Expression

People and Progress 2013- 2014
UConn Department of Molecular and Cell Biology

In this Issue:

Expression

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MCB *Expression* is published annually for alumni and friends of the Department of Molecular and Cell Biology, College of Liberal Arts and Sciences at the Univeristy of Connecticut. The Department also publishes a quarterly newsletter, *MCB Notes*. Please direct any inquiries about either publication to Department of Molecular & Cell Biology, University of Connecticut, 91 North Eagleville Road, Unit 3125, Storrs, CT 06269-3125 or jessica.williamson@uconn.edu.

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Thanks to Elaine Mirkin for information about the PSM programs.

ON THE COVER: Amanda Dupuy (PhD student in Genetics and Genomics, Strausbaugh lab) preparing the Roche 454 GS FLX+ instrument for a DNA sequencing run.

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From the Department Head

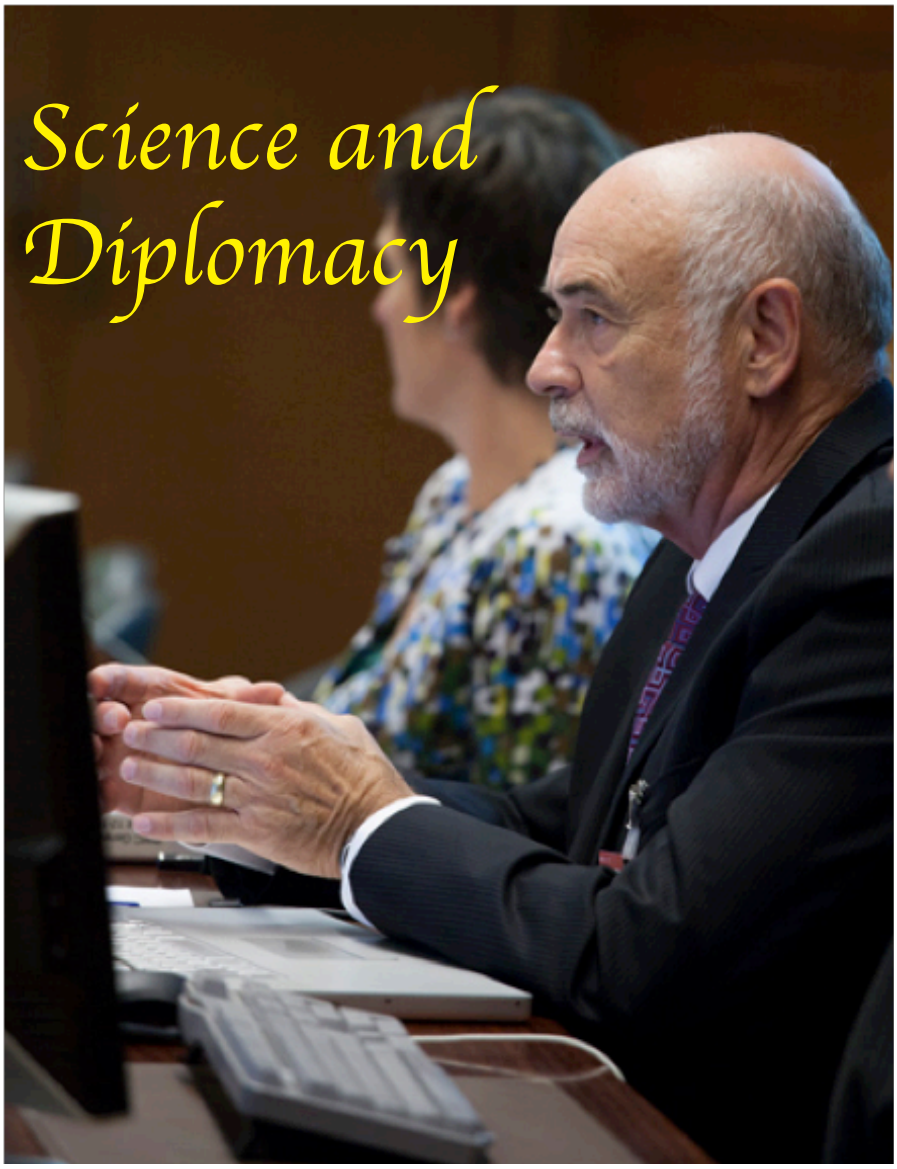
These are exciting times in MCB! We have decided to share our news with you through a new annual newsletter, Expression. We chose this name from amongst words used in molecular biology that express the positive, dynamic nature of the department. Gene expression symbolizes the response of a cell to changing conditions, a moving forward to thrive under new conditions in an ever-changing environment. This captures the atmosphere that we all feel in MCB these days. With new faculty, new facilities, fresh student faces, and even fresh ideas from those of us with older faces, we are all very excited for our future and we want to share this with all of you. We hope you'll keep this issue around for a while and occasionally pick it up to read about developments in MCB or catch up on people who you remember from your time here. From all of us here, welcome home to MCB!

Research in the Department continues to expand in new directions augmented by access to new state-of-the-art instruments. As featured in this issue, new DNA sequencing facilities enable many more of our research programs to easily utilize "next-generation" high-throughput sequencing as an almost everyday investigatory tool. Structural biology has built on its strengths in molecular characterization with the recent acquisition of a Small-angle X-ray Scattering (SAXS) instrument (featured in the Nov. 2013 MCB Notes).

New faculty and new collaborations are also driving research to new heights. The Jackson Laboratory-UConn collaborative program and the UConn Institute for Systems Genomics are building new bridges to our MCB research and graduate programs. Our research programs have grown to include studies of mitochondrial membrane protein functions (Alder lab, featured in this issue), intracellular controls of membrane dynamics (Campellone lab), community ecology and chemical biology of an ant-fungus symbiosis (Klassen lab), gene dosage and genome evolution (Malone lab), and computational biophysics of structural transitions of biological materials (May lab).

We hope you enjoy our inaugural issue of Expression. We are making greater efforts to reach out to our alumni to keep them informed of developments in MCB. If you are not on our mailing list to receive electronic copies of our quarterly MCB Notes, please drop us a line and we can arrange to send these to you. Also, please let us know of any new developments in your life that you would like to share with other alumni. We would like to expand our coverage of our alumni's successes in both MCB Notes and Expression.

Michael A. Lynes
Professor and Head
Dept. of Molecular and Cell Biology



Benson Explores the Intersection of Science and Politics as Jefferson Science Fellow

Two UConn professors returned to Storrs in Fall 2013 from Washington, D.C., where they spent a year as two of just 13 scientists chosen nationwide to work as Jefferson Science Fellows for the Department of State and the U.S. Agency for International Development (USAID).

The selective program invites prominent university professors from scientific disciplines to spend a year in Washington giving expertise to support the work of U.S. foreign relations and international development programs. The program is supported by the professors' universities, the State Department, and the National Academies of Science.

David Benson, professor of molecular and cell biology, spent his year in the Department of State's Bureau of International Security and Nonproliferation, working with the Office of Biological Policy Staff. His work at UConn involves the biogeography of microorganisms, so his expertise was put to use assessing biological weapons issues. Professor Benson was joined by Sara Harkness, professor of human development and family studies, who spent her year as senior advisor to the Health and Education teams in the Latin American and Caribbean Bureau at USAID, working primarily on children's literacy issues.

One of Benson's projects involved assessing and providing opinions on how to regulate research that focuses on potentially dangerous microorganisms. A major example, he explains, is the H5N1 influenza virus. To find a cure, scientists need to do research on the virus; but doing that research involves creating more virulent strains, which produces its own set of risks.

"In science, you look at numbers and trends on graphs," says Benson. "In policy, you look at things from a 30,000-foot level. You learn quickly that you can't put that much detail into memos. You learn to sift the sand and come out with the diamonds."

"I met so many good people who are really trying to do the best they can for our country – smart people, competent people," he adds. "I learned an enormous amount from them."

In August 2013, Benson served on the U.S. delegation to the Biological Weapons Convention Meeting of Experts, a conference sponsored by the United Nations in Geneva. At the conference, he and his colleagues from the Office of Biological Policy Staff presented what he calls a "mini-university" on microbiology and molecular diagnostics to a room full of diplomats.

"We wanted to educate diplomats from around the world about some basic science," he says. The session drew a standing-room only crowd.

