

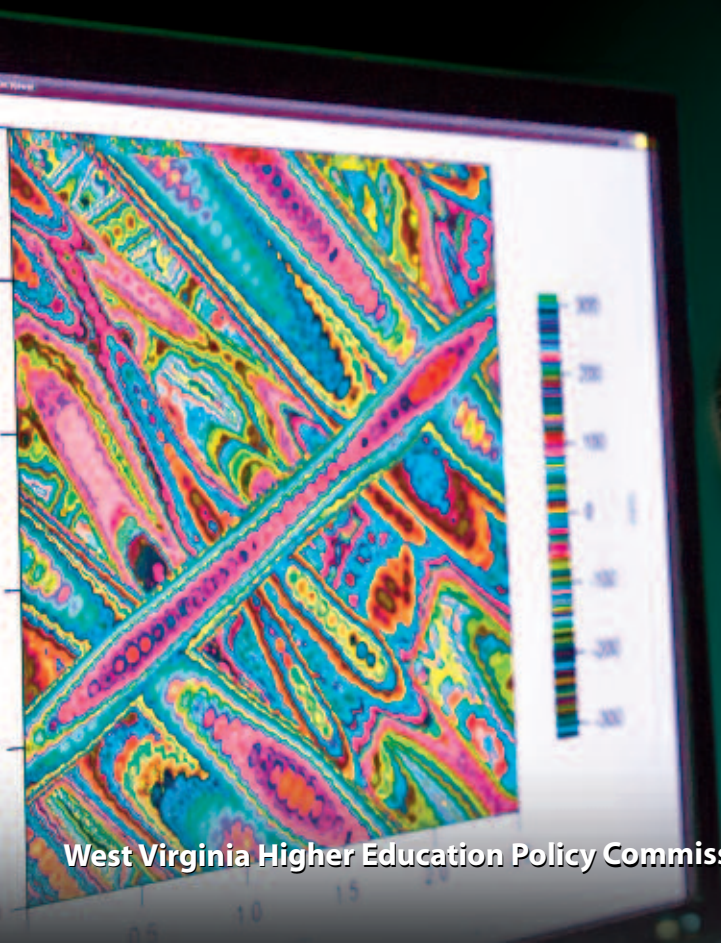
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# NEURON

WEST VIRGINIA JOURNAL OF SCIENCE AND RESEARCH

FALL/WINTER 2011

making a difference



West Virginia Higher Education Policy Commission



Dr. Cerasela Zoica Dinu  
West Virginia University

WVPEPSCOR



# making a difference

## WVU'S CERASELA ZOICA DINU RECOGNIZED FOR TEACHING AND RESEARCH

There may come a day when hospital walls and kitchen countertops are coated with a safe, environmentally friendly paint that prevents the growth of harmful germs. Applying such a coating on common household and commercial surfaces ultimately may prevent infections, diseases and death and save society countless dollars on health care.

If and when that day comes, we might be able to credit National Science Foundation-sponsored research led by Dr. Cerasela Zoica Dinu and her students in the bioanalytical and microscopy labs at West Virginia University.

Dinu, assistant professor of Chemical Engineering in the College of Engineering and Mineral Resources (CEMR), joined WVU in 2009. In a short time, Dinu has made an impression for excellence in research as well as teaching.

She recently completed an NSF-research project to create cellular-based "ink pens" to print single molecules on surfaces and is principal investigator on two other NSF grants.

Dinu is working with Dr. Nianqiang Wu on the self-decontaminating coatings project mentioned above. And she and Dr. Yon Rojanasakul are researching how cellular functions are affected by exposure to nanomaterials, materials about 50,000 times smaller than the width of a human hair.

That research also involves the National Institute of Occupational Safety and Health and collaborator Dr. Linda Sargent. "A particular risk associated with nanotechnology lies in the huge gap between public awareness and education and the promises that nanotechnologists are making," says Dinu. "We need to develop risk assessment methods to the hazards associated with nano-size manipulation. Once guidelines are in place, nanomaterials and nanotechnology can be developed and used responsibly."

While many tout the potential benefit of nanotechnology to detect and repair individual diseased cells, Dinu sees more. "To me, maybe the greatest benefit of nanotechnology is unifying disparate sciences and multidisciplinary backgrounds to resolve problems in diverse areas: from catalysis, to biology and biomedical engineering. And that is what I am doing through my collaborations."

While research is her passion, she applies equal skill to teaching. She received awards for both in 2011, being selected by CEMR as New Researcher of the Year and by the National Academy of Engineering as one of the nation's innovative young engineering educators.

"She's great in class," says student Gabrielle Rogers-Nieman, one of the six students in Dinu's lab and 17 in her classroom. "She combines traditional lectures with innovative teaching that gets the students involved. She introduces critical thinking. She encourages you to be a scientist. She helps you become confident in science."

### The Cerasela file:

B.S. Physics, M.S., Biophysics:  
University of Bucharest, Romania

Ph.D. Biology: Max Planck Institute  
of Molecular Cell Biology and  
Genetics, Dresden, Germany

Postdoctoral Fellowship: Rensselaer  
Polytechnic Institute, Troy, New York



Dr. Dinu's lab includes, from left, Alan S. Campbell, Reem Eldawud, Gabrielle Rogers-Nieman, Dr. Dinu, Hosam A. Elbaz and Chenbo Dong.

Says Dinu: "I try to demonstrate to them that they've been involved. They haven't spent 50 minutes in my class reading. They've spent 50 minutes thinking."

