according to the Centers for Disease Control and Prevention, and obesity is often related to causes of death, such as heart disease, stroke, and some types of cancer.

The center's approach is unique; scientists from a variety of backgrounds including human nutrition, psychology, cancer biology, economics, and pediatrics will receive support to explore collaborative, translational projects with the goal of obtaining large-scale external funding to support obesity research.

"The complexity of obesity expands beyond the simple etiology of energy imbalance to include genomic, molecular, cellular, and organic components that interact with individual preferences, family and community contexts, work life, economics, and the local, state, and national policy landscape," Davy said.

The center was developed around a number of successful collaborative teams and includes approximately 17 affiliated Virginia Tech and Carilion Clinic investigators. Some examples include center members **Brenda Davy**, associate professor of human nutrition, foods, and exercise and **Richard Winett**, professor of psychology, who are completing a study that investigates lifestyle strategies for diabetes prevention while focusing on the role of resistance training.

Similarly, **Fabio Almeida**, assistant professor of human nutrition, foods, and exercise was recently funded to examine interactive technology strategies to prevent diabetes with **Wen You**, assistant professor of agricultural and applied economics, **Richard Seidel**, associate professor of psychiatry at the Virginia

Tech Carilion School of Medicine, Estabrooks, and Brenda Davy.

Another example of the team research that will be ongoing in the center is a study by **Matthew Hulver**, associate professor of human nutrition, foods, and exercise, in collaboration with Kevin Davy and **Madlyn Frisard**, assistant professor of human nutrition, foods, and exercise that studies the role of pro-inflammatory pathways in maladaptation to metabolic stress (changes in diet, exercise) in skeletal muscles. Muscle cells become inflamed as a result of over-eating or lack of physical activity.

"The goal of our center is to influence public health through our work, and the solution to societal issues related to obesity prevention and treatment is more than simply having a range of faculty across a lot of disciplines working on obesity research from their own perspective," said Estabrooks. "What is needed is an interdisciplinary translational strategy to design effective and sustainable obesity prevention and treatment strategies that can reach those people who need them most."

The center is also partnered with the Interdisciplinary Graduate Education Program, administered through the Graduate School at Virginia Tech, which supports interdisciplinary graduate student research.

Listed below is a sampling of the researchers that make up the center.

Fralin Translational Obesity Research Center Members

Fabio Almeida, Assistant Professor, Human Nutrition, Foods and Exercise. Studies social relationships and their influence on health beheavior policies, practices, and programs.

Isabel Bradburn, Research Director, Child Development Center for Learning and Research. Leads an intitiative to increase interdisciplinary lifespan research in obesity.

George Davis, Professor, Agricultural and Applied Economics. Focuses on understanding the effects of time and income allocations on nutrition intake, quality, and health.

Brenda Davy, Associate Professor Human Nutrition, Foods and Exercise. Investigates how to improve diet, physical inactivity behaviors and sugary beverage consumption.

Kevin Davy, Professor, Human Nutrition, Foods and Exercise. Focuses on understanding the cardiovascular and metabolic consequences of obesity and aging.

Paul Estabrooks, Professor, Human Nutrition, Foods and Exercise. Professor, Family Medicine, Virginia Tech Carilion School of Medicine. Addresses practical approaches to childhood obesity treatment and prevention; community physical activity and nutrition programs, policies & practices; and worksite wellness.

Madlyn Frisard, Assistant Professor, Human Nutrition, Foods and Exercise. Focuses on understanding the role of mitochondrial function and oxidative damage in the development of metabolic disease.

Deborah Good, Associate Professor, Human Nutrition, Foods, & Exercise. Studies how body weight is controlled through physical activity, using mouse models and focusing on a specific transcription factor, Nhlh2, and its gene regulatory targets.

Matthew Hulver, Associate Professor, Human Nutrition, Foods and Exercise. Investigates abnormal glucose and fatty acid handling in skeletal muscle of chronic disease states such as obesity, type 2 diabetes, metabolic syndrome, and cancer.

Jennie Hill, Assistant Professor, Human Nutrition, Foods and Exercise. Uses a social ecological framework to study the influence of built and social environments on physical activity and nutrition for individuals and populations.

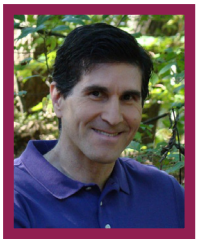
Hanna Jaworski, Pediatrician, Carilion Clinic. Develops broad childhood obesity prevention and treatment approaches to reach obese children at Carilion Clinic.

Mary McFerren, Director, ENFNP, SNAP programs. Provides primary maganement and leadership in accordance with federal guidelines and identified needs of limited resource families and individuals in Virginia.