> *"In science, you look at numbers and trends on graphs. In policy, you look at things from a 30,000-foot level."*

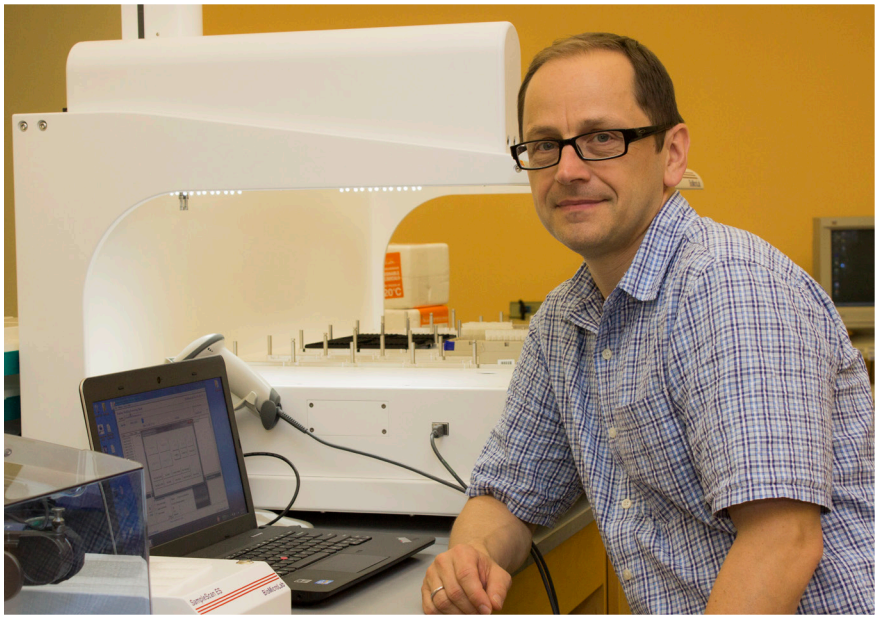
Benson says that his experiences in policy this year will definitely have an impact on his teaching. This semester he is teaching a molecular and cell biology course called Microbes that Changed History. Many of the microbes he will discuss in class – smallpox, bubonic plague, and influenza, to name a few – shaped history in ways related to today's biological warfare.

"During the bubonic plague, people tossed the bodies of the dead over castle walls to infect those inside," he explains. "These diseases affected all of civilization."

By Christine Buckley, CLAS
Adapted from UConn Today

MCB at the Forefront of Genomics Research at UConn

Premature infants adapt to their new world. Marine invertebrates adapt to climate change. Bacteria adapt to different hosts. Adaptations require complex changes in the genetic compositions of individuals and populations. MCB researchers are equipped to investigate those changes. For over a decade MCB scientists have provided the DNA sequencing tools to advance the department's research and teaching missions and have guided UConn scientists to open new frontiers in their research programs. DNA sequencing technologies have enabled investigators to adapt their research to exciting worlds of new possibilities.



Starting in 2002 with the opening of the Center for Applied Genetics and Technology (CAGT), Prof. Linda Strausbaugh's vision for genomic research and training at UConn, large-scale and high throughput DNA sequencing technologies have allowed MCB research programs to tap into new ways to investigate molecular genetic phenomena. The Center has seen its share of changes in sequencing technology, from its first sequencer platform, the 454 GS FLX+ produced by the Connecticut firm 454 Life Sciences, to newer devices including the Life Technology Ion Proton and the Illumina NextSeq machines. "Genomics is exciting and challenging, much like computer sciences," says Prof. Rachel O'Neill, current Director of CAGT. "Genomics has tended to follow Moore's law." Moore's law states that processing power for computers will double every two years.

O'Neill says that investigators from over 30 departments at the Storrs and Health Center campuses have used the CAGT. One project in particular illustrates how the availability of sequencers on campus can propel a research program in a new direction.

Prof. Ann Bucklin, a UConn Marine Sciences marine zooplankton population geneticist, began examining the impact of climate change on planktonic tunicates called salp. Bucklin wanted to identify genes involved with their adaptation to changing environmental conditions. She turned to the CAGT where her students learned to sequence the salp genome. This was difficult as there were no similar genome sequences available for comparison, but her team succeeded. Her students are now trained in molecular technologies and this opened a new research thrust in her lab. "Being able to put genomics into [her work] … was a powerful tool for her," says O'Neill. "Having the Center available so we could train her students … was a very big, positive success story."

In August 2014 CAGT entered a new phase when its instrumentation was incorporated under the new Center for Genome Innovation (CGI) and O'Neill was named its Director. CGI is acquiring 4 Illumina Next-Generation

Sequencing instruments and microfluidics platforms for single cell genomic analysis. These instruments will be located on both the Storrs and Farmington campuses. Associate Professor Craig Nelson will supervise the microfluidics facility.

Another new arrival on the UConn sequencing scene is the Microbial Analysis, Resources and Services (MARS) facility, a part of the Biotechnology Bioservices Center (BBC). The MARS facility, opened in March 2014, was the brainchild of Prof. Joerg Graf, who serves as its Facility Head. MARS provides advanced sequencing facilities beyond the BBC's more traditional Applied Biosystems capillary electrophoresis-based DNA sequencers.

The MARS facility is primarily geared toward microbe sequencing projects. "Ours is a microbial center, but we can do other things," says Graf "We can extract DNA from any tissue. It can be plants, it can be soil, or it can be microbes." Microbial populations associated with a number of hosts have been studied already, including those from bats, sharks, leeches, cicadas, mice and termites.

The facility currently houses an Illumina MySeq DNA sequencer and robotics for sample preparation that minimizes human errors. "We have the capability of extracting in a high throughput fashion DNA from many different samples," Graf says. "We use bar-coded vials for everything so that we can track samples from receiving the samples, to the DNA that is being extracted." Data derived from these samples is also linked to their barcodes.

Graf recently launched a study with collaborators at the Connecticut Children's Hospital and the UConn School of Nursing to study the intestinal microbial flora of prematurely born infants. These infants can develop necrotizing enterocolitis, a serious intestinal disease among premature infants. Graf and his collaborators will regularly collect fecal samples from prematurely born infants beginning at birth and, using the MARS facility, examine their microbial populations. They hope to observe changes in those populations with time and perhaps observe how those from children who do and do not develop entercolitis differ. This preliminary study could lead to a larger future study.

Both CAGT and MARS are integral parts of the training programs for graduate students enrolled in both the Applied Genomics and Microbial Systems Analysis Professional Science Masters (PSM) programs. PSM students are trained to use the instruments in these facilities in modular courses. "Tying [the PSM program] into training on instruments was a critical component in its development," O'Neill observes.

Training of undergraduate and graduate students and postdoctoral investigators at these facilities provides essential skills for seeking employment in today's job market. "We've had a lot of Masters students, bachelors degree students and PhD students who have said that having seen and been trained on an instrument was the selling point for them [in getting a job]," says O'Neill.

DNA sequencing technologies change rapidly and UConn and MCB continue to move forward to provide investigators and educators with the most modern tools. However, MCB's research training continues to focus on the fundamentals. As O'Neill remarks, in spite of the technological changes it still comes down to C, A, G and T.

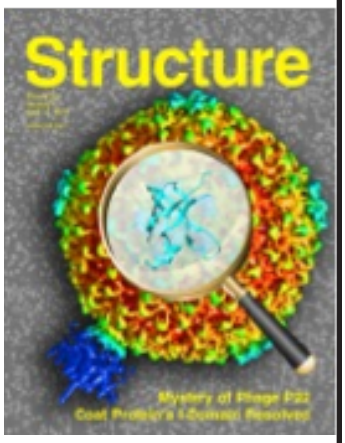
By Kenneth Noll

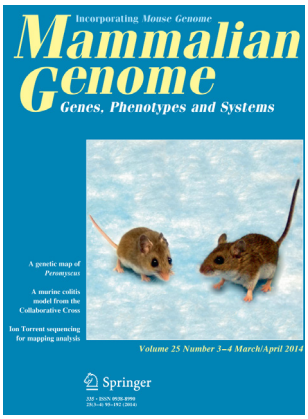
Left: Salp photo courtesy of Larry Madin, WHOI
Other photos by Shail Kabrawala. Center: Prof. Joerg Graf in MARS facilty; Right, Top: Michael Peracchio, PhD student in Genetics and Genomics with the Ion Proton in the CAGT; Center: Austin Ricker, MSA PSM in MARS facility; Bottom: CAGT instruments

On the Cover

Are fluorescence-detected sedimentation velocity data reliable? Lyons, D. F., Lary, J. W., Husain, B., Correia, J. J., and Cole, J. L. (2013) Analytical Biochemistry 437:133–137.

Multiple Functional Roles of the Accessory I-Domain of Bacteriophage P22 Coat Protein Revealed by NMR Structure and CryoEM Modeling. Rizzo AA, Suhanovsky MM, Baker ML, Fraser, L. C., Jones, L. M., Rempel, D. L., Gross, M. L., Chiu, W., Alexandrescu, A. T., and Teschke, C. M. Structure. (2014) 22:830-841.



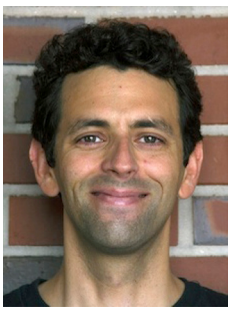


A genetic map of *Peromyscus* with chromosomal assignment of linkage groups (a *Peromyscus* genetic map). Kenney-Hunt J., Lewandowski A., Glenn T.C., Glenn J.L., Tsyusko O.V., O'Neill R.J., Brown J., Ramsdell C.M., Nguyen Q., Phan T., Shorter K.R., Dewey M.J., Szalai G., Vrana P.B., Felder M.R.. Mamm Genome. (2014) 25:160-179.

A Journal of Virology "Spotlight" - An article of "signficant interest" selected by the editors. Highly specific salt bridges govern bacteriophage P22 icosahedral capsid assembly: identification of the site in coat protein responsible for interaction with scaffolding protein. Cortines J. R., Motwani, T., Vyas, A. A., and Teschke, C. M. Journal of Virology (2014) 88:5287-5297.

