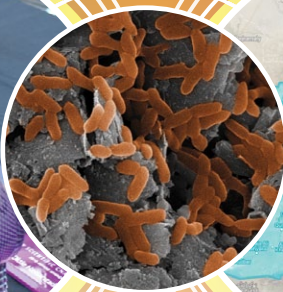
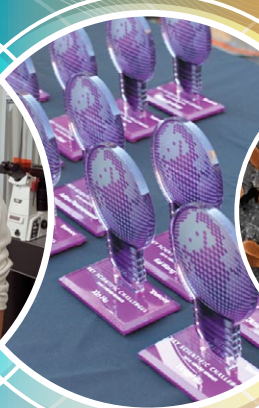


UMassAmherst

Research is What's

NEXT



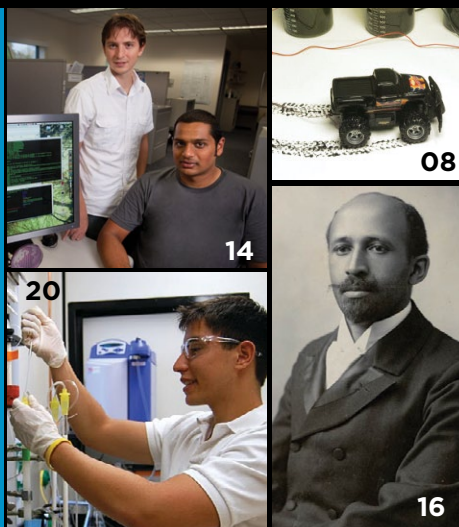
# UMASS AMHERST

The mission of **The University of Massachusetts** is to provide an affordable and accessible education of high quality and to conduct programs of research and public service that advance knowledge and improve the lives of the people of the Commonwealth, the nation, and the world.

## REPORT ON RESEARCH 2010 CONTENTS

- 01** FROM THE VICE CHANCELLOR
- 03** STIMULATING YEAR
- 06** WHAT'S NEXT FOR BIOFUELS RESEARCH
- 08** MIGHTY MICROBE
- 10** POWER SURGE!
- 12** BRIDGING THE GAP
- 14** BRIGHT MINDS
- 16** AFRO-AM TURNS 40
- 18** CAPS AND GOWNS IN KABUL
- 20** BREEDING BETTER BIOLOGISTS
- 22** INSPIRING INNOVATION
- 24** SPONSORED ACTIVITY
- 26** TECHNOLOGY TRANSFER
- 28** FACULTY RECOGNITIONS

### BACK COVER INSIDE FACULTY BOOKSHELF



**Editor**  
Karen J. Hayes '85

**Design**  
Matt Jasiorowski, UMass Amherst  
Creative Communications

**Writing**  
Karen J. Hayes '85, Caitlin Coughlin '11, John Sippel

**Photography**  
John Solem

*This report reflects activities from  
July 1, 2009 – June 30, 2010.*

*For additional copies contact  
University Relations  
Whitmore Administration Building  
181 Presidents Drive  
University of Massachusetts  
Amherst, MA 01003  
(413) 545-9586  
or visit [www.umass.edu](http://www.umass.edu)*

**NEXT**  
Research, Scholarship and Creative Activity  
for a Brighter  
Future



Dear Friends and Supporters:

I am pleased to provide you with this report on the UMass Amherst Fiscal Year 2010 achievements and to offer you a glimpse of what's next for campus research, scholarship, and creative activity.



Our campus continues its rise as a top public research university despite the ongoing economic recession. As a confirmation, the campus had another record-breaking year for sponsored activities, receiving \$170 million in grants and contracts, a 24 percent increase compared with Fiscal Year 2009. Nearly \$40 million are funds from the American Recovery and Reinvestment Act of 2009, also known as stimulus money. In this report, you will read about some of the groundbreaking projects stimulus funding is supporting. One project is the Energy Frontiers Research Center where work to develop technology for the next generation of efficient and affordable solar cells is under way. Stimulus funding also supports renovations to the Lederle Graduate Research Tower where outdated laboratories will be transformed into modern, open space, helping faculty to collaborate and to work on the next great ideas.

Our research continues to win the confidence of federal funding organizations. With our very productive and creative faculty, we secured the number four spot on the National Science Foundation's list of top New England Grant Recipients for the second year in a row.

In addition to advancing science and knowledge, the campus continues to honor its public service mission by fostering research, scholarship, and creative activity that feeds our regional economy. The campus is a founding partner in the soon-to-be-constructed Green High Performance Computing Center. This world-class, sustainable facility, with supercomputers required for cutting-edge research, will be located within twenty minutes of the campus. On a grassroots level, UMass Amherst is partnering with the City of Springfield to help revitalize regional business development and entrepreneurship through the Springfield Business Incubator. In this venture, the campus will work more closely with Springfield-area academic and business leaders to identify and nurture the next new businesses spawned from classrooms and labs.

On behalf of the campus, I thank you, our friends and supporters, for helping UMass Amherst pursue what's next in research, scholarship, and creative activity. We look forward to even greater success in the future as we work to improve the state economy. UMass Amherst is what's NEXT for the Commonwealth and the nation.

Sincerely,

A handwritten signature in black ink that reads "Mike Malone". The signature is fluid and cursive, with a long horizontal line extending from the end.

Michael F. Malone  
Vice Chancellor for Research & Engagement  
Ronnie & Eugene Isenberg Distinguished Professor of Engineering

Professor Kevin Fu Chosen to Advise White House on Trustworthy Computing

iPhone App to Rescue Oiled Gulf Coast Wildlife

## **UMass Amherst, STCC Announce Partnership to Grow New Businesses at Springfield Incubator**

College of Engineering and School of Education Ranked Among Top Graduate Programs by *U.S. News and World Report*

*Chronicle of Higher Education* names UMass Amherst a “Top Producer of Fulbright Students”

## **White House Taps Professor Derek Lovley to Receive Funding to Convert Carbon Dioxide Emissions to Fuels**

## **UMass Amherst Researchers Discover How to Move Protons, Improve Hydrogen Fuel Cell Technology**

U.S. Department of Agriculture Chooses Food Scientist Yeonhwa Park for National School Lunch and Breakfast Nutrition Standards Committee

*British Journal of Cancer*: Chemical Engineer Neil Forbes Develops System to ‘Detonate’ Cancer-Fighting Protein inside Tumors on Command

## **UMass Amherst Physicist, Biologist Develop New Microscope So Powerful It Sees Individual Molecules**

## **UMass Students Win Yahoo! Key Scientific Challenges Award**

**UMass Amherst Research is**

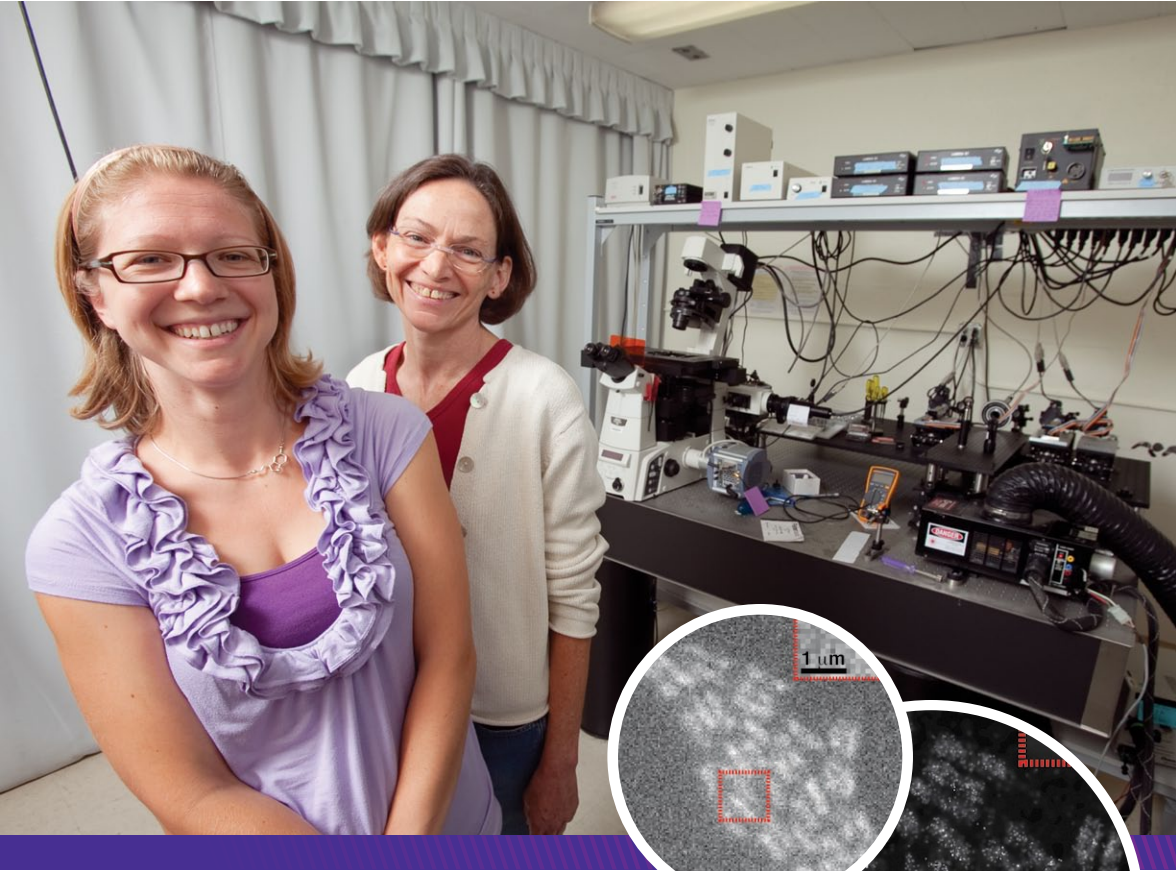
# **What’s NEXT**



**STIMULATING YEAR**

**AMERICAN RECOVERY AND REINVESTMENT ACT**

**SPURS NEXT LEVEL OF RESEARCH**



A major STORM has settled on UMass Amherst. It didn't bring the high winds, hail, and lightning common to Western Massachusetts but its impact is being felt far beyond the region. The Stochastic Optical Reconstruction Microscopy (STORM) will allow scientists to see molecules and structures 100 times more clearly than through using traditional light microscopy. Built under the direction of Jennifer Ross, physics, (left) and Patricia Wadsworth, biology, this instrument is one of only two in the nation at a university. STORM will immensely improve the ability of scientists to view nanoscale proteins, structures, and organelles inside cells.

