
What's your spark?

The power of possibility – it's what inspires faculty and graduate students at the University of Connecticut to tackle complex problems, often by forging new connections across different disciplines. These scientists, scholars, and artists bring a genuine passion to their work as they generate pioneering solutions to the problems that plague the human condition and knowledge that enriches people's lives.

My 2010 President's Report poses a pivotal question: *What's your spark?* Addressing this question reveals the instinctive curiosity that motivates the work of our faculty and graduate students and how they pursue their scientific, scholarly, and artistic endeavors. The pages that follow tell the story behind their work – what drives them to explore, how their mentors and colleagues offer guidance, and where their efforts are ultimately taking them.

In this report, you'll find inspired examples of interdisciplinary research and collaboration across a wide range of fields – from engineering and biomedical science, to agriculture and law, to history and art. Evident throughout is an enthusiasm for discovery, which I believe exemplifies the University's dedication to generating new knowledge. It's a passion I personally share as a faculty member, author, and scholar of history.

As UConn's community of faculty and graduate students continues to push innovative ideas in promising new directions, I encourage you to look forward with me to a future rich with the possibilities of collaboration and innovation, all of which start with a spark.

Michael J. Hogan
President, University of Connecticut

Questions with global impact

Adam Wilson has long possessed a curiosity about "how the world works." Having spent a great deal of time outdoors as a child, Wilson recalls his family making maple syrup and keeping a garden. His interest in the natural world led him to obtain degrees in biology and earth science, and then to travel for a two-year Peace Corps assignment to Morocco, where he educated local villagers about environmental resources, helped build an educational center for young women, and offered support for a local cooperative.

His time in Morocco, Wilson says, ultimately solidified his notion of pursuing a doctoral degree. "It made me realize how much going back for a Ph.D. would allow me to build my skills and be more effective," says Wilson, now a fourth-year doctoral candidate in UConn's ecology and evolutionary biology (EEB) program, part of the University's College of Liberal Arts and Sciences.

Trekking an hour and a half to the nearest Moroccan Internet café to explore different doctoral programs online, Wilson was drawn to the prestigious, interdisciplinary work of John Silander, a renowned UConn professor whose research includes an ongoing project based in South Africa that relates to biodiversity and climate. Wilson was equally impressed with the research-oriented nature of UConn's EEB department and eventually accepted an invitation to study at UConn, with Silander as his mentor – without having met Silander in person or ever setting foot in Storrs. "I wouldn't recommend it," Wilson laughs, "but it's worked out for me."

South Africa is now at the center of Wilson's own research, which focuses on understanding and explaining patterns of wildfire in an ecologically diverse corner of South Africa called the Cape Floristic Region.

Rather than seeking ways to prevent wildfire – a natural phenomenon that many ecosystems are adapted to, or even require in order to thrive – Wilson is pursuing his graduate research to strive "to understand what controls wildfire, what drives it, and then frame those questions in a larger context of climate change [and] try to understand how temperature, precipitation, and humidity influence the probability of fire."

Recent research, Wilson says, suggests that the increasing frequency of wildfires over recent decades in certain areas of the world may be explained, at least in part, by a longer fire season. That is, longer, warmer, and drier summers may present greater opportunity for wildfires to occur. Whether longer fire seasons are a result of climate change and whether that in turn contributes to more frequent fires remain among the complex questions Wilson is attempting to answer.

Professor John Silander, above left, advises doctoral student Adam Wilson, whose wildfire research in ecology and evolutionary biology centers on South Africa, pictured at left, as photographed by Wilson.

Ph.D. candidate Adam Wilson, pictured at right and on opposite page, conducts fieldwork focused on climate change and wildfire in South Africa.

"I'm interested in applied science – what does it mean to be human, and how do we get along in the world? A lot of those kinds of questions fundamentally involve biology."

Adam Wilson, fourth-year doctoral candidate in ecology and evolutionary biology

Wilson's work, though centered in the realm of ecology and evolutionary biology, reaches across numerous disciplines, involving statistics, climatology, and remote sensing. He also collaborates with experts at universities and quasi-governmental organizations in South Africa and the United States.

"In the field of ecology, there are so many large, complex problems that are going to require a multidisciplinary approach," Wilson says. "Climate change is an example – probably the best example – where no one field can tell the whole story."

Silander cites Wilson's aptitude for working across diverse disciplines as one of his strengths. "I view the students that are going to be most productive as those who are stretched across disciplines and can actually talk to a variety of different people," Silander says. "Oftentimes, some of the most exciting things come from work that is interdisciplinary."

Ultimately, Wilson anticipates, this type of broad-scale research about wildfire and climate change will offer management organizations in South Africa the knowledge they need to make more informed decisions about how they should utilize the land and its resources. For instance, knowing which areas may be more susceptible to climate change or where wildfires are becoming more frequent may affect decisions about where new structures should be built or how biodiversity can be preserved most effectively.

"I think that there's a definite need for research that's focused on applications … not only where we're learning things we didn't know before, but where the outcome is some kind of information that's relevant for people who make decisions," Wilson says. "The first step to figuring out what to do is to figure out what's going on."

A professor in UConn's prominent Department of Ecology and Evolutionary Biology in the College of Liberal Arts and Sciences, John Silander is among 30 full-time faculty regularly awarded major research grants from such agencies as the National Science Foundation, the MacArthur Foundation, the National Geographic Society, NASA, the U.S. Geological Survey, and the U.S. Department of Agriculture. Silander has conducted research on natural forests in North America, the conservation and loss of rain forests in Madagascar, invasive plant species in New England, and the biodiversity of plants in South Africa.

"Some of the most exciting things come from work that is interdisciplinary," says professor John Silander, above right.

"We create a supportive environment, where students have access to resources, are provided with interesting ideas, and where they see their results published in premier journals so they can take pride in what they accomplish."

Bahram Javidi, Board of Trustees Distinguished Professor, School of Engineering

Ph.D. candidate Mehdi DaneshPanah, left, and Board of Trustees Distinguished Professor Bahram Javidi in the School of Engineering debate a research problem related to optics.

Focusing on the unforeseen

Mehdi DaneshPanah recalls his parents returning home to Iran after a trip to the United States with a memorable gift – a computer. Immediately, DaneshPanah says, he started to teach himself basic computer programming, developing an interest that would carry him through to his later studies in electrical and computer engineering.

Now a Ph.D. candidate in UConn's School of Engineering, DaneshPanah brings that same enthusiasm to his current work, which is based in a branch of physics known as optics, a field that allows him the freedom to explore new ideas. With engineering, he says, "everything is under my control. I can invent things. I can have a wild idea, break it down, and then actually make a system that works."

In the lab of his advisor, Board of Trustees Distinguished Professor Bahram Javidi, DaneshPanah is working to develop sophisticated imaging systems with a range of applications in areas as diverse as medicine, military technology, and cinematography.

Optical elements, such as lenses and prisms, have been the subject of study since ancient times, with the earliest telescopes and microscopes devised beginning around the 1600s. The invention of photography nearly two centuries ago further transformed how people viewed and captured images. Over the past half century, innovations in computational optical imaging – allowing scientists to observe an object or a scene by reconstructing the image digitally with the help of computer algorithms – have advanced the field to even greater heights.

Doctoral candidate Mehdi DaneshPanah's research in optics focuses in part on digitally reconstructing views of biological microorganisms in 3-D, using novel, noninvasive methods that could greatly enhance cell research.

Building on recent modern advances in this field, DaneshPanah hopes to uncover "unconventional ways of seeing" and push imaging technologies into new niches. "People have been developing imaging devices and sensors based on the way they see the world," he says. "It takes imagination and innovation to be able to break this habit. We are at a point where advanced imaging systems surpass human vision capabilities. It is now a matter of pushing the envelope into new territories."

One component of his doctoral work focuses on developing novel three-dimensional imaging systems. For instance, in collaboration with other graduate students and visiting scholars in Javidi's lab, DaneshPanah is creating a sensor that surveys a scene from afar and provides data that can be used to reconstruct that scene entirely in 3-D – research work that has a wide range of applications in science, technology, and the entertainment industry.

