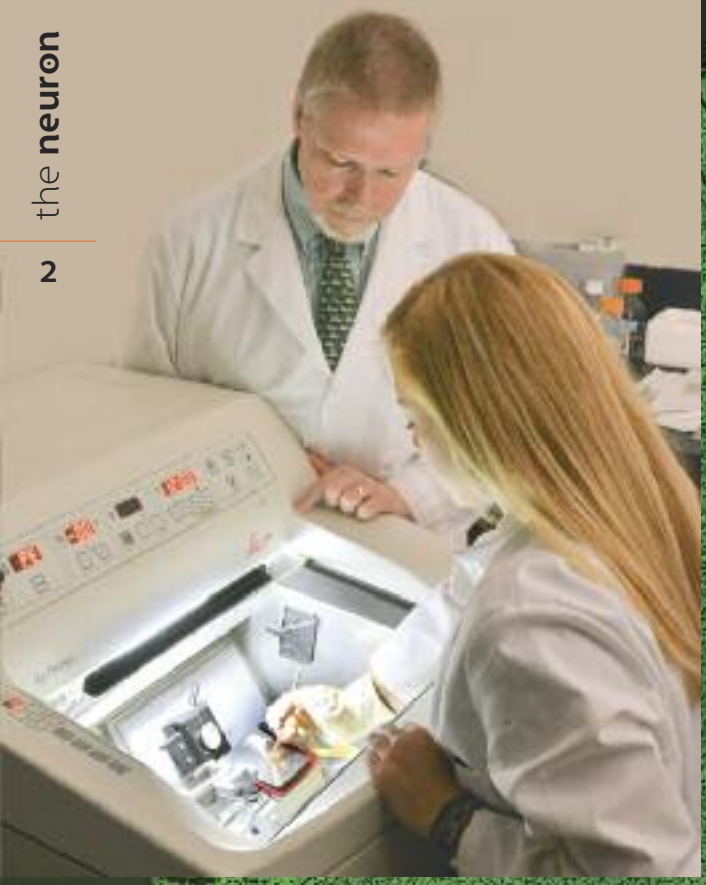
the NEURON

the west virginia journal of science and research

Fall 2015

Dr. Elmer Price
Marshall University



Undergrad Research Assistant Amanda Clark works in the lab with Price.

Professor FIREed up at Marshall

Dr. Elmer Price

Marshall University

Dr. Elmer Price is a man on a mission. Part of his mission at Marshall University is to develop new treatments to eradicate the symptoms of Parkinson's Disease. With help from a recent $350,000 grant from the National Science Foundation (NSF), support from the West Virginia EPSCoR program in conjunction with the last Research Improvement and Infrastructure grant and some really engaged undergraduate students, he's well on his way.

Price, professor of biological sciences at Marshall, said that the importance of his new grant is at least two-fold. First, it validates that Marshall can be competitive in scientific biomedical research on a national scale. Second, the money provides practical support that's needed in order to continue his research into Parkinson's, a disease in which the nerve cells in the brain that produce dopamine become sick and die, causing muscle rigidity, tremors and changes in speech and gait and motor control. After diagnosis, there are treatments available that can help relieve symptoms, but there is no cure. Likely a chief reason that he funded is that his research into Parkinson's and other neurological diseases is cutting edge. In fact, he doesn't know of anyone else in the world taking a similar approach.

To understand this a little more, a brief science lesson may be in order. Price said that the scientific community used to assume that brain cells could not regenerate. It turns out that they can, but only in niches of the brain such as in the memory/learning and the olfactory areas. Olfactory is the sensory system in the brain that is used for the sense of smell. The olfactory bulb is a structure located in the forebrain that receives neural input about odors detected by cells in the nasal cavity. The axons of olfactory receptor (or, smell receptor) cells extend directly into the highly organized olfactory bulb, where information about odors is processed.