Inset: A cell imaged with traditional microscopy (left) and super resolution (right).

The building of STORM was funded by federal stimulus money. "This is one of several key proposals funded by nearly \$40 million in stimulus money that was awarded to UMass Amherst," says Michael F. Malone, vice chancellor for research and engagement. The grants were designated for both specific research projects and general infrastructure.

Wadsworth and Ross received \$684,000 to build the super-high-resolution microscope that significantly improves the ability to observe and track individual protein molecules. “This takes research to the next level,” says Ross. For example, the ability to see very small things—objects 20,000 times thinner than a human hair—can help answer some of the most vexing questions in biology. Until now, observing individual proteins has involved isolating them from the cells in which they operate, a process in which normal interactions and behaviors are lost. Ross’s and Wadsworth’s new microscope changes the method to study proteins. It allows scientists much greater precision in identifying objects—such as certain cellular proteins—by letting them see the proteins individually and watch their movement in real time. The two scientists are particularly interested in observing individual molecules that control cell division to learn how cell processes go awry and lead to the uncontrolled cell growth that causes cancer.

“This microscope will help virtually all scientific disciplines to answer important questions ranging from how neurons communicate with each other in the brain to discovering the most efficient green energy sources,” says Ross.

### **TWENTY-FIRST CENTURY LEDERLE**

A \$7-million stimulus grant from the National Institutes of Health will fund building improvements at the nearly 40-year-old Lederle Graduate Research Tower. The renovations include building two new laboratories and creating shared lab and instrument space. The project will transform 15,000 square feet of cramped cubicles and outdated laboratories dating from the 1970s into modern, open space that will encourage

collaboration and exchange of ideas. “The goal is to continue to enhance and expand interaction between the biological and physical sciences—a high priority for our science departments,” says James F. Kurose, executive associate dean of the College of Natural Sciences.

### **CREATING AFFORDABLE SOLAR CELLS**

With a \$16-million grant from the U.S. Department of Energy, the newly created Energy Frontier Research Center is charged with finding better ways to convert the sun’s energy into electrical power. Using the campus’s largest stimulus grant to date, researchers in the center will lead efforts to develop highly efficient, low-cost organic polymer materials to replace the more expensive silicon materials currently used for harvesting solar energy. In releasing the funds, U.S.

Secretary of Energy Steven Chu noted that the UMass Amherst center and others will mobilize the talents and skills of the nation’s scientific communities in pursuit of the breakthroughs needed to make alternative and renewable energy viable as replacements for fossil fuels.

### **GREEN BIOFUELS PRODUCTION**

The development of green biofuels production processes received a boost with a \$1.9 million National Science Foundation stimulus grant and a \$2.2-million Department of Energy award.

The grants were awarded to George Huber, a member of the chemical engineering department and the John and Elizabeth Armstrong Professional Development Professor, who is leading groundbreaking research into biofuels. “We are developing new processes that will allow us to obtain liquid transportation fuels and chemicals from domestically available biomass sources rather than importing crude oil. In addition to improving our economy and our national security, these processes will also significantly



### **STIMULUS AWARDS RECEIVED IN 2010**

Number of awards: 66

Dollar amount: \$39,973,864

Research areas include biofuels, cancer, diabetes, electrofuels, solar energy, antibiotics resistance, and drug delivery.



1. Federal stimulus money funded the Energy Frontier Research Center photovoltaics facility. Faculty and students such as Dian Chen (pictured) use the facility to conduct research on solar cells.
2. An NIH stimulus grant will help Lila Gierasch (left) investigate how diseases arise from folding mistakes in cell proteins.
3. Physical Plant's Joe Balzano (left) and Executive Associate Dean Jim Kurose team up to transform lab space in the Lederle tower (background) thanks to stimulus funding.

reduce our greenhouse gas emissions and improve our environment," says Huber.

### **PROTEIN MISFOLDING IN DISEASE**

When scientists better understand protein misfolding in cells, cures for diseases such as Huntington's and Parkinson's are more likely to be found. With a \$360,447 National Institutes of Health stimulus grant, Distinguished Professor Lila Gierasch, chemistry and

biochemistry and molecular biology, will further her research into what goes wrong when proteins misfold. Her project is in collaboration with Evan Powers of Scripps Research Institute, based in Florida and California. "Basic research reveals how biology works, which in turn helps scientists engineer better treatments for disease," says Gierasch.

---

**"Our campus community acted quickly to develop and submit federal stimulus funding proposals and the effort has paid off handsomely. Our faculty and the excellence of their research have stood out and garnered resources for the campus."**

*—Chancellor Robert C. Holub*

---



# WHAT'S NEXT

## FOR BIOFUELS RESEARCH



### FROM SEED TO SALE

The list of projects on TIMBR's website reads like a *Complete Guide* to biofuels research and the faculty a *Who's Who* in the alternative energy field. Formally known as The Institute for Massachusetts Biofuels Research, TIMBR boasts an interdisciplinary team of chemists, engineers, plant scientists, and microbiologists who are producing promising research critical to moving the nation from fossil fuel dependence toward abundant, cost-effective alternative fuels.

"The institute's research is vertically integrated and our talented team consists of experts in all areas of biofuels research and development," says James Demary, managing director. "So you could say we cover the spectrum of biofuels research from seed to sale."

### FEEDSTOCK

TIMBR member Samuel Hazen, biology, works with seeds to produce biofuels. The grass species *Brachypodium distachyon* (brachy) has emerged as central to his research into key energy and food crops for biomass processing. In February, Hazen and an international team of more than 100 researchers published the entire genome of the model grass commonly

known as purple false brome in the journal *Nature*. According to Hazen, *B. distachyon* is an excellent model for genetic and molecular biology research because it is very small, has a short life cycle, and is easily grown in the laboratory. In three months, a generation of the grass can be monitored and analyzed, in contrast to other grasses that take a full year. With quicker results, scientists can build comprehensive data and develop insights for research into energy crops.

"Plant and microbial sciences are vital if we are to meet the expectation that agriculture will provide a substantial proportion of our energy needs via plant biomass conversion to transportation fuel," says Hazen.

Twenty-eight TIMBR-affiliated scientists are working in 12 different labs devoted to biofuels. The research is also backed by \$2 million from both the U.S. Department of Energy and U.S. Department of Agriculture.

### CONVERSION

The main obstacle to replacing imported petroleum-based products is developing a low-cost way to process biomass. Removing the obstacle is the work of John and Elizabeth Armstrong Professional Development

Professor George Huber, chemical engineering. Huber uses a technology called aqueous-phase processing to develop highly-efficient and low-cost processes, materials, and reactors for biomass conversion to fuels and chemicals. “Aqueous-phase technology is an effective biomass conversion strategy because it’s fast, efficient, and green,” says Huber. Huber is widely known for creating the patent-pending Catalytic Fast Pyrolysis (CFP™) process for turning sawdust, plant stalks, and other cellulosic waste into green gasoline. This year he received \$4 million in federal stimulus grants to build on his research. Anellotech (see page 27) is a spinoff company that uses the clean technology platform.



1. Samuel Hazen and an international team of more than 100 researchers recently published the entire genome of the model grass commonly known as purple false brome.
2. George Huber will use \$4 million in federal stimulus grants to further develop his technology for converting biomass to green gasoline.
3. Susan Leschine’s biofuels company Qteros is set to open a pilot-scale production facility in Chicopee, Mass.

**PRODUCTION**

Microbiology professor Susan Leschine describes her vision for the day when clean, renewable, and local resources fuel motor vehicles that restore and preserve the health of the planet. Leschine is a leading authority on cellulose-digesting microbes, their role in the global carbon and nitrogen cycles, and their industrial applications. For the last 25 years, Leschine has directed a research program on microbes and microbial communities that decompose plant biomass. This research led to forming Qteros, Inc. (formerly SunEthanol), headquartered in Marlborough, Mass. The company converts cellulose derived from non-food-based biomass into ethanol. Recently, Qteros and UMass Amherst patented the technology.

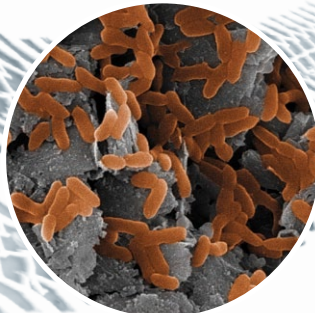
The patent is based on an organism Leschine and microbiology colleague Thomas A. Warnick found on the banks of the Quabbin Reservoir in central Massachusetts more than 10 years ago. It was dubbed the “Q Microbe®.” “The company’s vision is to accelerate the low-cost, commercial-scale production of cellulosic ethanol (ethanol from non-food sources). We are rapidly transforming that vision into a global commercial reality,” says John McCarthy, president and CEO of Qteros. According to McCarthy, a key advantage of the company’s technology platform is the Q Microbe. A natural bio-refinery in itself, it produces ethanol as part of its metabolism, as well as possessing a number of other unique characteristics that together dramatically streamline the low-cost production of cellulosic ethanol.

“Only through interdisciplinary collaboration can we see the whole picture as we seek energy solutions.”

*–Susan Leschine, professor of microbiology*

## MIGHTY MICROBE

### BACK TO THE FUTURE WITH ELECTROFUELS



The notion of time traveling may have been science fiction in Robert Zemeckis's 1985 film *Back to the Future* but the notion of providing fuel for the film's time-hopping Lamborghini from banana peels and other common organic compounds wasn't far from becoming reality. Using ancient living organisms found in riverbed mud to produce "electrofuels," microbiologist Derek Lovley could make the process of powering a Lamborghini or a Lexus even simpler and greener than what was depicted in the film.

Lovley discovered the tiny microbe *Geobacter* in the sediment of the Potomac River two years after Zemeckis's film debuted. *Geobacter* drives Lovley's new technology called Microbial Electrosynthesis (ME). ME is a one-step process that acts like reverse photosynthesis and is at the core of electrofuels generation. In basic terms, electric energy powers *Geobacter* to breathe in carbon dioxide and exhale energy-rich organic compounds that can be used to make liquid fuels and industrial chemicals.

"This could be the most exciting and significant development in alternative fuels in years," says Lovley. "One reason this process is so exciting is that we go directly from carbon dioxide to fuel, bypassing all kinds of difficulties encountered in producing fuels from biomass."