Faculty News

New Faculty



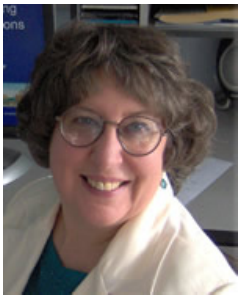
Assistant Professor John Malone

John Malone's laboratory investigates the relationship between gene dosage and phenotype, with a focus on copy number variants, sex chromosomes, and dosage compensation in a developmentally interesting group, frogs, and the important model genetic system of *Drosophila*. The long-term goal of his laboratory is to identify the mechanisms that produce gene dose sensitivity to understand how changes in gene dose impact evolution, behavior and human disease.

Assistant Professor Jonathan Klassen

Jonathan Klassen studies microbial community ecology, especially using the fungus-growing ant symbiosis as a model system to understand how microbial interaction networks evolve across ecological gradients. He is particularly interested in how the differing ecologies and population structures of multiple symbiotic partners affect the stability and function of their overall symbioses. His research couples genomics and chemical biology both to understand the molecular mechanisms underpinning such interactions and to exploit them for drug discovery.

Faculty Retirement



Professsor Linda Strausbaugh

Linda Strausbaugh retired August 1st. She joined the UConn faculty in 1980. She founded the Center for Applied Genetics and Technology and served as its first Director. She structured and spearheaded the formation of the Professional Science Masters programs at UConn. Her research centered on the function and evolution of multigene families; fungal communities in human health and disease; and historical and forensic genetics.

MCB lead the College of Liberal Arts and Sciences in total indirect costs returned to UConn ($4.2 million) and in total expenditures from research grants ($1.3 million) in FY '12/'13.

‘Magnificent Microbes’ Offers Kids a New View of the World

Microbiology PhD student Emma White (right) distributes termites to KASET participants Sai Keerthi Manasanil, who will be entering South Windsor High School in the fall, Nicholas Michel, entering eighth grade in Tolland Middle School, and Hannah Leibowitz, who is also entering South Windsor High School.

Who doesn’t like to look at squiggly things under a microscope?

Combining the efforts of the Department of Molecular and Cell Biology with those of the Connecticut State Museum of Natural History, a Magnificent Microbes course recently offered students a fascinating look at some of the tiny organisms that populate our planet.

Kenneth Noll on the shores of Mirror Lake explaining biological collection techniques to KASET participant Hannah Leibowitz, from South Windsor.

Kenneth Noll, professor of molecular and cell biology, taught the course for the first time in Summer 2014 as part of UConn’s Kids are Scientists & Engineers, Too (KASET) program. He is as enthusiastic about the experience as the students were.

“If we’ve opened their eyes so that they will walk around and see the world in a different and appreciative way, then the course will have been a success,” Noll says.

Among the topics covered in the week-long session were microscopic organisms that keep our food good, and those that make it go bad. Students learned how yeasts make bread and how bacteria make yogurt, as well as finding out how to keep kitchens clean from the microbes that can make people sick.

Nicholas Michel prepares culture plates, using soil he collected on campus, to see the microbes that grow there.

Moving outside, participants hunted for microbes that are found in lawns, ponds and woods. They even got to collect termites so they could discover the microbes that live in the digestive tracts of these insects, enabling them to digest complex sugars found in wood into simpler molecules that they can use for food.

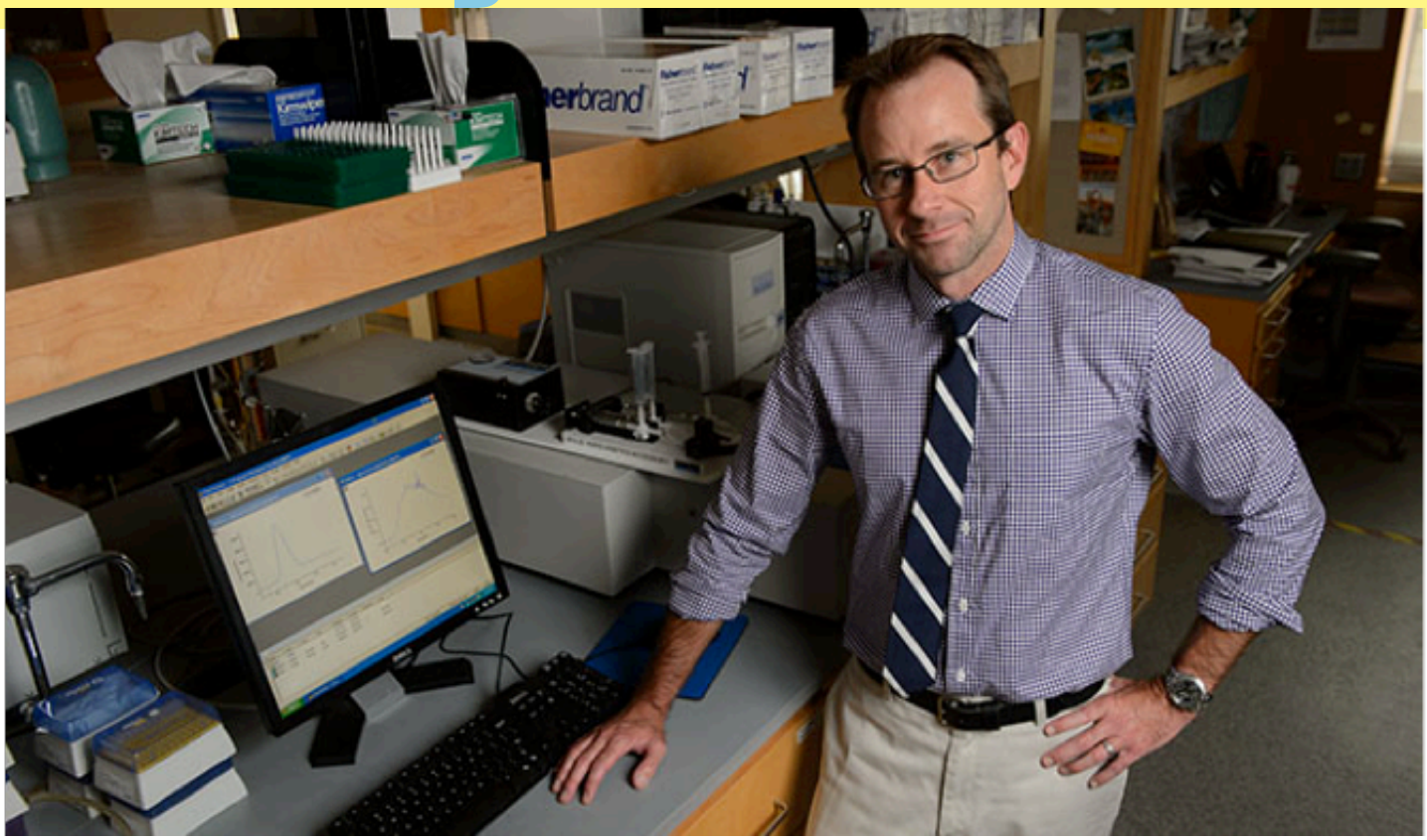
Students variously described the course as being ‘cool’ and ‘fun’ and ‘interesting’ — all indications that they did what Noll had hoped for – looking at the world in different and appreciative ways.

Other courses offered through the 2014 version of this popular summer program include topics as varied as marine exploration, astronomy, biomedical engineering and chemistry, all of which provide students in grades five through 10 with an introduction to the STEM fields.

By Sheila Foran
Photos by David Colberg
Adapted from UConn Today

Fall 2013 posted a record 309 Molecular and Cell Biology undergraduate majors, continuing a multi-year trend.

Peering into the Protein Pathways of a Cell



Nathan Alder, assistant professor of molecular and cell biology, at his lab. (Peter Morenus/UConn Photo)

As a cell's central power plant, the mitochondrion is a busy place.

Specially-coded proteins from the nucleus are constantly being ferried across the mitochondrion's inner membrane, where they help the mighty organelle do its work – producing the cell's high-energy molecules, carrying out signaling duties, and controlling cell growth.

Scientists have known that the central channel through which most of these proteins must pass – a critical gatekeeper known as the translocase of the inner mitochondrial membrane 23 or TIM23 for short – requires an electrical field for its gating function. But they weren't quite sure how the whole process worked.

Until now.

Using highly sensitive fluorescent probes, a team of scientists based at UConn has managed to peer deep into the inner workings of a cell, capturing the never-before-seen structural dynamics of the TIM23 channel complex while it functioned in its natural environment.

In doing so, the team, led by Nathan N. Alder, an assistant professor in the Department of Molecular and Cell Biology in the College of Liberal Arts and Sciences, discovered that the TIM23 complex not only opens and closes in response to fluctuations in the energized state of the mitochondrion's inner membrane, as the scientific community suspected, it also changes its very structure – altering the helical shape of protein segments that line the channel – as the electrical field across the membrane drops.

The research, which appeared in the journal *Nature Structural & Molecular Biology*, explains how the energized state of the membrane drives the structural dynamics of membrane proteins and sheds new light on how cellular transport systems harness energy to perform their work inside the cell. It also shows how fluorescent mapping at the subcellular level may reveal new insights into the underlying causes of neurodegenerative and metabolic disorders associated with mitochondrial function.