On the other end of the spectrum, DaneshPanah is also interested in "extending the limits of microscopy to be able to see more than what conventionally can be seen with an ordinary microscope." With an imaging technique called digital holographic microscopy, for example, DaneshPanah is designing new ways to digitally reconstruct 3-D views of biological microorganisms. Such noninvasive microscopy methods could enhance cell research.

The potential impact of future imaging systems remains largely unknown, yet the technology could easily touch every aspect of our lives. Imagine a world in which doctors might diagnose health conditions by reconstructing images of patients' bodies in 3-D, real-time displays; a lab where microscopic cells could be examined noninvasively with a level of precision never before feasible; or your home, where your favorite film's action scenes would look as if they are unfolding in your own living room. For UConn researchers like DaneshPanah, this is merely the beginning.

Taking action when the heat is on

In the world of competitive sports, heat stroke can occur at any level, from high school team practices to professional sporting events. In recent years, heat stroke has made national headlines in the wake of the deaths of such athletes as NFL lineman Korey Stringer and high school football player Max Gilpin. Many others fall victim every year to this life-threatening, heat-related illness, which strikes when the body becomes dangerously hot.

Pictured clockwise from center, associate professor Douglas Casa, along with doctoral students Rebecca Lopez and Becca Stearns, monitor an athlete's vital signs as part of ongoing research examining the effects of heat and hydration on athletic performance.

A national expert on heat and hydration, UConn associate professor Douglas Casa notes that exertional heat stroke fatalities have been rising, with the second-highest five-year death toll in the past 40 years occurring between 2004 and 2008. Although the condition is not always preventable, heat stroke is 100 percent survivable if the proper treatment is provided immediately, according to Casa.

Two of Casa's doctoral students – Becca Stearns and Rebecca Lopez, both certified athletic trainers seeking their Ph.D.s in exercise science through UConn's kinesiology department in the Neag School of Education – have witnessed this lesson firsthand.

Working alongside Casa, who serves as their advisor, Stearns and Lopez attend road races and marathons across the country, providing medical treatment to athletes suffering from exertional heat stroke and other heat illnesses. Casa, who survived severe heat stroke himself as a teenager, has saved the lives of 127 heat stroke victims at 53 different events over the past two decades – often with his graduate students by his side.

While his graduate students also receive hands-on training in the University's kinesiology heat chamber laboratory and through field studies, Casa underscores the significance of direct contact with athletes experiencing exertional heat stroke.

Offering the No. 1 doctoral program of its kind in the nation, UConn's kinesiology department in the Neag School of Education is home to world-renowned faculty with expertise in such fields as heat and hydration, strength and conditioning, and sports nutrition – among them professor and department head Carl Maresh, professor Lawrence Armstrong, and associate professor Douglas Casa, head of the Athletic Training Education Program.

Research studies conducted by UConn doctoral students Rebecca Lopez and Becca Stearns could help determine more accurate hydration guidelines for athletes.

This spring, UConn's kinesiology department will partner with Gatorade and the NFL to form the Korey Stringer Institute, named for the Minnesota Vikings football player who died of heat stroke in 2001. Stringer's wife, Kelci, sought out associate professor Douglas Casa, who served as an expert witness in the legal proceedings, to lead the Institute's efforts. Casa has appeared in past years as a guest on "The Today Show," CNN, and ESPN; has helped prepare NCAA recommendations about reducing the likelihood of heat stroke; and has published extensively in such sources as the *Journal of Athletic Training*. Under Casa's direction, doctoral student Becca Stearns will help lead the Institute's research and education efforts.

"We obviously can't induce heat stroke in our research," Casa says. "When it comes to the treatment of heat stroke, we go to these athletic events because that's where the heat strokes happen." On site, Casa says, athletic trainers like Lopez and Stearns have the opportunity to apply the necessary clinical care. "They see the role of hydration, the role heat acclimatization plays, and then they're talking with a patient whose life they just saved by applying the proper treatment."

Both longtime athletes themselves, Stearns and Lopez also work closely with Casa to conduct doctoral research related to heat and hydration. Central to their work is the ongoing debate over hydration, which is focused in part on fluid intake guidelines – how much athletes should drink in order to stay properly hydrated.

"There's a huge controversy right now," says Lopez, a fourth-year doctoral student. Some experts, she says, believe that hydration guidelines should be individualized, based on how much a person sweats; others feel that athletes should drink only what they feel they need and "just let their thirst guide them."

Adding to the complexity of the debate is the fact that sports played in different settings can affect how much water an athlete requires; the duration and intensity of the exercise, in addition to other factors, such as access to fluids, also can play a role.

"Essentially, every laboratory study has found that people, as they get more dehydrated, get hotter," Casa says. "That's obviously extremely relevant for someone who's an athlete; that's why you want to stay hydrated."

However, this rise in body temperature did not seem to hold true for athletes previously studied in the field. Casa and his graduate students wondered whether prior field studies had limitations in their design.

To help address this discrepancy, Stearns, a second-year doctoral student, conducted one study in which she examined trail-runners over the course of two races lasting the same distance; the runners had to complete each race within the same time frame, ensuring that the intensity of each workout was identical. However, they ran one race hydrated and one race dehydrated. It was the first field study of its kind, says Casa, to control the intensity at which the athletes exercised, and its findings showed that the runners' core body temperatures did in fact increase when the runners were dehydrated – offering further evidence of the importance of proper hydration for athletes.

Part of Lopez's research has followed a similar path, examining runners while controlling how much fluid they drank during two races, then assessing body temperature and other physiological measurements after each race. In one race, the runners were told to drink as much water as they felt they needed; in the other, they were instructed to drink all the water made available to them during the race, regardless of their thirst.

Although the results of this particular study are still pending, Casa and Lopez hope studies like this will help set a strong foundation for determining appropriate and accurate hydration guidelines for athletes.

"There is a lot of misinformation out there," Lopez says. "It's important for athletes and exercising individuals to get the right information, based on the research available."

Blood samples gathered from athletes as part of the studies conducted by faculty and graduate students in kinesiology are analyzed to help determine each athlete's hydration status before and after each race.

Exertional heat stroke has consistently been one of the three leading causes of death in high school and college sports in the United States for the past decade, Casa points out, citing national statistics. Ultimately, then, this type of ongoing doctoral research may also save lives.

"I don't think people realize how much of a factor environmental stress and hydration status is," Stearns says. "There's still a lot of education and changes in policies that need to be done. You think heat and hydration, that's such a simple thing. Everyone knows that you're supposed to drink water, but there are still athletes dying from heat stroke … The thing with heat stroke is that you can't always prevent it, but you can prevent somebody from dying from it."

Breaking new ground

The passion Russell Schimmer has for exploration was sparked by his parents, with whom he remembers traveling a great deal as a child. His father was a Dutchman who, during World War II, survived a Nazi forced labor camp; his mother immigrated to the United States from Puerto Rico at an early age. "I grew up with these bicultural experiences – both people who had struggled, who had seen a lot in their lives," he says.

By the time he graduated high school, Schimmer was eager to embark on his own adventure. He left home at 18 and spent a decade touring the world as a professional guitarist, leading to the realization that he didn't want to travel around without a purpose. "In the back of my head, I think I always knew I wanted to go back to school," he says.

Having followed a rather unconventional path, Schimmer eventually completed an undergraduate degree in archaeology at Yale University and today is seeking dual degrees at the University of Connecticut. Blending an unlikely pair of disciplines, Schimmer is pursuing a Ph.D. in the College of Agriculture and Natural Resources as well as a J.D. at the School of Law.

