

# the NEURON

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*On the Cover***WVU BIOLOGY PROFESSOR WORKING TO HELP ARMY DETECT THREATS**

The work of a West Virginia University assistant professor on cutting edge technology, which can lead to more effective ways for security forces to detect threats from explosives and chemical and biological warfare agents, has resulted in a cooperative agreement with the U.S. Department of Defense.

Letha Sooter, an assistant professor of biology at the Eberly College of Arts and Sciences and a researcher with WVNano, will receive more than \$409,000 from the U.S. Army Research Laboratory to work with molecular recognition elements (or MREs), in hopes of creating devices that will detect such explosive, chemical and biological warfare.

MREs are bio-molecules that bind with specific targets. "And the targets can be absolutely anything," Sooter said.

She once worked with MREs that glowed and bound to cracks in airplanes. Other researchers are looking for MREs that bind to cancer cells.

She's searching for the biomolecules that will detect chemical and biological dangers for soldiers and civilians.

"Molecular recognition elements are such a powerful tool," Sooter said. "They're amazing little things. They do a wonderful job of being specific and having a high affinity for their target."

But finding them, she says, is a little like winning the lottery. Sooter has an extensive library of molecules – or lottery tickets – that she tests over time. But there's only one winner, and she has to keep searching until she locates it.

The cooperative agreement will give Sooter and her team of student researchers three years worth of funding to accomplish this goal. If they locate the correct biomolecules, the Army will apply them to the sensing devices they are currently creating and soldiers will be able to use the technology in theater.

"The end goal is always the most exciting part for me," Sooter said. "If we can find this and create something that will really help the nation out – that would be great."

But getting there is an arduous process. Not only does the science have to be right, but the device has to work under a strict set of circumstances. While the Army is concerned about the device's portability and ease of use, Sooter has to worry about the biomolecule functioning in any environment – ocean, desert and even subway station.

Because Sooter has been working with MREs for nearly a decade and conducted research at the Army Research Lab before coming to WVU in July 2008, she is optimistic that there will be more collaboration between the government and the university.

"Hopefully, this cooperative agreement is the first of many," she said.

Dr. Sooter was recruited with an EPSCoR Research Infrastructure Improvement (RII) Grant.



Photo Courtesy West Virginia University

## about the Division of Science and Research

The Division of Science and Research provides strategic leadership for infrastructure advancement and development of competitive research opportunities in science, technology, engineering and mathematics disciplines. The office directs the National Science Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR) in West Virginia, coordinates scientific research grants to academic institutions from federal and state agencies, and conducts outreach activities to broaden the public's understanding of science and technology. *Vision 2015: The West Virginia Science and Technology Strategic Plan* is available online at <http://www.wvresearch.org>.



Lucas Bolyard, left, is recognized at the White House

## WEST VIRGINIA HIGH SCHOOL STUDENTS MAKE DISCOVERIES

**Lucas Bolyard**, a stargazer and sophomore at South Harrison High School, discovered a rare pulsar – a rotating radio transient – which recently earned him recognition by President Barack Obama.

On October 7th, the President and First Lady hosted “Astronomy Night” at the White House to highlight science, technology, engineering and mathematics (STEM) education and increase awareness of the field of astronomy. Bolyard was recognized for his notable astronomical discovery.

Bolyard made the discovery by analyzing data from the Robert C. Byrd Green Bank Telescope as part of the Pulsar Search Collaboratory (PSC) – a joint project of the National Radio Astronomy Observatory, the National Science Foundation, West Virginia University and supported by WVEPSCoR.

**Shay Bloxton**, a sophomore at Nicholas County High School, made a discovery of her own in September 2009. Her discovery appears to be an astronomical object that has a quantifiable period and dispersion measure. Whether this object is a transient signal similar to the object Bolyard discovered or a full-fledged pulsar is unknown, and will have to await follow-up observations with the Green Bank Telescope later this year. Bloxton will participate in that observing session.





## FOCUS ON DIVERSITY

### FACULTY DIVERSITY REACHING NEW HEIGHTS AT MARSHALL



*Working in a lab in the Robert C. Byrd Biotechnology Science Center are Marshall University faculty members, from left, Dr. Elizabeth E. Murray, Dr. Marcia A. Harrison, Dr. Piyali Dasgupta, Dr. Beverly C. Delidow and Dr. Judith A. Silver*

A group of faculty members at Marshall University has been awarded \$750,000 by the National Science Foundation (NSF) to continue a successful initiative to increase the number of female science, technology, engineering and mathematics (STEM) faculty members at the university.

Dr. Marcia A. Harrison, professor of biological sciences and the principal investigator on the grant, will use the funds to further innovative recruitment, retention and policy efforts undertaken at the university over the past three years.

The Marshall University-ADVANCE program was established in 2006 with a \$1.2 million grant through the NSF's Advancement of Women in Academic Science and Engineering Careers (ADVANCE) program. The new funding will extend the program for two additional years.