The opportunity to conduct groundbreaking nanotechnology research and help establish a new biomedical engineering program in CEMR brought the Romanian native to WVU. "I really like what WVNano has to offer. With the involvement of the colleges, the faculty, the students and the administration, I feel like I can make a difference."

Learn more at [www.cemr.wvu.edu](http://www.cemr.wvu.edu)

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## about the division of science and research

The West Virginia Higher Education Policy Commission's Division of Science and Research directs the National Science Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR) in West Virginia. The division also coordinates scientific research grants to academic institutions and conducts outreach activities to broaden the public's understanding of science, technology, engineering and mathematics (STEM) disciplines. For more information, visit [www.wvresearch.org](http://www.wvresearch.org)

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## NIH AWARDS \$5.5 MILLION TO WVU FOR CANCER RESEARCH Five-year renewal recognizes Center of Biomedical Research Excellence

Capping a decade of success in cancer research, the National Center for Research Resources, part of the National Institutes of Health, has awarded a five-year, \$5.5 million research grant to West Virginia University's Mary Babb Randolph Cancer Center. The grant will support the Center of Biomedical Research Excellence (CoBRE) for Signal Transduction and Cancer, led by Dr. Laura F. Gibson of the WVU School of Medicine.

WVU's CoBRE award is the third phase of a research program originally funded a decade ago. "Winning Phase III funding is recognition of the exemplary contribution that WVU scientists are making to the scientific community's understanding of the basic mechanisms of cancer," said Dr. Christopher C. Colenda, chancellor for Health Sciences. "Since the establishment of our CoBRE in Signal Transduction, our faculty members have published approximately 300 scientific journal articles. That is an amazing record."

Signal transduction is a complex process that governs how cells respond to external substances. Receptors on the cell's surface react to the outside element by transmitting a signal into the interior of the cell, causing changes in cell function. Disruption of normal signaling pathways in a cell can lead to cancer and other diseases.

The first two phases of funding were aimed at nurturing the development of scientists in the early part of their academic research careers, Gibson said. "Seventeen investigators were funded during the initial two phases of the CoBRE award," she said. "Phase I and Phase II awards also helped establish and strengthen several core facilities at the Health Sciences Center which are shared by many cancer researchers at the University."

This third phase will allow the Cancer Center to develop research collaborations with other scientists across the University and elsewhere.

"Investigators from diverse disciplines, departments and campuses across the state all have something important to contribute to cancer research," Gibson said. "With this funding, we are able to make high-quality, sophisticated research tools more accessible to a wide variety of researchers."

For more information, visit [www.wvucancer.org](http://www.wvucancer.org).



## NEW HIGH-PERFORMANCE COMPUTING CLUSTER GIVES MARSHALL UNPRECEDENTED RESEARCH, TEACHING AND LEARNING TOOLS

Taking on some of mankind's greatest challenges and advancing cutting-edge science, research and learning all require enormous computing power.

Now, researchers, faculty and students at Marshall University have access to a new high-performance computing (HPC) cluster that will enable them to make significant advancements in fields as diverse as bioinformatics, climate research, physics, computational chemistry and engineering.

Dr. Jan I. Fox, Marshall's chief information officer, says all these disciplines rely on the state-of-the-art computing tools and methods provided by the new cluster.

"This new HPC cluster makes possible scholarly innovation and discoveries that were, until recently, possible only at the most prestigious research institutions," she said. "Along with our connection to Internet2, our students and faculty now have access to computing power, data and information we could only imagine just a few years ago."

Nicknamed "BigGreen," Marshall's new cluster is made up of 23 high-end computer systems housed in the University's Drinko Library. Once they have a user account on BigGreen, researchers can access the cluster and its resources from anywhere.

For the computer-savvy, it is important to note that BigGreen features 276 central processing unit cores, 552 gigabytes of memory and more than 10 terabytes of storage. Eight NVidia Tesla graphics processing units with 448 cores each provide support for massively parallel computation, pushing BigGreen to roughly six Teraflops—or six trillion floating point operations per second—of theoretical peak computing power. A variety of scientific software packages are installed and available for use on the cluster, including COMSOL Multiphysics, Mathematica and CLC Genomics WorkBench.

For most people, it is enough to understand that BigGreen is powerful enough to allow simulations of black holes and gravitational waves. It can provide data support for sequencing of DNA at unprecedented speeds, and it can make possible the design of complex underground mine ventilation systems. The cluster can also accommodate molecular modeling, disaster simulations and gait analysis in the university's Visualization Lab.

BigGreen was made possible in part by a National Science Foundation grant that funds "Cyberinfrastructure for Transformational Scientific Discovery in West Virginia and Arkansas (CI-TRAIN) EPS-0918949," a partnership among eight higher education institutions in West Virginia and Arkansas.

For more information, visit [www.marshall.edu/it/research](http://www.marshall.edu/it/research).





## WVU CENTER DEVELOPS WRAP TREATMENT TO REMEDY MOUNTAIN STATE BRIDGE DEFICIENCIES

West Virginia has more than 6,700 bridges – from its 17 historically-registered wooden covered versions, to engineering marvels like the New River Gorge Bridge.

But many of the state's bridges are in need of repair or replacement at a time when funding for such projects is severely limited. West Virginia ranks among the top 25 percent of states with significant bridge deficiencies. Which means Dr. Hota GangaRao is a busy man these days.

The founder and director of West Virginia University's Constructed Facilities Center, GangaRao has spent his career as a leading researcher and voice in the study of structural deterioration and rehabilitation, while perfecting a process that preserves existing bridges and buildings.

Now the Center is working closely with the West Virginia Division of Highways to rehabilitate up to 500 concrete bridges across the state.