Here's where the cutting edge comes into play: Price and the student researchers working in his lab have created small cylinders made from a substance called fibrin. Fibrin is already routinely used in many surgical procedures and is, in fact, the same material that the body uses for clotting blood when one suffers a wound. The small fibrin cylinders are inserted into the brain to redirect the news cells from the olfactory area into the area of the brain that Parkinson's Disease affects. When carried out in the lab, there has been an astounding rate of 60-70% improved motor behavior for rats affected by Parkinson's because of the insertion

Undergrad Research Assistant Lydia Hager examines brain tissue using a microscope in Price's lab.

Photos by John Sibold

about the division of science and research

The Neuron is produced by the WV Higher Education Policy Commission's Division of Science and Research. The Division coordinates federal and state scientific research grants, including WVEPSCoR, to academic institutions in West Virginia and conducts outreach activities to broaden the public's understanding of science, technology, engineering and mathematics (STEM). Visit **www.wvresearch.org** for more information.
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This material is based upon work supported by the National Science Foundation under Award No. OIA-1458952.
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of these new cells. These are staggering numbers when assuming that similar percentages may eventually be seen in human patients in the future.

Perhaps what's most rewarding for him, though, is the second part of his mission: guiding students into research.

The FIRE, or Full-Immersion Research Experience, program funded by Price's new NSF grant aims to recruit students early in their undergraduate years and integrate them into Price's laboratory. This is nothing new for Price, though. Unlike some other professors who may be taken aback by having to teach freshman, Price feels privileged to teach an Intro to Biology class.

He said, "I can identify not only the best students at the very beginning of their college experience, but I also have the chance to unearth the ones who have a real spirit of inquiry."

"This [FIRE] program is designed to introduce and immerse undergraduates in this cutting-edge biological research, with the goal of increasing the number of Marshall students who go on to nationally recognized graduate programs," he said.

Students who are chosen to work in Price's lab as part of this program are paid a salary, which allows them to devote a significant amount of time to working in the lab. They participate in all aspects of the lab's work, including conducting individual research projects, presenting at weekly lab meetings, co-authoring scientific papers and abstracts, preparing grant proposals and attending regional and national meetings.

Price said he's very excited about the program because, unlike volunteer lab positions, the more professional and extended involvement in a research lab will help prepare his students for great success in graduate school so that they can go on to have successful careers in science. In this way, he hopes to also increase the educated STEM (science, technology, engineering and mathematics) workforce in West Virginia.

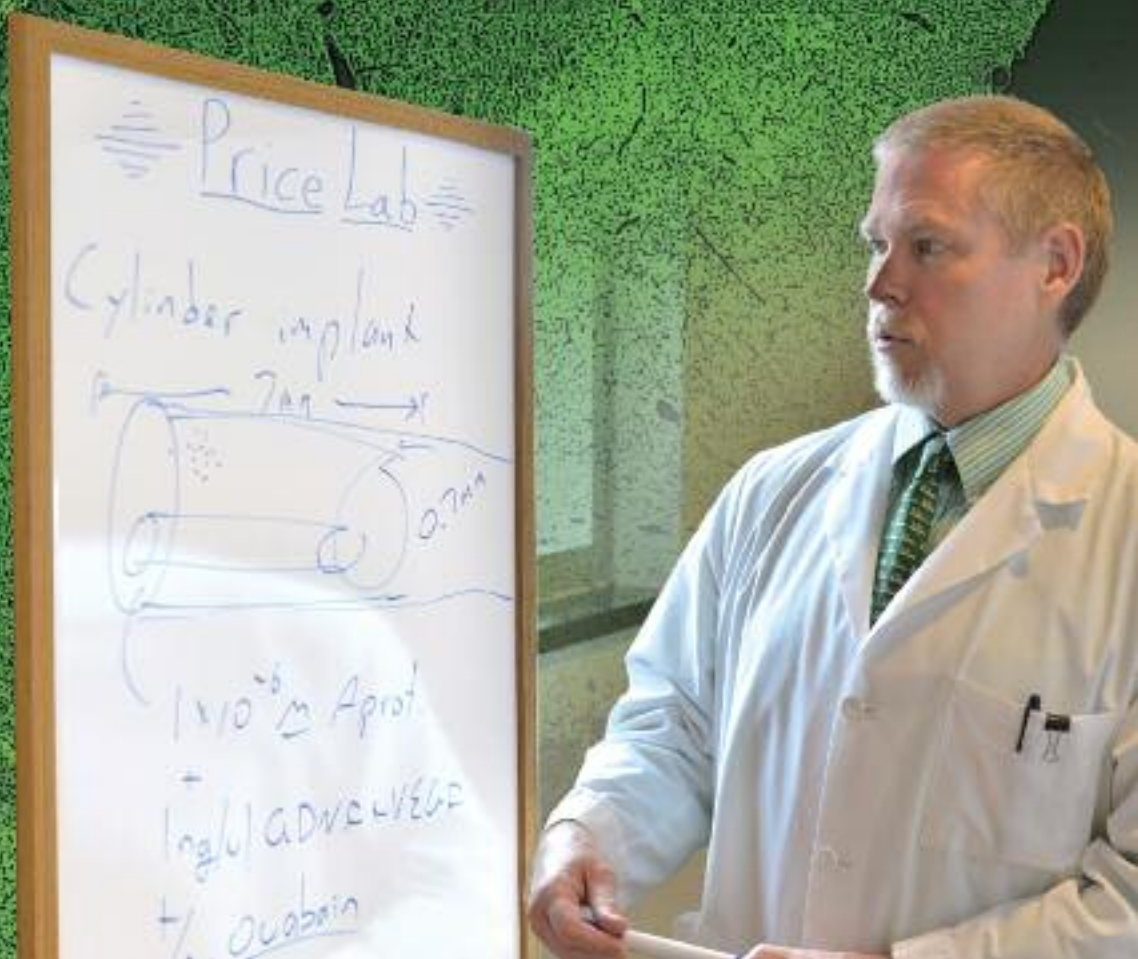
He jokes that he's not entirely altruistic though.