Harrison's MU-ADVANCE co-investigators include Dr. Beverly C. Delidow, associate professor of biochemistry and microbiology; Dr. Patricia Y. Logan, associate professor of information technology and engineering; Dr. Elizabeth E. Murray, associate professor of integrated science and technology; and Dr. Judith A. Silver, professor of mathematics.

From 2003-2008, there has been an increase in female STEM faculty from 21.3 percent to 27 percent at Marshall. All participating colleges – the Colleges of Science, Liberal Arts, Information Technology and Engineering, and the Basic Science Departments in the School of Medicine – have increased gender equity.

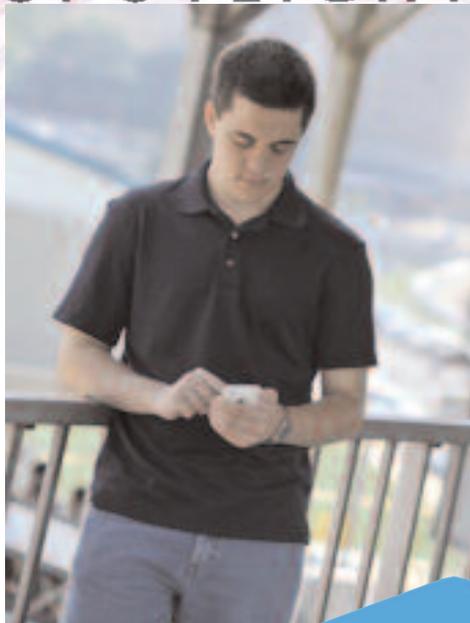
The national ADVANCE program supports projects, like the one at Marshall, to help institutions transform long-standing practices and academic climates that discourage women from pursuing careers in high-tech fields.

Funding was provided under the American Recovery and Reinvestment Act.

For more information about MU-ADVANCE, visit [www.marshall.edu/mu-advance](http://www.marshall.edu/mu-advance)



# Student SPOTLIGHT a CLOSER look



Jared Crawford, a Parkersburg native majoring in both computer and electrical engineering, with an emphasis on nanotechnology, at West Virginia University has made a big name for himself on campus.

Nominated by his advisor, Dr. Jeremy Dawson, Crawford was awarded a \$10,000 scholarship from the National Consortium for Measures and Signals Intelligence Research Scholars Program.

Working with Dawson, whose research is funded by the National Science Foundation, Crawford researched the creation of nanophotonic structures called photonic crystals, which are the central components in a sensor system that can detect very low levels of chemical and biological substances. This research, based in nanoscience, is crucial to optimizing the next level of environmental security.

In addition to receiving this prestigious scholarship, Crawford put his spare time to good use, creating a WVU application for the iPhone. This student-friendly "app" allows users to access a variety of services, including an interactive campus map and dining hall menus.

In the first two days it was available, more than 200 people downloaded the application.



**"It was sort of my way of giving back to the community"**

Jared Crawford  
creator of the "iWVU"  
application for iPhone





## WESLEYAN AND BELIZE STUDENTS STUDY RED MANGROVES

Students and faculty from West Virginia Wesleyan College and the University of Belize are collaborating to study the ethnobotany and habitat changes of the red mangrove, a tree that reaches 70 to 80 feet in height in the tropics. The project is one of four WVEPSCoR grants, totaling \$112,880 at Wesleyan and also is supported by funds from the West Virginia IDeA Network of Biomedical Research Excellence.

Through this International Innovation Grant, which encourages science, technology, engineering and mathematics faculty and students to think globally about research, the participants at Wesleyan are teaming up with those from Belize right from the Buckhannon campus.

The goal of the project is to establish an ongoing collaboration among Wesleyan faculty Dr. Kim Bjorgo-Thorne, assistant professor of biology, and Dr. Luke Huggins, associate professor of biology; the University of Belize; and the Belize Foundation for Research and Collaboration Education.

Initial studies by Dr. Thippi Thiagarajan, associate professor and dean of the faculty for the Department of Science and Technology at the University of Belize, have shown the red mangrove to contain chemicals that block the growth of bacteria.

Dr. Huggins and students Melissa Hicks of Wesleyan and Mitylene Bailey and Andy Hua of the University of Belize are working with Dr. Thiagarajan to determine the cytotoxic effects of mangrove extracts in mammalian cancer cells.

Dr. Bjorgo-Thorne and Abe Levin-Nielsen, a biology major from Vienna, WV, are tracking the changes in spatial distribution for mangrove communities in Belize.

Red mangrove trees are the first line of defense in coastline protection from hurricane winds and storm surges in tropical regions. The red mangrove forests also protect residents of low-lying coastal areas from the effects of damaging tides and winds.