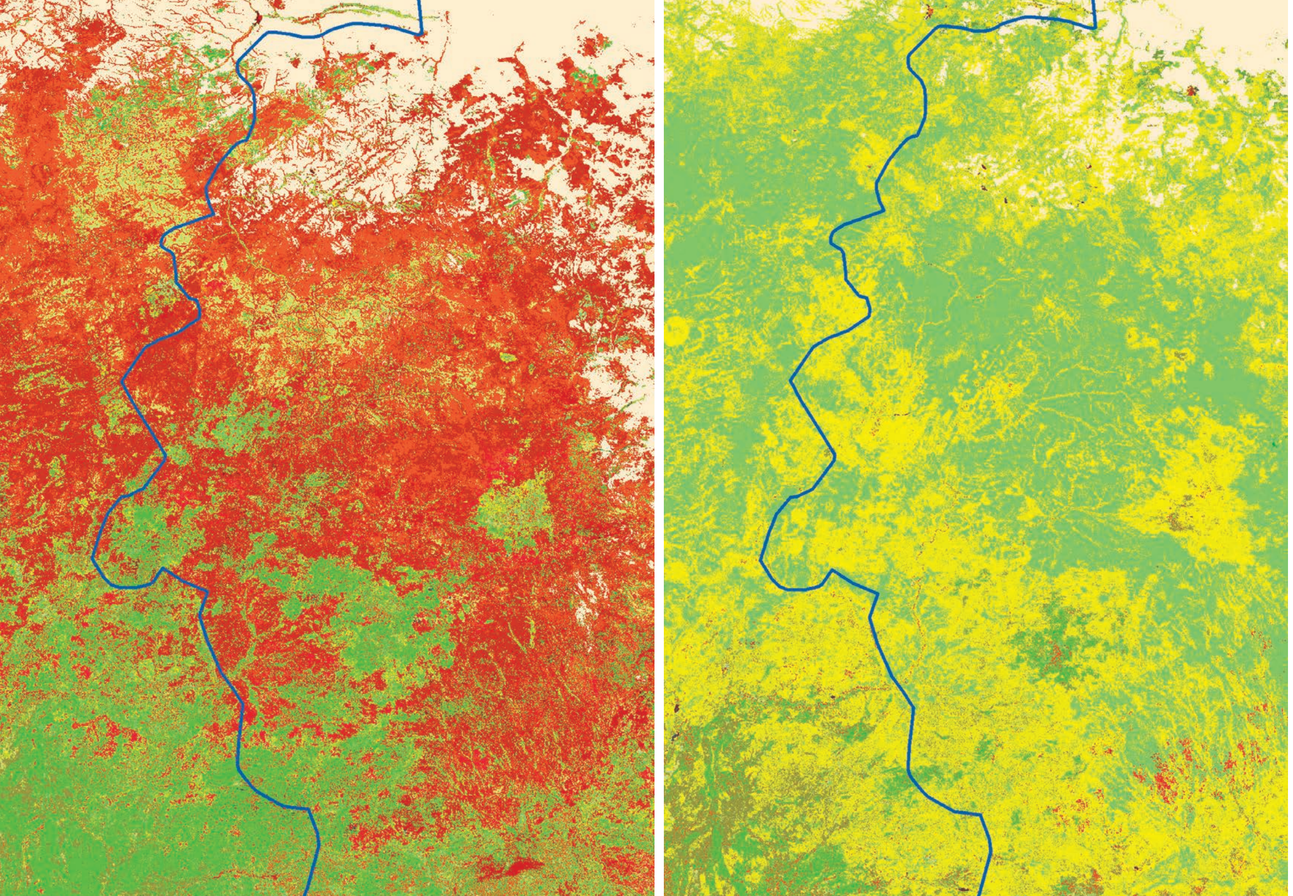
Integrating his legal education with his studies at the agricultural school, which focus on the analysis of satellite imagery – a technique known as remote sensing – Schimmer is merging these two fields to achieve two very distinct research objectives.

"I don't have the capacity to change the world. The pieces are there – I just want to rearrange them a little bit."

Russell Schimmer, doctoral candidate in the College of Agriculture and Natural Resources and J.D. candidate at the School of Law

Russell Schimmer, center, whose research blends humanities with science, brings together law professor Kurt Strasser, left, and natural resources professor Daniel Civco to discuss his work.

Using satellite imagery, Russell Schimmer is seeking ways to monitor environmental waste generated by mining.



On one front, his doctoral work deals with monitoring environmental waste. Over the life of a mine, hundreds of thousands of tons of a hazardous waste product – called mine tailings – are generated by the processing methods used in the mining industry. Although many countries follow strict regulations to reclaim and confine these pollutants, the dams constructed to contain them sometimes fail, with far-reaching environmental consequences.

Part of Schimmer's research involves applying satellite imaging technology to identify, and potentially track, these waste products. Schimmer hopes to develop this research approach fully and ensure its reliability, as such a technique could, he says, provide the mining industry with the ability to monitor tailings and detect the source of any leakages. "We hope to become very, very good at tracking and monitoring these mine waste products," he says.

"Russ is very interested in using his remote sensing work to say something about what's happening on the ground and in the environment, and then using legal tools to bring that to bear on the decision making of the legal institutions. That's an enormous accomplishment."

Kurt Strasser, Phillip I. Blumberg Professor of Law

Satellite imagery could offer evidence of alleged genocide, according to Schimmer. Images from Darfur show, from 2003 (left) to 2007, an increase in vegetation (yellow) in former livestock grazing areas, suggesting a significant reduction in the number of livestock, which correlates with systematic violence in the region during the same period.

At the same time, using satellite imagery to track mine tailings could help keep mining companies accountable for their actions. "To do that effectively," says associate professor Thomas Meyer, who has worked with Schimmer on his research, "Russell realized that perhaps the best tools are remote sensing coupled together with deep knowledge of international and environmental law."

Beyond monitoring environmental contamination, Schimmer is also combining his understanding of law and his research in remote sensing in another, perhaps unexpected way. Examining the landscapes of such places as Darfur and Rwanda through satellite imagery, Schimmer has been looking at how changes in these landscapes over time could offer evidence of genocide.

In his investigation of Darfur, for instance, Schimmer gathered not only chronological records of satellite imagery depicting the area, but also as much primary source information about the alleged events as possible, including eyewitness accounts from international crime tribunals and news reports written by journalists covering the events.

"Once I took all of the information," Schimmer says, "I started looking at the images, to see whether I could corroborate what people recounted with what the changes were in the landscape."

Compiling a complete spatial and temporal picture of the area, Schimmer observed drastic environmental changes in the landscape, such as increases in vegetation in areas formerly used for livestock grazing – a change that correlates with other existing evidence of the systematic violence in the region during the same period. He then eliminated any other possible explanations – such as rainfall – for the changes evident in the satellite images. "You have to make this as indisputable as you can," he says. "So you begin to funnel it down in a Sherlock Holmes sort of way."

Conducting research with clear relevance in the legal realm, Schimmer knows that pursuing his law degree concurrently with a Ph.D. in the Department of Natural Resources and the Environment will bring his work to a new level. "My legal studies," he says, "will allow me to be that person who can bridge that gap, who can bring the science into the humanities."

Although bringing together an education in remote sensing and law may be an unusual approach, the potential inherent in linking the two disciplines is certainly promising – from an environmental perspective as well as a political one. As Daniel Civco, Schimmer's doctoral-degree major advisor and a professor of natural resources, says, "The science can inform decision making and policy making at the global level. Russell wants to marry the science with some real-world implementation for the betterment of people."

"One important lesson I learned – growing up without parents – is that you're going to have to work for your achievements. And I strongly believe that I can do anything that can be done by anybody else."

John Ngunjiri, fifth-year molecular and cell biology Ph.D. candidate, College of Liberal Arts and Sciences

John Ngunjiri, right, studies interactions among influenza virus particles with his advisors, professors Philip Marcus and Margaret Sekellick.

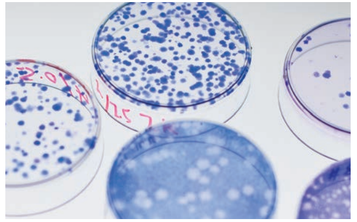
Developing the best defense

Raised in a Kenyan village, John Ngunjiri was educated at a "bush" school that not only lacked governmental support and qualified teachers but also had not yet produced any students who went on to pursue a university degree.

In spite of this, Ngunjiri, believing he could succeed if he worked hard enough, largely taught himself. "I thought a lower-standard school should not determine my fate," he says. "I realized that the library had all the books I required. So I read for myself."