He said, "My students help me come up with research solutions and ideas that may have never crossed my mind. We sit and take time to troubleshoot together. It's a win-win!"

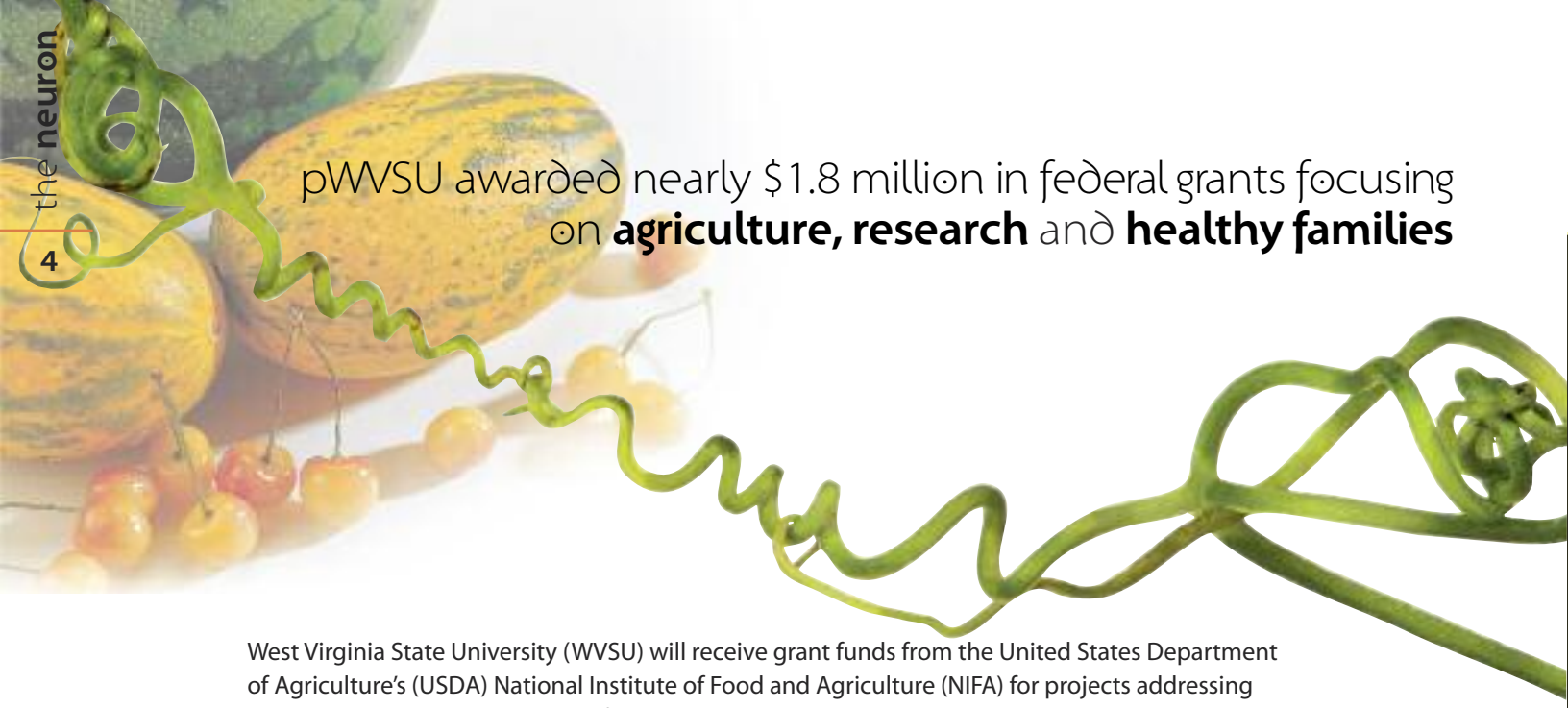
Regarding the future, Price is enthusiastic about telling others the importance of continued funding for research.