"We evaluate the bridge in situ – meaning we look at how much it has corroded, how much the concrete has spalled, and other aspects," GangaRao said. "Then we strip the bridge down to a solid portion of its original concrete or steel."

The structure is then covered with a two-inch outer mortar cover and wrapped tightly with a material made from either glass or carbon fabric and resin; the fabric gives the wrapping material strength, while the resin binds with the structure's original substrate.

"Not only does it hold things together, but the wrap also enhances the strength of the overall structure," he said.

The Center's preservation process works for old buildings as well. "We have rehabilitated three school buildings – one in Preston County, two in Gilmer County. They were rehabilitated at a fraction of the cost it would have taken to replace them," GangaRao said.



## BRISTOL-MYERS SQUIBB FOUNDATION AWARDS GRANT TO MARSHALL UNIVERSITY'S CENTER FOR RURAL HEALTH

### *\$2.6 million to help Appalachian communities fight type 2 diabetes*

The Bristol-Myers Squibb Foundation has awarded \$2.6 million to Marshall University's Center for Rural Health to help diabetes coalitions in 10 Appalachian communities implement effective local solutions to the widespread problem of diabetes.

The coalitions are part of Marshall's Appalachian Diabetes Control and Translation Project, which since 2000 has created 66 such coalitions in nine states through funding from the Appalachian Regional Commission (ARC) and the Centers for Disease Control and Prevention (CDC).

The grant is part of the foundation's "Together on Diabetes" program, which supports efforts to develop and expand effective patient self-management programs and to draw whole communities into the fight against type 2 diabetes.

"Diabetes is such a big problem in distressed Appalachian counties in part because lifestyles have changed over the last 20 years," said Dr. Richard Crespo of Marshall, project coordinator. "People have become more sedentary, leading to obesity, which is a major risk factor for diabetes. Thus the solution is in the community, not the doctor's office."

The grant will provide support for coalitions in 10 distressed counties, helping them to implement evidence-based programs that promote long-term behavior change and improve the health of people who have type 2 diabetes.

The CDC and ARC will provide training, and Marshall will guide the 10 diabetes coalitions through a planning process, equip them with evidence-based programs, and provide ongoing technical assistance. Marshall also will evaluate the program, looking at the coalitions themselves, changes in their communities, and improvements in patients' diabetes health.





## WVSU STUDENTS BENEFIT FROM PLANT GENOMICS COLLABORATIONS

Research students involved in the Plant Genomics Program at West Virginia State University are picking up real world research experience by participating in unique conference, workshop and internship opportunities.

As part of a collaborative grant between WVSU Research Scientist Dr. Padma Nimmakayala and scientists at Cornell University, undergraduate biology students Joshua Hechesky and

Zachary Perry experienced 10-week summer internships in Cornell's Plant Science Department. During their visit, they worked with several scientists, receiving 'hands on' experience with high throughput genotyping of Single Nucleotide Polymorphisms in varieties of corn.

Recently, WVSU Biotechnology graduate student Hugh Dalton, pictured above, traveled with mentoring scientist Dr. Barbara Liedl to Ithaca, NY, for the 43rd Annual Tomato Breeders Round Table and the 26th Annual Tomato Disease workshop held at Cornell. While at the event, Dalton heard presentations and networked with emerging and well-known scientists using novel methods in research. When asked about the impact of his experience he stated; "Hearing what is being done with the latest technology has given me ideas and insight into my approach with my own thesis goals."

WVSU faculty and staff are dedicated to providing unique experiences for research students. For more information, contact the WVSU Agricultural & Environmental Research Station at 304-204-4388 or visit <http://grdi.wvstateu.edu>.



## DOE AWARDS \$1.5 MILLION TO WVU INDUSTRIAL ASSESSMENT CENTER

West Virginia University's College of Engineering and Mineral Resources will receive \$1.5 million over the next five years as part of the Department of Energy's Industrial Assessment Center program. The grant, a renewal of a program that has been at WVU since 1992, places emphasis on students gaining practical training on core energy efficiency and management concepts.

The IAC program provides undergraduate and graduate engineering students with the opportunity to conduct energy assessments in area manufacturing facilities while local companies and factories get expert advice on reducing energy consumption and emissions, thereby saving money and becoming more economically competitive.

"The desired end result is to create the next generation of energy engineers," said Dr. Bhaskaran Gopalakrishnan, IAC director, shown below.

The focus on energy efficiency not only provides students with invaluable training, but also results in economic development in the region as companies reduce cost through energy savings and increase their global competitiveness.

This project also helps reduce environmental emissions.

"The ultimate objective is to introduce companies to proper procedures for energy management and efficiency, and to help them in reducing their energy consumption," said Dr. Wafik Iskander, assistant director of the IAC.

Learn more at [www.cemr.wvu.edu](http://www.cemr.wvu.edu).







## NEW WEST VIRGINIA CRAYFISH SPECIES DISCOVERED. Could there be more?

A team of researchers headed by West Liberty University biology instructor Zachary Loughman, above right, has reported the discovery of a new species of crayfish. The findings were published in the journal *Proceedings of the Biological Society of Washington*. Loughman's co-authors were West Virginia University wildlife and fisheries professor Dr. Stuart Welsh and Dr. Thomas Simon, senior research scientist at Indiana State University.

Loughman and Welsh have been working together for several years on a project funded by the W.Va. Division of Natural Resources' Natural Heritage Program to track the occurrence and status of crayfish throughout the state.

"Since 2007, our task has been to survey every major watershed and to determine the true extent of West Virginia's crayfish diversity," Dr. Loughman explained. "Stuart and I have collected crayfishes in over 800 West Virginia rivers, creeks and wetlands. The crayfishes we collect are examined and identified in the lab by comparing them to previously-described species."