## VEGETABLE GENOMICS AT WEST VIRGINIA STATE UNIVERSITY

*Drs. Padma Nimmakayala and Umesh K. Reddy*

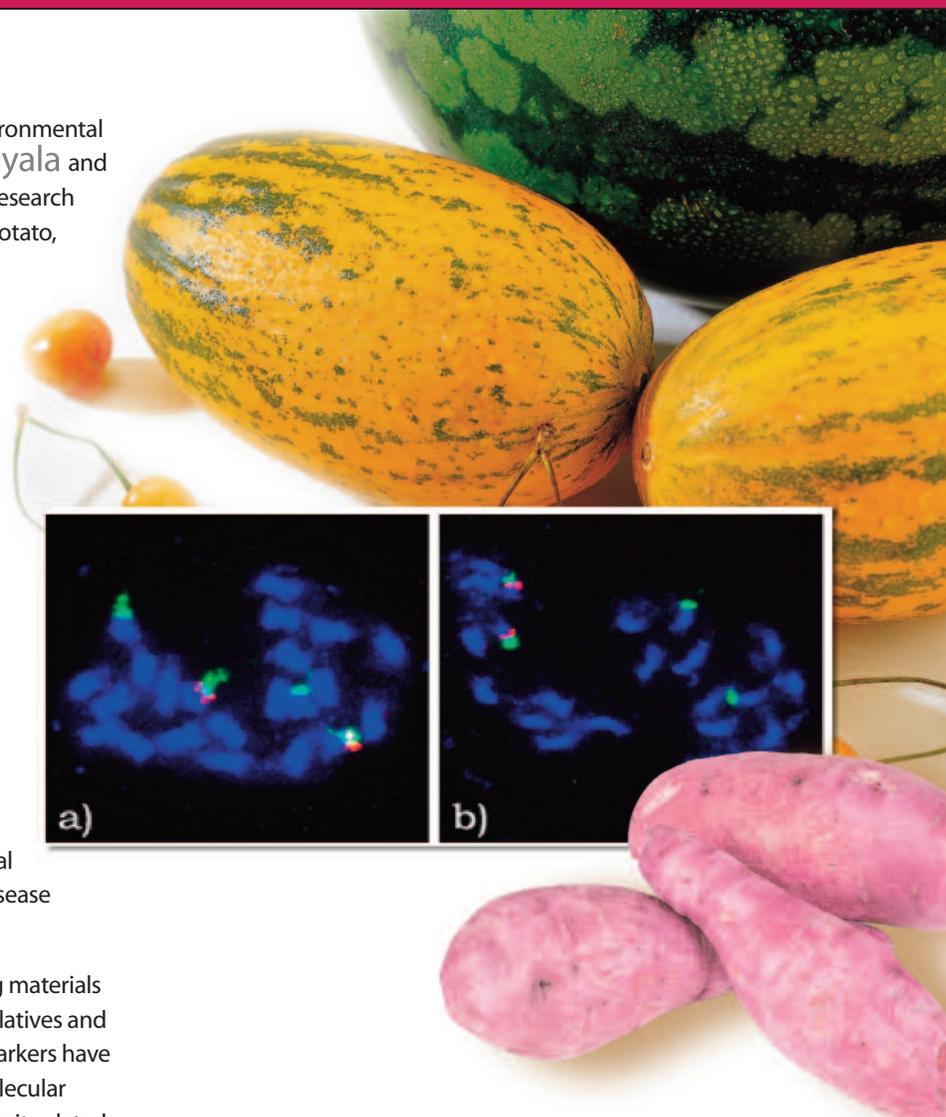
West Virginia State University Agricultural and Environmental Research scientists, **Drs. Padma Nimmakayala** and **Umesh K. Reddy**, have been involved with research focused on genomics-assisted breeding in sweet potato, peppers and cucurbits (e.g. watermelon, melon, summer squash, winter squash and bitter gourd), since 2004.

With cumulative support of \$2 million, in both institutional and federal funding, their research focuses on issues such as development of crop genome specific DNA markers; genetic maps; mapping quantitative trait loci (QTL); assembling Expressed Sequence Tags (ESTs), tiny portions of entire genes that can be used to help identify unknown genes and to map their positions within a genome; building mapping resources; and fluorescent in situ hybridization (FISH) based cyto-molecular characterization (image at right).

These resources are being integrated into a framework model for use in association mapping, as well as field level plant breeding and horticultural evaluation to improve the fruit yield, quality and disease resistance among the vegetable cultivars.

This research has generated several novel breeding materials through introgression between genes from wild relatives and diverse cultivated forms. Large sets of molecular markers have also been developed that can be used to study molecular diversity, map genes related to various important fruit-related traits among heirloom collections and their genealogical relationships, as well as the breeding histories in various vegetable crop species.