Andrew Neilson, Assistant Professor, Food Science and Technology. Investigates the use of naturally-occuring compounds in grapes and cocoa for prevention of obesity and type-2 diabetes diabetes.

Tina Savla, Assistant Professor, Human Development. Researches missing data in longitudinal studies, structural equation modeling and survival analysis, mixed models, and tools for causal inference.

Eva Schmelz, Associate Professor, Human Nutrition, Foods and Exercise. Investigates the use of sphingolipids in cancer prevention and the molecular mechanisms of how these lipids prevent colon, breast and ovarian cancer.



Richard Seidel, Clinical Psychologist Psychiatry and Behavioral Medicine, Carilion Clinic. Researches disease self-management, weight control, and other aspects of lifestyle medicine.

Richard Winett, Heilig Meyers Professor, Psychology. Investigates the intersection of health psychology and public health, and the development of primary and secondary prevention programs linked to nutrition, physical activity, and exercise.

Wen You, Assistant Professor, Agricultural and Applied Economics. Focuses on assessing and valuing the role of time in household decision-making processes, exploring potential causes of childhood obesity, and determining optimal incentive structures to support weight loss.

Jamie Zoellner, Associate Professor, Human Nutrition, Foods and Exercise. Seeks to build research capacity among at-risk communities to promote the sustainability of effective nutrition and physical activity interventions.

Cancer slowing compound also combats malaria

By Lindsay Key

An extract from a shrub often used for medicinal purposes in tropical Africa may have lethal effects against a dangerous parasite that transmits malaria, according to a multi-institutional team of scientists led by researchers at Virginia Tech.

The discovery, published in the Journal of Natural Products, shows that a compound isolated from this common plant with low branches and creamy, white fragrant flowers appears to be useful for the development of drugs targeting the parasite *Plasmodium falciparum*. The same chemical compound was previously shown to slow the growth of ovarian cancer cells, researchers say.

"The next step in the research is to prepare analogs of the active compounds in hopes of finding some more stable compounds with even better activity. The compound we've identified already appears to have better anti-malarial activity than Chloroquine, a standard drug on the market," said **David G.I. Kingston**, a University Distinguished Professor of chemistry in the College of Science, a researcher affiliated with the Fralin Life Science Institute, and director of the Virginia Tech Center for Drug Discovery.

For the study, Kingston partnered with **Maria Belen Cassera**, an assistant professor of biochemistry in the College of Agriculture and Life Sciences, and **Jessica Bowman** of Lynchburg, Va., a graduate student in biochemistry in the College of Agriculture and Life Sciences, working with Cassera.

The biochemists conducted bioassays on Kingston's collection of plants from Madagascar, collected as part of the Madagascar International Cooperative Biodiversity Group. In 2011, Kingston received a grant from the National Center for Complementary and Alternative Medicine, part of the National Institutes of Health, to test the plants for anti-malarial activity.

"Natural product compounds seem to be full of surprising benefits to cure human disease," Bowman said. "To be a part of the on-going research for transmission blocking agents is very rewarding."

With the help of **Liva Harinantenaina**, a research scientist working with Kingston, the team honed in on an ethanol extract of *Mallotus oppositfolius*, a West African tropical flowering plant often used as a chewing stick in Nigeria but not fully studied in the scientific world. Then, they worked together to isolate three antimalarial compounds from the extract.

Studies conducted by Cassera and **Paul Roepe**, professor of chemistry and professor of biochemistry and cellular and molecular biology at Georgetown University, showed that one of the three compounds kills the malaria parasite in its asexual stage as well as its gametocyte stage, which is when transmission to mosquitoes occurs.

"Finding new drugs that will also target the gametocyte stages of the malaria parasite are essential to reduce its transmission," Cassera said.

Cassera is also an affiliated faculty member with the Fralin Life Science Institute. Kingston and Cassera are both members of the Virginia Tech Center for Drug Discovery, which was established last June to increase collaboration among drug discovery researchers in varying colleges and departments.

Photo: Members of the Virginia Tech Center for Drug Discovery. **Top left photo:** David Kingston conducts research on plants native to Madagascar, in collaboration with the National Institutes of Health.