"Money allocated to universities for research from the state and federal levels is not a gift – it's truly an investment in the state's future," he said.

For more information about Price such as his education and background visit wvresearch.org and click on "Scientist Spotlight."



pWVSU awarded nearly $1.8 million in federal grants focusing on **agriculture, research** and **healthy families**



West Virginia State University (WVSU) will receive grant funds from the United States Department of Agriculture's (USDA) National Institute of Food and Agriculture (NIFA) for projects addressing agricultural research and healthy families.

"Each day, through research, public service and economic development, West Virginia State University students, faculty, researchers and staff work together to fulfill our mission of supporting our communities and fellow West Virginians. With these funds, we can further our commitment, improve the quality of life in the region and state and make a difference with research and service at the epicenter of our efforts," WVSU President Brian O. Hemphill said.

WVSU's awards total approximately $1.79 million, the maximum amount of funds eligible in the USDA's competitive grant program.

"To receive this level of funding speaks volumes about the talented research and teaching faculty at State," said Dr. Orlando F. McMeans, Vice President for Research and Public Service. "This is not only the maximum amount of funding a university can receive, it's also the most WVSU has received in an award cycle."

WVSU is one of 19 institutions eligible to compete in the program, exclusive to the nation's 1890 land-grant universities. The monies fund four proposed research, teaching and extension projects.

Three of the projects deal with improving food security in West Virginia through research and teaching. Two projects focus on improving crop quality for plant breeding and disease-resistant traits in watermelons. Another seeks to develop an educational agriculture incubator in southern West Virginia and a fourth focuses on providing tools and education to grandparents who provide custodial care to their grandchildren.

Launched in 1990, the 1890 Institution Teaching and Research Capacity Building Grants Program strengthens the linkages among the 1890 institutions, other colleges and universities, the USDA and private industry, while improving the quality of academic and research programs at the 1890 institutions. The program focuses on advancing cultural diversity in the scientific and professional workforce by attracting and educating more students from underrepresented groups. It is authorized by section 1417 (b)(4) of the National Agricultural Research, Extension and Teaching Policy Act of 1977.

WVU groundbreaking solar energy research published in Nature Photonics

A team of researchers from West Virginia University (WVU) have had their groundbreaking research on converting solar energy to fuel published in Nature Photonics, a prestigious peer-reviewed scientific journal.

The team, led by Nianqiang Wu, professor of mechanical and aerospace engineering, has developed a new mechanism to be used in solar energy conversion: plasmon-induced resonance energy transfer.

"Solar-to-fuel conversion is similar to a solar panel, but instead of directly creating electricity, sunlight is used to create a renewable fuel for later use," said Wu. "Unlike turning sunlight into electricity, however, not all of the solar spectrum can be utilized because of the energy needed to create fuels such as hydrogen."