In the summer of 2008, West Liberty students Matthew McKinney and Nicole Garrison, along with Stuart and Loughman, collected specimens from across the Greenbrier River system. "We brought them back to the lab, took measurements and compared them to previously described species, but found one species in particular didn't fit any previously described species diagnosis," Loughman said. "There were multiple characteristics that differed from the species they were previously thought to be -- the Big Water crayfish (*Cambarus robustus*)."

The new species, *Cambarus smilax*, has been given the common name Greenbrier crayfish in reference to West Virginia's Greenbrier River basin. It appears to be found only in this West Virginia watershed, while the Big Water crayfish is found in several states throughout the eastern United States.

"This crayfish is a unique part of West Virginia's biodiversity," Loughman said. While there are over 20 described species of crayfish in the state, he estimated there are two to five species yet to be described. Loughman added that WLU's involvement in the study of crayfish is unique, as West Liberty houses one of three laboratories at the university level in the country dedicated to astacology, the study of crayfish.

Loughman says the study of crayfish, often referred to as mudbugs in West Virginia, is necessary. "Conserving crayfishes is important given the ecological role these organisms play. In streams, crayfish create habitats that simply aren't present without them. These habitats are utilized by everything from mayflies to minnows and even large salamanders. In addition, crayfishes are important food sources for several game fishes and imperiled species, such as hellbender salamanders. The addition of a crayfish to West Virginia's fauna that is unique to the state demonstrates that new species are still waiting to be discovered in West Virginia forests, streams and rivers."

For more information please visit <http://westliberty.edu/news>.

"The addition of a crayfish to West Virginia's fauna that is unique to the state demonstrates that new species are still waiting to be discovered in West Virginia's forests, streams and rivers."

Zachary Loughman



## COMBINING HYDROPONICS WITH AQUACULTURE GROWS ECONOMIC DEVELOPMENT AND CLEAN WATER

While you knew that fresh fish and leafy greens make for a healthy meal, did you know that growing them together can have a positive impact on water quality?

Researchers at West Virginia University are expanding their investigation into aquaponics – a sustainable production system that combines aquaculture (fish farming) with hydroponics (cultivating plants in water). Their work will be funded by a Conservation Innovation Grant from the United States Department of Agriculture's Natural Resource Conservation Service.

The aquaponics team is conducting its studies in flowing-water aquaculture systems at a farm and two commercial fish production operations in West Virginia.

In these systems, fish release nutrients into the water creating an opportunity for the production of plants. These nutrients include ammonia, nitrates, nitrites and phosphates, all of which influence water quality. Growth of the plants in the water helps to remove the soluble nutrients from the water flow, thereby reducing the negative impact into sensitive waters.

Besides reducing the environmental impact of fish-production systems, aquaponics may also offer an extra source of income for fish producers. The addition of vegetable and flower production increases the volume and diversity of goods for market.

Lance Lin, an assistant professor of civil engineering and principal investigator on the project, said that the next steps for aquaponics research may be economic, exploring the large-scale financial feasibility of adding aquaponics to fish production systems.

"This project serves as a great example of how economic development and environmental protection can be achieved at the same time while we strive to cope with limited water resources," Lin said. "In this case, added income from vegetable and ornamental crops may be supplemented by improved water quality, creating a win-win situation."

Learn more at <http://davis.wvu.edu/>.

## WVU RESEARCHERS TEAM WITH NETL ON NOVEL SIMULATOR FOR COAL POWER PLANTS

Power plant simulators at West Virginia University will train controllers around the world on operation of highly efficient, clean-coal burning power plants.

The AVESTAR™ Center, a first of its kind advanced virtual energy simulation training and research center, is designed to teach power plant personnel how to operate an integrated gasification combined cycle (IGCC) power plant, complete with carbon capture capability.

The Center will operate two identical simulator facilities, one at the WVU National Research Center for Coal and Energy, and another at the National Energy Technology Laboratory (NETL). Both locations are in Morgantown.

The simulator effort is being led by WVU Chemical Engineering Professor Richard Turton and U.S. Department of Energy's Stephen E. Zitney.

The real-time operator training system will be combined with a three-dimensional virtual reality environment and enable trainees to interact with the simulated 3-D facility to study and learn plant operation, control, and safety.

"Every unit in the plant will be represented in the virtual work world," Turton said. "Operators will be able to go anywhere in the plant, allowing them to do a virtual tour of the power plant without leaving the confines of the classroom."

WVU Vice President for Research and Economic Development Dr. Curt Peterson said the project is part of the University's research on energy and the environment. "Providing state-of-the-art training and information on ways to responsibly use one of the state's most abundant natural resources is important part of that activity."

Funding for WVU's portion of the collaborative work was provided through the NETL-Regional University Alliance.

Information about training is available online at [www.netl.doe.gov/avestar](http://www.netl.doe.gov/avestar).





## MARSHALL AWARDED MSHA FUNDING TO DEVELOP VIRTUAL TRAINING ACADEMY

The U.S. Department of Labor's Mine Safety and Health Administration has announced that Marshall University is one of eight organizations nationwide to receive funding through the Brookwood-Sago Mine Safety Grant program.

Marshall's Center for Environmental, Geotechnical and Applied Sciences (CEGAS) will receive \$117,000 to develop a Virtual Mine Safety Training Academy—a comprehensive mine safety training tool featuring a web-based, simulated environment that will include an underground room-and-pillar coal mine.