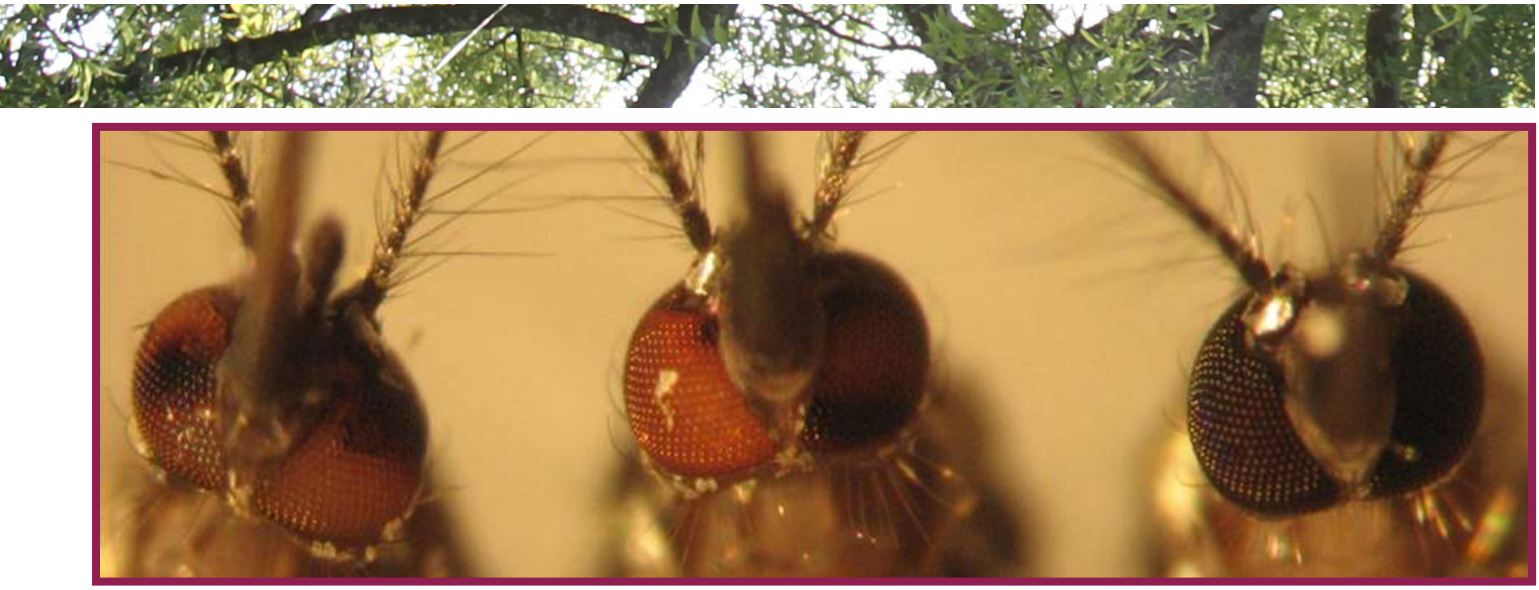


Photo courtesy of Azadeh Aryan: The varied color patterns in the eyes of these mosquitoes, modified using the TALEN technology, is because of cell-to-cell variability in the degree of gene editing.

Researchers alter mosquito genome with goal of disease control

By Lindsay Key

Virginia Tech researchers successfully used a gene disruption technique to change the eye color of a mosquito — a critical step toward new genetic strategies aimed at disrupting the transmission of diseases such as dengue fever.

Zach Adelman and **Kevin Myles**, both associate professors of entomology in the College of Agriculture and Life Sciences and affiliated researchers with the Fralin Life Science Institute, study the transmission of vector-borne diseases and develop novel methods of control, based on genetics.

In a groundbreaking study recently published in the journal PLOS One, the scientists used a pair of engineered proteins to cut DNA in a site-specific manner to disrupt a targeted gene in the mosquito genome. *Science* magazine heralded these transcription activator-like effector nuclease proteins, known as TALENS, as a major scientific breakthrough in 2012, nicknaming them "genomic cruise missiles" for their ability to allow researchers to target specific locations with great efficiency.

While TALENS have been previously used to edit the genomes of animal and human cell cultures, applying them to the mosquito genome is a new approach, according to Adelman.

"Unlike model organisms with large collections of mutant strains to draw upon, the lack of reverse genetic tools in the mosquito has made it is very difficult to assign functions to genes in a definitive manner," Adelman said. "With the development of this technology, our understanding of the genetic basis of many critical behaviors such as blood-feeding, host-seeking, and pathogen transmission should be greatly accelerated."

To test the capability of TALENs to specifically edit the mosquito genome, the scientists designed a pair of TALENS to target a gene whose protein product is essential to the production of eye pigmentation in *Aedes aegypti*, a mosquito species known for its transmission of the viruses that cause dengue fever.

Using the TALEN pair to edit the gene in the mosquito's germ cells early in development, they were able to change the eye color of a large percentage of the mosquitoes arising in the next generation from black to white.

"To date, efforts to control dengue transmission through genetics have focused entirely on adding material to the mosquito genome. Ensuring that this added material is expressed properly and consistently has been a challenge," Adelman said. "This technology allows us to pursue the same goals, namely, the generation of pathogen-resistant mosquitoes, through subtraction. For example, removing or altering a gene that is critical for pathogen replication."