Metals like silver, gold, copper and aluminum are known for their distinctive color. But when you shrink them down, the color is adjusted.

"Nanostructured silver, gold, copper and aluminum are powerful optical antennas, absorbing light as if they were many times their physical size," said Wu. "The research group is using these properties to engineer better sunlight absorption."

The trick, according to Alan Bristow, assistant professor of physics in the Eberly College of Arts and Sciences, comes in getting the energy from the metal to the rest of the solar cell.

"According to Heisenberg's famous uncertainty principle, we can know the exact position or speed of an electron, but not both at the same time," said Bristow. "A similar uncertainty between energy and time becomes very important at the nanoscale."

After light is absorbed by the metal nanoparticle, Bristow said, there is an exceedingly short time in which to extract the energy before it is wasted as heat. The short lifetime leads to uncertainty in the energy, which can be readily exploited.

The research team, whose work has been funded by grants from the National Science Foundation and the U.S. Army Research Laboratory, has engineered a structure that takes the energy from the nanoparticle very quickly, thus taking advantage of this uncertainty while remaining true to energy conversion laws.

While commercial implementation is still years away, Wu is encouraged by the team's progress.

"President Barak Obama's Clean Power Plan proposes 30 percent more renewable energy generation by 2030. I think it's fair to say we are hot on the trail of making that attainable through this technology," he said.

Joining Wu and Bristow on the research team are postdoctoral fellow Jiangtian Li and graduate students Scott Cushing, Fanke Meng and Tess Senty.

Marshall **Forensic Science Graduate Program** ranks **number one** on national assessment test scores

The Marshall University Forensic Science Graduate Program has once again ranked number one in the country for students receiving the highest overall test scores, compared to other graduate programs participating in the Forensic Science Assessment Test, a national assessment test offered each year by the American Board of Criminalistics.

Marshall's Forensic Science Graduate Program ranked first or second in 14 of 18 subject matter areas that included drugs, crime scene, evidence handling, fire debris, forensic biology, latent prints, legal, pattern evidence, questioned documents, toxicology, lab operations, firearms/tool mark, quality assurance/quality control and trace evidence.

It is the sixth time in nine years that Marshall's nationally-recognized program ranked number one in the country on the assessment test.

Dr. Terry W. Fenger, director of the program, said the test is useful for assessing the program's strengths and demonstrating to prospective students and the general public its ability to meet national standards.

"The fact that our students continue to excel on this exam each year demonstrates not only the quality of the program and its students, but the dedication of its full-time faculty and the many adjunct faculty members," he said. "The program greatly benefits from the input of law enforcement and criminal justice system professionals here locally and across the state."

WVU awarded **two prestigious DOE grants** to develop new methods for **energy generation and storage**

Xingbo Liu

Parviz Famouri

Nigel Clark

The United States Department of Energy's (DOE) Advanced Research Projects Agency-Energy, known as ARPA-E, has awarded two grants totaling $4 million to faculty in West Virginia University's (WVU) Statler College of Engineering and Mineral Resources that will contribute to programs to change the way we generate, store and use energy.

"The ARPA-E program is extremely competitive and only the best and most innovative ideas are able to secure funding from the program," said Fred King, vice president for research at WVU. "These awards demonstrate that when it comes to energy, West Virginia University and its faculty are global leaders. It is significant that these projects represent two very different areas of energy research, reflecting the breadth as well as depth of West Virginia University's energy research program."

"These awards, WVU's first, are extremely prestigious, and I am proud of the efforts of Drs. Famouri, Clark and Liu to earn these grants," said Gene Cilento, Glen H. Hiner Dean of the Statler College. "Their work has helped place this college and university on the ARPA-E map and has solidified our standing as a major player in the energy research arena."

The intent of the highly competitive program is to support energy research that the DOE believes is pioneering in its approach and has the greatest potential to make an impact on the country's energy portfolio.

WVU's first ARPA-E grant was awarded in November 2014 in partnership with Materials and Systems Research Inc., a Utah-based research and development firm. As part of the project, Xingbo Liu, professor of mechanical and aerospace engineering, received $550,000 for innovation in solid oxide fuel cells.