Nikolaus Pfanner of the University of Freiburg, Germany, an international leader in the field of cellular protein trafficking, and several members of his research group, called the study "a major step towards a molecular understanding of a voltage-gated protein translocase."

"The molecular nature of voltage sensors in membrane proteins is a central question in biochemical research," Pfanner and his colleagues said. "The study … is not only of fundamental importance for our understanding of mitochondrial biogenesis,

but also opens up new perspectives in the search for voltage-responsive elements in membrane proteins."

Applying a new technique

The fluorescent mapping technique used in the research was a key to the project's success. Alder says he first realized the application's potential when he successfully mapped channel proteins in a functioning mitochondrion in 2008. In the current study, he advanced the process further, using probes to capture the behavior of a particular segment of the TIM23 channel complex as it was impacted by voltage changes in the membrane's electrical field.

"Fluorescent mapping made this possible," says Alder, who, as a post-doctoral student, worked with protein fluorescent labeling pioneer Arthur E. Johnson of Texas A&M's Health Science Center. "It allowed us to peer into the functioning dynamics of a protein import channel complex that is responsible for building up the power plant of the cell … What we found was that these protein-trafficking complexes are certainly not static. This is a very, very dynamic channel."

To monitor the fluorescence probes inside the mitochondria, the research team used advanced spectrofluorimeters equipped with xenon lamps and laser diodes to measure steady-state and time-resolved fluorescence, respectively.

To conduct the study, Alder incorporated cysteine residues modified with a fluorescent probe at specific positions along a transmembrane segment of a TIM23 complex derived from a common species of yeast, *Saccharomyces cerevisiae*. The team then monitored the probes in real time to observe how the channel's voltage-gating and structure responded to induced changes in the inner membrane's electrical field.

"It's an indirect way of looking at the structure of something, but because we are able to look into an actually functioning mitochondrion, it's given us a whole world of new information," says Alder.

"That the magnitude of the voltage gradient across the membrane could play a significant role in defining the structure of these proteins is probably one of the most significant elements of this research," he adds.

A defining moment

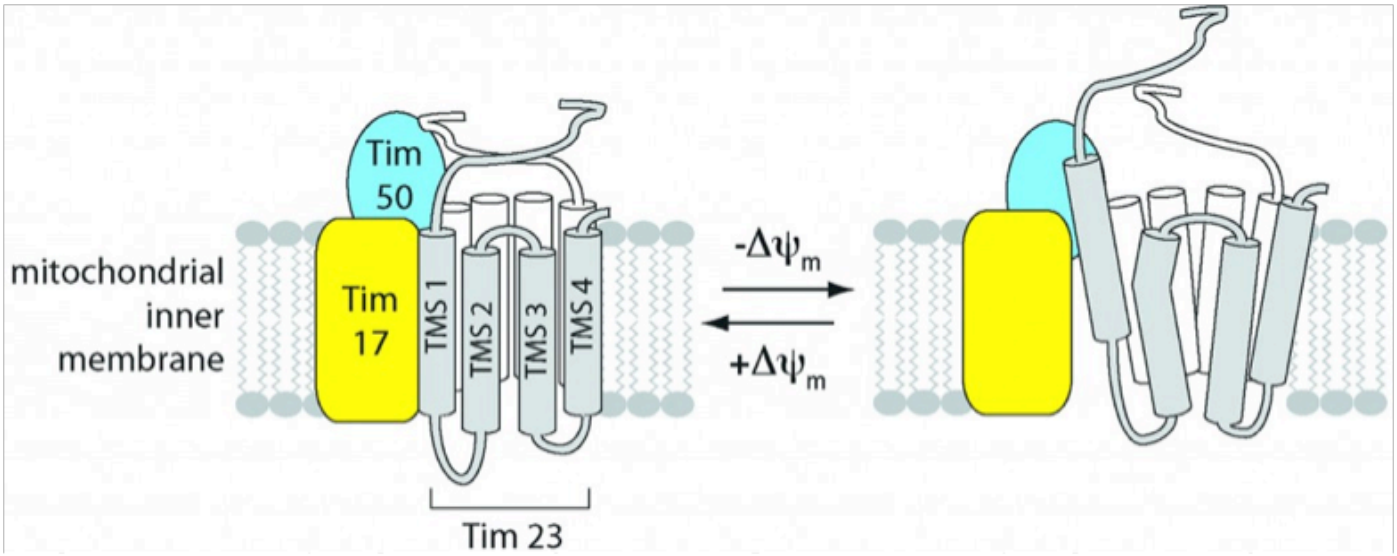
Watching the process was, for Alder, a defining moment in his career.

"When I first saw a certain kind of structure that told me I was in the middle of a channel, that was one of the most exciting times in my professional life," he says. "I knew I was getting insight into a fundamental natural phenomenon, something no one has ever seen before."

When Alder saw the protein-conducting channel bending and collapsing in response to changes in the membrane's voltage levels, he was equally thrilled.

"That was one of those rare technical moments in my professional life that showed we were really getting insight into a fundamental process going on inside a cell," he says. "It's always been known that you need an energized membrane to make these channels work, but no one had a clue why."

Joining Alder on the project were MCB graduate students Ketan Malhotra and Murugappan Sathappa and research associate Judith S. Landin. Johnson, Alder's mentor at Texas A&M, is a co-author. Alder's work was funded by the National Science Foundation; Johnson's work was sponsored by the National Institutes of Health and the Robert A. Welch Foundation.



A representation of structural alterations in the protein-conducting channel of the TIM23 complex that occur in response to changes in the energized state of the mitochondrial inner membrane. (Graphic by N. Alder)

Alder says the next phase of the research will look to isolate the TIM23 protein channel complex in an artificial system to see if it continues to respond to voltage fluctuations outside of its natural habitat. The research team is also hoping to identify the parts of the protein complex that are acting as voltage sensors.

"Once we start to identify exactly what is the voltage sensor, we will have a better understanding of the translocase process, and ultimately we can apply this knowledge to other kinds of protein transporters whose dysfunction has been implicated in the etiology of diseases such as cardiovascular disease and cancer," Alder says. "If their function is tied to the energized state of the membrane, we'll be able to see whether defects in that ability to couple to the membrane might be associated with the pathogenesis of these diseases."

By Colin Poitras
Adapted from UConn Today

Of Special Note

Leadbetter Wins National Research and Mentoring Award

Professor Edward Leadbetter was selected as the winner of the 2014 D.C. White Research and Mentoring Award by the American Society for Microbiology. The Award was announced May 17 at the opening session of the 14th General Meeting of the American Society for Microbiology in Boston.

Leadbetter became a Professor in the Department of Biology at UConn in 1978 and retired from MCB in 2006. He is currently at the Woods Hole Oceanographic Institution, Massachusetts, where he is a guest investigator in the laboratory of Virginia Edgcomb.

The D.C. White Award is presented in honor of D.C. White, who was known for his interdisciplinary scientific approach and being a dedicated and inspiring mentor. Leadbetter's long research and teaching career epitomizes these characteristics.

Leadbetter's former graduate student, Dr. Lisa Gorski, U.S. Department of Agriculture, nominated him for the award. She was assisted by two other former students, Lilliam Casillas-Martínez, Professor of Biology at the University of Puerto Rico-Humacao and Mark Martin, Associate Professor of Biology at the University of Puget Sound.

Gorski says of Leadbetter's mentoring, "All students came to him for advice and his door was always open. He helped countless microbiology students over the years to move on in the field." Casillas says, "Nowadays it is very rare to find advisors that excel as a researcher and a mentor, but many international students found such treasure in Ed at UConn."

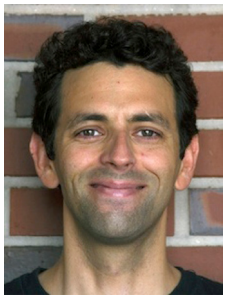
In addition to his teaching duties in MCB, Leadbetter was co-Director of the summer Microbial Diversity course at the Marine Biological Laboratory at Woods Hole, Massachusetts in 1991-95. The course taught graduate students, postdocs, and researchers from many fields about a wide spectrum of microbes emphasizing their importance in the Earth's processes. Leadbetter was a leader in upholding these views in the face of increasingly molecular, specialized science. Martin, a student in the Microbial Diversity course, says, "He spent a good deal of time sharing his perspectives about microbiology, mirroring the great C.B. van Niel's view of perceiving microbial diversity as a vast interrelated network."

Leadbetter graduated from Franklin & Marshall College where he was mentored by long-time ASM member Ralph Slepecky. He received his PhD from the University of Texas, Austin, where he met his wife of 57+ years, Gloria. Leadbetter spent almost 20 years at Amherst College, mentoring dozens of exceptional undergraduates. In 1978, he moved to UConn where he continued to mentor before his retirement.

During his career, Ed enjoyed pursuing novel microbial activities: from hydrocarbon oxidation, to the utilization of novel electron donors by sulfur and non-sulfur phototrophs. He pioneered studies of an unusual form of motility in bacteria called gliding motility. He also spent a year at the National Science Foundation as a program director.