Ngunjiri eventually passed the highly competitive tests that qualified him to enter the state-supported university system in Kenya's capital city. He became a "village hero," proving his aptitude among students taught in the higher-quality schools of Kenya's urban centers. "That is one lesson that I learned – if you want something, sometimes if other people cannot help you get it, you can help yourself get it," he says.

This was a lesson Ngunjiri accepted early in life. Having lost both his parents to illness as a boy, he knew even at a young age that he wanted to understand disease.



John Ngunjiri's ongoing doctoral research in virology could lead to more effective flu vaccines.

Having pursued his undergraduate education in Africa and a graduate degree in Japan, Ngunjiri is now a doctoral candidate in molecular and cell biology in UConn's College of Liberal Arts and Sciences, where his research centers on virology – specifically, the influenza virus.

While the flu has recently garnered international media attention with the global pandemic of H1N1, a strain of influenza, millions fall ill and anywhere from 250,000 to 500,000 deaths occur annually due to influenza epidemics worldwide, according to the World Health Organization. Understanding the virus and developing increasingly effective vaccines remain, then, imperatives in the research world.

Viruses are known to replicate only inside cells of living organisms. While the influenza virus produces thousands of particles per cell, just 5 percent of those particles are infectious. Ngunjiri wants to know why – and what role, if any, the other 95 percent of particles may have in infection. His research focuses in part on describing and characterizing the properties of two specific kinds of influenza virus particles – defective-interfering particles and noninfectious cell-killing particles.

Ngunjiri has distinguished these two types of flu virus particles conclusively, publishing his findings in 2008 and 2009 in collaboration with his advisors, professors Philip Marcus and Margaret Sekellick. Marcus, a renowned pioneer in viral infection research and a Board of Trustees Distinguished Professor, has received the highest rank bestowed upon UConn faculty, having demonstrated excellence in research, teaching, and service. Sekellick, a professor-in-residence, has partnered closely in research with Marcus for several decades.

Ngunjiri is now investigating how these two types of virus particles interact with one another and with other virus particles inside cells, with hopes that his work could ultimately lead to the development of more effective live attenuated flu vaccines.

Devising innovative experiments and coming up with new questions every day, he never exhausts his enthusiasm for research. "No matter how many times you are in the lab, there are so many things to discover that you may not do it all in your lifetime," he says. "Trying to understand what is behind the complex interactions of a virus and its host cell is what keeps me in the lab."

Cancer is the second most common cause of death in the United States, exceeded only by heart disease.

Visions of hope

Professor Quing Zhu in the School of Engineering, left, reviews imaging techniques with Ph.D. candidates Yasaman Ardeshirpour, center, and Andres Aguirre.

Each year, more than 1 million American women undergo breast biopsies, yet more than 80 percent of those biopsies subsequently reveal no cancer. Meanwhile, thousands of women at risk for ovarian cancer are having one or both ovaries surgically removed – many, as it turns out, unnecessarily.

These needless procedures are taking place in part because detecting these types of cancers is particularly difficult using the technologies currently available. UConn scientists such as professor Quing Zhu and her graduate students in the School of Engineering are dedicated to improving cancer diagnostics by striving to develop and refine a range of advanced imaging techniques. Medical imaging systems that offer more precision and sensitivity could help reduce unnecessary, pricey surgeries and, in turn, lead to potential savings in health care costs.

Yasaman Ardeshirpour, a fourth-year Ph.D. candidate in electrical engineering, wanted to pursue a career in which she could apply her love for science and "see the results." Ardeshirpour, who has several family members employed in the field of medicine, had always had a passion for math and physics. But, she says, "I was more interested in applying it to some medical application. I think it's more satisfying to see how you can help people."

At UConn, she is working closely with a device pioneered and patented by Zhu, her advisor, to help enhance breast cancer diagnostics. The device, which uses technology called ultrasound-guided diffuse optical tomography (DOT), is noninvasive, fast, and safe for the patient, as well as less expensive to implement than other medical imaging techniques, such as MRI.

In order to grow and metastasize, cancer stimulates the development of blood vessels, which nourish the cancerous tissue. The system devised by Zhu generates three-dimensional images of breast tissue that can reveal the location and concentration of blood vessels in the tissue, helping scientists to distinguish more accurately between malignant and benign tissue. These 3-D images also can be used to monitor changes in a tumor over the course of chemotherapy.

As part of her doctoral research, Ardeshirpour is involved in implementing, applying, testing, and debugging this patented DOT system, which is currently being utilized in clinical studies at the UConn Health Center and Hartford Hospital. "We are trying to get a better way to diagnose [breast] cancer in the early stage," Ardeshirpour says. "When it gets to later stages, it's very difficult to cure."

Doctoral students in UConn's School of Engineering are testing cancer detection techniques that could offer more accurate results than current methods do. "We are trying to find a better way to diagnose cancer in the early stage," says Ph.D. candidate Yasaman Ardeshirpour.

"Both of these students are working on practical, health-related issues to solve real-world problems. I keep telling my students, 'Don't just get interested in writing publications and graduating. Work on some problems that are not just interesting, but that are going to help our sisters and brothers, mothers and grandmothers.'"

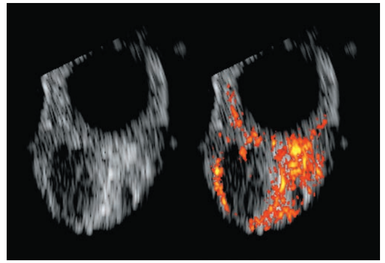
Quing Zhu, professor of electrical and computer engineering

Under Zhu's guidance, as well as that of her collaborator, gynecologic oncologist Molly Brewer at the UConn Health Center, other UConn graduate students are also taking a novel approach to confronting the difficulties inherent in detecting certain types of cancer. Among them is fifth-year doctoral student Andres Aguirre. The focus of Aguirre's research is investigating the potential of a form of medical imaging called photoacoustic tomography (PAT) in detecting ovarian cancer.

Because most women with this type of cancer are not diagnosed until the disease has reached stage III or IV, Aguirre says, "more than 70 percent of women with it will die within five years. This is mostly because it is very hard to detect." In fact, of all gynecological cancers, ovarian cancer has the highest rate of mortality.

The PAT imaging technique being tested by Aguirre combines ultrasound with a laser that emits a short pulse through the tissue of the ovary. He converts the resulting ultrasound waves into electrical signals, digitizing them to reconstruct a sort of three-dimensional image, or "map," of the ovarian tissue. Similar to those in Ardeshirpour's research, these images will reveal any areas in the ovary with unusually high concentrations of blood vessels – an indication of cancer. Aguirre's use of PAT, says Zhu, holds much promise as a unique method for detecting this particular type of cancer.

Using a novel medical imaging technique, Ph.D. student Andres Aguirre can view ovarian tissue in greater detail (right) than has been previously possible with ultrasound alone (left).



"I wanted to do biomedical engineering – I wanted to be able to see a process, develop systems, and at the same time, I wanted to do something that actually helps people."

Andres Aguirre, doctoral candidate in electrical engineering

While Zhu's research expertise centers on breast and ovarian cancer, Aguirre has another special interest – Alzheimer's disease. Having watched his grandfather suffer from and succumb to this devastating disorder, Aguirre hopes one day to apply the knowledge he has gained in biomedical imaging to study the brain and, more specifically, to detect Alzheimer's. It is, as Zhu says, "this strong passion to solve problems" on the part of her students that, coupled with innovative applications of technology, will ultimately change disease detection, and treatment, for the better.

Doctoral candidate Sierra Root, left, consults with her advisor, associate professor H. Leonardo Aguila, at the UConn Health Center.

In pursuit of promising developments

Stem cells never cease to amaze Sierra Root, who has a particularly personal sense of dedication to spending day after day looking after, evaluating, and marveling at the cells she painstakingly cultivates in petri dishes at her UConn Health Center laboratory.

"The human body has over 200 cell types," Root says. "During development, you start with one cell type. Over nine months of pregnancy, you get a functional human being; it's amazing."