In one year, Lovley has received \$3.8 million in funding from the federal Department of Energy. In April, Vice President Joe Biden announced the awarding of a \$1 million stimulus grant to help Lovley refine the technology for converting carbon dioxide into fuels. Lovley received an additional energy department grant of \$2.8 million. "Making valuable chemicals and more affordable green fuel from solar power, bacteria, and carbon

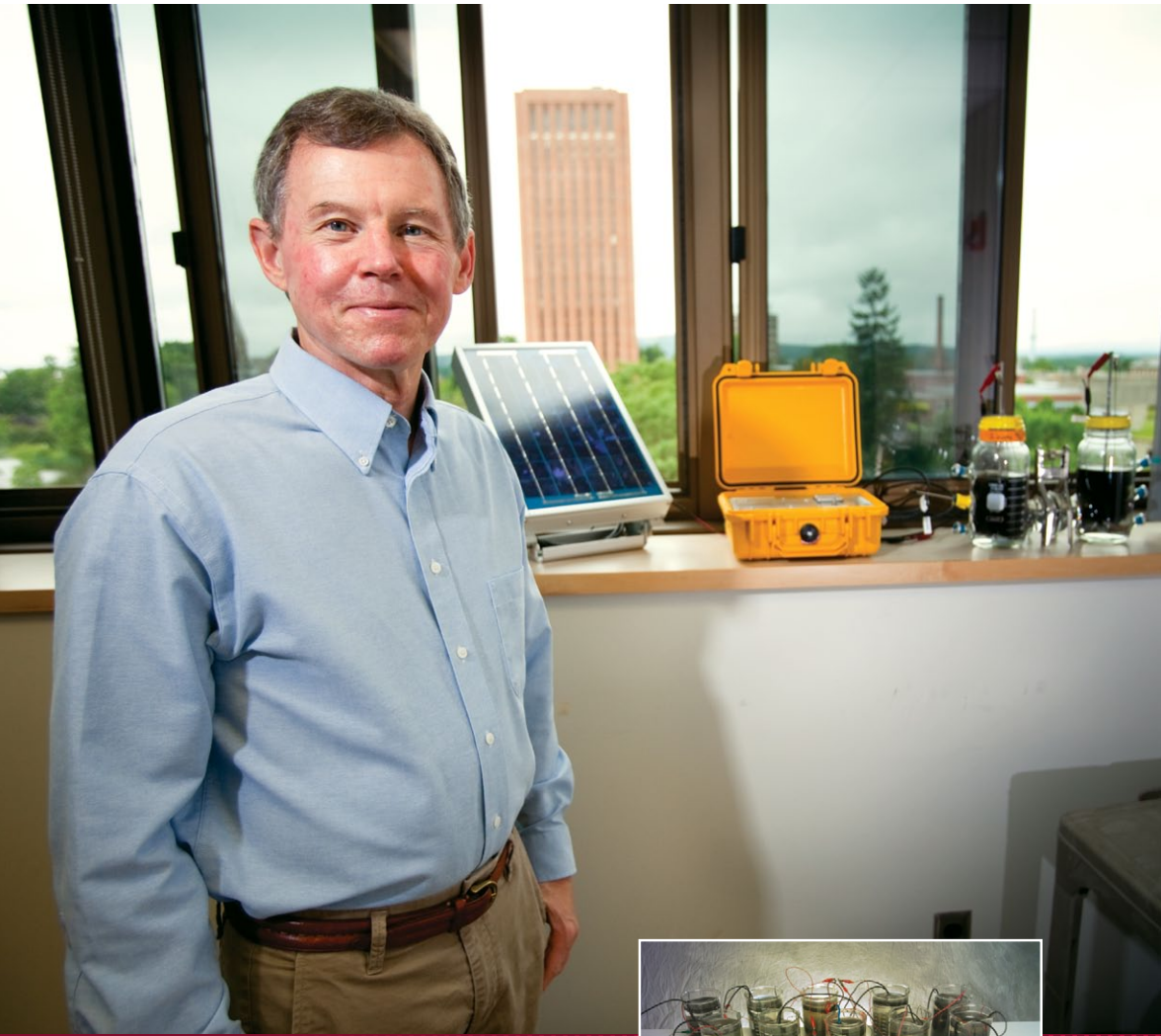
dioxide could be transformative for our society if it works on a commercial scale," says Lovley.

As a clean energy technology, ME has many advantages. It's carbon neutral and uses solar energy more efficiently than plants. It requires no biomass feedstock or arable land, uses far less water than current biofuels technologies, and needs no elaborate post-production fermentation. Once established, the *Geobacter* cells and electrode food sources remain plentiful, achieving 90 percent efficiency at turning electrons into fuel without further processing. Lovley and colleagues published their experimental results and discuss implications of the technology in the May 2010 issue of *mBIO*, an online journal of the American Society of Microbiology.

Since discovery of the *Geobacter* family of anaerobic bacteria in 1987, research on the species has been wide-ranging. The studies have demonstrated how different strains of the bacteria can eat metal, produce electricity from waste, and survive in temperatures much higher than all other life forms. Research on *Geobacter* has even led to the development of new theories about how gold deposits formed and how life began on earth. Who knows what's next for Lovley's mighty microbe?

A timeline of Lovley's *Geobacter* research and related discoveries is available on the campus's website [www.umass.edu/umhome/research](http://www.umass.edu/umhome/research)





Professor Derek Lovley's research has produced valuable chemicals and more affordable "green" fuel from solar power, bacteria, and carbon dioxide.



**“One reason this process is so exciting is that we go directly from carbon dioxide to fuel, bypassing all kinds of difficulties encountered in producing fuels from biomass. This could be the most exciting and significant development in alternative fuels in years.”**

*–Derek Lovley, distinguished university professor of microbiology*





## POWER SURGE!

# GREEN HIGH PERFORMANCE COMPUTING CENTER POWERS WHAT'S NEXT FOR UMASS AMHERST RESEARCH

Geoscientist Robert DeConto wants to understand the past, present, and likely future of global climate change. His research group uses computer models of the atmosphere, oceans, ice sheets, and other aspects of the climate system to better comprehend the mechanisms underlying past and future climate change, including rises in sea level. His models consider not only the individual components of the climate system and their underlying physics, but also the interactions and coupling between them, so these complex models require powerful computers. “Our models generate many terabytes of data when they run. Data storage is an important

to house the computational power for DeConto as well as others.

High-performance computing, the use of large clusters of computers or special purpose supercomputers to crunch data too large for traditional computers, is an indispensable research tool in science and engineering and (increasingly) the social sciences and other academic disciplines. In addition to requiring significant floor space, supercomputer facilities need cooling, ventilation, and technical support for the machines. The campus has many computationally intensive research projects in the life sciences, the environment, and energy that produce,

**“The \$168-million, Green High Performance Computing Center will help advance the campus’s leadership in areas of importance to the state economy and the nation, and will enable collaborative research projects among the region’s internationally recognized academic institutions and industrial partners.”**

*–James F. Kurose, executive associate dean, College of Natural Sciences*

issue for us,” says DeConto, an authority on the Earth System approach to understanding global climate dynamics. “Do we have access to enough computational power and data storage to meet our research needs,” he asks and answers, “a big no.”

DeConto will soon have access to the computational power he needs to better examine the past to predict what’s next on the global climate scene. The building of a world-class Green High Performance Computing Center by UMass Amherst and a slate of state, academic, and industry partners on the grounds of a former textile manufacturing plant in nearby Holyoke will provide a facility

store, and process the terabytes of data that scientists like DeConto need. But the campus’s current high performance computing center, located on the first floor of the Lederle Graduate Research Center, will not meet the campus’s growing high-performance computing needs.

“Campus departments have been creative about configuring high-performance systems to meet their needs but our facilities allow us to only go so far,” explains James F. Kurose, executive associate dean, College of Natural Sciences, who helped shape the Green High Performance Computing Center project. “Having a cutting-edge regional resource



like the Green High Performance Computing Center literally in our back yard will help faculty take their research programs to the next level.” The facility will also support the concept of green or sustainable computing, which uses energy-efficient design and operations to reduce the overall carbon footprint of the computing infrastructure.

Holyoke, about a 20-minute drive from campus, was a prime choice for the center because of the city’s high-speed data networks and access to inexpensive hydroelectric power, says Eric Nakajima, senior innovation adviser, Massachusetts Executive Office of Housing and Economic Development. Other partners are the Massachusetts Institute of Technology, Boston University, Northeastern University, Harvard, Cisco Systems, and EMC Corporation.

Although the facility itself will be a boon to campus research, chemistry professor Scott Auerbach is just as eagerly awaiting the opportunities for collaboration the computing center and its partners will bring. “Researchers across disciplines have common computational challenges,” says Auerbach. “We each develop our own tricks and learn how to do things in certain ways. Creating a high-performance computing community in addition to building the facility will allow us to share our techniques. The cross-pollination of ideas is really limitless.”

Auerbach studies “proton hopping” and its role in hydrogen fuel cell development. As a technology, fuel cells are much more efficient at generating energy than internal combustion engines or batteries. Hydrogen fuel cells produce electricity by first splitting

hydrogen into protons and electrons: electrons go through the fuel cell electrical circuit while protons have to pass through a synthetic membrane. On the other side of the circuit, the protons and electrons combine with oxygen to produce water. This chemical reaction produces electrical energy and because the byproduct is water, the technology is environmentally friendly.

“We have good, stable materials such as copper for electron transfer,” says Auerbach. “Proton exchange membranes hold the big challenges in hydrogen fuel cell development.” Designing new materials means Auerbach must try to combine molecules in ways that allow him to develop materials with good characteristics for proton exchange. That’s where the calculations come in. “There are millions of combinations. High-performance computing allows us to pare down all the possibilities to some good leads. Computer-aided discovery is essential to shortening the research and development life cycle,” says Auerbach.

Auerbach, DeConto and others will soon have supercomputing opportunities. The Massachusetts Green High Performance Computing Center is projected to open its doors in 2012. What’s next, says Kurose, is to establish a collaborative research agenda among the center’s partners in advanced computing and applications that positions Massachusetts as a global research leader. “Working in close partnership with our local, regional, and state officials, UMass Amherst is poised to leverage the facility for national research competitiveness and economic growth,” says Kurose.