Gorski considers Leadbetter her "scientific father," a feeling shared by many of his students. "Ed Leadbetter is one of a kind, a microbiologist's microbiologist," says Martin. The D.C. White Award recognized his outstanding contribution to his field through the scientific careers he fostered.

By Kenneth Noll with assitance from Lisa Gorski and ASM



Assistant Professor John Malone was invited to participate in the New Horizons in Science symposium held in Mexico City June 21-23. The symposium is conducted by the Royal Society of Canada, The Mexican Academy of Sciences, and the US National Academy of Science. The symposium was created by the partner Academies to stimulate scientific exchange and to focus on the next generation of science leaders. Malone's invitation is a significant honor accorded only to selected North American young investigators. Malone made a presentation in the Biotechnology symposium entitled "Gene dosage and phenotype." His talk presented his research in the UConn Institute for Systems Genomics to understand the mechanisms that allow some gene dose changes to be tolerated while other dose changes are detrimental. Other symposia at the meeting were Astrophysics; Hazards and Disasters; Oceanography and Marine Biology; and Green Chemistry.

Genome Research on Mouth Fungi May Help Predict Infections

Using a novel genome-based approach, researchers in UConn's College of Liberal Arts and Sciences and School of Dental Medicine have identified and described the community of fungi that lives in an average healthy person's mouth.

The findings will eventually help medical professionals better understand, treat, and possibly prevent the oral infections that can occur in many patients whose immune systems are suppressed, like people undergoing therapy for cancer and the elderly.

These infections often make it hard for people to eat, take medications, and even speak, and have the potential to spread to other parts of the body.

"There has been a lot of genome work done on bacteria in the body, but almost none on fungi," says Linda Strausbaugh, professor of molecular and cell biology in CLAS.

Linda Strausbaugh, left, Amanda Dupuy, a PhD student, and Patricia Diaz, assistant clinical professor of periodontology, review research data in a lab at Beach Hall. (Peter Morenus/UConn Photo)

"This is the first study to identify medically-important oral fungi on a large scale," she notes. "Our study is particularly important because we developed methods to assure the identifications we were making from genomic data were indeed correct. Our long-term goal is to help take a personalized approach to medicine."

The findings are based on the idea that these infections are associated with the disruption of people's normally-functioning complement of bacteria and fungi in their mouths.

Like the complement of non-harmful bacteria in the mammalian gut, many species of bacteria and fungi live peacefully in the mouths of humans and other mammals. Characterizations have typically involved laboratory culturing of swabs of people's mouths to identify the fungi.

These studies are limited, says Strausbaugh's graduate student Amanda Dupuy, because they rely on getting fungi to grow in laboratory conditions, which are often unfavorable.

"This genomics approach is so important," says Dupuy, "because it uses DNA to identify the full range of fungi found in the mouth."

Strausbaugh, Dupuy, and their colleagues used a novel approach to "breaking" fungi in the laboratory, using special zirconia beads to crack open fungi collected from people's saliva samples, allowing them to investigate the DNA of a wide range of oral fungi.

"Many of us think of fungi solely as mushrooms," says Strausbaugh. "But most are not mushrooms, and some are encapsulated in hard cellular walls, which need to be broken so we can get at the DNA inside."

This approach allowed the researchers to identify more than 25 groups of fungi that occurred in more than half of their research subjects, and also to identify a species of fungus that was very prominent but never before observed in the mouth. Dupuy says that these top 25 groups are biomedically important because they represent a baseline description of an average person's mouth.

"Each person has a unique complement of mouth fungi," says Strausbaugh. "We know that people are genetically predisposed to things. So, is it possible that we are predisposed to different communities of fungi?

"The interesting thing here is the potential for predictive ability," Strausbaugh adds. "Can we potentially come up with a set of biomarkers that could predict whether a person is at risk for fungal infections?"

The next step in the group's research, says project director Patricia Diaz, professor of dental medicine at the UConn Health Center, is to look at how the oral fungal community changes over time in people undergoing chemotherapy treatments, and track whether changes are related to the development of oral lesions. These results could help scientists and medical professionals better predict patients' risk of oral infection.

"Some of these normally harmless fungi, given the right circumstances, could cause mischief," says Strausbaugh. "There is concern about fungi as emerging human pathogens, especially in immunocompromised people, infants, and older adults."

Dupuy, a fifth-year PhD student, says that the project has given her a perspective on how genomics can interact with people's daily lives.

"I always had a vision of helping people by using genetics," she says. "This project has opened my mind to what genetics and genomics can really do."

This research appears in the March 10 issue of *PLoS One*. The project is supported by a four-year, $3 million NIH grant.

By Christine Buckley, CLAS
Adapted from UConn Today

ASM Selects UConn as a Milestone in the History of Microbiology Research

Professor Herbert W. Conn

On Saturday, October 26, 2013 the American Society for Microbiology (ASM) honored the achievements of Herbert W. Conn, one of its cofounders, with the designation of the University of Connecticut as its 8th Milestones in Microbiology site. The event was celebrated by a symposium and a dedication ceremony attended by prominent scientists, dignitaries from UConn and Wesleyan University, ASM officials, invited guests, members of the community, and members of Dr. Conn's family.

In commemoration of the Milestones designation, the Honorable Dannel P. Malloy, Governor of Connecticut, provided an Official Statement to honor and recognize Professor Conn and the ASM Milestones in Microbiology site at the University of Connecticut. The Statement was read at the Milestones dedication ceremony and copies of the Statement provided by the Office of the Governor were presented to Conn's family. Stanley Maloy, Past President of ASM, presented the commemorative Milestones plaque to University Provost Dean Mun Choi, who expressed appreciation for the honor on behalf of the entire UConn community. The plaque is prominently displayed at the UConn Dairy Bar, an area with high visitor impact near where Conn once worked.

Ceremony speeches featured an overview of Conn's life and works, which were expanded upon in exhibits at the ceremony venue in the lobby of the Biology/Physics Building. Posters, collections of Conn books, and a display about Mark Twain's story, "3,000 Years Among the Microbes," which mentioned Herbert W. Conn. Sister Noella Marcellino, a 2003 PhD graduate of the UConn Microbiology program, provided a well-received poster presentation about her artisanal cheese production at the Abbey of Regina Laudis, Bethlehem, CT along with samples of her Bethlehem cheese (a St. Nectaire-type cheese) that she made and offered to the guests.

Among the event attendees were descendants of Herbert Conn – Dr. Bruce Cochrane and Mrs. Berta Jo Bolick. Cochrane, Herbert Conn's great-grandson and professor in the Department of Biology at Miami University (Ohio), presented reflections on

Reading the Official Statement from the Governor of Connecticut, the Honorable Dannel P. Malloy, honoring and recognizing Professor William H. Conn and the ASM Milestones in Microbiology designation for the University of Connecticut at the Milestones dedication ceremony. Left to right: front, Dr. Bruce Cochrane, Dr. Kenneth Noll, Mrs. Berta Jo Bolick, Mr. Allen Bolick; rear, Dr. James A. Poupard, Chair, Center for the History of Microbiology/ASM Archives, Dr. Mun Choi, Provost & Executive Vice President for Academic Affairs, University of Connecticut, and Dr. Stanley Maloy, Dean, College of Sciences, San Diego State University, former ASM President.

Herbert Conn and his son, Harold J. Conn, gathered from a largely unpublished biography of Herbert that Harold wrote. A copy of this biography is held at the Dodd Center Archives and Special Collections of the Thomas J. Dodd Research Center at UConn. Harold J. Conn was president of the Society of American Bacteriologists (the forerunner of ASM) in 1948 as was his father, Herbert W. Conn in 1902.

Bolick is a great-granddaughter of Herbert Conn through his daughter, Bertha. Bertha's daughters Bettina Greaves, Phyllida Walker, and Julia Conn (named after her grandmother, H. W. Conn's wife) recently generously donated Herbert Conn's Seibert compound microscope to UConn. The microscope was displayed at the Milestones ceremony, and has now on permanent display in MCB, home of the Microbiology program founded by Herbert Conn. On the day of the Milestones event, the Bolicks also showed a family scrapbook containing the correspondence of Herbert and Julia Conn written while he was on sabbatical in Europe in 1897-8. It included letters that described his visits to laboratories of European scientists and several sketches drawn by Herbert of the people and places they visited during their travels.