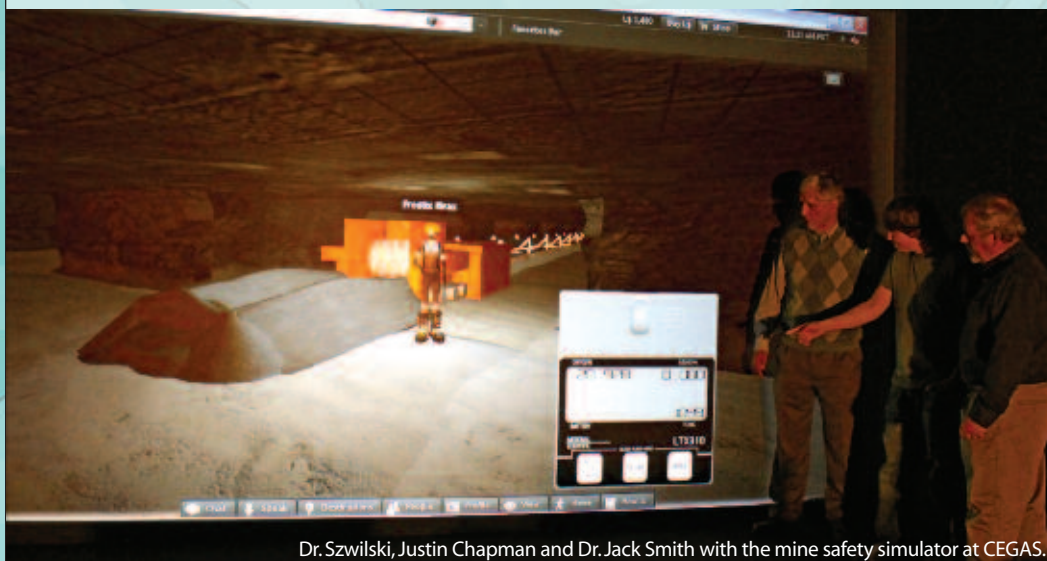


photo - Dr. Isaac Waits

Dr. Szwilski, Justin Chapman and Dr. Jack Smith with the mine safety simulator at CEGAS.

Dr. Tony Szwilski, CEGAS director, said researchers will use the UNITY game engine to create a site that will provide valuable mine emergency response exercises, including communications and decision-making in dangerous and stressful mine environments.

The Brookwood-Sago grants program was established through a provision in the Mine Improvement and New Emergency Response Act of 2006. This funding will be used to develop and implement training and related materials for mine emergency preparedness, as well as for the prevention of accidents in underground mines.

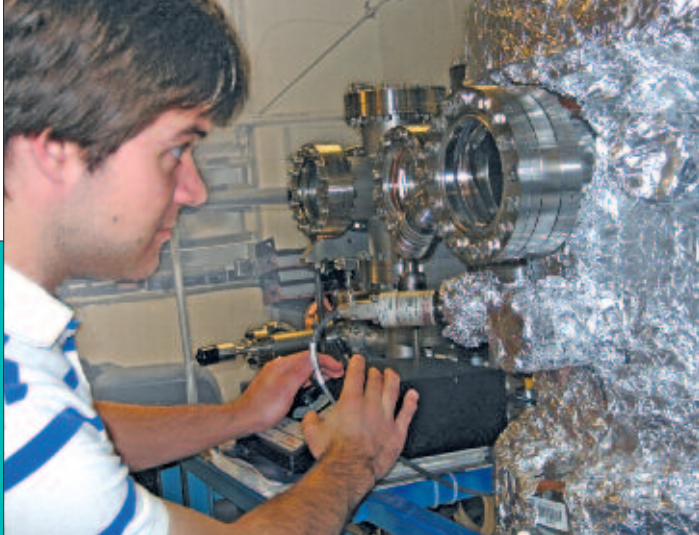
The grants were named in remembrance of 13 men who died in two explosions at the Jim Walter Resources Inc. No. 5 Mine in Brookwood, Ala., in 2001, and 12 men who died in an explosion at the Sago Mine in Talsmanville, W.Va. in 2006.

For more information, visit [www.marshall.edu/cegas](http://www.marshall.edu/cegas).



Richard Turton





## WVNANO NAMES NEW FELLOWS

*The WVNano Initiative has brought in eight new Graduate Fellowship Program students and four returning students for the 2011-12 academic year.*

The program at West Virginia University supports Ph.D. graduate students from science, technology, engineering and math (STEM) disciplines to increase STEM diversity at WVU and ensure lifetime career success through comprehensive career training. Each year, approximately six additional graduate students receive a \$27,000 fellowship stipend for interdisciplinary research in bionanotechnology that supports the WVNano Interdisciplinary Research Teams. These research programs address rapid, field-deployable DNA fingerprinting for human and pathogen identification, miniature ultrasensitive toxin and other environmental hazard sensors that do not rely on large laboratory equipment and devices that quickly determine damage to cell functionality.

New participants in the WVNano Graduate Fellowship Program are Michael Aldridge, Department of Biology; Jamie Barr, Biomedical Sciences; Chris Bostick, Pharmaceutical and Pharmacological Sciences; Brandon Durney, C. Eugene Bennett Department of Chemistry; Reem El Dawud, Department of Chemical Engineering; Dakota Jackson, Biomedical Sciences; Valerie Minarchick, Cellular and Integrative Physiology; Ryan Williams, Pharmaceutical and Pharmacological Sciences.

Returning Fellows are Andrea Armstead, Pharmaceutical and Pharmacological Sciences; Christina Byrne-Hoffman, Pharmaceutical and Pharmacological Sciences; Nicole Shamitko-Klingensmith, C. Eugene Bennett Department of Chemistry; and Zahra Ronaghi, Lane Department of Computer Science and Electrical Engineering.