"*Aedes* mosquitoes have become increasingly important as vectors of disease from a public health perspective," said George Dimopoulos, a professor of molecular microbiology and immunology at John Hopkins University who was not involved in the study. "The lack of vaccines and drugs for dengue has left the mosquitoes that carry the virus as one of the most promising targets for controlling the disease. A better understanding of how the virus infects the mosquito and other biological properties of the insect will be required to develop intervention strategies that can block virus transmission by the mosquito. The ability to genetically engineer mosquitoes is essential for the study of such biological functions. The TALEN-based system in mosquitoes that was developed by Dr. Adelman provides this important capacity."

Co-authors of the study include Azadeh Aryan, a Ph.D. student in the department of entomology in the College of Agriculture and Life Sciences, and Michelle A.E. Anderson, a research technician in the department of entomology in the College of Agriculture and Life Sciences.

Hydroponic farm to fork: what are the risks?

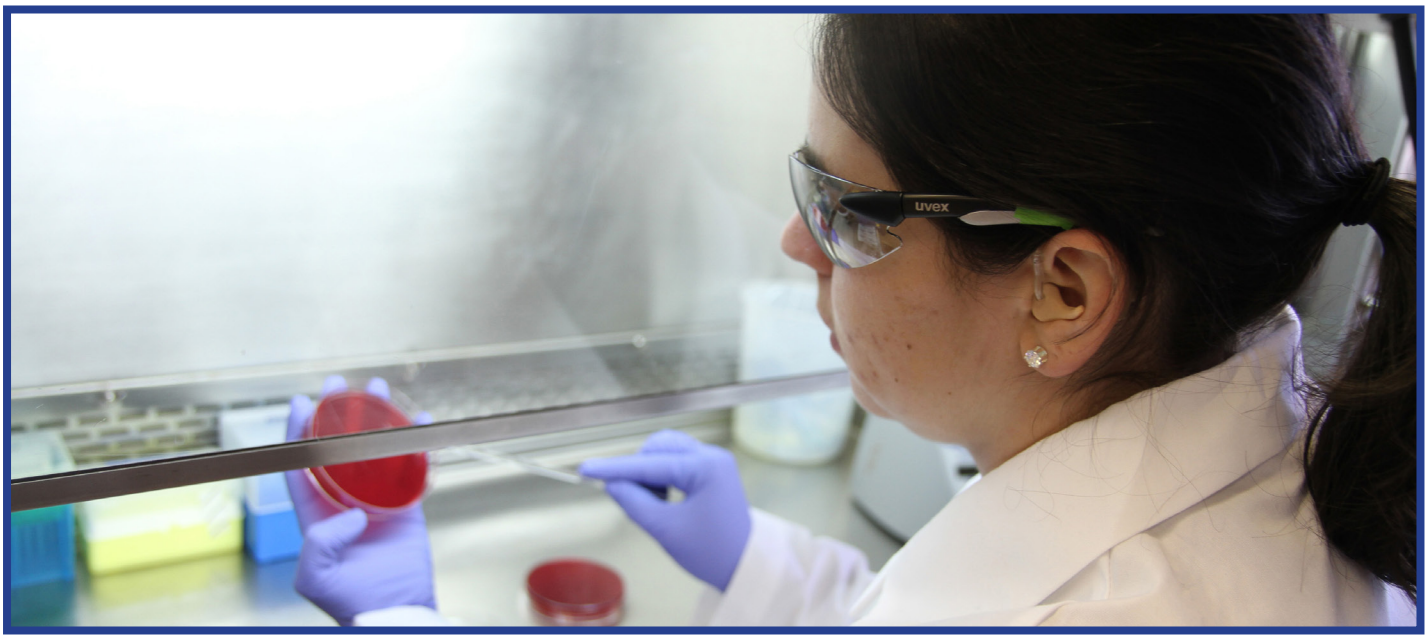


Photo: Jessie Waitt works in Monica Ponder's laboratory in Fralin Hall.

STUDENT SPOTLIGHT

By Cecilia Elpi

According to the Centers for Disease Control (CDC), 46 percent of all food-borne illness outbreaks originate from produce, which includes plants, vegetables, herbs, and fruits. Unlike meats, vegetables are not always cooked to kill food-borne pathogens and the risk associated with the contamination of produce from hydroponic farming environments is widely unknown.

Hydroponic farming is different from traditional farming methods where the growth of plants occurs in soil; hydroponic farms replace soil with water to cultivate crops. Hydroponic farming methods are beginning to grow in popularity worldwide, because of their ability to produce a large amount of crops in a limited amount of space. Virginia Tech has its own hydroponic facility in Saltville, Virginia.

Jessie Waitt of Powhatan Va., a master's student in food science and technology works with **Monica Ponder**, assistant professor of food science and technology in the College of Agriculture and Life Sciences to examine the contamination risks associated with harvesting, packaging, transporting and storing hydroponically grown lettuce. The ultimate goal of her research is to inform good agricultural practices.