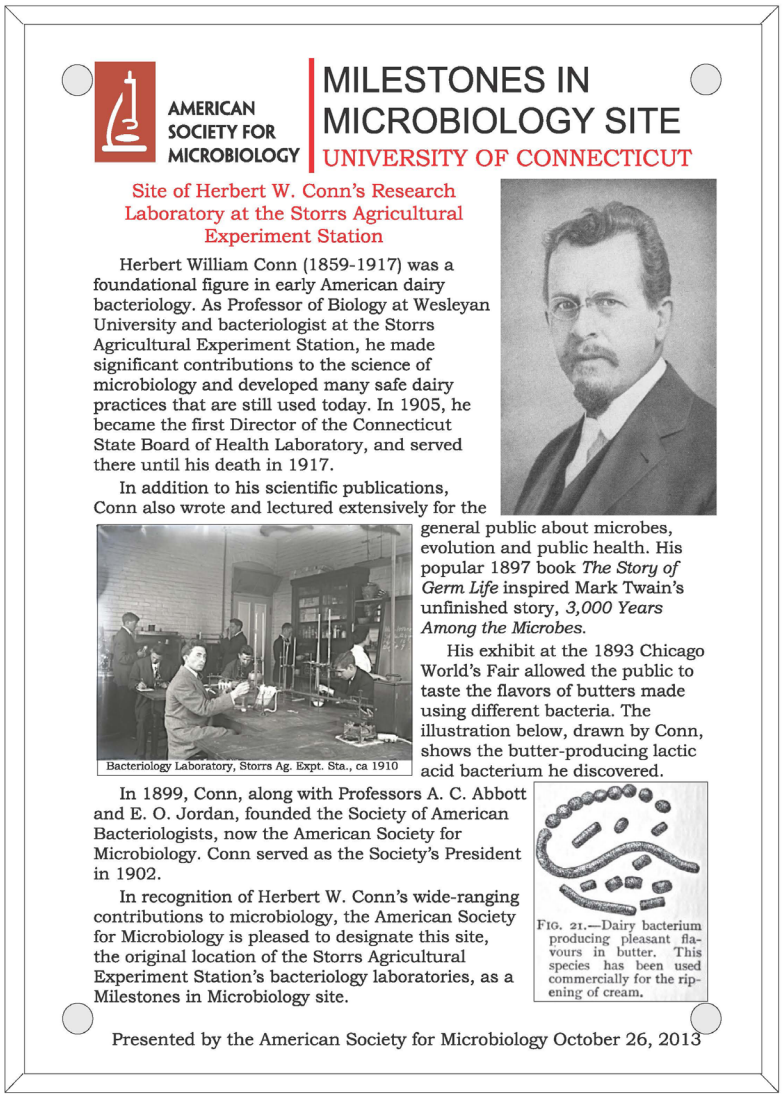
Conn's Seibert microscope, generously donated to MCB by his family, on display at the Milestones Ceremony. It is on permanent display in the Department.

Prior to the presentation of the Milestones plaque, a symposium, "H. W. Conn's Golden Age of Bacteriology becomes The New Golden Age of Microbial Biology," was convened. The symposium, featuring presentations by Dr. Maria Marco, Food Science and Technology Department, University of California, Davis; Dr. Frederick Cohan, Biology Department, Wesleyan University; Dr. Joseph Petrosino, Department of Molecular Virology & Microbiology, Baylor College of Medicine; and Dr. Kenneth Noll, MCB. Marco's presentation focused on modern advances in dairy bacteriology, the major topic of Conn's research, in regard to probiotics and the health of the human gut. Cohan spoke about topics in modern microbial evolution research. Although Conn wrote extensively about evolutionary theory of his day, microbial evolution had not yet been conceived since so little was known about microbes. Petrosino described his work at the Baylor College of Medicine as part of the NIH Human Microbiome Project. Although Conn could not have conceived of the use of modern omics technologies, he clearly saw the need to investigate microbial activities in the human body using the best tools of the day.

In the final symposium presentation, Noll focused on Conn's role as an educator, a role that Conn was especially proud of, by discussing his activities as a professor at Wesleyan University and the Connecticut Agricultural College (now UConn), an educator of the general public, an organizer of two World's Fair exhibits, a promoter of public health reforms, and author of many science textbooks and books for the public. In addition to taking special interest in educating dairymen about hygiene on the farm, Conn made many efforts to educate women, particularly housewives and nurses, about domestic hygiene and the roles of microbes in their respective activities.

The emerging field of dairy probiotics and the public's growing awareness of the importance of microbes to human and environmental health are true milestone developments. Herbert Conn's accomplishments provided a foundation for these developments and those are his large and lasting contribution to human welfare.

By Kenneth Noll



AMERICAN SOCIETY FOR MICROBIOLOGY

MILESTONES IN MICROBIOLOGY SITE

UNIVERSITY OF CONNECTICUT

Site of Herbert W. Conn's Research Laboratory at the Storrs Agricultural Experiment Station

Herbert William Conn (1859-1917) was a foundational figure in early American dairy bacteriology. As Professor of Biology at Wesleyan University and bacteriologist at the Storrs Agricultural Experiment Station, he made significant contributions to the science of microbiology and developed many safe dairy practices that are still used today. In 1905, he became the first Director of the Connecticut State Board of Health Laboratory, and served there until his death in 1917.

In addition to his scientific publications, Conn also wrote and lectured extensively for the general public about microbes, evolution and public health. His popular 1897 book *The Story of Germ Life* inspired Mark Twain's unfinished story, *3,000 Years Among the Microbes*.

Bacteriology Laboratory, Storrs Ag. Expt. Sta., ca 1910

His exhibit at the 1893 Chicago World's Fair allowed the public to taste the flavors of butters made using different bacteria. The illustration below, drawn by Conn, shows the butter-producing lactic acid bacterium he discovered.

In 1899, Conn, along with Professors A. C. Abbott and E. O. Jordan, founded the Society of American Bacteriologists, now the American Society for Microbiology. Conn served as the Society's President in 1902.

In recognition of Herbert W. Conn's wide-ranging contributions to microbiology, the American Society for Microbiology is pleased to designate this site, the original location of the Storrs Agricultural Experiment Station's bacteriology laboratories, as a Milestones in Microbiology site.

FIG. 21.—Dairy bacterium producing pleasant flavours in butter. This species has been used commercially for the ripening of cream.

Presented by the American Society for Microbiology October 26, 2013

The ASM Milestones in Microbiology plaque now hanging in the UConn Dairy Bar located near to where Conn worked.

In Memoriam

Philip Marcus: A Lifetime of Achievements in Cell Biology and Interferon Research

Philip Irving Marcus, Board of Trustees Distinguished Professor of Molecular and Cell Biology and renowned virus and interferon researcher, died on Sept. 1, at the age of 86.

He made many seminal discoveries in the field of viral infections and the role of interferon in those infections.

Marcus spent the past 44 years on the faculty at UConn, and was known to many as a compassionate professor who donated his time unselfishly to colleagues and students through his research, teaching, and service.

He was born June 3, 1927 in Springfield, Mass., the son of Julius and Marley Marcus and was the brother of Maxine Altshuler and Emil Marcus, all of whom predeceased him.

In 1945, he graduated Springfield Technical High School, the STEM system of its time. During World War II, while in high school, he worked at the great forges in the Springfield Armory. He enlisted in the Army Specialized Training Reserve Program, and was assigned in 1945 to attend UConn in Storrs, Conn. After six months each at UConn and the University of Maine-Orono, he had earned two years of college credit.

Assigned to active duty in the US Air Force and stationed in Istres, France, he rose to the level of staff sergeant within a year. The GI Bill enabled him to attend college, the first in his family to do so. He received degrees from the University of Southern California (B.S. in Bacteriology, 1950); University of Chicago (M.S. in Microbiology, 1953); and University of Colorado Medical Center (PhD in Microbiology/Biophysics, 1957).

While at the University of Chicago, he worked with Aaron Novick and nuclear physicist Leo Szilard, and later with Paul Talalay. In Colorado, he became codiscoverer of the clonogenic assay and the feeder cell system, making it possible to grow clones from single mammalian cells as in stem cells. He was the first to clone the immortalized HeLa cells. That procedure led to the first determination of human cell sensitivity to X-rays. Over 50 years later, he documented a luncheon conversation with Szilard that led to the concept and physical setup for the first clonogenic assay.

Marcus then spent nine years on the faculty of the Albert Einstein College of Medicine in New York, supported by a 10-year U.S. Public Health Service Research Career Development Award. While there, he showed the dynamic movement of virus molecules on the surface of infected cells, and with a pediatrician colleague, Dr. David Carver, developed a new test to detect rubella virus. During this time in New York, he was director for nine years of the post-doctoral Course on Quantitative Animal Virology and Cell Culture that was taught in the summer at Cold Spring Harbor Laboratory, N.Y.

In 1969, Marcus returned to UConn, where he was appointed head of the then Microbiology Section. He spent the remainder of his career at UConn, where he administered the first Program Project on campus supported by the National Institute of Health, chaired the first Biosafety Committee, created a Virus and Interferon Research Laboratory that was recognized internationally for its innovative studies, published more than 130 scientific papers, and was awarded five U.S. patents.

As an early director of the Biotechnology Center, he helped attract companies with a focus on biotechnology to Connecticut. Then, for 12 years as director of the Biotechnology/ Services Center, he expanded the acquisition of state-of-the-art instruments that drew scientists to the facility. He continued to advance biotechnology in Connecticut as a charter member of the Connecticut Academy of Science and Engineering, and was pleased to know that the Research Park (Tech Park) planned for Storrs will be realized. In 1987, he received the UConn Alumni Association Award for Excellence in Research, and in 2003, was recognized as a Board of Trustees Distinguished Professor.

His annual course in virology, taught for 36 years, was sought after by students looking to be challenged. These students were a source of great pride.