This fellowship is funded through the West Virginia University Research Corporation, West Virginia Higher Education Policy Commission and National Science Foundation Cooperative Agreement 1003907.

Learn more at <http://wvnano.wvu.edu>.



Michael Aldridge



Jamie Barr



Chris Bostick



Brandon Durney



Reem El Dawud



Dakota Jackson



Valerie Minarchick



Ryan Williams



Andrea Armstead



Christina Byrne-Hoffman



Nicole Shamitko-Klingensmith



Zahra Ronaghi

INNOVATION

## US EDA SUPPORTS SUSTAINABLE REGIONAL ECONOMIES

Marshall and Concord universities have been awarded \$500,000 over five years from the U.S. Economic Development Administration (EDA) to establish a resource center to help spur innovation and increase the competitive prowess of West Virginia businesses.

The EDA investment will establish the West Virginia EDA University Center at Marshall University. The collaborative effort between Marshall and Concord will provide technical assistance and applied research to help increase productivity of businesses, spur innovation and entrepreneurship, and increase long-term regional competitiveness and economic diversification of industries across the state.

"Entrepreneurship from our private-sector and creative energies from our universities and Marshall's Robert C. Byrd Institute for Advanced Flexible Manufacturing are the key ingredients in this rich mix aimed at helping our businesses excel," said U.S. Rep. Nick J. Rahall (D-W.Va.), who announced the award in September. "The EDA's mission is job creation and it plays a truly dynamic role in planning long-term, sustainable growth for regional economies. This new center will help our businesses, current and future, to leverage investment in research, development and training to grow jobs and prosper."



## UNIVERSITY OF CHARLESTON STUDENTS TAKING ADVANTAGE OF RESEARCH OPPORTUNITIES

Thirty-two students in four years have reaped the rewards of organized scientific research at the University of Charleston, thanks to a unique opportunity made possible by a National Institutes of Health–West Virginia IDeA Network of Biomedical Research Excellence program. Drs. Rebecca Linger and Gagan Kaushal, both professors at the UC School of Pharmacy, applied for the grants, which stipulate that undergraduates and student pharmacists work in the lab “getting their hands wet” with research.

Dr. Linger’s laboratory is studying bifunctional enzymes. The purpose of the research is to understand how these proteins communicate between their two active sites. Dr. Kaushal is an expert in formulation development, and his student assistants are working on a transdermal patch to be used for phobia and anxiety.

“I intend to pursue a career in medicine so I will be looking at numerous healthcare challenges that depend on research to find solutions,” said student Jon-Tait Beason. “In Dr. Linger’s lab, not only am I gaining an understanding of the significance of research to our well-being, I have also developed an appreciation for accuracy, precision, patience, dedication, teamwork and ethics.”

Conducting undergraduate research has sparked an interest in a pharmacy career and the opportunities offered at UC’s new pharmacy school for student Tammy Yoxtheimer.

“I have found my experience working in the lab to be exciting and rewarding,” Yoxtheimer said.

For more information, visit [www.ucwv.edu/](http://www.ucwv.edu/).



UC students from left; Jon-Tait Beason, Benjamin Mancheril and Hayley DeMay.

## WEST VIRGINIA STATE STUDENTS WIN NATIONAL AWARDS TWO YEARS IN A ROW

The American Chemical Society (ACS) recently awarded the West Virginia State University student chapter of the ACS two national chemistry awards. WVSU chemistry students received the Commendable Chapter Award and a Green Chemistry award for 2010-2011 academic year activities.

The ACS Commendable Chapter Award is given to student chapters for their community service and outreach, while the Green Chemistry award is for waste reducing practices in chemistry during the academic year.

This marks the second consecutive year that WVSU Chemistry students have won national awards in American Chemical Society competitions, the only school in the state to do so. Dr. Tom Guetzloff and Dr. Micheal Fultz, both professors of chemistry, are the faculty advisors to the winning student group. The ACS student chapter at WVSU served over 1,500 K-12 students and community citizens during the year through community programming and volunteer outreach efforts.

## BAD DAY FOR PUMPKINS BUT GREAT FOR STEM EDUCATION

After counting a seemingly endless line of squashed, broken and cracked orange gourds, one observer of the 13th Annual Capital City Pumpkin Drop commented: “It’s not a good day for pumpkins.”

Maybe so, but it was a great day for Science, Technology, Engineering and Mathematics education in central West Virginia. About 1,000 students representing 23 schools from six counties took part in the pumpkin drop in Charleston’s Appalachian Power Park.

Bridgemont Community and Technical College sponsored the event as part of its STEM outreach program. The challenge for students in grades four through 12 was to work together to figure out how to package a pumpkin so that it would survive, intact, a 40-foot drop. While prizes were awarded for first, second and third place, as well as the Grand

Slam Pumpkin, the true winners were the hundreds of students who engaged their minds in a fun learning experience that may ultimately direct them toward future STEM careers.

The Pumpkin drop was one of several around the state with similar teaching goals.





# News & Announcements

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## YANG RECEIVES NSF GRANT TO STUDY EFFICIENCY OF NANOMATERIAL TOXICOLOGY

A \$200,000 National Science Foundation grant may lead to better methods of nanomaterial research.

Feng Yang, an assistant professor at West Virginia University's College of Engineering and Mineral Resources, received the grant to develop statistical

methods to improve experimental efficiency in toxicology studies of nanomaterials.