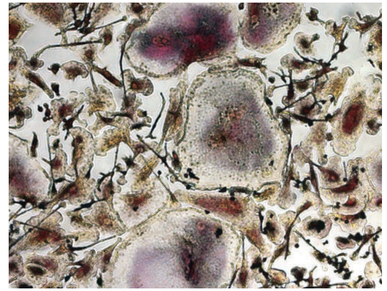
Root arrived at UConn at a particularly opportune time, beginning her Ph.D. in biomedical sciences at the UConn Health Center in 2005. That same year, Connecticut became the third state in the nation to pass pioneering legislation providing public funding in support of stem cell research; the program pledged $100 million for stem cell research and training in Connecticut through the year 2015.

The potential of human embryonic stem cells (hESCs) is exceedingly promising. These cells have the capacity to give rise to almost any type of specialized cell in the body. If scientists can determine how to control the differentiation of embryonic stem cells into specific types of cells – such as blood, bone, muscle, or virtually any other cell type – it could become possible to treat any number of diseases.

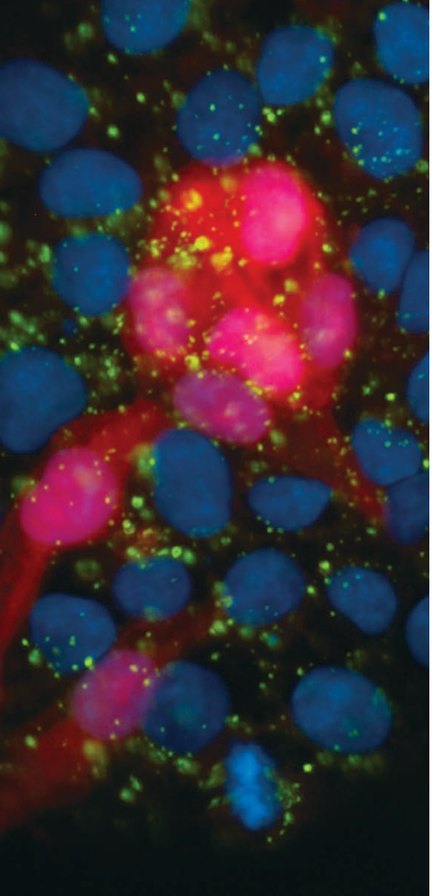
At first, Root wasn't certain that graduate students would be permitted to work firsthand with human embryonic stem cells. But shortly after arriving at UConn, she was conducting research alongside associate professor Ren-He Xu, an internationally recognized stem cell expert and director of the Stem Cell Core laboratory, established in 2006. Under Xu, Root became UConn's first graduate student to receive training in the complex methods required to grow and maintain hESCs.

In 2008, Root continued her stem cell research with H. Leonardo Aguila, an associate professor of immunology, director of the Flow Cytometry Core for Stem Cell Research, and one of several UConn faculty members working on a $3.5 million multi-investigator project headed by David Rowe, professor of genetics and developmental biology at the UConn Health Center.

According to Aguila, who also serves as Root's advisor, the research taking place in his lab has taken a big step forward since Root joined the group. "We are now in a process in which we can feel extremely confident about how to maintain and grow embryonic stem cells, to differentiate them, to analyze them," he says. "We wouldn't be at that stage if Sierra hadn't joined our laboratory."



Osteoclasts, a type of bone cell, are important in bone formation and remodeling. Ph.D. student Sierra Root's research relates in part to understanding the biological process that forms bone during development and identifying cells capable of ultimately developing into the precursors that form bone. Stem cell research in this area could one day help patients who suffer from such conditions as osteoporosis.



Combining the in-depth knowledge she acquired in Xu's lab and the expertise she is gaining now in cell analysis, Root is focusing her doctoral research on designing new strategies to generate, identify, and isolate specific cells that arise from hESCs and are capable of ultimately developing into the precursors – called progenitors – that form blood, bone, and blood vessels through biological processes called hematopoiesis, osteogenesis, and vasculogenesis.

These three processes are tightly linked during development, and understanding how they interact could eventually benefit those diagnosed with such conditions as osteoporosis, rheumatoid arthritis, and several types of cancer.

Root has a special appreciation for the value of her research. Having endured a severe case of Lyme disease as a child and additional serious health problems as a young adult, she spent much of her teenage years either in the hospital undergoing surgery or at home, when she had no choice but to leave high school and be homeschooled.

Always a strong student with diverse interests, she put her dreams of being a doctor on hold, knowing she wasn't well enough to leave home and attend college. She took a few community college courses in order to stay close to home and considered a possible technical career in radiology until one of her professors actively encouraged her to pursue a Ph.D.

Last year, UConn joined an elite group of universities – including Harvard and the University of California-San Francisco – that has successfully created new human embryonic stem cell lines, an achievement crucial to investigators who continue to make discoveries that may ultimately result in novel treatments and cures for diseases.

The years she spent hospitalized as an adolescent left lasting memories. "Most of my hospitalizations as a kid were at a children's hospital in Philadelphia. I saw horrific, horrific things – just some really sad cases," she says. She remembers fellow patients suffering from sickle cell anemia, cystic fibrosis, and various forms of cancer. "Stem cells are supposed to offer some promise for all of these diseases. So that's definitely a motivation."

Though competition for stem cell research funding remains fierce, regulations have recently been eased by the National Institutes of Health (NIH) with the support of President Barack Obama, freeing up federal money for human stem cell research efforts.

"I think it's very important that we work together as a team," Root says. "With stem cell research, it's not one lab or one person that's going to make a difference. It's going to take some time ... and there's still a lot to overcome."

Root and her fellow researchers at the UConn Health Center use a stain to help identify human embryonic stem cells that are pluripotent, meaning they have the potential to differentiate into any cell type.

Seeking new paths to discovery

Robin Romano, William Benton Museum of Art, UConn

THE HUMAN EXPERIENCE

Promoting Positive Social Change

With its uniquely interdisciplinary approach and scope, UConn's human rights program remains a standout in the realm of higher education. Whereas universities typically present human rights as legal or political issues with a focus on international laws, norms, and institutions, at UConn there is a heavy contribution from the humanities. In addition, a vast array of distinctive programs dedicated to the subject have been developed, including the UConn Human Rights Institute, the UNESCO Chair & Institute of Comparative Human Rights, dedicated archives of historical documents in the Thomas J. Dodd Research Center, and the Human Rights Gallery in the William Benton Museum of Art. Richard Wilson, the Gladstein Distinguished Chair in Human Rights and director of the Human Rights Institute in the College of Liberal Arts and Sciences, has received a National Endowment for the Humanities fellowship to continue his research on expert witness testimony from historians and social scientists in international criminal trials. UConn's collaborative human rights programs are also distinguished by the presence of the first UNESCO Chair in Human Rights in the United States, Amii Omara-Otunnu, who also serves as executive director of the UConn-ANC Partnership and director of the University of Fort Hare Linkage Program in South Africa.

Collaborating on Care for the Aging

The Hartford Partnership Program for Aging Education (HPPAE) in the School of Social Work is collaborating with The Institute of Living at Hartford Hospital to educate and prepare social workers in the area of geriatric social work. The HPPAE at UConn specifically targets underrepresented populations in the field of gerontology, such as Latino and African American students. In a recent effort to sustain the enriched learning experiences of M.S.W. students, the School of Social Work also partnered with The Institute of Living to receive support for its program from the North Central Area Agency on Aging, a regional nonprofit organization that provides planning and management of funding and advocacy for services to older persons and their caregivers in the North Central Connecticut region.

Improving the Health of Women and Newborns

Cheryl Beck, Board of Trustees Distinguished Professor of Nursing, is one of the country's leading experts on post-traumatic stress disorder and childbirth. She has spent the past 20 years studying postpartum depression mood and anxiety disorders. In recent years, her research has found that traumatic childbirths can have an adverse impact on some women's ability to breastfeed and that intensive one-on-one support for traumatized mothers may be necessary to help them establish breastfeeding. Beck has also discovered that, for other new mothers, childbirth can be so traumatic that they experience post-traumatic stress disorder, the same debilitating disorder that scars the lives of combat veterans and victims of rape and other violent crimes. In 2009, Beck was recognized for her dedication to improving the health of women and infants with the Association of Women's Health, Obstetric and Neonatal Nurses 2009 Distinguished Professional Service Award.