Information regarding these research endeavors is available at:  
<http://webpages.wvstateu.edu/~ureddy/>



# BUCKS FOR BRAIN

## ADVANCED ENERGY INITIATIVE UNDERWAY AT WVU

In the midst of major nationwide energy issues – including shrinking oil and natural gas reserves, competition for fossil fuels with emerging economies, and environmental impacts – West Virginia University is bringing energy research to another level as part of one of its efforts under the Research Trust Fund, also known as Bucks for Brains, which is aimed at turning research into economic development opportunities.

With a strategic plan that focuses on fossil energy, sustainable energy and energy policy, the goal is to make WVU an internationally-recognized leader in innovative energy research.

Researchers at the university are at work on wide-ranging energy issues. Xingbo Liu is working on a coating to make fuel cells more efficient; Shahab Mohaghegh is working on remote monitoring of underground carbon dioxide storage; James Smith's team patented a new horizontal wind energy turbine; Paul Ziemkiewicz is studying ways to cleanse salty water that is produced when gas fields are developed in the Marcellus Shale formation; and Elliott Kinne's work on coal to liquid fuel processes is the subject of a Texas demonstration project.

Recently, three industry-led teams that include WVU and four other major research universities were awarded contracts to provide a range of research and engineering services to the National Energy Technology Laboratory – part of the U.S. Department of Energy's national laboratory system. The collective value of the three contracts is expected to exceed \$465 million over a five-year period.



# NS on the Move



Photos - Rick Hayes/Marshall University

*Dr. Joan E. Wilson works in a laboratory in the Robert C. Byrd Biotechnology Science Center at Marshall University*

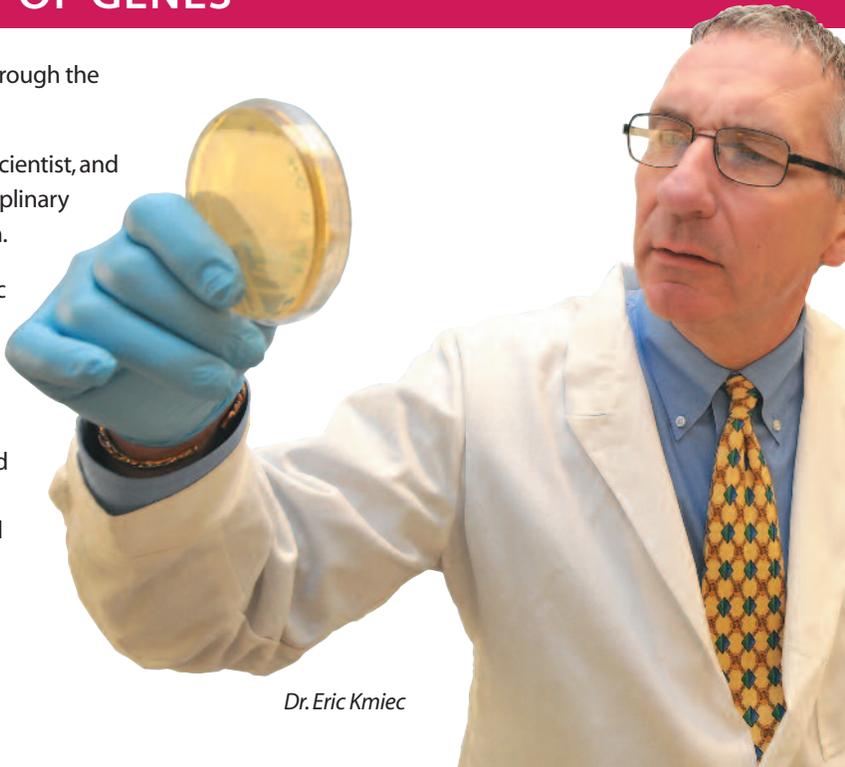
## MARSHALL HONES IN ON STUDY OF GENES

At Marshall University, scientists are undertaking the study of genes through the state's Research Trust Fund.

The effort is being lead by **Eric Kmiec**, director and lead research scientist, and senior scientist **Joan Wilson** at the Marshall Institute for Interdisciplinary Research (MIIR) – Marshall's focal point in the Bucks for Brains program.

Kmiec, a specialist in gene editing, is developing approaches to genetic alteration for afflictions like Muscular Dystrophy; while Wilson, a gene regulation specialist, is focusing on work that could better indicate the causes of diseases that presently have unknown origins.

The goal of the MIIR, which was created in 2008, is to develop a focused program of pioneering research dedicated to producing patentable scientific breakthroughs and creating new high-tech businesses based on those discoveries. The institute builds on existing areas of research strength and provides opportunities for collaborations with scientists already working at Marshall.



*Dr. Eric Kmiec*



Students John Smith and Jon-Paul Bordogna at Shepherd's Renewable Energy Demonstration Site

## ALTERNATIVE ENERGY AT SHEPHERD UNIVERSITY: A RENEWABLE FUTURE

*Clarissa Mathews, Ph.D. and Edward Snyder, Ph.D.  
Institute for Environmental Studies  
Shepherd University*

In 2005, Drs. Clarissa Mathews and Ed Snyder received an EPSCoR Innovation Grant to develop a Renewable Energy Demonstration Site for education, research and outreach at Shepherd University. This grant enabled the acquisition of renewable energy technology necessary to establish a renewable energy field laboratory on the Shepherd University campus.