# BRIDGING THE GAP

## TOWARD A PUBLIC UNDERSTANDING OF ECONOMICS



The gap between what is happening to our economy and the average citizen’s understanding of it can be as wide as a football field. That could change as economics professor Nancy Folbre tries to make it easier for the public to learn about economic issues with broad impact. “It’s important for people to understand how the economy works, especially when it’s not working very well,” says Folbre.

Nancy Folbre, (at left) is a regular contributor to the *New York Times* blog *Economix*, a place where contributors analyze the news and use economics as a framework for thinking about the world.

Teaching at UMass Amherst since 1981, Folbre is an expert on public higher education, women's role in the workplace, and the undocumented costs of caring for children or elderly parents, and related issues. Her passion is to bridge the divide between those who understand economics and those who don't.

A prolific writer, for the past two years she has been a contributor to the blog *Economix*, on the *New York Times* website. "I like the

have evolved without the MacArthur award," notes Folbre.

In meeting her goal to better help the public understand economics, she has authored seven books, including her most recent, *Saving State U: Why We Must Fix Public Higher Education* (The New Press, 2009). This book discusses the role of public higher education as a beacon for citizenship and cultural exploration as well as the risk

**"It's important for people to understand how the economy works, especially when it's not working very well."**

*—Nancy Folbre, professor of economics*

*Economix* blog," says Folbre, "It presents a variety of views, and seems like a great interface between academics and the public." Her postings have spurred debate, editorials, and letters to the editors — in support of and against her economic positions.

Through her blogging and other work, Folbre is honoring the campus's land-grant promise to transfer knowledge discovered through research and creative activity to the citizens of Massachusetts. She is an involved member of the campus's Center for Research on Families and the Center for Public Policy and Administration, two interdisciplinary programs that actively support and disseminate social and behavioral science research.

In 1998, she received a prestigious MacArthur Foundation Fellowship, also known as the Genius Award. With its support, Folbre wrote *"The Invisible Heart: Economics and Family Values"* (New Press, 2001). The book served as a foundation for research that followed. "I don't know how my work would

institutions face as funding is reduced. "Public universities need more stable and generous public funding in order to maintain quality and to avoid increases in tuition and fees," says Folbre.

Looking at what's next, Folbre will continue research on a soon-to-be-published book, *Love and Money: Care Provision in the U.S.* The book represents collaborative work by Folbre and nine other researchers who were supported by the Russell Sage Foundation. Another priority for Folbre is working with the Valley Alliance of Worker Coops to develop an internship program focused on local cooperative businesses. Folbre says the area around UMass Amherst is "particularly rich in worker-owned businesses" and the campus itself features student-run cooperative businesses such as Earthfoods, People's Market, and Campus Design and Copy. The future, Folbre says, will be filled with finding ways to promote public understanding of vital economic issues.



## BRIGHT MINDS

### INVENTING THE FUTURE OF THE INTERNET



The future of the Internet may be one click away from the computers of two doctoral candidates at UMass Amherst. Computer science students Sameer Singh (right) and Michael Wick (left) have each won a Key Scientific Challenge grant from Yahoo! Labs based on their ideas of the next generation of the internet.

Singh and Wick are two of the 23 Challenge winners in 2010, the second year of awards. Two other UMass Amherst students received awards in the program's inaugural year. Three of the four students work with computer science professor Andrew McCallum. Many of McCallum's former students now have jobs with Yahoo!, Google or at universities across the country.

The two PhD candidates, who each received \$5,000, spent two days in the fall

at Yahoo!'s campus in Sunnyvale, California, presenting their work and networking with Yahoo! scientists and other award winners. Wick explained that his research looks at ways to structure the voluminous data scattered on the web to improve the efficiency of searches in order to reduce user frustration. His winning proposal centered on ways to overcome problems associated with extracting information from raw text including how to best store that information in a database.

Singh is trying to solve the difficult problems that common names present in computer searches by developing a program that would differentiate among many people with the same name.

Singh says there are many benefits to winning the award: “As a graduate student, feedback on ideas and research is extremely valuable, especially when coming from the scientists in Yahoo! Labs.” The visit to the Yahoo! Labs headquarters created

Acknowledgement of the computer science department’s quality comes from other sources as well. The department’s graduate program is ranked 20th in the nation and its artificial intelligence graduate program eighth, according to the 2011 *US News and World Report*.

“Our students are extremely well prepared for making contributions in areas that companies like Yahoo! are interested in,” notes Andrew Barto, computer science department

---

**“The faculty and students at UMass Amherst have contributed to the foundations of information retrieval and machine learning, two core technologies that we use in all areas of our business. Therefore it’s strategic for Yahoo! to recruit UMass students to bring the newest thinking to our products.”**

***– Ken Schmidt, Yahoo! Academic Relations***

---

opportunities for an exchange of ideas, new friendships, and a stage for collaborations in the future. “Perhaps we’ll launch our own Internet company and give out our own awards someday,” jokes Singh, who completed a summer internship at Google.

According to Jamie Lockwood, manager of the Challenge program, the award is an opportunity for graduate students to further develop their ideas about the world-class science that will unveil the next generation of the Internet. Ken Schmidt, Yahoo! Academic Relations to UMass Amherst, says, “The faculty and students in the UMass Amherst computer science department have contributed to the foundations of information retrieval and machine learning, two core technologies that we use in all areas of our business. It’s strategic for Yahoo! to recruit UMass students to bring the newest thinking to our products.”

chair. “We view it as a mutually beneficial relationship. They have the opportunity to interact with our students and we benefit from their contributions to the department,” he explains.

Schmidt believes that a major advantage of the relationship between Yahoo! and UMass Amherst is how both are willing to work on new ideas from both academic and industry perspectives. “It’s all about openness and willingness to work together to advance the new sciences of the web,” says Schmidt, “and nurturing the next generation of Internet scientists and entrepreneurs.”



# AFRO-AM TURNS 40

## WHAT’S NEXT FOR THIS SIGNATURE PROGRAM?

When UMass Amherst’s W. E. B. Du Bois Department of Afro-American Studies was founded in 1970, the university had only five black professors and more students from Africa and Asia than blacks from Massachusetts. Two years earlier those five professors, banding together as the Committee for the Collegiate Education of Black Students, arranged for the enrollment of a significant number of African Americans; the graduates from that first-year cohort would outnumber the full roster of black graduates in the previous 105 years of the university’s history.

From that improbable starting point the department has become a preeminent source of knowledge of the history and culture of black people in Africa and the New World. It has also promoted an ethos of social responsibility and enhanced the campus’s cultural life in profound and varied ways.

“I’m most struck by how unsurprising our success has been,” says Professor Amilcar Shabazz, the department’s seventh and current chair. “We began as—and, in my

to move into a society which we very confidently, optimistically, and naïvely thought was on the verge of making serious and permanent advances in matters of race.”

It was Thelwell who first urged that the department be named for William Edward Burghardt Du Bois, a Massachusetts native and a towering figure in American intellectual history. In its first several years the department attracted what Thelwell calls “the most scintillating gathering of black intellectuals anywhere in the world,” including writers Chinua Achebe and James Baldwin, jazz musicians Max Roach and Archie Shepp, playwright Paul Carter Harrison, dancer Diana Ramos, painter Nelson Stevens, African art

---

“We were there to provide black students with an understanding of their ancestors’ struggles and aspirations and the higher values of black culture. We wanted them to recognize that their education enabled them to make not just a living but a meaningful contribution to the progress of the race and the nation.”

*– Ekwueme Michael Thelwell, professor emeritus*

---

humble and unbiased opinion, we continue to be—the best African American department in the country. That is largely because our founders had far greater ambitions than merely responding to the political events of the hour.”

One of those founders, Professor Emeritus Ekwueme Michael Thelwell, sums up their goals: “We hoped that our black students would acquire the skills and the competencies

historian Josepheus Vidal Olafemi Richards, diplomat Cherif Guellal, anthropologist Johnnetta Cole, and even Shirley Graham Du Bois, Du Bois’s wife, who taught African literature and creative writing.

Thereafter budget cuts forced the department to rein in some of its expectations but it has always remained true to its mission, thanks to a stalwart group of faculty members. Esther Terry, who was there from the very



1. Students take pride in the recently renovated New Africa House, home to the Afro-American Studies department.

2. Amilcar Shabazz, department chair



start, created a vital and groundbreaking theater program, and chaired the department for 19 years. During that time she successfully championed the creation of a doctoral program that holds the distinction of being the only Afro-American studies program to be included in the National Research Council's Assessment of Research Doctorate programs.

As for the future, Shabazz notes, "I do see one broad area in which work is still very

much needed: political economy, especially in the face of persistent inequality, abysmal health indicators, and unacceptable rates of incarceration. African Americans still have too much access to the American Nightmare rather than the American Dream, and that's the challenge for the years ahead."

Beyond that, Shabazz sees one further challenge: "We need to continue to be the best."

## DU BOIS GETS DIGITIZED

The UMass Amherst Libraries, home to the W.E.B. Du Bois papers since 1973, have been awarded a \$314,787 grant from the National Endowment for the Humanities' We the People program to complete digitization of the African American intellectual and activist's papers. With initial support from the Verizon Foundation, Special Collections and University Archives embarked on the historic project in 2009 to make the Du Bois papers available freely on the Internet. This collection of letters, photographs, manuscripts, memorabilia, and audiovisual materials is widely recognized as one of the nation's most significant collections for the study of African American history.





# CAPS AND GOWNS IN KABUL

## WHAT'S NEXT FOR UMASS AMHERST IN AFGHANISTAN



- 1. Afghan students receive their Master's of Education in Kabul.
- 2. David Evans, Joseph Berger (4th and 5th from left) and David Buchanan (4th from right) with Chancellor Obaidullah Obaid (center) of the Kabul Medical University.
- 3. Faculty from Afghan medical universities take a biostatistics short course facilitated by the UMass School of Public Health and Health Sciences.

David R. Evans had traveled to Afghanistan a dozen times, but his latest trip in March was the most memorable. Evans, who directs the Center for International Education, was in Kabul to participate in the graduation ceremony of the first group of Afghan students to receive master's degrees in education since the fall of the Taliban.

The degrees were earned through a post-graduate program that Evans and School of Education professor Joseph Berger helped Afghan colleagues design. "This was an important event for Kabul Education University and drew a lot of attention in Afghanistan," says Evans. "The U.S ambassador and the Afghan minister for higher education took part in this historic event."