Liu's research is focused on the electrochemical reaction that occurs on the anode side of the fuel cell. Typically, the reaction produces electricity, water, heat and small amounts of carbon dioxide, but his work will lead to a fuel cell that is capable of converting natural gas into liquid fuel. The result will be a fuel cell that will deliver affordable generation of power or liquid fuel from natural gas with increased durability, produce a reliable alternative fuel source, reduce greenhouse gas emissions and increase efficiency.

WVU's second award was granted in June to Parviz Famouri, professor in the Lane Department of Computer Science and Electrical Engineering and Nigel Clark, provost for WVU Institute of Technology and WVU Beckley and the George B. Berry Chair of Engineering. The $2 million grant will support development of an engine with an electric generator that can produce electricity for the home of the future. The project will produce electric power from a single fuel source – natural gas. The novel system will use a single, low-friction, free-piston internal combustion engine that drives a linear electric generator.

In a traditional engine, fuel is ignited and small explosions – internal combustion – move a piston up and down a cylinder. The piston is attached to a rod and crank. The linear movement of the piston rotates the crank. Famouri and Clark's free-piston design uses only the linear motion of the piston and does not have a rotating crank. With fewer moving parts, reduced volume and decreased friction losses, the design provides a higher level of efficiency.

More information about the projects and ARPA-E can be found at wvresearch.org.

Skull morpho

Scott Hatfield from Parkersburg, W.Va. and Kennedy McLean from Glen Easton, W.Va. are shown in the anatomy lab with the research data specimens.

Scientific resea
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Matthew Zdilla
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Ribbon-cutting marks opening of M

No one, including Marshall University Interim President Gary G. White, was disappointed as members of the university and Huntington community gathered to see firsthand why the new Arthur Weisberg Family Applied Engineering Complex has attracted so much attention since its groundbreaking. A celebration of the opening of the 155,000 square-foot, 480-foot long, four-story, $56 million building took place on August 13 with a ceremonial ribbon cutting.

Before his passing, namesake Arthur "Art" Weisberg was the president of Huntington-based Arthur's Enterprises, which made a large donation to help pay for the facility which features advanced learning environments, teaching/research laboratories and resources to support undergraduate and graduate programs in engineering, mechanical engineering and bioengineering, computational sciences, environmental sciences, transportation and applied digital/simulation technology. It also houses the offices of the Marshall University Research Corporation.

The Weisberg building is organized to promote multidisciplinary collaboration among the university's programs and researchers. A central atrium soars four stories and serves as a window into the structure. The complex's scale and brick and cast stone exterior are consistent with adjacent campus architecture.

Dr. Wael Zatar, dean of Marshall's College of Information Technology and Engineering said Marshall currently has approximately 650 students in undergraduate engineering, computer science and safety technology programs and graduate engineering, computer science, environmental science and technology management programs. The university anticipates the new building could help double that number of students in less than 10 years.

Zatar said, "The building will allow for growth, the addition of new programs and tremendous opportunities for our students. The education and experience they receive in this complex will benefit the community and region by providing top-notch graduates to meet the needs of prospective employers in the region and will capitalize on the growing interest in the fields of engineering and technology."

Because of the Weisberg family's financial assistance, the university successfully re-established the engineering degree program in 2006. Engineering is now one of Marshall's fastest-growing majors.

Art Weisberg's reason for supporting Marshall's engineering program was simple: "Engineering, to me, is the future of America and West Virginia… I love Huntington and I know this gift will make a lasting difference," he said when the donation for the engineering complex was announced in June 2012.

For details about the complex's state-of-the-art features, visit wvresearch.org.

logy study continues for second summer

rch done in West Liberty University's College of Sciences
w months included the study of skulls in the lab of Dr.
, associate professor of Biology and Physician Assistant

ond year in a row that our skull morphology research took
mer we collected anatomical specimens and created the
summer the imaging and analysis took place. It's been very
ur students to be involved in this research," Zdilla said.

l research will be helpful to neurosurgeons, Zdilla
ing that the result gives surgeons a better idea of how
ocedures that require passage into the skull through
(foramina) in the skull base.

ulls were analyzed and different images were taken
efinition camera and computer program known as
rocesses the images and analyzes the data.

ennedy McLean of Glen Easton, W.Va. is one of two
did the research this summer. She took measurements
data. Since she's majoring in human biology it was a
r job for her.