The resulting Renewable Energy Demonstration Site is dedicated to demonstrating a wide variety of renewable energy technologies to the Shepherd University campus and community.

The Renewable Energy Demonstration Site, dubbed the "RED Zone" by our students, was established immediately adjacent to the Robert C. Byrd Science and Technology Center.

Student and community interest in the renewable energy demonstration site has been phenomenal, as has the application of site resources to curriculum at Shepherd University. Students were actively involved in the site planning phase, influencing the placement of wind and photovoltaic components and overall site development.

The RED Zone also has had a significant impact on research opportunities for both students and faculty. Examples of research projects include analyses of wind speeds at varying directions and heights within the site, collection and evaluation of waste vegetable oil from campus dining facilities for conversion to biodiesel, and comparisons of electrical output from different solar panel modules.

In addition, the RED Zone has been instrumental in community outreach, increasing local and regional awareness of alternative energy technologies.

The support of EPSCoR at the time it was provided has allowed Shepherd University to take the lead in providing renewable energy educational opportunities for its students and the community at large. We are starting to realize the economic fruits providing such information and are certain that in the future this site will result in further energy innovation.

## STUDIES AT MARSHALL SHOW PAIN RELIEVER MAY PREVENT AGE-RELATED CONDITIONS



Recent studies conducted by **Dr. Eric Blough** and his colleagues at Marshall University have shown that use of the common pain reliever acetaminophen may help prevent age-associated muscle loss and other conditions.

Their study examined how acetaminophen may affect the regulation of protein kinase B (Akt), an enzyme known to play an important role in regulation of cellular survival, proliferation and metabolism.

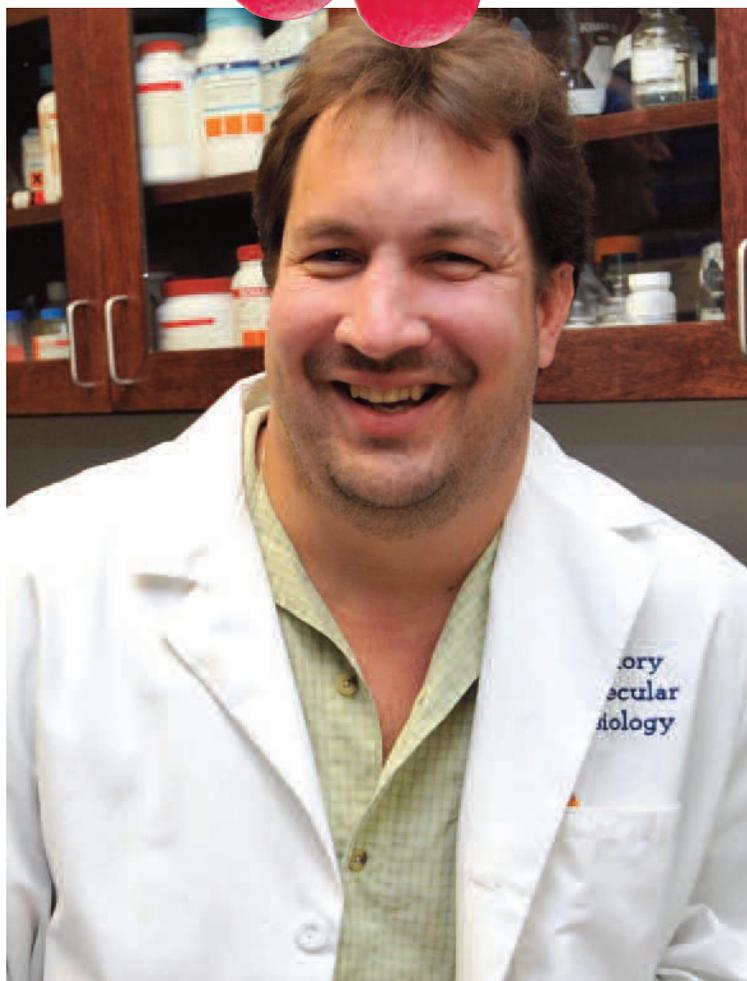
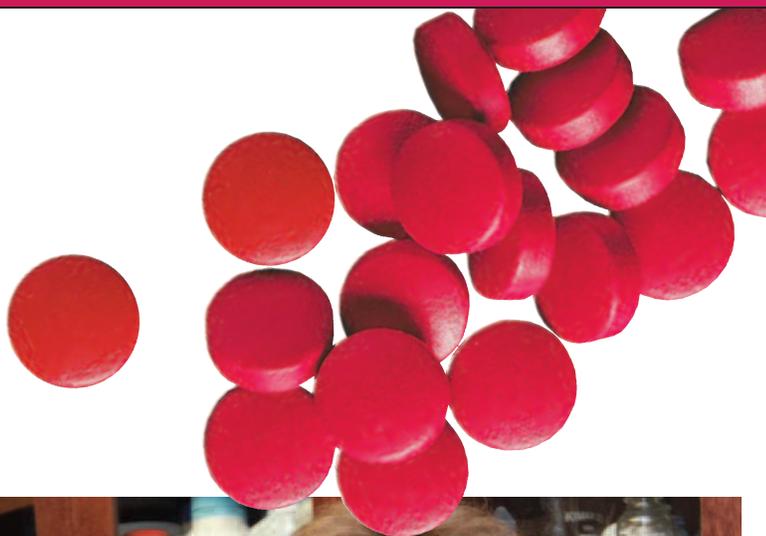
The researchers' data indicates that aging skeletal muscles experience a decrease in the proper functioning of the enzyme and that acetaminophen intervention in aged animals could be used to restore Akt activity to a level comparable to that seen in young animals. In turn, this improvement in Akt activity was associated with improvements in muscle cell size and decreased muscle cell death.