The graduation ceremony represented the culmination of four years of work to create and implement the first functional master's program in Afghanistan since the fall of the Taliban in 2002. Since that time, UMass Amherst has been developing a presence in Afghanistan, providing technical and educational programs that train

teachers and improve that country's higher education system.

Now, with the help of a \$1.1 million grant from the U.S. Agency for International Development, Evans is part of a campus partnership to develop training for Afghan doctors and other medical personnel. Last year, the agency asked the Center for International Education and the Institute for Global Health to work with Kabul Medical University as part of a consortium called the Higher Education Project – Medical Education. The institute is headed by UMass Amherst public health professor David Buchanan. The Academy for Educational Development is the prime contractor for the consortium that includes the University of Nebraska Medical Center and Indiana University.

“This grant is an addition to the funding we’ve already received to improve the Afghan education system,” says Evans. The two main tasks for the UMass team are to help improve the quality of medical education and develop a school of public health that will offer a master’s degree program. “We’ll be working to improve teaching methods and faculty training and building institutional capacity at the medical school,” says Evans. He explains that the higher education system

country with the highest maternal mortality rate in that part of the world. “Overall, we’re concerned about improving the relevance and adequacy of medical training at the university,” Buchanan says.

The Center for International Education’s involvement in Afghanistan dates to the fall of the Taliban and started when it secured three small contracts to work in the country. Since that time, the programs have grown, Evans says, but so has the network of

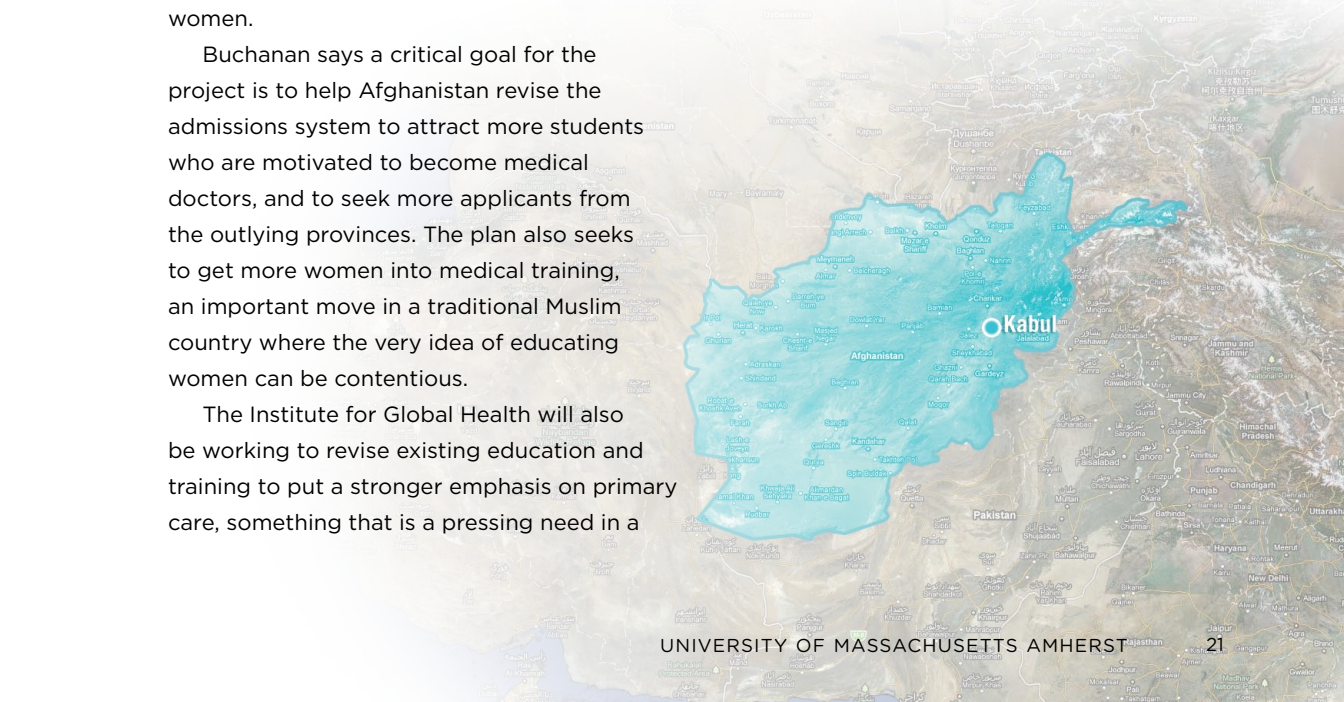
The plan also seeks to get more women into medical training, an important move in a traditional Muslim country where the very idea of educating women can be contentious.

in Afghanistan has many challenges. Students finishing the equivalent of high school take placement exams similar to SATs, and those with the highest scores traditionally attend the medical university. These students, however well qualified, enter an antiquated medical education system that has suffered through 30 years of war, the Soviet occupation, and the Taliban’s restriction on the education of women.

Buchanan says a critical goal for the project is to help Afghanistan revise the admissions system to attract more students who are motivated to become medical doctors, and to seek more applicants from the outlying provinces. The plan also seeks to get more women into medical training, an important move in a traditional Muslim country where the very idea of educating women can be contentious.

The Institute for Global Health will also be working to revise existing education and training to put a stronger emphasis on primary care, something that is a pressing need in a

connections within the country and with the Amherst campus. As head of U.S. Agency for International Development, Patrick Fine who received a master’s degree from the School of Education in 1986, helped accelerate program growth in the early years. He also worked with other alumni in the country. “It’s a beautiful example of starting small and building on each example,” says Evans.



# BREEDING BETTER BIOLOGISTS

## BIG-TIME RESEARCH IS WHAT'S NEXT FOR BIO STUDENTS



Professor Elsbeth Walker (center, right) teaches students methods to sequence DNA.

What does UMass Amherst have in common with a medical institute founded by Howard Hughes, the eccentric aviator and entrepreneur? Both value research, education, and uncovering the mysteries of life. In September 2006, the campus received a grant from the Howard Hughes Medical Institute that helped reshape the undergraduate biology curriculum to center on building student scientific skills. The grant,

Walker's gene and genome analysis class. In this course, highly motivated students in their sophomore or junior year consider the methods and ideas of modern genetics by studying orphan genes of unknown function. Working in teams, students use bioinformatics tools and wet bench techniques to sequence the gene's DNA and to identify the gene's biological function. These student teams are the first ever to do so and are in effect the

---

**Working in teams, biology undergraduates use bioinformatics tools and wet bench techniques to sequence a gene's DNA and to identify the gene's biological function. "We are educating student scientists."**

*— Elizabeth Connor, professor of biology*

---

along with the opening of the new Integrated Sciences Building in 2009 with state-of-the-art equipment and labs, has helped launch the first crop of biology undergraduates having an experience once reserved for students in graduate school.

One of the most popular courses in the new curriculum is Professor Elsbeth

world's experts on their particular gene. When they're done, they publish their work in a database to make the research accessible to the scientific community.

"We are educating student scientists," says Elizabeth Connor, biology professor and lead investigator for the Hughes grant. "The award was the seed funding to get this program



started and it's now becoming a model for how to teach students scientific skills." Connor has presented the model to faculty members at other institutions who are considering changes to their biology curriculum.

One of Walker's goals is to keep the gene and genome class she teaches relevant to current needs. This means that it changes every year as new techniques and tools of the discipline become available. She also adds some unknowns every year because the heart of the class is having "not a single person in the world knowing the outcome until the project is complete. This makes students true scientific investigators, and sets up a situation in which students and instructors are true collaborators."

And data suggest the class structure really does work. In a recent national survey of undergraduate students enrolled in programs designed to help them acquire scientific skills, Walker's gene and genome analysis course came out on top. "The National Science

Foundation's Summer Research Experiences for Undergraduates (REU) is considered one of the most effective programs for helping students to acquire research skills," says Connor. "The student assessment data reveal that Elsbeth's course outscored even the REU averages for helping students to acquire these skills."

So what's next for Connor's program? "I'm in conversations with other UMass Amherst faculty who are interested in redesigning classes where students pair up to work on research problems as they do in Elsbeth's course," says Connor. The success of Walker's class has put into motion plans to double the number of students trained in the course from 24 to 48 in 2011. This gives more students the ability to work on in-depth research projects while acquiring important skills that will both prepare them for graduate work and make them more marketable in their fields. "We want to be sure our students have a satisfying academic experience and that they are well trained for their future pursuits," says Connor.

## EXCEPTIONAL STUDENT, EXCEPTIONAL OPPORTUNITY

Science has always been a part of my family life," says biochemistry major Nemat Sharaf '10 (right). He recalls his mother piqued his scientific curiosity by bringing home items from work such as protein models. Now, Sharaf too is headed for a career in science.

An Exceptional Research Opportunities Fellowship awarded in the summer of 2010 from the Howard Hughes Medical Institute boosted his career plans. As part of the fellowship, Sharaf studied with Nobel laureate Dr. Craig Mello of the UMass Medical School and an expert in studying the function of genes through RNA interference. "I love the discovery side of research which involves searching for answers to problems yet to be solved," he says.

Sharaf's research experience was not limited to working with Mello. During the summer of his junior year in 2009, he worked with doctors at Children's Hospital in Boston studying Duchenne muscular dystrophy, an extremely severe form of the disease. For his Commonwealth Honors College thesis, Sharaf focused on PFO, a protein that may eventually help identify the specific location of a clog in an artery. Allejandro Heuck, professor of biochemistry and molecular biology, was his thesis adviser. As part of research, Sharaf mutates PFO and other proteins to study how the mutated proteins act.

What's next for Sharaf: pursuing MD and PhD degrees.





# INSPIRING INNOVATION

## INCUBATOR PLANS TO SPAWN DEVELOPMENT



With new leadership and its first UMass Amherst spinoff, the Springfield (Mass.) Incubator is breathing new life into regional innovation, entrepreneurship, and economic development. “UMass Amherst is a source of great inspiration to new businesses,” says Marla Michel, the new director of the incubator and the UMass Amherst executive director of economic development strategies and regional partnerships.

Founded by political science professor Stuart Shulman (above left with Michel), Texifter LLC is the first of what Michel hopes will be several business start-ups by UMass Amherst faculty hatching in the incubator.

park that houses the incubator. Another advantage is the ability to tap into a skilled workforce educated by Springfield Technical Community College (STCC).