"There are several instances where lettuce has the opportunity to become contaminated," said Waitt. Water—the characteristic that makes hydroponic farms unique—can also introduce risk for contamination.

Waitt's experiment proposed the question: if the water supply becomes contaminated with the pathogen *Salmonella enterica*, can the pathogen reach the head of the lettuce and survive under recommended storage temperatures? She found that yes, it can. Waitt modeled the entire process from farm to table in both ideal and 'reality' based conditions.

The standard for realistic conditions involved warmer storage temperatures of 12 degrees C, which studies have found is the norm in most household refrigerators.

In both conditions *Salmonella* survived and was found on the head of the lettuce.

"Previous research has stated that removing the outer leaves of lettuce was enough to remove the pathogen, and that is not what I found," said Waitt. Waitt uses glow germ to demonstrate how easily contamination can spread. Glow germ is only visible to the human eye with a black light, and is often used to train children about the importance of washing hands.

Ponder places a large emphasis on the importance of this research informing better agricultural practices.

"Several local hydroponic farmers have demonstrated an interest in these practices and the hope is this research can help us better guide them," said Ponder. Ponder, along with other Virginia Tech researchers, works with the Virginia Cooperative Extension to train extension agents who in turn train local farmers. One of the program's aims is to help make food safer.

Waitt is just under three months from achieving her master's degree at Virginia Tech, and received her undergraduate degree in biology and chemistry from Sweet Briar College in 2009, after which she spent 18 months working as a microbiologist with Pfizer/Wyeth Pharmaceuticals. Ponder and Waitt are working towards publication of these findings.

Waitt's favorite pastime is riding Tarzana, her horse. "If I don't find a job right away in microbiology, I will just spend more time with Tarzana," she said. Another characteristic that makes Waitt unique is that she is deaf. She lost her ability to hear at 2 years old from a bacterial meningitis infection. However, her loss of hearing has not slowed her ability to communicate effective agricultural practices or to help influence farmers.

Photo: Jessie Waitt examines the contamination risks associated with harvesting, packaging, transporting and storing hydroponically grown lettuce.

student notes

Graduate students recognized for vector-borne disease research

The 3rd Vector-Borne Disease Reseearch Symposium was held March 8-9, 2013 at the Inn at Virginia Tech. Approximately 70 people attended the symposium, which included 12 talks (including three guest speakers) and 25 poster presentations in the areas of parasitology, vector biology, and vaccine and drug discovery, in which four students took home first place awards. Students here are pictured with Pablo Sobrado, associate professor of biochemistry in the College of Agriculture and Life Sciences, and coordinator of this year's symposium. For a group photo, see page 13.

First place, poster presentation in chemistry:
Eugene Camerino

First place, poster presentation in parasitology:
Ana Lisa Valenciano

First place, oral presentation:
Frank Criscione
Ph.D. student, Biochemisry

First place, poster presentation in vector biology:
Maryam Kamali

COFFEE BREAK WITH A SCIENTIST

John McDowell, principal scientist of Latham Hall, discusses his research and love of Virginia Tech and the Fralin Life Science Institute.

What is the focus of your current research?

My group tries to understand how plant pathogens manipulate their hosts. We do a lot of our research with the reference plant *Arabidopsis thaliana* and its natural oomycete (fungus-like) pathogen *Hyaloperonospora arabidopsidis*, which we've nicknamed Hpa. Like many plant pathogens, Hpa is an obligate plant pathogen that can't be cultured apart from its host.

Our recent work on Hpa started when we sequenced its genome and compared it to related pathogens that are non-obligate. This study, along with similar studies of obligate pathogens from different evolutionary lineages in other labs, revealed several genomic "signatures" of the obligate lifestyle. This gave us a broad understanding of adaptations that are necessary for success as an obligate plant pathogen.

Now, we are building on this foundation with mechanistic studies to understand the details of how pathogens like Hpa suppress the host immune response and extract nutrients to fuel their own growth. Additionally, we have a translational project in which we are using information from pathogen genomics to develop new tools for controlling a highly destructive root rot disease of soybean that is caused by a relative of Hpa.

This project has been a great learning experience, because we are part of multidisciplinary team that are working together to ensure that we design tools that not only work in a lab setting, but will ultimately make a difference in the field.

How did you become interested in your line of research?

My interest in genetics was sparked by an article in National Geographic about the power of recombinant DNA technology, which was new at the time (yes, this was decades ago!). I picked up this magazine from a coffee table at a friend's house, while watching TV during winter break of my college freshman year… when I was trying to decide on a major. I sometimes wonder whether my career path would have been different if I had sat at the other end of the couch that night.