"Using a model that closely mimics many of the age-associated physiological changes observed in humans, we were able to demonstrate that chronic acetaminophen treatment in a recommended dosage is not only safe but might be beneficial for the treatment of the muscle dysfunction many people experience as they get older," said Blough, an associate professor in the university's Department of Biological Sciences.

The research, which was published in the international journal *PLoS One*, was supported with funding from McNeil Pharmaceutical.

According to Blough, scientists in his lab will now turn their attention to examining other physiological systems, such as the heart and blood vessels, to see if acetaminophen therapy might have similar benefits for people with cardiovascular disease.

Dr. Blough was recruited to Marshall with the support of the 2002 NSF EPSCoR Research Infrastructure Improvement (RII) grant.



Photos - Rick Hays/Marshall University

# NEWS AND ANNOUNCEMENTS

## ENERGY EFFICIENT RESEARCH AT MARSHALL

Two Marshall University professors, **Dr. Richard Begley**, associate director of the Nick Joe Rahall II Transportation Institute, and **Dr. Michael Norton**, professor of chemistry, have helped develop ultra energy efficient Solid State ElectroCeramescent Lighting, which has applications in the defense, transportation and safety industries.



## WVU PRESIDENT CLEMENTS: RESEARCH GROWTH KEY

Total sponsored funding for West Virginia University's research initiatives increased 8 percent from \$140.7 million in fiscal year 2008 to \$152.3 million in fiscal year 2009. The university also has increased the number of competing federal grant awards from 103 to 128 in the last year, and the amount of these awards increased 33 percent. During his first State of the University address, President James P. Clements announced ways to increase and strengthen research at WVU – including creating a grants budget office, a new mentoring program, and a new electronic research administration system to help with submitting proposals to the federal government.

*Photo - Courtesy West Virginia University*



## STUDENTS MAKING WAVES

- Thirteen WVU students selected for the WVNano International Research Experience for Students spent eight weeks from June 13-Aug. 12 conducting interdisciplinary research at the State Key Laboratory of Supramolecular Structure and Materials at Jilin University in China.

- Two students from WVU – **Shenrong Ye**, whose professor is Lloyd Carroll, and **Therwa Hamza**, a student of Bingyun Li – presented posters on their research at the National Science Foundation's EPSCoR Conference in Washington, D.C. in October.
- **Janet Fraser**, a native of Burnaby, British Columbia, who is pursuing an M.S. degree in Technology Management at Marshall, has been selected as a participant in the prestigious Christine Mirzayan Science & Technology Policy Graduate Fellowship Program in Washington, D.C. Fraser has been assigned to the Transportation Research Board, where she will conduct research on transportation safety and emergency medical services.
- **Mary Kylee Underwood**, a physics major at WVU, was selected to attend "SC09" – an international conference for high-performance computing, networking, storage and analysis in Portland, Oregon. A native of Mineral Wells, Underwood works with Professor James P. Lewis doing computational materials science. This past summer, she worked at the IBM Almaden Research Center on computational chemistry research that was funded by Stanford's Center for Polymer Interfaces and Macromolecular Assemblies (CPIMA).
- Two soon-to-be Marshall University students – **Suzann Al-Qawasmi** from Huntington High School and **Evan Madden** from Cabell Midland High School – participated this summer in a program designed to generate excitement for research science and to encourage students to study physics, chemistry and biology. Through the J. Churchill Hodges Summer Scholars Program, the students worked in Marshall laboratories studying DNA (Deoxyribonucleic acid), RNA (Ribonucleic acid) and PCR (polymerase chain reaction).