These benefits will help the Scibelli Enterprise Center, home of the Springfield Incubator, become the entrepreneurial hub of Western Massachusetts. “The Incubator will become the logical location for university spinoffs and other technological companies,” says Michel, who was appointed director of the incubator in the spring. Her appointment rejuvenates the Greater Springfield-UMass Partnership, an effort to bring the resources of a top research university to spur economic

---

**“The City of Springfield gets a world-class university partnering with a technical community college that fosters new business in the Commonwealth. These are the kinds of outcomes we envisioned for the Greater Springfield-UMass Partnership.”**

*–Chancellor Robert C. Holub*

---

Texifter uses advanced algorithms to search, sift, sort, and analyze enormous numbers of documents. Clients include government officials, academics, legal researchers, NGOs, and corporations.

“The Springfield Incubator is a great match for Texifter because of the telecommunications infrastructure it provides,” Shulman says. “As an information technology start-up, we’re focused on getting the product built and the company going. There aren’t many places that could deliver a data pipe and reliability.” The region’s fiber optic network is located in the technology

development in one of the state’s poorest cities.

Specifically, Michel will focus on establishing ties between the incubator and UMass Amherst research centers, institutes, and programs and between UMass and STCC, a key partner in the effort to reinvigorate the incubator. “The campus strengths in information technology and clean energy bode well for future tenants of the incubator,” says Michel. In reaching her goal to have thriving businesses in Springfield, Michel will work with faculty and external institutions for grants to support the incubator’s mission.

National Endowment for the Humanities Awards \$314,000 to UMass Amherst Libraries to Complete Du Bois Papers Digitization

**Record Year for Sponsored Research: \$170 Million**

UMass Amherst Radar Engineers Join \$11.9 Million National Tornado-Chasing Experiment

UMass Amherst Fourth Largest New England NSF Grant Recipient

**Qteros and UMass Amherst Receive U.S. Patent for Production of Ethanol from a Unique Microorganism, the Q Microbe**

UMass Amherst Engineering College Ranked Among Top Graduate Programs by *U.S. News and World Report*

**UMass Partners with State and Region on Green High Performance Computing Center**

**UMass Amherst Awarded Nearly \$40 Million in Stimulus Funding**

UMass Amherst Leading Partner in \$600,000 Federal Grant and Collaborative Commitment to Boost Competitiveness of Precision Manufacturing Industry

**UMass Amherst Licenses Biofuels Startup Firm, Anellotech, to Produce Green Gasoline and Other Fuels**

**UMass Amherst Research is  
What's NEXT**

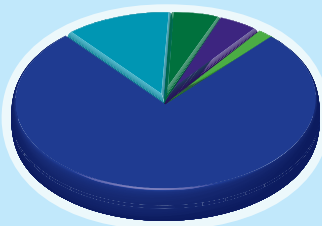
# SPONSORED ACTIVITY

## Fiscal Year 2010 SPONSORED RESEARCH

Proposals Submitted:	1,294
Dollar Requests:	\$713 million
Awards:	1,134
Award Dollars:	\$169.9 million
Research Expenditures:	\$135.3 million

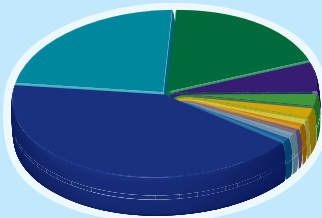
**Access the campus's full  
sponsored activities report  
at: [www.umass.edu/research](http://www.umass.edu/research)**

Summary of Awards Accepted by Sponsor Category: FY 2010		
Sponsor	Awards	Total
Federal	498	\$129,262,137
Commonwealth of Massachusetts	74	\$9,165,862
Other States & Local Governments	12	\$456,655
Private Sector - Industry	225	\$10,434,480
Private Sector - Non-Profit	325	\$20,674,374
Total Fiscal Year 2010	1,134	\$169,993,508



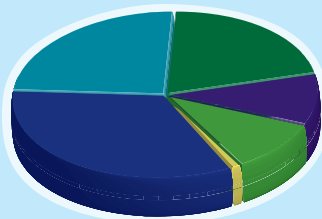
FY10: Distribution of Award Dollars by Sponsor Category

- Federal 76%
- Private Sector: Non-Profit 12%
- Private Sector: Industry 6%
- Commonwealth of MA 5%
- Other State & Local Govts. < 1%



FY10: Distribution of Award Dollars Accepted from Federal Agencies

- NSF 42%
- DHHS 23%
- DOE 19%
- DOD 6%
- USDA 3%
- SBA 2%
- NASA 1%
- DOC 1%
- DOI 1%
- DOEd 1%
- Other 1%



FY10: Distribution of Award Dollars Accepted from Private Sector Sponsors

- Industry 34%
- Institutes & Associations 24%
- \*Other Colleges & Universities 21%
- Foundations 10%
- Other Sponsors 10%
- Health Agencies 1%

\* A significant portion of these awards are prime Federal Funds

## FUNDING HIGHLIGHTS

**Training School Speech-Language Pathologists to Assess and Manage Communication Skills in Children with Autism**, Mary Andrianopoulos, Elena Zaretsky, Shelley Velleman, Patricia Mercaitis (Communication Disorders) and Mary Lynn Boscardin (Education). U.S. Department of Education, \$796,841.

**Climate System Variability**, Raymond Bradley (Geosciences). National Oceanic and Atmospheric Administration, \$633,350.

**Security and Privacy in Integrated Transportation Systems**, Wayne Burleson (Electrical and Computer Engineering). National Science Foundation, \$1.17 million.

**Precision Manufacturing Regional Alliance Partnership**, James Capistran (Polymer Science and Engineering). National Science Foundation, \$600,000.

**Advancing Physical Activity Measurement Using Pattern Recognition Techniques**, Patty Freedson (Kinesiology). National Institutes of Health, \$985,000\*.

**Cultural Heritage in European Societies and Spaces (CHESS)**, Krista Harper and Jacqueline Urla (Anthropology). National Science Foundation, \$149,500.

**Catalytic Fast Pyrolysis™ for Biofuels Production**, George Huber (Chemical Engineering). National Science Foundation, \$2 million\*.

**Global Environment for Network Innovation (GENI)**, David Irwin, Prashant Shenoy, and Michael Zink (Computer Science). National Science Foundation, \$535,000.

**Data Games — Tools and Materials for Learning Data Modeling**, Clifford Konold (Scientific Reasoning Research Institute). National Science Foundation, \$1.8 million.

**Extramural Research Facilities Construction Renovation of Lab Space and Shared Instrument Facilities in the Lederle Graduate Research Tower**, James Kurose (Computer Science). National Institutes of Health, \$7 million\*.

**Electrofuels via Direct Electron Transfer from Electrodes to Microbes**, Derek Lovley (Microbiology). Department of Energy, \$3.8 million.

**Targeting Multiple Diseases through Gamma Secretase**, Barbara Osborne (Veterinary and Animal Sciences). National Institutes of Health, \$954,099.

**MRI: Development of FPALM-STORM for Live Cell Single Molecule Microscopy**, Jennifer Ross (Physics) and Patricia Wadsworth (Biology). National Science Foundation, \$684,000\*.

**Polymer-Based Materials for Harvesting Solar Energy (PHaSE) Energy Research Center**, Thomas Russell (Polymer Science and Engineering) and Paul Lahti (Chemistry). U.S. Department of Energy, \$16 million\*.

**US/Mexico Large Millimeter Telescope**, Peter Schloerb (Astronomy). National Aeronautics and Space Administration, \$700,000.

**Development of Enabling Chemical Technologies for Power from Green Sources**, Sankaran “Thai” Thayumanavan (Chemistry). Army Research Office, \$870,001.

**Morphological and Energetic Factors in the Evolution of Human Locomotion**, Brian Umberger (Kinesiology). National Science Foundation, \$593,504.

**Transitional Assistance for the SNAP-Ed Family Nutrition Program**, Lisa Sullivan-Werner (Nutrition). Massachusetts Department of Transitional Assistance, \$2.7 million.

\* American Recovery and Reinvestment Act (stimulus) funding

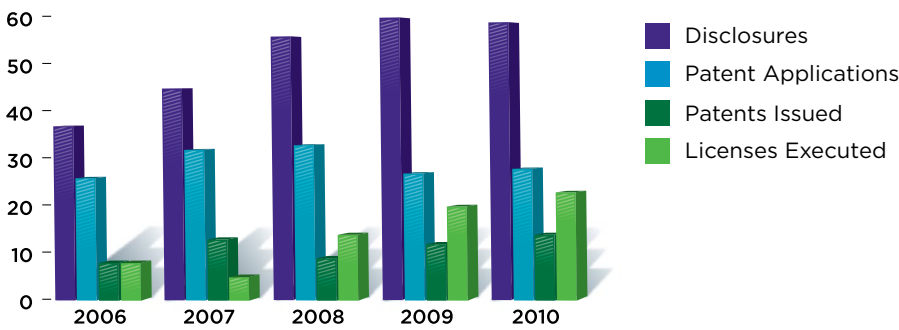


# TECHNOLOGY TRANSFER

**The UMass Amherst Intellectual Property portfolio generated \$2,353,519 in total licensing revenues in FY10.**

Disclosures:	59
Patent Applications:	28
Patents Issued:	15
Licenses Executed:	23 (& 2 Option Agreements)
Total Revenue received:	\$2,353,519

Trends in Patents and Licenses



## UMASS PATENTS

**BRYAN E. COUGHLIN** (Polymer Science and Engineering): USP 7,563,848. Cross-Linked Polycyclooctene

**TODD S. EMRICK** (Polymer Science and Engineering): USP 7,563,507. Pyridine and Related Ligand Compounds, Functionalized Nanoparticulate Composites and Methods of Preparation; USP 7,589,240. Quantum Dots Tailored with Electronically-Active Polymers; USP 7,598,313. Amphiphilic Polymer Capsules and Related Methods of Interfacial Assembly

**ROBERT X. GAO** (Mechanical and Industrial Engineering): USP 7,602,985. Multi-Scale Enveloping Spectrogram Signal Processing for Condition Monitoring and the Like

**HAIM GUNNER and WILLIAM A. TORELLO** (Plant, Soil, and Insect Sciences): USP 7,666,406. Antifungal Methods

**HERBERT O. HULTIN** (Food Science): USP 7,556,835. High Efficiency Protein Extraction

**SUSAN LESCHINE** (Microbiology): USP 7,682,811. Systems and Methods for Producing BioFuels and Related Materials

**THOMAS P. RUSSELL** (Polymer Science and Engineering) and **MARK TUOMINEN**, (Physics): USP 7,572,669. Nanocylinder Arrays

**DANIEL SCHAUBERT** (Electrical and Computer Engineering): USP 7,639,201. Wideband Loop Antenna

**HOWARD SCHULTZ** (Computer Science): USP 7,630,077. Underwater Imaging System

**SANKARAN THAYUMANAVAN** (Chemistry): USP 7,687,600. Invertible Amphiphilic Polymers

**ROBERT M. WEIS** (Chemistry): USP 7,678,540. Template-Directed Assembly of Receptor Signaling Complexes

**JAMES J. WATKINS** (Polymer Science and Engineering): USP 7,709,959. Adhesion of a Metal Layer to a Substrate and Related Structures; USP 7,740,821. Highly Condensed Mesoporous Silicate Compositions and Methods

## MILESTONE AWARD

**TODD EMRICK**, Associate Professor of Polymer Science and Engineering and Director of the Materials Research Science and Engineering Center (MRSEC) received his fifth career patent this year. Emrick researches the synthesis of new materials that target a variety of applications in materials science and therapeutics.