New Frontiers in Health Behavior Research

The Center for Health, Intervention, and Prevention (CHIP) serves as a nexus for investigators at the University of Connecticut and other institutions to stimulate collaborative partnerships for the development of major research initiatives in health behavior change. CHIP is a multidisciplinary research center dedicated to the study of the dynamics of health risk behavior and the processes of health behavioral change in individuals and targeted at-risk populations. Headed by psychology professor Jeffrey Fisher, whose research focuses on initiation and maintenance of health behavior change, CHIP investigators presently have more than $49 million in active grants. In addition to research on HIV/AIDS prevention, other areas of interest to CHIP include cancer prevention, health behavior change in diabetic patients, and alcohol and substance uses associated with other health risk behaviors.

State of the Arts

Ongoing scholarship in the School of Fine Arts touches on everything from Gothic art to pornography. Art history professor Jean Givens, whose work has been supported by grants and fellowships from the J. Paul Getty Foundation, the American Philosophical Society, the American Council of Learned Societies, and the National Endowment for the Humanities, centerws her research on medieval England and France, the history of visual and verbal literacy, and design initiatives in 20th-century Denmark and Sweden. Her books include *Observation and Image-Making in Gothic Art*, awarded the Medieval Academy of America's John Nicholas Brown Prize for 2009, and *Visualizing Medieval Medicine and Natural History, 1220-1550*. Kelly Dennis, associate professor of art history, is the author of the recently published *Art/Porn: A History of Seeing and Touching*, which examines the impact of photography on depictions of the nude and society's conflicting discourses on and historical perceptions of art and pornography. In 2009, Dennis was awarded the Ansel Adams Research Fellowship at the Center for Creative Photography at the University of Arizona for her research on Ansel Adams' color photography.

IMPROVING HEALTH

Implants With Impact

UConn, which has been at the forefront of dental implant care, education, and research for many years, supports many research initiatives, including projects funded by the National Institutes of Health to improve dental implant and restorative techniques, promote bone growth, and develop new materials for implant prostheses. The Center for Implant & Reconstructive Dentistry opened at the UConn Health Center in 2008 with a team of nationally recognized experts who provide a full range of dental implant services. With state-of-the-art treatment rooms and sophisticated equipment, the Center includes a tomography unit that quickly and precisely captures 3-D and 2-D images of jaws and teeth. The Center, which brings together research initiatives from the School of Dental Medicine and the New England Musculoskeletal Institute, UConn's signature program in bone biology, is directed by Donald A. Somerville, an accomplished prosthodontist with subspecialties in dental implants and jaw reconstruction. Other prominent implant specialists at the Center include Thomas D. Taylor, a specialist in maxillofacial prosthetics who also serves as executive director of the American Board of Prosthodontics; Elena Nazarova, a pediatric dentist who conducts research on prosthodontic treatment in children; Martin Freilich, who is leading a dental implant and bone health study focused on women who have been diagnosed with osteoporosis or osteopenia and who need at least one dental implant; and David Shafer (pictured, left), chair of the Division of Oral and Maxillofacial Surgery at the School of Dental Medicine.

Assessing the Benefits

Professor of pharmacy practice C. Michael White directs the UConn/Hartford Hospital Evidence-based Practice Center, which recently evaluated the purported health benefits of several popular dietary supplements, such as garlic and glucomannan. Performed as a public service, this research has been published in various academic journals over the past year and, these scientists hope, will help keep people better informed about what they are consuming and how it may affect their bodies. White has also been involved in a variety of other collaborative research projects, studying the value of the herbal supplement echinacea in preventing and treating colds as well as the effectiveness of various medications in treating one of the most common and potentially deadly forms of heart disease.

Innovative Education for Older Patients

Faculty members in the School of Nursing, such as professor Patricia Neafsey, are pursuing research related to the dangers of self-medication among elderly patients in Connecticut. In recent years, Neafsey has received more than $1 million in funding from the National Institutes of Health to conduct research in this area. She and her interdisciplinary team have developed and tested an interactive, user-friendly multimedia computer program that teaches older adults about the medications they take and the risk of potentially dangerous drug interactions.

Big Developments on a Small Scale

The School of Pharmacy's Diane Burgess, a national expert in drug delivery systems and a professor of pharmaceutics who was named a Board of Trustees Distinguished Professor this past year, is partnering with chemistry professor Fotios Papadimitrakopoulos and electrical and computer engineering professor Faquir Jain to develop miniaturized, implantable blood glucose sensors. The tiny wireless sensors, small enough to be injected under a person's skin through a needle, can be used to relay real-time metabolic information such as blood glucose levels without the more invasive skin prick commonly used today by patients with diabetes. Most recently, Burgess' research group developed a biocompatible coating for the sensors to prevent body tissue from rejecting them or limiting their effectiveness over time. Such efforts could result in the development of commercialized products indispensable for millions of people with diabetes.

Support From the Gates Foundation

Working to develop innovative approaches to prevent and treat infectious diseases, associate professor Arthur Günzl in the Department of Genetics and Developmental Biology at the UConn Health Center has been awarded the Health Center's first grant from the Bill & Melinda Gates Foundation. The grant is awarded through the foundation's Grand Challenges Explorations initiative, which aims to develop a pipeline of creative ideas that could change the face of global health. Günzl's research focuses on *Trypanosoma brucei*, the parasite carried by the tsetse fly in sub-Saharan Africa that causes sleeping sickness. If left untreated, sleeping sickness is invariably fatal, yet existing treatment drugs are highly toxic, expensive, difficult to administer, or not effective against all subspecies of the parasite. Günzl's work in this area could lead to novel treatment possibilities at a time when new strategies to combat the parasite are urgently needed.

Visionary Research

Robert R. Birge, the Harold S. Schwenk, Sr. Distinguished Chair in Chemistry in the College of Liberal Arts and Sciences (pictured above), won the 2009 Connecticut Medal of Science, the state's highest award for scientists. Birge is known for his pioneering work in protein engineering and biomolecular electronics, which has led to seminal discoveries in the fields of vision, quantum computation, and protein-based data processing, including a protein-based disk drive that was the first such memory device ever produced. Most recently, he developed a prototype retinal implant being developed by LambdaVision, Inc., which was formed through the UConn R&D Corporation.

Environmental Innovations

Engineering New Discoveries

The Institute of Materials Science (IMS) at UConn was established in 1965 by the Connecticut General Assembly to provide superior graduate research education in the interdisciplinary fields of materials science and engineering and to provide materials-related technical outreach to Connecticut's industries. Today, IMS is at the leading edge of nanotechnology research, with more than 100 scientists, researchers, and faculty working on major projects. Among the highlights of current IMS work by UConn researchers:

Fotios Papadimitrakopoulos, professor of chemistry in the College of Liberal Arts and Sciences and associate director of IMS (pictured below, right), is leading several projects, including studies focused on a wide range of materials and devices in the area of nanobiosystems.

Puxian Gao, assistant professor of materials science and engineering in the School of Engineering, is developing composite nanowire materials for a variety of potential uses in electronics and optoelectronics applications, including composite materials to reduce automobile emissions.

Maurice Gell, professor emeritus in materials science and engineering, is leading a project focused on nanocomposite optical ceramics for several uses, such as developing dense ceramic coatings and structures with improved toughness. He is also collaborating with Eric Jordan, professor of mechanical engineering, to develop nanocomposite ceramic materials to realize new, previously unattainable mechanical and optical properties.

Bryan D. Huey, assistant professor of materials science and engineering, is using one of only four atomic force microscopes in the world to develop new methods of increasing high-speed scanning of nanomaterials.

Sea Changes

One of the most anticipated research reports scheduled for release in 2010 is the world's first comprehensive Census of Marine Life – past, present, and future – and it will include contributions from Ann Bucklin, professor and marine sciences department head in UConn's College of Liberal Arts and Sciences (pictured above). Bucklin led the international Census of Marine Zooplankton project, creating a census of the estimated 14,000 zooplankton species. The Census of Marine Life, funded by the Alfred P. Sloan Foundation and dozens of other private and public funders, is a global network of researchers in more than 80 nations engaged in a 10-year scientific initiative to assess and explain the diversity, distribution, and abundance of life in the oceans.