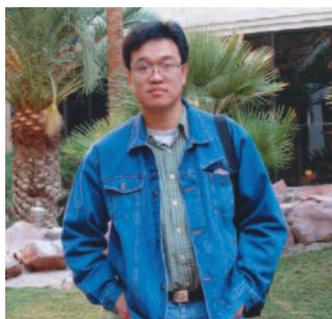
*Photo - Courtesy West Virginia University*





## AN INFUSION OF FEDERAL DOLLARS

- The FBI awarded \$414,184 to Arun Ross, associate professor at WVU, to research ways to improve finger print analysis, and \$426,772 to Tina Moroose, a WVU teaching assistant professor, to research improvements in the way investigators collect human scent evidence.
- The forensics program at Marshall is set to receive more than \$5.8 million from the U.S. Department of Justice to enhance research opportunities and provide assistance to forensic crime laboratories.
- As a result of the American Recovery and Reinvestment Act passed by Congress earlier this year, West Virginia's higher education research efforts have so far received 56 new awards worth more than \$19 million.
- WVU's Davis College of Agriculture, Forestry and Consumer Sciences has received \$1.7 million from the United States National Oceanic and Atmospheric Administration (NOAA) to establish an Environmental Research Center.
- The National Institutes of Health approved a \$529,094 grant award for Marshall's Department of Pharmacology, Physiology and Toxicology, supplementing existing funding for cardiovascular research.
- Xiaodong Michael Shi, assistant professor at WVU, received a \$550,000 CAREER Award, the NSF's most prestigious young investigator award. Shi will conduct research that could be instrumental in advancing drug design, fine chemical production and new material synthesis by studying specific transition metal organic compounds.



*Photo - Courtesy West Virginia University*





## SMALL BUSINESS INNOVATION RESEARCH (SBIR) CONFERENCE

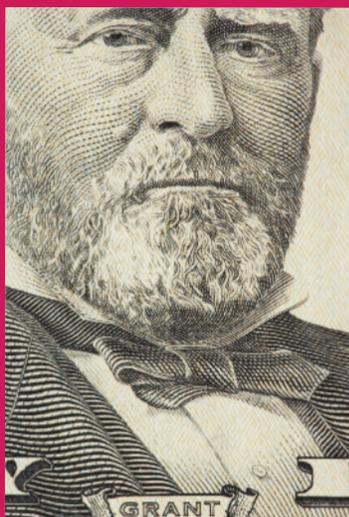
On Nov. 30 through Dec. 2, 2009 at the Waterfront Place Hotel in Morgantown, the Mid-Atlantic SBIR/STTR Conference will be held – marking the first regional SBIR/STTR event to be hosted in West Virginia. The conference will bring together federal agencies, entrepreneurs, small and large companies, researchers, colleges and universities, venture capitalists and angel investors, and federal laboratory and university representatives. To register, visit: [www.midatlanticsbir.com](http://www.midatlanticsbir.com).

## MARSHALL SEMINAR SERIES FEATURES BIOTECH EXECUTIVE

Dr. Anthony Davies, vice president of product development for biopharmaceutical company Geron Corporation, will be the featured speaker in the second in a series of public seminars hosted by the Marshall Institute for Interdisciplinary Research. The program, which will be held on December 3rd in Huntington, is free and open to the public. Reservations are requested. For more information, visit [www.marshall.edu/miir](http://www.marshall.edu/miir)

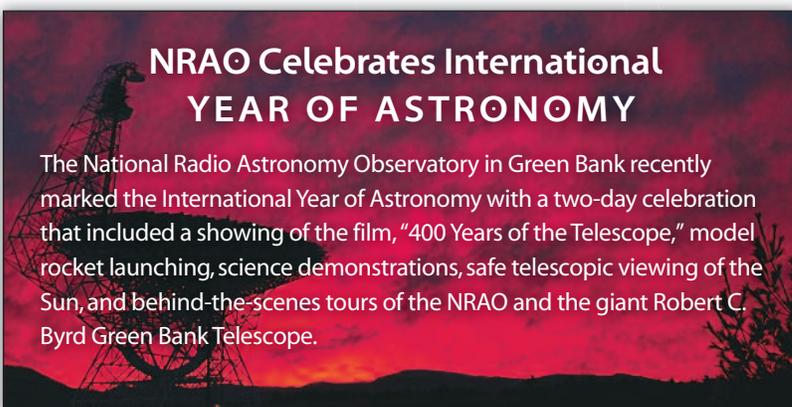
## INTERESTED IN REVIEWING PROPOSALS?

Are you interested in serving as a reviewer for the West Virginia Higher Education Policy Commission's research grant programs? We are always looking for talented faculty with an eye for promising research in all STEM areas. For more information, contact Dr. Jan Taylor at [jan.taylor@wvresearch.org](mailto:jan.taylor@wvresearch.org).



## CREATE WV CONFERENCE FOCUSES ON CHANGING TIMES

The third annual Create WV Conference – a statewide celebration of creative communities that develop new economic opportunities for West Virginians – was held from October 18th-20th in Huntington. The conference honored creativity across the state that is sparking new economic growth, particularly in those industries that generate income from the development of intellectual property and innovative entrepreneurship.