## SPINOFF NEWS

Biofuels company **Anellotech** has developed a clean technology platform for inexpensively producing petrochemicals and transportation fuels from renewable non-food biomass. The company was profiled in the March 29, 2010 issue of *Technology Review*. Using technology developed by Chemical Engineering Professor George Huber, Anellotech will employ a patent-pending Catalytic Fast Pyrolysis (CFP™) process to convert cellulose and lignin found in biomass into a mix of aromatic compounds such as benzene, toluene, and xylene. These molecules are among the basic components of gasoline and serve as important chemical feedstocks in the manufacturing of chemical-based products and packaging. ([www.anellotech.com](http://www.anellotech.com))

**MPF LLC**, founded in 2000 by the late Food Science Professor Herbert Hultin, is commercializing technology that substantially improves the quality and utilization of low-value meat proteins. Using its proprietary “Succulence System,” MPF can increase meat processing yields and improve tenderness and flavor while lowering the need to treat meats and seafood with chemical salts and phosphates. Currently serving four of the largest U.S. seafood producers, MPF is expanding its market reach into Europe. ([www.succulence.com](http://www.succulence.com))

**Protein Attachment Technologies** of Amherst, Mass., and Blue Sky Biotech of Worcester, Mass., have entered into a global license agreement covering PA Tech’s Template Directed Assembly (TDA™) technology. PA Tech’s products mimic the behavior of the signaling proteins normally

found on the cytoplasmic side of the cell membrane, and are used in the rapid screening of drug candidates. The TDA technology is based on the newly issued U.S. Patent 7,678,540, “Template-directed Assembly of Receptor Signaling Complexes.” PA Tech was co-founded in 2005 by UMass Amherst chemist Robert Weis and his former graduate student Anthony Shrout (MS ’01; PhD ’06). ([www.patechllc.com](http://www.patechllc.com))

**Qteros**, of Marlborough, Mass., which was co-founded in 2007 by UMass Amherst microbiologist Susan Leschine, is accelerating the global commercialization of cellulosic ethanol. This year the company announced the newly issued U.S. Patent No. 7,682,811, “Systems and Methods for Producing Biofuels and Related Materials,” recognizing the discovery and characterization of the novel ethanol-producing organism *C. phytofermentans* (the Q Microbe®) by Leschine and campus colleague Thomas Warnick. This patent teaches the core technology licensed to Qteros, which operates a biomass pretreatment pilot plant in Chicopee, Mass. ([www.qteros.com](http://www.qteros.com))

**Therapeutic Systems** of Amherst, Mass., and UMass Amherst executed a license for a personal deep-pressure touch simulation system (DPTS). Developed by Mechanical and Industrial Engineering Professor Sundar Krishnamurty, DPTS is designed for use by autistic children to relieve anxiety, increase focus, and suppress self-injurious behavior. Alumnus Brian Mullen (BS ’04; PhD ’09), who co-invented the licensed technology with Professor Krishnamurty, leads the Therapeutic Systems team. It includes researchers in the fields of sensory and occupational therapy for autism, consultants in insurance reimbursement and FDA medical device regulatory affairs, and a strategic manufacturing partner. ([www.therapeuticsystems.com](http://www.therapeuticsystems.com))



## FACULTY BOOKSHELF

1. *When Gay People Get Married: What Happens When Societies Legalize Same-Sex Marriage* (New York University Press). **M. V. Lee Badgett, Economics.** 2010 Distinguished Book Award.

2. *Critical Multicultural Analysis of Children's Literature: Mirrors, Windows and Doors* (Routledge). **Maria José Botelho and Masha Kabakow Rudman,** Teacher Education and Curriculum Studies

3. *Hormesis: A Revolution in Biology, Toxicology and Medicine*, (Humana Press). **Edward Calabrese,** School of Public Health and Health Sciences, Co-editor.

4. *The Liar in Your Life: The Way to Truthful Relationships* (Twelve). **Robert Feldman,** Psychology

5. *Saving State U: Why We Must Fix Public Higher Education* (The New Press). **Nancy Folbre,** Economics

6. *More Teaching Games for Understanding: Moving Globally* (Human Kinetics). **Linda Griffin,** Teacher Education and Curriculum Studies, Co-editor.

7. *DNA and Biotechnology, Third Edition* (Elsevier Academic Press). **Molly Fitzgerald-Hayes,** Biochemistry and Molecular Biology, with Frieda Reichsman.

8. *At the Altar of the Bottom Line: The Degradation of Work in the 21st Century* (University of Massachusetts Press). **Tom Juravich,** Labor Studies

9. *Wind Energy Explained: Theory, Design and Application, 2nd edition* (Wiley). **James Manwell and John McGowan,** Mechanical and Industrial Engineering, with A.L. Rogers.

10. *Native Americans, Christianity, and the Reshaping of the American Religious Landscape*, (University of North Carolina Press). **Joel W. Martin,** Humanities and Fine Arts, Editor.

11. *Transforming Learning with New Technologies* (Allyn & Bacon). **Robert W. Maloy, Ruth-Ellen Verock-O'Loughlin, and Sharon A. Edwards,** Teacher Education and Curriculum Studies; **Beverly Park Woolf,** Computer Science

12. *Betsy Ross and the Making of America*, (Henry Holt). **Marla R. Miller,** History

13. *Fragile Networks: Identifying Vulnerabilities and Synergies in an Uncertain World* (Wiley). **Anna Nagurney,** Finance and Operations Management, with Qiang Qiang.

14. *Lost Alphabet, a book of poetry* (Copper Canyon Press). **Lisa Olstein,** English

15. *Wounded Knee: Party Politics and the Road to an American Massacre* (Basic Books). **Heather Cox Richardson,** History

16. *Television in Transition: The Life and Afterlife of the Narrative Action Hero* (Wiley-Blackwell). **Shawn Shimpach,** Communication

17. *Los periodistas literarios: o el arte del reportaje personal, Selección y prólogo.* **Norman Sims,** Journalism. Translation by Nicolás Suescún (Bogota, Columbia: El Áncora Editores).

18. *Making Transnational Feminism: Rural Women, NGO Activists, and Northern Donors in Brazil*, (Routledge Press). **Millie Thayer,** Sociology

19. *The Search for Fulfillment: Revolutionary New Research That Reveals the Secret to Long-Term Happiness* (Ballantine Books). **Susan Krauss Whitbourne,** Psychology

## FACULTY RECOGNITIONS

### **Acoustical Society of America Fellow**

Richard Freyman, Communication Disorders

### **American Academy of Nursing Fellow**

Beth Henneman, Nursing

### **The American Association for the Advancement of Science (AAAS) Fellows**

Raymond Bradley, Geosciences

Peter Hepler, Biology

Lynnette Leidy Sievert, Anthropology

Vincent Rotello, Chemistry

### **American Political Science Association Women and Politics Research Section (President)**

Maryann Barakso, Political Science

### **American Psychological Association Fellow**

Michael Constantino, Psychology

### **American Physical Society Fellows**

Narayanan Menon, Physics

Rory Miskimen, Physics

### **American Society for Eighteenth-Century Studies (President Elect)**

Julie Candler Hayes, Languages, Literatures and Cultures

### **Association for Education in Journalism and Mass Communication Professional Freedom and Responsibility Award**

Sut Jhally, Communication

### **Dorothy Crowfoot Hodgkin Award from the Protein Society**

Lila Gierasch, Biochemistry and Molecular Biology

### **Fulbright Scholars**

William Curtis Conner, Chemical Engineering

Ethan Katsch, Legal Studies

Suzanne Model, Sociology

### **Guggenheim Fellow**

Alice Harris, Linguistics

### **Hungary's Ministry of Culture and Education Pro Cultura Hungarica Medal**

Catherine Portuges, Comparative Literature

### **Institute of Electrical and Electronics Engineers Fellows**

Lixin Gao, Electrical and Computer Engineering

Mani Krishna, Electrical and Computer Engineering

### **Institute of Medicine of the National Academies, Committee on the Science of Research on Families Member**

Sally Powers, Psychology

### **International Association of Landscape Ecology (U.S. Regional Division) Distinguished Landscape Ecologists Practitioner Award**