Anyway, this article, and subsequent readings, inspired me to choose cell and molecular biology as an undergraduate major. I also worked in a molecular microbiology lab, which framed all of its research questions in an evolutionary context. This undergrad research experience was critically important for me, because it crystallized my interest in how genes evolve new functions.

I pursued this question by joining the Genetics Ph.D. program at the University of Georgia, which at that time was one of only a handful of programs that combined substantial strengths in molecular genetics and evolutionary biology. My Ph.D. research focused on molecular function and evolution of a gene family in *Arabidopsis*, and coincided with the advent of *Arabidopsis* as a model system for plant research.

By the time I was finishing my Ph.D., researchers in the plant-pathogen field had developed tools to clone genes that underpin plant-pathogen co-evolution. This was a natural extension of my interest in evolution of gene function, and I also liked that plant-microbe interaction was an area with immediate applications for agricultural productivity. I was lucky enough to get a postdoc position in a lab that was leading this area of research, and therein laid the foundation for questions that I continue to pursue today.

What do you feel are some of the biggest challenges facing scientists today?

That's a tough question, because science is inherently challenging at every level of endeavor. At a mundane but important level, we all face the challenge of funding our research. This is nothing

Photo courtesy of John McDowell: *Arabidopsis*, infected with the downy mildew pathogen *Hyaloperonospora arabidopsidis* (Hpa).

new but is starkly highlighted right now by the imminent spectre of sequestration. I'm particularly frustrated when I serve on grant panels and see proposals by young investigators with terrific ideas fall short of the funding line, because the proposals lack one or two proof-of-concept experiments and the program can only fund 7 proposals out of 100.

I don't have any magic answers for how to solve this problem, except that more money should be allocated for research. I know that's kind of a pat answer, but history clearly shows that the taxpayers get a fantastic return on their investment in research. I think that's a message that sometimes gets lost with our stakeholders, so it's up to us to continuously remind them through effective outreach and public engagement. VT can also (and does) help by providing seed money so that those proof-of-concept experiments can get done.

Another challenge that I've been thinking about lately is the evolution of science towards interdisciplinarity. Once again, this is nothing new; after all, the structure of DNA was solved over half a century ago by biochemists and physicists working together. Perhaps what is different now is that the importance of interdisciplinarity is broadly recognized and is becoming institutionalized. This is evident in composition of teams that populate the tables of content in *Science* and *Nature*, and in RFAs from the agencies that fund our research.

The good news is that VT is well positioned in this aspect. Even when I interviewed here 14 years ago, I felt like VT was ahead of the curve, compared to its peers, in fomenting an institutional culture that supports collaboration. This was one of the big draws that attracted me to VT, and has only grown in the years since. The Interdisciplinary Graduate Education Programs are a great example of this. I think we still have a lot of untapped potential for interdisciplinary collaboration within and outside of the life science sector at VT, and we have an opportunity to define ourselves as an institution where tomorrow's students can access entirely novel programs of training.

At the broadest level, we face the ongoing challenge and opportunity to contribute to ongoing and emerging global problems. I suppose this is a bit trite at the moment, but I sincerely view climate change as an existential problem and the central challenge of this century. The 21st century has also been touted as the century of the brain, thanks in part to the promise of neuroscience. And of

Q&A

course diseases, particularly those that are infectious, provide ongoing challenges; an aphorism in my field of research is that, over evolutionary time, "the pathogen always wins." Fortunately, VT is well positioned to address all of these problems, and I think that our collaborative culture can enable VT to be nimble in responding to new problems. Challenging and exciting times lie ahead, for sure.

What does the Hokie phrase *Ut prosim* mean to you personally?

That's an easier question, because that motto defines the essence of my job. I know it sounds kind of corny, but it really is true that my day-to-day activities are in service to the U.S. taxpayers who subsidize my research, state taxpayers who subsidize my teaching, students who invest their time and effort in my classes, the individuals in my lab for whom I provide training and resources, and so on. Last, but perhaps most relevant for this interview, is service to my profession. There are several faculty at VT whom I've adopted as role models because they've balanced doing great science while having a real impact at VT through their service.

What do you enjoy about being involved with the Fralin Life Science Institute?

The institute is an extraordinarily effective catalyst for growing life sciences at VT, and does so by addressing many of the challenges that I've already mentioned: fostering new collaborations, assisting young researchers at the critically important early stages of their careers, supporting novel graduate training programs and undergraduate research, building community spirit, and engaging our stakeholders. Dennis and the institute staff have done a fantastic job of building this institute, and I'm simultaneously thrilled and humbled by the opportunity to contribute to the institute's continued growth.

Fun Facts

Hometown: Knoxville, TN

Hobbies: I have a wonderful family, which includes my wife Cathy (VP for orthopedics and spine services in Southwest VA, for Hospital Corporations of America), my sons Jonah (14) and Ethan (12), two cats, a parakeet, and an African side-necked turtle. We enjoy outdoor sports like cycling, hiking, and skiing, along with travel, reading, and good food.