## PROTEA BIOSCIENCES CEO PRESENTS AT ANNUAL BOSTON BIOTECH R&D CONFERENCE

Steve Turner, President and Chief Executive Officer of Protea Biosciences, Inc., presented at the 2009 Boston Biotech R&D Conference on October 27th at the Harvard Medical School. The conference brought together faculty from top academic institutions and executives from some of the Boston area's emerging biopharmaceutical companies, as well as members of the biotechnology investment banking community.

## COMMENTARY

By: Brian Noland, Ph.D.

Chancellor, West Virginia Higher Education Policy Commission



### AN INNOVATIVE WEST VIRGINIA IS WITHIN REACH

Children are inherently creative. They see the promise and opportunity on a blank sheet of paper and the adventures waiting in their own backyard. They look at the world and view everything as a new possibility. As a state full of talented people and growing communities, we should harness that same creativity – the kind that finds potential in every corner – to produce plentiful intellectual capital, innovative technologies, new economic growth and a West Virginia more and more people want to call home.

That was the ambition set forth at the Create WV Conference, a statewide event that recently convened in Huntington, which celebrated communities encouraging newly-created economic opportunities – at the heart of which are knowledge creation and innovative entrepreneurship. What was heard there was clear:

to succeed in this new economy, West Virginians must use their own ingenuity.

**“to succeed in this new economy, West Virginians must use their own ingenuity”**

This charge strikes to the core of the Commission’s work through *Vision 2015* – West Virginia’s strategic plan for science and technology that aims to spur job creation and technology-based business development across the Mountain State. Our vision is that research and innovation will become the primary driver of West Virginia’s new, diverse and prosperous economy.

To reach that goal, we need solid investments in our research universities – and fortunately, the news on that front is quite good. Research dollars are flowing to West Virginia at an incredible rate and associated investments are steadily increasing on an annual basis. From 2001-2008, combined research and development expenditures at our colleges and universities

totaled more than \$1 billion, peaking last year at nearly \$171 million. And as a result of the American Recovery and Reinvestment Act passed by Congress earlier this year, our state’s higher education research efforts – ranging from advanced supercomputing and facility infrastructure, to studies in biometrics, public health and energy – have received 56 new awards, totaling more than \$19 million.

Combined with the investments made by the state, such as the Research Challenge Fund, Bucks for Brains and Eminent Scholars programs, the vision of a new West Virginia outlined in *Vision 2015* is crystallizing.

It is because of these bold steps that we are attracting world-renowned scientists and researchers to our universities and increasing the number of students pursuing degrees in science, technology, engineering and mathematics (STEM) disciplines, while increasing diversity in these fields at the same time. We certainly have more to do; we must invest major new resources in research infrastructure to lay the foundation for economic diversification and expansion. Toward that end, we recently submitted two new and crucial proposals to the National Science Foundation focused on faculty support, facilities and STEM student programs.

Thanks to strong leadership and long-term commitment, we are making the necessary investments to inspire intellectual capital and advance the skills of a changing workforce. This is precisely how we will translate imagination into innovation and build a West Virginia where creativity, businesses and opportunities thrive.

## FROM THE VICE CHANCELLOR: It Takes a State



At the National EPSCoR Conference in Washington D.C. in October, we engaged in panel discussions on the themes of “sustainability” and “innovation” – and we were proud to talk about how far West Virginia has come in science and research, and the solid path we’re on for the future.

The growing investments at our colleges and universities – which you’ll see high-

lighted repeatedly in this edition of *The Neuron* – are decisive cornerstones of the exciting and reachable goals set forth in *Vision 2015*, West Virginia’s strategic plan for science and technology that aims to spur technology-based business development in the Mountain State.

As I said in Washington, it takes a state to make this happen. And West Virginia is indeed making it possible through initiatives like the Research Challenge Fund and the Bucks for Brains and Eminent Scholars programs.

Because of these bold steps, we are making real progress – sustained, innovative progress that is putting our state on the map, making research stronger than ever before, and helping secure strong minds and a strong economic future for West Virginia.

To build on this foundation, we recently submitted two new proposals to the National Science Foundation focused on gaining new infrastructure in the form of faculty support, cyberinfrastructure, laboratories and student programs in science, technology, engineering and mathematics – all of which will bolster our efforts across West Virginia.

I thank everyone involved in making these promising advancements possible, and I join you in looking forward to new opportunities just around the corner for West Virginia.

Carpe Diem,

Paul L. Hill, Ph.D.

Vice Chancellor for Science and Research  
West Virginia Higher Education Policy Commission

## Science and Research Council

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West Virginia Wesleyan College

### Dr. Fred Butcher

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Division of Science and Research  
West Virginia Higher Education Policy Commission

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