With the advancement of nanotechnology in a wide range of applications, many nanometer-sized particles, or nanoparticles, are now commercially available. However, the problem exists between the development of these nanoparticles and the risk assessment. Any substance can be toxic to humans if too much is consumed. It has been found that nanoparticles are more toxic than relatively big particles because they are extremely small.

"Think of nanomaterials as extremely small dust in the air," explains Yang. "Breathing in too much dust makes people sick."

"Some nanomaterials are fed to animals to see how they react," said Yang. "Such biological experiments are expensive and I intend to develop statistical methods so that fewer experiments are needed to find out the toxicity effects of nanomaterials."

Yang is working to develop procedures that will reduce the amount of biological experiments needed for toxicity assessment. This research will substantially reduce the cost of experiments while alleviating the rising concerns for animal ethics. If successful, the method to be developed could accelerate the process of understanding any potential environmental hazard and human exposure risk posed by nanomaterials.

Yang plans to recruit female, low-income and minority students to participate in the proposed research, hoping to attract young talent into the multidisciplinary field. "As a woman in engineering, I understand the challenges faced by women and minorities and I believe involving them in higher education and research will benefit society in the long run."

While the research hopefuls have yet to be determined, Yang hopes to begin her research soon. Yang is collaborating with Dr. Dale Porter at the National Institute for Occupational Safety and Health.

## AEP FOUNDATION GIFT TO SUPPORT RESEARCH AT MARSHALL UNIVERSITY

Marshall University has received a \$750,000 gift from the American Electric Power Foundation to establish a research endowment. Proceeds from the endowment will be used to support the Marshall Institute for Interdisciplinary Research and the Institute's collaborations with other Marshall research initiatives. The donation is the largest single gift ever made by the foundation in West Virginia.

The donation will be matched through the state's "Bucks for Brains" West Virginia Research Trust Fund.





## BLUEFIELD STATE STUDENTS TO IMPLEMENT PEER-LED SUPPORT NETWORK

The Bluefield State College Research and Development Corporation has received an \$85,000 Minority Serving Institutions Initiative from the Substance Abuse and Mental Health Services Administration. The grant will provide training and stipends for five BSC students to collaborate with faculty to develop and implement a sustainable, peer-led support network for a high-risk behavior and HIV/AIDS prevention, awareness and training program.

Dr. Anthony Woart will be project director and principal investigator. Dr. Tamara Ferguson will be project liaison. Dr. Cravor Jones will assist with training student leaders and educators.

Learn more at [www.bluefieldstate.edu](http://www.bluefieldstate.edu).

## Recent Events



### WVU STUDENT WINS GRAND PRIZE AT NATIONAL EPSCoR CONFERENCE POSTER PRESENTATION

Three graduate students represented the state of West Virginia at the National Science Foundation EPSCoR conference in Idaho in October.

From Marshall University, Edwin Warnick, an undergrad in the Weisberg Division of Engineering and Computer Science, presented a poster titled "CRES: Cyber-security Research and Education System" with Seth Jackson and advisor Dr. Paulus Wahjudi.

From West Virginia University, Ming Li, a graduate student in the Department of Mechanical and Aerospace Engineering working with Dr. Nick Wu, presented a poster entitled, "Energy Transfer of Fluorescent CdSe/ZnS Quantum Dots and Gold Nanoparticles and its Applications for Mercuric (II) Ion Detection."

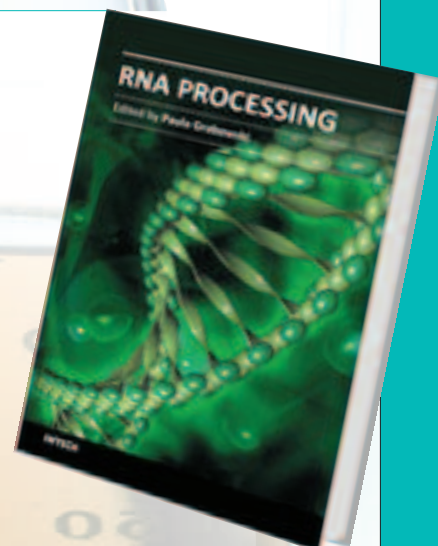
Nicole Shamitko-Klingensmith of WVU's C. Eugene Bennett Department of Chemistry and a WVNano Graduate Fellow presented a poster titled "Mapping the Mechanical Properties of Surfaces in Solution with Nanometer Resolution: Applications for Biology," with co-author Kelley Wambaugh and advisor Dr. Justin Legleiter. She won Grand Prize in the Other category of posters.

### DOCTORAL STUDENT, PROFESSOR WRITE CHAPTER FOR MOLECULAR BIOLOGY PUBLICATION

Marshall University doctoral student J. Adam Hall and faculty member Dr. Philippe T. Georgel have collaborated to write a chapter for a new book focusing on RNA processing in animal and plant cells.

Their chapter describes the interaction between RNA splicing and chromatin, and appears in the book "RNA Processing," which was edited by Paula Grabowski and published in August. The book is freely available online through open access publisher InTech.

Visit [www.intechweb.org](http://www.intechweb.org) for more information.





## MEDICAL SCHOOL NAMES RESEARCH INSTITUTE IN HONOR OF LONGTIME DEAN MCKOWN

The new translational genomic research institute at Marshall University's Joan C. Edwards School of Medicine has been named in honor of Dr. Charles H. McKown Jr., who served as the school's dean for more than 22 years before becoming Marshall's vice president for health sciences advancement this summer.

The Charles H. McKown Jr. Translational Genomic Research Institute is located on the top floor of the Edwards Comprehensive Cancer Center. Completed this summer, it includes more than 10,000 square feet of research space and has advanced scientific equipment including a "next-generation" genetic sequencer.