Planting the Seeds for Future Space Voyages

Serving as the state's land grant university, UConn plays a major role in providing a wide variety of research and outreach education through the College of Agriculture and Natural Resources, where studies focus on agriculture, the environment, food, families, and quality of life. This research also extends to studying plant life and food grown in space. Mary Musgrave, professor and head of the Department of Plant Science and Landscape Architecture, has conducted research with grants supported by NASA, experimenting with plants in both space and hypergravity, providing a framework to begin predicting how plants might fare if grown in extraterrestrial environments that are not quite weightless, such as the moon. Her work could ultimately help astronauts sustain themselves during long-term space expeditions by growing their own food onboard space shuttles or in other habitats in outer space.

Addressing National Interests

Expertise in High Demand

Steven Geary, professor of pathobiology in the College of Agriculture and Natural Resources and director of the Center of Excellence for Vaccine Research, served as a 2008-09 Jefferson Science Fellow at the U.S. Department of State in Washington, D.C. Geary was one of only seven tenured faculty from around the nation who were scientific advisors to the diplomatic corps, led for the first part of the fellowship year by Condoleeza Rice and then by Hillary Rodham Clinton. He worked on several projects in the Verification, Compliance and Implementation Bureau within the Department of State's Office of Biological Weapons Affairs, which has responsibility for analyzing biological weapons research and development activities in designated nations. Geary's assignments involved a wide array of projects that utilized his expertise in vaccine research and development, pathobiology, and biological agents. He also worked with scientists at Los Alamos National Laboratory on the development and implementation of a Pathogen Strain Library, which is a national database that can be used by intelligence agencies in the event of a biological weapon release. Geary's expertise is valued by the diplomats in the capital to help monitor development of potential weapons of mass destruction, and he continues as a consultant on biological weapons issues for the Department of State.

Meeting the Needs of the Nation

The School of Engineering has captured four U.S. Department of Education grants aimed at supporting graduate study in research areas considered "areas of national need" under the agency's Graduate Assistance in Areas of National Need (GAANN) program. The funding, paired with additional matching funds, totals nearly $1 million per year and will support approximately 30 to 35 graduate students annually. GAANN Fellowships fund U.S. citizens – particularly those from traditionally underrepresented populations– as they pursue doctoral studies. Four areas are targeted for the GAANN Fellowship awards: biomaterials for tissue regeneration; sustainable energy and environmental technologies; computing research in biomedical informatics and underwater sensor networks; and computing security to strengthen financial, communications, transportation, and defense systems.

A Greater Sense of Security

Three National Science Foundation grants totaling $400,000 will help advance ongoing cyber-security research conducted by Aggelos Kiayias, associate professor of computer science and engineering in the School of Engineering (pictured at right), who is studying how to improve the security of data transmitted and stored electronically. One project focuses on wireless networks, which permit laptop computers and other portable computer devices to access the Internet without the need for plug-ins through such locations as Internet cafés, hotels, offices, universities, and homes. A related project will help improve algorithmically based encryption methods so that they permit easy data sharing while offering affordable security. A third project seeks to develop a way to introduce secure and auditable privacy contracting, a method that can be used to define a tradeoff between privacy and data mining.

SHARING SPECIALIZED KNOWLEDGE

Real Estate Research

John Clapp, professor of finance and director of UConn's Center for Real Estate and Urban Economic Studies at the School of Business, was cited as the 13th-most-published real estate researcher in the world, according to a recent study published in the *Journal of Real Estate Research*. The study also found that the University of Connecticut consistently achieved the highest ranking worldwide for published real estate research in nine of the pre-eminent real estate journals over the past 17 years.

History in the Making

Home to numerous faculty members renowned for their expertise in a wide range of fields, the University's Department of History includes specialists in such diverse areas as human rights, European history, African history, and international relations. Robert Gross, the James L. and Shirley A. Draper Chair in Early American History (pictured at left), focuses his work on the social and cultural history of the United States from the colonial era through the 19th century. His first book on the American Revolution, *The Minutemen and Their World*, won the Bancroft Prize in American History. Helen Rozwadowski, associate professor of history and coordinator of maritime studies, received the History of Science Society's 2008 Watson Davis and Helen Miles Davis Prize and the 2005 John Lyman Book Award for best book in the category of science and technology for her book *Fathoming the Ocean: The Discovery and Exploration of the Deep Sea*. Associate professor Mark Overmyer-Velázquez, director of the Center for Latin American and Caribbean Studies, is a specialist in Latin American history whose book *Visions of the Emerald City: Modernity, Tradition and the Formation of Porfirian Oaxaca, Mexico* was named best book of the year in 2007 by the New England Council on Latin American Studies.

Leader in Autism Research

Deborah Fein, Board of Trustees Distinguished Professor of Psychology in the College of Liberal Arts and Sciences, conducts internationally recognized research on autism. One of her most recent studies, presented during the 8th Annual International Meeting for Autism Research in Chicago, suggests that at least 10 percent of children with autism overcome the disorder by age 9 – most of them after undergoing years of intensive behavioral therapy. Her research has been supported by several divisions of the National Institutes of Health, the March of Dimes, the National Association for Autism Research, and the U.S. Department of Health and Human Services Maternal and Child Health Bureau.

Taking Care of Business

Bringing together wide-ranging knowledge in finance, marketing, and management, faculty in the UConn School of Business are publishing ongoing comprehensive studies on various aspects of the business world. In 2009, Robert Bird, assistant professor of marketing with a specialty in business law, and John Knopf, assistant professor of finance, published their findings from one of the first studies to provide empirical evidence of the economic costs of wrongful discharge laws and how these laws can impede employers' performance. John Veiga, Board of Trustees Distinguished Professor of Management, is one faculty member exploring the effects of telecommuting on job satisfaction and work-life balance, providing a valuable perspective for corporate managers.

Unraveling Mysteries

Nicholas Bellantoni, an associate professor of anthropology renowned for his expertise as a forensic archaeologist, also serves as Connecticut's state archaeologist, based at the College of Liberal Arts and Sciences' Connecticut State Museum of Natural History and Archaeology Center. This past year, Bellantoni traveled to Germany and Russia for an episode of The History Channel's new series "MysteryQuest" to study a skull fragment purportedly belonging to Adolf Hitler. From DNA evidence taken from blood and bone fragments that Russian officials have long claimed were that of the Nazi dictator, Bellantoni and his collaborators – including molecular and cell biology professor Linda Strausbaugh and Dawn Pettinelli, manager of UConn's Soil Nutrient Analysis Laboratory in the College of Agriculture and Natural Resources – determined definitively that the skull did not belong to Hitler. The findings, which are not without controversy, have since been reported by news organizations worldwide.

Experts in Sustainable Energy

Twelve top alternative energy researchers have joined the School of Engineering through Connecticut's public/private partnership, the Eminent Faculty Initiative in Sustainable Energy. The program is funded by a permanent allocation of more than $2.8 million annually from the state of Connecticut, supplemented by $5.6 million in seed funding from private industry and other sources. The initiative promotes research, education, and technology transfer activities in the area of carbon-neutral green energy technologies. Industry partners include UTC Power, the Northeast Utilities Foundation, and FuelCell Energy. With expertise spanning varied energy technologies, the new faculty members bring broad experience gained while working with Westinghouse Electric, FuelCell Energy, the U.S. Department of Energy's Lawrence Livermore National Laboratory, Case Western Reserve, Vanderbilt, Rensselaer Polytechnic Institute and other top research universities, and the NASA Center for Advanced Microgravity Materials Processing.

Economic Growth in Africa

Mwangi S. Kimenyi, associate professor of economics in the College of Liberal Arts and Sciences, has been named a senior fellow at the Brookings Institution, a nonprofit public policy organization based in Washington, D.C. An expert on the African economy, Kimenyi joined the Africa Growth Initiative, part of Brookings' Global Economy and Development program, focusing on Africa's development challenges. He also serves as a research associate with the University of Oxford and is the founding executive director of the Kenya Institute for Public Policy Research and Analysis, which provides research and policy analysis and advises the government and private sector in Kenya.