Mountains or Seaside? Mountains, and it's not even close!

Small towns or big cities? Small towns for residence, but big cities for holidays. Paris is my favorite.

Favorite quote: I have dozens. One came from a senior student during the first days of my Ph.D. program: "John, bench science is like baseball: if you maintain a .300 batting average (ED: 30% success rate) over the course of your career, then you'll be a first-ballot hall-of-famer". This is a great quote for beginning researchers, because it lets them know that it's okay to fail sometimes.

Fralin brings world-renowned life scientists to campus

By Lindsay Key

The Virginia Tech Life Science Seminar Series is in full swing this semester, with renowned scientists from across the world visiting campus to speak on diverse topics, including infectious diseases, cancer biology, plant sciences, and genomics.

Launched more than 10 years ago, the Virginia Tech Life Science Seminar Series is funded by the Fralin Life Science Institute, the College of Agriculture and Life Sciences, and the Virginia Bioinformatics Institute. Seminars occur every Friday, from 12:20 p.m. to 1:20 p.m., in the Virginia Bioinformatics Institute conference room.

The program also gives graduate students the opportunity to meet with invited speakers over lunch to explore more in-depth scientific concepts, career paths and opportunities, and to get feedback on their own work.

"The goal is to pick a diverse group of speakers to provide our scientific community with an opportunity to catch up on what is going on in other areas of research and to spark our students' curiosity in areas still unexplored for them," said **Carla Finkielstein**, associate professor of biological sciences in the College of Science and coordinator of the series since 2010.

Speakers are nominated by life science faculty members who serve as hosts. Nominations take place twice a year and all faculty members working in the life sciences are encouraged to submit a nomination form.

"The series is the only one on campus with a broad breadth of scientific topics, and support from all faculty is needed to keep this series running," Finkielstein said.

Photo at left: Carla Finkielstein (left) poses with VTLSS speaker Linda Wordeman, and her faculty host Daniela Cimini (right). Photo above: Linda Wordeman presents her research in the VBI Conference room.

Upcoming Seminars

April 19: Dr. Ralf Langen, "How proteins control membrane curvature"

April 26: Dr. Martin Polz, "Ecology and Evolution of Bacterial Populations in the Wild"

May 3: Dr. Michael Klemba, "Natural variation in the substrate binding pocket of M1-family aminopeptidases modulates specificity and promotes functional specialization

May 10: Dr. Doug Lyles, "Inhibition of host gene expression by vesicular stomatis virus: New vaccine vectors and oncolytic viruses"

More info online at www.fralin.vt.edu/vtlss

Chris Roberts, associate professor of biomedical science and coordinator of the **Fralin Cancer Biology Seminar Series**, discusses the impetus for the series.

Photo: Graduate students are assisted in a laboratory in the Integrated Life Sciences Building by Chris Roberts (standing, back) and Eva Schmelz, associate professor of human nutrition, foods, and exercise.

Why develop the series?

The decision to develop a cancer biology seminar series stemmed from the fact that although there were many investigators on campus who were conducting cancer biology related research, there was very little information available on the various aspects that were being studied, and further, there was not a forum to bring together various researchers for interactive discussions on cancer. More importantly, there was not a forum specifically tailored for students and/or post-doctoral fellows to discuss their research and any associated problems.

Why is it so important?

We felt it crucial for students to gain input from other scientists, who often see things from a different perspective. Hence, we assembled a core of researchers situated initially in the ILSB research building at the CRC, to participate in a seminar series that specifically focused on cancer biology research questions.

What success have you seen develop since last year's series?

This has evolved to a monthly seminar series in which students, post-docs and principal investigators can present short or extended presentations of current ongoing investigations in their laboratories. This fall we had a full series with numerous faculty across campus participating (biomedical engineers, biochemists, cell biology and drug discovery chemists).

What can we look forward to with this year's seminar series?

We hope to be able to continue the seminar series in the coming years. This semester we have invited new VT faculty to present extended presentations and introduce them to the focus group. Dr. Zhi Sheng, a recent hire at the Virginia Tech Carilion Research Institute will present in May, with student presentations reserved for April.