For more information, visit <http://musom.marshall.edu>.



Student researcher Allison Wolf in the Charles H. McKown (inset) Research Institute.



Bojan Cukic



Katerina Goseva-Popstojanova



Arun Ross



Daryl Reynolds



Xiaodong Michael Shi



Paul Cassak



David Klinke

## WORKSHOP AT WVU AIMS FOR FUTURE CAREER AWARDEES

The West Virginia University Research Office hosted its first National Science Foundation CAREER Award Proposal Workshop in October featuring a panel of previous WVU CAREER awardees.

About 45 faculty, postdoctoral candidates and researchers attended the event to gain insight into how they might obtain a CAREER award. The Faculty Early Career Development Program offers the NSF's most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research.

Panelists, and the year they received their CAREER award, were:

Bojan Cukic	2000
Katerina Goseva-Popstojanova	2005
Arun Ross	2007
Daryl Reynolds	2008
Xiaodong Michael Shi	2009
Paul Cassak	2010
David Klinke	2011

## STaRSYMPOSIUM2012



SET FOR APRIL 20 & 21

The West Virginia Science, Technology and Research Symposium is scheduled for April 20 and 21, 2012, at West Virginia State University in Institute. Check [www.wvresearch.org](http://www.wvresearch.org) for updates.



## COMMENTARY

**DR. ANDREW N. BLACKWOOD**

Executive Director, National Youth Science Foundation

In 1963, West Virginia hosted the inaugural **National Youth Science Camp** (NYSC) as part of the state's Centennial Celebration. Conceived as a one-time event, the NYSC proved so successful then that it continues to this day, stronger and more important than ever.

Over its nearly 50-year history, more than 5,000 students representing every state as well as 25 countries have participated in the program – free of charge. Camp alumni include scientists, researchers, physicians, teachers, entrepreneurs, and inventors; more than 40 percent went on to obtain terminal degrees. All are ambassadors for West Virginia.

Originally designed to showcase science and research conducted in West Virginia, the camp has evolved to become a valued service to the nation's best young scientists. At the height of the Space Race, Astronaut Neil Armstrong sketched the trajectory that he would use to go to the Moon. As they finished mapping the human genome, Dr. Francis Collins, Director of the National Human Genome Research Institute, lectured about the responsibilities and opportunities of thoroughly understanding human genetics. Most recently, Marissa Mayer, Google vice president and NYSC alumnus, spoke about the role and importance of Internet technologies as Google sought to balance freedom and government censorship around the world.



Throughout its history, the NYSC has been as much about economic development as it has been about education. Science, technology, engineering, arts and mathematics (STEAM) are the driving forces behind innovation and improving the economic climate. Investing in STEAM education activities is critical, and with the support of the State of West Virginia, the Foundation has not lost sight of this challenge and the importance of leveraging the camp experience to benefit more West Virginia students.

Since 2005, an additional program, the Governor's School for Mathematics and Science, has allowed West Virginia students to conduct original research at the National Radio Astronomy Observatory in Green Bank. Starting last summer, students from across the state attended the W.Va. Youth Science Camp, which was modeled after the NYSC and shared many of its faculty. With seed support from NASA, the Youth Science Discovery Experience encourages West Virginia students, teachers and scientists to work together to solve real-world problems using a project-based learning approach.

Looking ahead to the next 50 years, the Foundation has developed plans to construct the National Center for Youth Science Education near Davis, W.Va. The Center will become the home of the NYSC and the Foundation's other STEAM education programs and will allow us to directly serve more West Virginians and others from around the nation and the world.

The National Youth Science Foundation is based in the W.Va. Regional Technology Park and operates the National Youth Science Camp, the W.Va. Governor's School for Mathematics and Science, the W.Va. Youth Science Camp, the Youth Science Discovery Experience and other STEAM education programs. Learn more at [www.nysf.com](http://www.nysf.com).





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### From the Vice Chancellor:

## 2011 MILESTONES IN RESEARCH and DEVELOPMENT



It has been a season of milestones for WV EPSCoR and the Division of Science and Research. From our visit to the National Science Foundation in September to the celebration of our first year of management of the West Virginia Regional Technology Park, the achievements of faculty, staff and research managers has been noteworthy.

As we have moved into the second year of the Research Infrastructure Improvement (RII) award from the National Science Foundation, our collaborations among campuses at Marshall University, West Virginia State University and West Virginia University continue to grow and strengthen. That was evident during a presentation to NSF and peer panelists by our team, including Drs. Tina Cartwright (MU), David Lederman (WVU), Ulises Toledo (WVSU) and Ceresela Dinu (WVU), who is this *Neuron's* cover researcher. Indeed, I'm delighted by the star-power of our research team and the outstanding quality of their work.

Early in 2011 we began to establish milestones for the full incorporation of the WV Regional Technology Park into the Higher Education System. New buildings and renovations of laboratories have been strengthened by a grant from the US Economic Development

Administration to build out business incubation and innovation space for researchers. A full line of business and commercialization is planned while the Master Planning process is now headed by new park director, Dr. Phil Halstead who began his leadership position just a few months ago.

As 2011 comes to a close, we are saddened by the loss of WVRTP Chief Operating Officer Tom Reishman, a long-time and devoted friend, consummate professional and visionary businessman. He was dogged in his pursuit of operational systems and made a lasting contribution to the R&D community. During his year-long battle with cancer, many never knew about his struggle because he never allowed his illness to define him. In 2012, may we all resolve to emulate his example in life.

Carpe Diem,

Paul L. Hill, Ph.D.

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