Marcus was a member and active participant in a number of professional scientific societies, including the American Society for Virology and the International Society for Interferon and Cytokine Research, which in 2005 named him an Honorary Member. Serving 18 years as editor-in-chief of the *Journal of*

Interferon Research (later renamed the *Journal of Interferon and Cytokine Research*, JICR), he went on to serve as senior consulting editor of the JICR for 10 years until the present day. For 25 years, he was also an editor for the *Journal of Cellular Physiology.*

He typically mentored two PhD candidates and two undergraduate honors students doing research in the lab. The bulk of his research at UConn was in collaboration with long-time associate and faculty member Margaret J. Sekellick. Three highlights included: the discovery of the world's most efficient

Marcus with HeLa cell slides from the early 1950s.

inducer of interferon – a single molecule of double-stranded RNA; the molecular cloning of the first non-human (avian) interferon; and the discovery that influenza virus populations contained previously unknown large subpopulations of noninfectious viruses that were nonetheless biologically active.

He was an avid reader who, while developing ways to win the war between viruses and cells, imagined how humankind could lose if we destroyed ourselves first. He showed palpable disdain for politicians who did not appreciate the role of basic science in understanding and caring for the world and its many inhabitants.

He is survived by Angela, his wife of 60 years; his son Craig F. Marcus (Coventry, Conn.); daughter Wendy Marcus Gogel and her husband Gary Gogel (Brighton, Mass.); daughter Valerie Marcus Nassiff and her daughters Madison and Sydney (Bolton, Conn.); cousin Bernard A. Marcus and family (Webster, N.Y.); niece Bari Edlin and family (Sherman Oaks, Calif.); niece Susan Avisar and her husband Eytan and family (Sherman Oaks, Calif.); and niece Jacqueline Marcus (Los Osos, Calif.).

Donations in memory of Philip Marcus may be made to The Philip I. Marcus Graduate Student Virology Support Fund. Please make checks payable to The UConn Foundation Inc., and send to: 2390 Alumni Drive, Unit 3206, Storrs, Connecticut 06269.

By Combined Reports
Adapted from UConn Today

In 2013-14, MCB taught 69 courses that were taken by 5734 students from programs across every college and school at UConn.

MCB in the private sector

Prof. Hans Laufer is a partner and a member of the Management Team of a new startup company "Lobstagen LLC," a UConn Technology Incubation Program (TIP) company at Avery Point. Laufer's company has the objective of initiating lobster aquaculture to replenish lobsters in the Long Island Sound that are both temperature and disease resistant. Laufer has recently been awarded the "Certificate of Excellence in Lobster Research" by the United States Congress and was also elected an Honorary Life Member of the International Society of Invertebrate Reproduction and Development.

For the past 5 years, **Profs. Lawrence Hightower and Charles Giardina** have been doing contract research and consulting with OxyHeal Health Group located in San Diego, CA. The company's CEO, W. Ted Gurnee, is their collaborator on these studies of the molecular and cellular basis of hyperbaric oxygen therapy (HBOT). This therapy is used to treat chronic non-healing wounds, diabetic ulcers and carbon monoxide poisoning, among many other Food and Drug Administration-approved applications. The collaborators have recently published several pioneering papers about HBOT in the international journal *Cell Stress & Chaperones*.

MCB Graduate Summer Fellowship Awards

Brianna Flynn (Rachel O'Neill laboratory)
Claire M. Berg Graduate Fellowship in Genetics

Kyung-Min Chung (Nelson laboratory)
Arthur M. Chovnick Graduate Fellowship in Genetics

Christopher Mayo (Cole laboratory)
Richard C. Crain, Jr. Memorial Fellowship

Gaurav Joshi (Knecht laboratory)
Cross-Disciplinary Fellowship in MCB and Pharmaceutical Sciences

Randal Kudra (Malone laboratory) and **Ketan Malhotra** (Alder laboratory)
Jean Lucas-Lenard Special Summer Fellowship in Biochemistry

Arpita Biswas (Goldhamer laboratory) and **Asav Dharia** (Nelson laboratory)
Pfizer Summer Fellowship in Molecular and Cell Biology

Scott Chimileski (Papke laboratory)
Antonio H. & Marjorie J. Romano Graduate Education Fund

Alumni News

Lisa Gorski, PhD Microbiology ’93 works for the Agricultural Research Service, the research arm of the U.S. Dept. of Agriculture, researching foodborne pathogens like *Salmonella* and *Listeria* analyzing their ecology and interactions with produce.

Madan Katragadda, PhD Biochemistry ’03 is a Senior Principal scientist at Pfizer.

Olga Zhaxybayeva, PhD Genetics ’04 is now an Assistant Professor in the Department of Biological Sciences at Dartmouth College and was selected a 2014 Simons Investigator.

Michael Bennett, PhD Biochemistry ’05 is working as a Medical Writer at UBC Envision Group in the Greater New York City Area.

Adam Silver, PhD Genetics and Genomics ’08 was the first author on a publication in the presitgeous journal *Proceedings of the National Academy of Sciences* reporting that bacteria use similar mechanisms to colonize animals in both a beneficial and pathogenic manner. Silver did a postdoctoral fellow at Yale University and is now an Assistant Professor at the University of Hartford.

Gregory Fournier, PhD Genetics and Genomics ‘09 accepted a tenure track position as Assistant Professor at MIT’s Department of Earth, Atmospheric and Planetary Sciences (EAPS).

Scott Corley, PhD Biochemistry ’10 is currently working as a postdoc at Boehringer Ingelheim in Oakland, California.

Emily Noonan Place, PhD Cell Biology ’10 completed a postdoc at the Center for Molecular Biology in Medicine at the Stanford University School of Medicine where she was accepted into an elite fellowship training program at the National Cancer Institute during which NCI paid for her to obtain an MPH degree at Berkeley. Noonan Place has recently accepted a position at the Food and Drug Aministration in Washington, D.C..

Eleanor Cowley, MS Applied Genomics ‘13, is currently employed by Perkin Elmer as an Applications Specialist, Life Sciences & Technology.

Courtney Kimble-Badgett, MS Microbial Systems Analysis ’14 is currently employed as a Research Associate 1 by AxioMx.

Katherine Launer Felty, PhD Structural Biology, Biochemistry and Biophysics ’14 is a postdoc at Yale University working in the laboratory of Dr. Scott Strobel.

Sarah Sheftic, PhD ‘14 has just started a postdoc in the laboratory of Dr. Wolfgang Peti at Brown University.

Where are They Now?

Preston Garcia, Microbiology PhD ‘08, is currently an Assistant Professor of Biology in the Natural Sciences Department at Castleton State College in Castleton, VT. He started there in 2010 after conducting postdoctoral research at the University of Virgina School of Medicine in the laboratory of Prof. Joanna Goldberg. Garcia did his PhD research with Prof. Daniel Gage in MCB and was a student in the US Department of Education-funded GAANN Microbiology/Environmental Engineering PhD training grant program.

In a recent interview Garcia reflected on his experiences in MCB that prepared him for his current position. While in the Microbiology program, Garcia says, “I felt that I was extremely well trained.” He says his research experience was especially important. “There was not a skill that I had not learned that I did not just pick up and start using at Virginia,” he says. An equally important aspect of his graduate experience involved opportunities to teach and supervise undergraduates. Those experiences proved essential for his work at a small liberal arts college. “Having that experience was invaluable,” he says. “The experience of teaching students and working with [MCB faculty] one-on-one when we were teaching” was especially important.

Garcia offers advice for current graduate students who envision an academic position at a small college. “Get as much classroom teaching experience as you can,” he says. Preparing a lecture and mentoring an undergraduate are also valuable experiences he notes. One must also supervise a research program at schools like Castleton and the choice of research projects requires careful consideration. A research program must be “something that is easily doable, that is relatively cheap and that can be paused,” Garcia says. It is best to create a program involving a collaborator at a more research-oriented institution. “Collaboration is key,” he says.

Garcia is very satisfied with his current position and attributes his success to his time in MCB. He remarks, “I would not be here and have the skill set I have if it did not come from MCB.”

PSM News

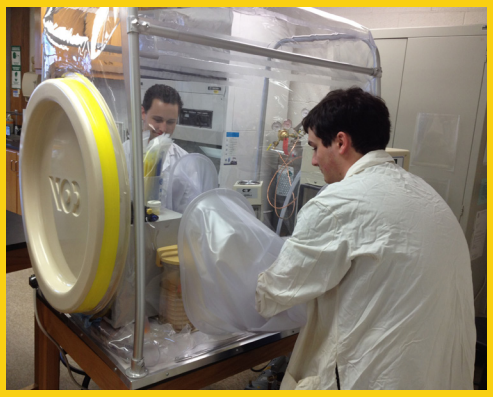
MCB faculty provide two Professional Science Masters (PSM) degree programs, one in Microbial Systems Analysis (MSA) and the other in Applied Genomics (AG). The PSM programs train graduate students for careers outside of academia. Each program offers cross-training for business, governmental or corporate environments. The PSM in Applied Genomics trains scientists with interdisciplinary competency in genetics, molecular biology, and computational analysis. The PSM in Microbial Systems Analysis gives advanced training in the complex interactions among microorganisms in the environment and engineered systems for careers in industry and government. As part of their training in each program, students participate in internships, typically with partnering companies.