NOTABLE HONORS AND DISTINCTIONS

Up for the Challenge

Three UConn Health Center scientists were awarded highly competitive challenge grants from the National Institutes of Health, focusing on specific knowledge gaps, scientific opportunities, new technologies, data generation, or research methods that would benefit from an influx of funds to advance the area in significant ways. Bruce Mayer, associate professor of genetics and developmental biology, is working with collaborators in his lab on a better way to classify tumor types so that cancers can be more effectively treated. Thomas Babor, professor and chair of the Department of Community Medicine and Health Care, will be studying the comparative effectiveness and feasibility of SBIRT (screening, brief intervention, and referral to treatment program) in a general dental clinic. Zihai Li, associate professor of medicine and tumor immunology, has received a grant to study the novel chaperone mechanism for platelet disorder.

Scratching the Surface

Shengli Zhou, an assistant professor of electrical and computer engineering, was selected to receive one of 67 Presidential Early Career Award for Scientists and Engineers (PECASE) awards presented in 2009. The PECASE awards are the nation's highest honor for professionals at the outset of their scientific research careers. Zhou will receive $200,000 yearly for five years to expand research aimed at improving the performance and robustness of a multi-carrier acoustic modem and equipping the modem with a positioning/navigational capability and the ability to accommodate multiple users in distributed networks simultaneously. These modems are used in underwater surveillance – such as unmanned underwater vehicles – and in stationary underwater sensor packages or underwater equipment that collects data for environmental monitoring and study purposes.

Staying Engaged in Education

Joseph S. Renzulli, Board of Trustees Distinguished Professor of Educational Psychology in the Neag School of Education, serves as director of the National Research Center on the Gifted and Talented and holds the Neag Chair in Gifted Education and Talented Development. Known for his groundbreaking research in gifted and talented education, his Schoolwide Enrichment Model has been used in more than 2,500 schools nationwide. This past year, Renzulli received the prestigious Harold W. McGraw, Jr. Prize in Education for 2009 from The McGraw-Hill Companies. His latest research with collaborator Sally Reis, Board of Trustees Distinguished Professor and Teaching Fellow in Educational Psychology (pictured above, with Renzulli), has resulted in a new book, *Light Up Your Child's Mind: Finding a Unique Pathway to Happiness and Success*, which offers parents practical advice on how to play more meaningful roles in children's education inside and outside the classroom.

New Opportunities for Exploration

UConn researchers have secured more than $33 million in federal stimulus funds through competitive grants awarded by federal agencies as part of the American Recovery and Reinvestment Act enacted by Congress. The funding will support a wide variety of ongoing and new research, including 43 projects at the University and 32 projects at the UConn Health Center. Among them are a $3.6 million grant to study biodefense responses to microbial pathogens, led by Health Center immunologist Leo Lefrancois; grants totaling $1.9 million, in part for research on bilingualism in sign and spoken language among hearing children of deaf families, conducted by Board of Trustees Distinguished Professor of Linguistics Diane Lillo-Martin; and $400,000 for an investigation into the formation and applications of ultracold molecules by physicist William Stwalley.

High Honors in Medicine and More

Cato T. Laurencin, vice president for health affairs and dean of the School of Medicine as well as a professor of chemical engineering in the School of Engineering, received two national honors for his academic and research work. He was named by President Barack Obama as a recipient of the 2009 Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring, which is presented to individuals or organizations in recognition of their mentoring of minority students who are underrepresented in the fields of science or engineering. He also received the 2009 Pierre Galletti Award from the American Institute for Medical and Biological Engineering, the organization's highest honor, which recognizes contributions to public awareness of medical and biomedical engineering. Laurencin, who is renowned as a bioengineering expert and an orthopaedic surgeon, was recognized in 2008 by the American Institute of Chemical Engineers as among the "100 Chemical Engineers of the Modern Era."

Prestigious Humanities Award

Pamela Brown, associate professor of English (pictured above) at the University's campus in Stamford, Conn., is a specialist in Shakespeare studies and Renaissance literature with a focus on popular culture and women's studies. Brown was honored this past year with a National Endowment for the Humanities (NEH) fellowship. These prestigious fellowships help support individuals pursuing advanced research of value to scholars and general audiences in the humanities; Brown's NEH award will support her book in progress, *Extravagant Stranger: The Foreign Actress in Shakespearean Drama*.

New Perspectives on the Cold War

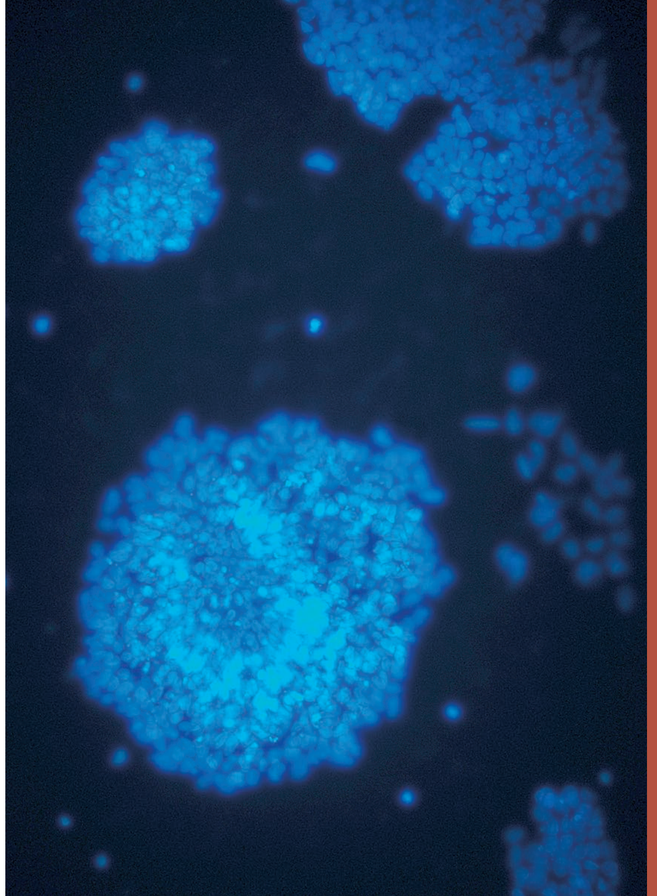
Frank Costigliola is a professor of history with expertise in U.S. foreign relations whose work has been recognized by fellowships from the Guggenheim Foundation, the National Endowment for the Humanities, and the Nobel Institute. Currently a member-in-residence at the Institute for Advanced Study, Costigliola is engaged in a book project with support from the National Endowment for the Humanities entitled *Lost Alliances: How Personal Politics Helped Win World War II and Form the Early Cold War*. The book analyzes the personal ties, cultural background, and emotional reasoning that influenced political relations in the wartime alliance and in the early Cold War.

Offering 17 graduate degrees in more than 90 fields of study, the University of Connecticut is a research-intensive institution that fosters interdisciplinary collaboration and unites faculty with students in forward-looking scholarly work. Classified as a Carnegie Foundation Research University, UConn shares this prestigious designation with the nation's top higher education institutions.

The Graduate School, with many highly ranked programs across the University, attracts internationally renowned faculty who serve as exceptional mentors, pursuing innovative research endeavors with the support of prestigious grants in diverse areas of social and physical sciences as well as the arts and humanities.

Research remains a top priority across the University and its Health Center, which are home to 117 research centers and institutes that serve UConn's teaching, research, diversity, and outreach missions. In addition, the University's Office of Technology Commercialization leads several programs that drive entrepreneurial activity across UConn as well as the state of Connecticut, providing the infrastructure needed to bring University discoveries from the laboratory to the marketplace.

For more information about admission to the University of Connecticut Graduate School, please visit grad.uconn.edu or contact Suman Singha, Vice President for Research & Graduate Education and Dean, at 860.486.3619.



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