Kevin McGarigal, Environmental Conservation

### **International Fruit Tree Association**

#### **Researcher of the Year**

Duane Greene, Plant, Soil, and Insect Sciences

### **International Sidney Society's Lifetime Achievement Award**

Arthur Kinney, English

### **J. Robert Beyster Fellowship**

Fidan Kurtulus, Economics

### **Jacob Cohen Award from the American Psychological Association**

Ronald Hambleton, Educational Policy, Research and Administration

### **Jeanne M. Priester Award for Outstanding Extension Health Education Program at the State/Multi-State Level**

Jean Anliker, Nutrition

### **Jefferson Science Fellow**

Cynthia Baldwin, Veterinary and

Animal Sciences

### **Madame Curie Prize in Environmental Health**

Edward Calabrese, Public Health

### **Marion and Jasper Whiting Fellow**

Dean Robinson, Political Science

### **Massachusetts Institute of Technology Technology Review's Innovator of the Year**

Kevin Fu, Computer Science

### **Materials Research Society Fellow**

Thomas P. Russell, Polymer Science and Engineering

### **Microscopy Society of America Fellow**

Joseph Goldstein, Mechanical and Industrial Engineering

### **Northeastern Association of Graduate Schools' Graduate Faculty Teaching Award**

Linda Shea, Hospitality and Tourism Management

### **Sloan Fellow**

Alexei Oblomkov, Mathematics and Statistics

### **Society of Rheology Arthur Metzner Early Career Award**

Jonathan Rothstein, Mechanical and Industrial Engineering

### **Sociological Research Association**

Douglas Anderton, Sociology

### **Tage Erlander Prize from the Royal Swedish Academy of Sciences**

Egor Babaev, Physics

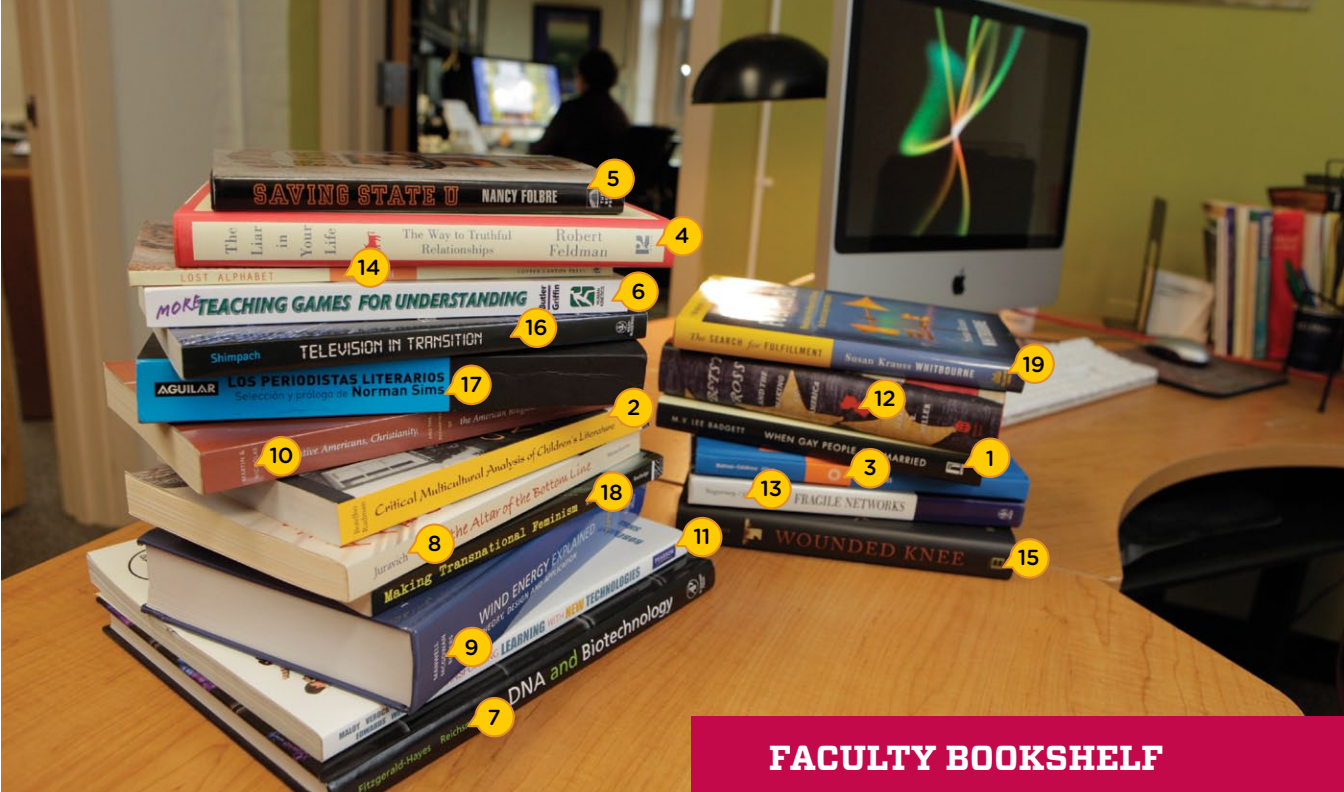
### **Time Magazine's Top 50 Inventions of 2009**

Derek Lovley, Microbiology

### **U.S. State Department Cultural Ambassadors to Argentina**

Madeline Blais and John Katzenbach, Journalism





## FACULTY BOOKSHELF

1. *When Gay People Get Married: What Happens When Societies Legalize Same-Sex Marriage* (New York University Press). **M. V. Lee Badgett, Economics.** 2010 Distinguished Book Award.

2. *Critical Multicultural Analysis of Children's Literature: Mirrors, Windows and Doors* (Routledge). **Maria José Botelho and Masha Kabakow Rudman,** Teacher Education and Curriculum Studies

3. *Hormesis: A Revolution in Biology, Toxicology and Medicine*, (Humana Press). **Edward Calabrese,** School of Public Health and Health Sciences, Co-editor.

4. *The Liar in Your Life: The Way to Truthful Relationships* (Twelve). **Robert Feldman,** Psychology

5. *Saving State U: Why We Must Fix Public Higher Education* (The New Press). **Nancy Folbre,** Economics

6. *More Teaching Games for Understanding: Moving Globally* (Human Kinetics). **Linda Griffin,** Teacher Education and Curriculum Studies, Co-editor.

7. *DNA and Biotechnology, Third Edition* (Elsevier Academic Press). **Molly Fitzgerald-Hayes,** Biochemistry and Molecular Biology, with Frieda Reichsman.

8. *At the Altar of the Bottom Line: The Degradation of Work in the 21st Century* (University of Massachusetts Press). **Tom Juravich,** Labor Studies

9. *Wind Energy Explained: Theory, Design and Application, 2nd edition* (Wiley). **James Manwell and John McGowan,** Mechanical and Industrial Engineering, with A.L. Rogers.

10. *Native Americans, Christianity, and the Reshaping of the American Religious Landscape*, (University of North Carolina Press). **Joel W. Martin,** Humanities and Fine Arts, Editor.

11. *Transforming Learning with New Technologies* (Allyn & Bacon). **Robert W. Maloy, Ruth- Ellen Verock-O'Loughlin, and Sharon A. Edwards,** Teacher Education and Curriculum Studies; **Beverly Park Woolf,** Computer Science

12. *Betsy Ross and the Making of America*, (Henry Holt). **Marla R. Miller,** History

13. *Fragile Networks: Identifying Vulnerabilities and Synergies in an Uncertain World* (Wiley). **Anna Nagurney,** Finance and Operations Management, with Quang Quang.

14. *Lost Alphabet, a book of poetry* (Copper Canyon Press). **Lisa Olstein,** English

15. *Wounded Knee: Party Politics and the Road to an American Massacre* (Basic Books). **Heather Cox Richardson,** History

16. *Television in Transition: The Life and Afterlife of the Narrative Action Hero* (Wiley-Blackwell). **Shawn Shimpach,** Communication

17. *Los periodistas literarios: o el arte del reportaje personal, Selección y prólogo.* **Norman Sims,** Journalism. Translation by Nicolás Suescún (Bogota, Columbia: El Áncora Editores).

18. *Making Transnational Feminism: Rural Women, NGO Activists, and Northern Donors in Brazil*, (Routledge Press). **Millie Thayer,** Sociology

19. *The Search for Fulfillment: Revolutionary New Research That Reveals the Secret to Long-Term Happiness* (Ballantine Books). **Susan Krauss Whitbourne,** Psychology



# UMassAmherst

University Relations  
Whitmore Administration Building  
University of Massachusetts  
Amherst, MA 01003

105365

## OFFICE OF THE VICE CHANCELLOR FOR RESEARCH AND ENGAGEMENT

Whitmore Administration Building  
181 Presidents Drive  
Amherst, MA 01003-9313  
[www.umass.edu/research](http://www.umass.edu/research)

VICE CHANCELLOR FOR RESEARCH AND ENGAGEMENT  
Michael F. Malone  
(413) 545-5270  
[vcrc@umass.edu](mailto:vcrc@umass.edu)

ASSISTANT TO THE VICE CHANCELLOR  
Kim Fill  
(413) 545-5270  
[kimfill@research.umass.edu](mailto:kimfill@research.umass.edu)

RESEARCH BUSINESS/PERSONNEL MANAGER  
Lisa Liebowitz  
(413) 545-3881  
[lliebowitz@research.umass.edu](mailto:lliebowitz@research.umass.edu)

## RESEARCH ADMINISTRATION

Research Administration Building  
70 Butterfield Terrace  
Amherst, MA 01003-9242

ANIMAL CARE  
Steve Plouff, Director  
(413) 545-0668  
[splouff@research.umass.edu](mailto:splouff@research.umass.edu)

COMMERCIAL VENTURES and INTELLECTUAL PROPERTY  
Michael Jaremchuk, Associate Director  
(413) 572-6121  
[jaremchuk@research.umass.edu](mailto:jaremchuk@research.umass.edu)

OFFICE OF GRANT and CONTRACT ADMINISTRATION  
Carol Sprague, Director  
(413) 545-0698  
[sprague@research.umass.edu](mailto:sprague@research.umass.edu)

RESEARCH AFFAIRS  
Bruce McCandless, Director  
(413) 545-5283  
[mccandless@ora.umass.edu](mailto:mccandless@ora.umass.edu)

RESEARCH COMPLIANCE  
Hilary Woodcock, Coordinator  
(413) 545-5274  
[hilaryw@ora.umass.edu](mailto:hilaryw@ora.umass.edu)

RESEARCH DEVELOPMENT  
Loren Walker, Director  
(413) 577-3726  
[loren@research.umass.edu](mailto:loren@research.umass.edu)

THE ENVIRONMENTAL INSTITUTE  
Sharon Tracey, Associate Director  
Blaisdell House  
310 Hicks Way  
(413) 545-2842  
[tei@tei.umass.edu](mailto:tei@tei.umass.edu)

UNIVERSITY OF MASSACHUSETTS PRESS  
Bruce Wilcox, Director  
East Experiment Station  
671 North Pleasant Street  
(413) 545-4990  
[wilcox@umpress.umass.edu](mailto:wilcox@umpress.umass.edu)



Research, Scholarship and Creative Activity  
for a Brighter  
Future