Recent internships and employment at AxioMx, Branford CT

Courtney Kimble-Badgett, M.S. Microbial Systems Analysis
Felicity Acca, M.S. Applied Genomics.
Kristina Belanger, M.S. Applied Genomics
Valerie Charbonneau, M.S. Applied Genomics

Recent internships and employment at Boehringer-Ingelheim, Ridgefield, CT

Devan Allard, M.S. Applied Genomics
Elizabeth Greene, M.S. Applied Genomics
Melissa Harris, M.S. Applied Genomics
Jonathan Hill, M.S. Applied Genomics
Oscar Low, M.S. Applied Genomics
Maria Bonatsakis Myzithras, M.S. Applied Genomics
Erica Waltz, M.S. Applied Genomics
Lonni Schulz, M.S. Applied Genomics



Top, right: Front right, Maitreyee Jain (MS MSA `13), third from left, Jason Peterson (MS AG `13) in the AG PSM course “Amplicon Sequencing.”
Middle, left: Left, instructor Craig Obergfell and, left, Leah Newman (MS AG `13) using a bead counter.
Bottom, right: Left, Matthew Capozziello (MS AG `13), right, Andrew Hirsbrunner (MS MSA `14) using an anaerobic chamber in the MSA PSM course “Operations of a Microbiology Laboratory.”

Current employment of pictured PSM students:
Maitreyee Jain, Research Associate at Sanofi Pasteur, Chicago
Jason Peterson, UMass/Dartmouth Hitchcock Hospital in translational clinical genetics
Leah Newman, Associate Researcher at the Genetics Department of the Mount Sinai Medical School, NYC
Matthew Capozziello, Biotechnology Associate I at Yale School of Medicine
Andrew Hirsbrunner, at the laboratory of Prof. Brian Aneskievich, UConn School of Pharmacy

Undergraduate Awards

University Scholars

The following MCB majors were named 2014 University Scholars (of 22 total Scholars). University Scholars is a prestigious undergraduate program at UConn in which students design and pursue an in-depth research project and craft individualized plans of study that support their intellectual interests during their final three semesters.

Andrea DiVenere, MCB and Chemical Engineering
Project Title: Rational Antisense Design
Committee: Ranjan Srivastava, Chemical & Biomolecular (chair), Kenneth Noll, MCB and Joerg Graf, MCB

Matthew Greenwood, MCB and PNB
Project Title: Investigation of the Lipid Dependence of Respiratory Complex IV Activation using Nanoscale Bilayers
Committee: Nathan Alder, MCB (chair), Anastasios Tzingounis, PNB and Victoria Robinson, MCB

Alexander Lawton, MCB and Spanish
Project Title: Analysis of Muscle Stem Cell Programming
Committee: David Goldhamer, MCB (chair), Mary Bruno, MCB and Masakazu Yamamoto, MCB

Patrick Lenehan, MCB
Project Title: The Role of RNA Transcripts in the Formation of Centromere Complexes in *Drosophila*
Committee: Barbara Mellone, MCB (chair), Charles Giardina, MCB and Rajeswari Kasi, Chemistry

Biology Undergraduate Research Colloquium Awards

The following awards were presented based on talks given during the 32nd Annual Biology Undergraduate Research Colloquium held May 2, 2014.

Sarah Banker, MCB
Connecticut Museum of Natural History Award
Title: Gene Trees and Species Trees: Piecing Together the Evolutionary History of the New Zealand Cicada Genus *Kikihia*
Research Advisor: Chris Simon EEB

Nandan Pandit, MCB
Honors Award in Life Sciences
Title: Quantifying the pH Gradient Produced by a Bacteriorhodopsin Based Retinal Implant
Research Advisor: Robert Birge, MCB and Chemistry

Savas Tsikis, MCB
Outstanding Senior in MCB Award
Title: Mutagenesis of 8-Oxoguanine Adjacent to an Abasic Site in Escherichia coli Cells Proficient or Deficient in DNA Polymerase IV
Research Advisor: Ashis Basu, Chemistry

Ragini Phansalkar, Biological Sciences
Excellence in Applied Genetics and Technology Award
Title: Exploring Applications of Motif Prediction in Viral Post-Translational Modification and Centromere Formation
Research Advisors: Barbara Mellone, MCB and Daniel Schwartz, PNB

Lt. Paul Drotch Scholarships

MCB majors **Henry Carnes**, **Nandan Pandit** and **Patrick Lenehan** were awarded 2014 Lt. Paul Drotch Memorial Scholarships.

Barry Goldwater Scholar

MCB Honors student **Patrick Lenehan** was named a Barry Goldwater scholar by the Barry Goldwater Scholarship and Excellence in Education Program. Lenehan was one of 288 Scholars chosen from a national pool of nominees from STEM fields. Lenehan is conducting research in the laboratory of Prof. Barbara Mellone in MCB.

Todd M. Schuster Award

MCB major **Oghenefejiro Okifo** was awarded the Todd M. Schuster Award in Molecular and Cell Biology. Okifo works in the laboratory of Prof. Carolyn Teschke on a project project to understand the effects of several amino acid substitutions in a domain of bacteriophage P22's coat protein that is important for the folding of the protein and stability of the assembled procapsid.

Graduate Student News

Leah Rosin, a Genetics and Genomics PhD student in Prof. Mellone's laboratory, was selected to participate in a 4-week visiting scientist program offered by the Center for Cell Circuits Visiting Scientist program at the Broad Institute of MIT, Harvard and other Boston area research insttutions and hospitals.

Scott Chimileski, a Genetics and Genomics PhD student in Prof. Papke's laboratory, won an international Nature writing competition. In addition to some small prizes, Chimileski will publish several articles on the Naturejobs blog. Chimileski served as a Nature "Journalist for the day" at the inaugural Naturejobs Career Expo in Boston in May and wrote an article on the Naturejobs site based on his winning entry about an imaginary product called "Six-Billion Gum," that would enlist helpful microbes to keep your mouth healthy.

Ala Shaqra has been named the 2013-2014 Outstanding MCB TA in recognition of his outstanding contributions, professional dedication to inspiring student learning and commitment to education. Shaqra is a Structural Biology, Biochemistry and Biophysics PhD student in Prof. Robinson's laboratory.

Louis DeFalco Jr., a Structural Biology, Biochemistry and Biophysics PhD student in Prof. Robinson's lab, was awarded an NSF East Asia and Pacific Summer Institute (EAPSI) Fellowship. He went to the National University of Singapore to work with Dr. Ganesh Anand and to study how the solution behavior of BipA is altered in response to guanine nucleotide binding using hydrogen/deuterium exchange experiments with mass spectrometry detection (HDXMS).

Graduate Degrees Conferred

August 2013
Aristarhova, Zanna, MS Applied Genomics
Brooks, James Matthew, PhD Microbiology
Bunce, Corey Michael, MS Cell Biology
Cabral, Bernard Joseph, MS Applied Genomics
Cao, Li, PhD Biochemistry
Dionne, Gilman, MS Biophysics
Goetjen, Alexandra Marie, MS Molecular and Cell Biology
Jain, Maitreyee, MS Microbial Systems Analysis
Jakuba, Caroline Maria, PhD Genetics and Genomics
Jeyapaul, Elakkiah, MS Genetics and Genomics
LaBreck, Christopher James, MS Molecular and Cell Biol.
Muthersbaugh, Nicole Kristen, MS Cell Biology
Paolini, Jennifer M., MS Biochemistry
Sharmin, Effat, MS Genetics and Genomics
Wang, Ling, MS Genetics and Genomics
Wienhold, Mark David, MS Molecular and Cell Biology

December 2013
Capozziello, Matthew T., MS Applied Genomics
Charbonneau, Valerie, MS Applied Genomics
Cowley, Eleanor Josephine, MS Applied Genomics
Hall, Laura Elizabeth, PhD Genetics and Genomics
Kolayarattil, Meera Bhanu, PhD Biochemistry
Low, Oscar Anthony, MS Applied Genomics
Malinoski, Christopher Peter, PhD Cell Biology
Montano, Elizabeth Anne, MS Applied Genomics
Ninteau, Nicole Rebecca, MS Applied Genomics

May 2014
Camp, James R., PhD Genetics and Genomics
Campbell, Stacha Simone, MS Microbial Systems Analysis
D'Lima, Nadia Giselle, PHD Biochemistry
Gradie, Paul E., MS Genetics and Genomics
Homer-Bouthiette, Collin, MS Cell Biology
Kimble-Badgett, Courtney, MS Microbial Systems Analysis
LaBelle, Lisa Marie, MS Applied Genomics
Lepensky, Christopher Kyle, MS Molecular and Cell Biology
Li, Yangzhou, MS Cell Biology
Rafatpanah, Michael, MS Genetics and Genomics
Schappert, Mary K, MS Molecular and Cell Biology
Sridhar, Raghavendra Rao, MS Cell Biology
Vazalwar, Ketki Shubhang, MS Genetics and Genomics
Wongchai, Yannawan, MS Cell Biology

In 2013-14, MCB faculty chaired 6 of the 22 University Scholar Committees, and served on 7 other University Scholar Committees.

Your contributions to MCB are appreciated.
Visit www.mcb.uconn.edu/giving-2/

Contact us at

Department of Moleclar and Cell Biology
University of Connecticut
91 North Eagleville Road, Unit 3125
Storrs, CT 06269-3125

Visit us at

www.mcb.uconn.edu

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MOLECULAR AND CELL BIOLOGY

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