Cancer Biology Seminar Series

3rd Tuesdays of every month
4 to 5:30 p.m.
1040 Integrated Life Sciences Building
Corporate Research Center

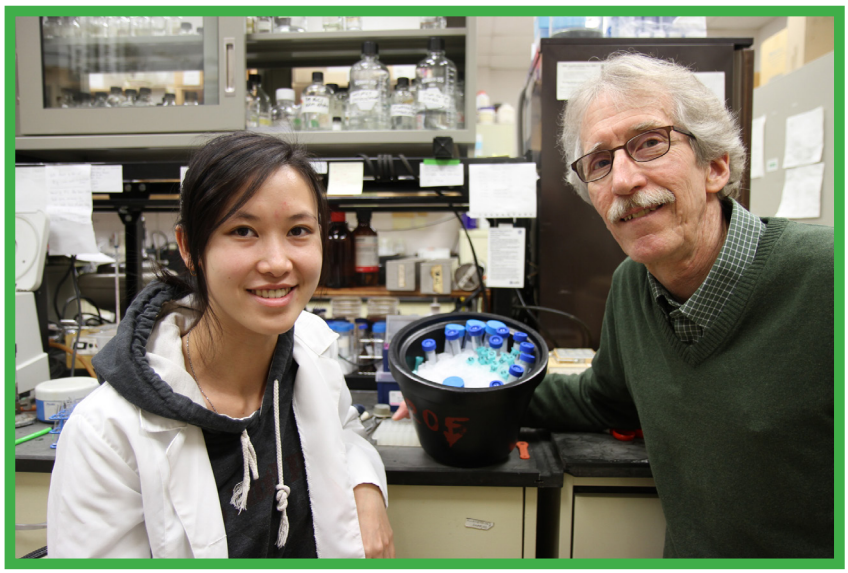
Vector-borne disease research symposium held March 8-9

Photo: Attendees of the 2013 Vector-borne Disease Symposium. Additional photos of student winners on page 9.

around fralin

Photo: Entomology graduate student Ashley Peery explains her research to Immo Hansen, assistant professor of molecular vector biology at the New Mexico State University, as part of the 2nd Vector-borne Disease Resarch Symposium, held March 8-9, 2013 at the Inn at Virginia Tech.

Photo: Diep Nguyen, a senior majoring in biochemistry, works with Fralin researcher and biochemist Tim Larson. Nguyen worked with Larson as part of a summer undergraduate resesearch fellowship during the summer of 2012, and stayed on to work in the lab the following year.



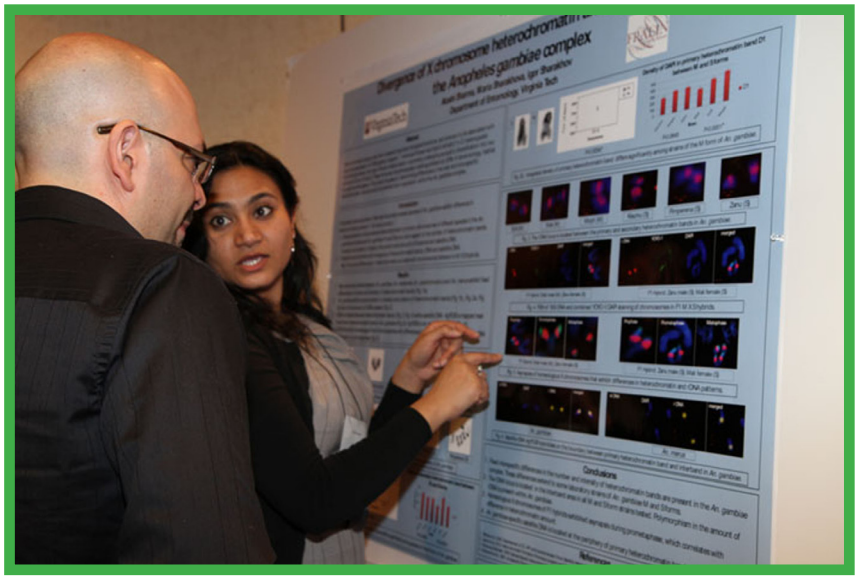


Photo: At the 2nd Vector-borne Disease Research Symposium, held March 8-9, 2013 at the Inn at Virginia Tech, entomology graduate student Atashi Sharma explains her research to Fernando Merino, a research scientist in biochemistry.

Photo: Life sciences graduate students relax at the 2nd Annual Graduate Student Mixer, held April 18, 2013 at the University Club at Virginia Tech. The event offered students the opportunity to meet graduate students from other departments and colleges who are also working in life sciences research.

Photo: At the 2nd Annual Graduate Student Mixer, students enjoyed chicken, vegetarian lasagna, and delicious sides and desserts provided by Custom Catering in Blacksburg.

Photo: The Floorboards, a Blacksburg rock band, played at the 2nd Annual Graduate Student Mixer.

VirginiaTech
Invent the Future

SURF'S UP!

Summer 2013

36 undergraduate students from the fields of biological sciences, biochemistry, fisheries and wildlife, biomedical engineering, and more are enrolled to attend Fralin's 2013 Summer Undergraduate Research Fellowship Program! The program is a paid 10-week, full-time, unforgettable research experience!

Photo above: SURF 2012 students Alex Garretson (left) and Jeronimo Silva

www.fralin.vt.edu

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