"I hope to become a PA [physician assistant] so this was an ideal research project for me. I am grateful for the chance to take part in the summer research program at West Liberty," she said.

The 2014 summer research was published in two scientific journals, Surgical Neurology International and Anatomy & Physiology. And this research is now being peer reviewed for the Journal of Craniofacial Surgery.

"We also presented our research earlier this year at the national meeting of the American Association of Anatomists, held in Boston. I'm proud of all our students who have worked on this study and am confident that it will help them in their professions and future careers," Zdilla said.

The research was part of the Topper-SURE program that offers students interested in science careers a way to strengthen their academic experience. Selected students work in research labs for eight weeks during the summer under the direction of a faculty research mentor. Funded with support from the West Virginia Higher Education Policy Commission's Division of Science and Research, Topper-SURE also provides each student researcher a $3,000 stipend. Valuable research experience for the resume is an added bonus.

Marshall's **Weisberg engineering complex**

WVU Tech **Engineering Program ranked #58** in the **nation**

WVU Tech's engineering program was ranked #58 in the nation on U.S. News & World Report's recently released 2016 Best Undergraduate Engineering Programs rankings list. The 2016 list marks an improvement in WVU Tech's ranking of more than 25 spots over last year.

For Campus President Carolyn Long, the ranking is the result of a focus on practical, experience-driven coursework and graduates who report high earnings directly tied to the engineering education they received at WVU Tech.

"The students we send out into the workforce are capable and competent professionals because the faculty and administration here have been working diligently for years to enhance and improve our engineering program. That work translates to a program that gets better with each passing year, and we're seeing that improvement recognized in this rankings announcement," she said.

WVU and Marshall partner for three-year, $1.5 million **health care and research funding program**

West Virginia's two largest universities are coming together to support collaborative research and healthcare projects addressing the Mountain State's health issues.

West Virginia University and Marshall University have each pledged $250,000 annually for a three-year combined effort to support innovative clinical projects and translational research that will ultimately help faculty members at both schools better serve West Virginia patients and communities and attract future external funding.

The program will accept applications for awards of up to $50,000 for initiatives that include project leaders from both WVU and Marshall.

To kick off the partnership, leaders from both institutions gathered at Stonewall Jackson Resort in Roanoke, W.Va., to discuss the program. Deans and department chairs from health sciences disciplines as well as clinical leadership discussed targeted research and clinical care areas to address West Virginia's biggest health concerns.

"This collaborative effort will provide foundational support and structure for our physicians and scientists to advance health and wellness in West Virginia," said Joseph I. Shapiro, dean of the Marshall University Joan C. Edwards School of Medicine. "By strengthening our connections, West Virginians and others in the Appalachian region will benefit."

"There is no higher obligation for either of our universities than to address the health issues of West Virginia," said Clay Marsh, vice president and executive dean for health sciences at WVU. "We share a vision of a healthier state and are united in this effort, and many others, to make that a reality."

Both universities will also maintain their commitments to ongoing statewide health improvement collaborations and look forward to extending partnerships with other entities throughout the state to continue to address health disparities.

Investigators will work together over the coming months to prepare their proposals by the Nov. 6 submission deadline. Awards will be announced in December and projects will begin Jan. 1, 2016.

Biomedical club makes **science fun** during community festivals

Making science fun was the goal during the Bluefield State College (BSC) Biomedical Club's involvement in Princeton's Fourth of July Celebration at Hunnicutt Stadium and the City of Bluefield's Lemonade Festival in late August. BSC science students, faculty and staff involved hundreds of young students in hands-on activities during the events.

"Seeing the wonder and excitement on the kids' faces made me feel like we were really making a difference in our community," said Dr. Amanda Matoushek, BSC Social Sciences Chair.

"Members of the Biomedical Club at Bluefield State College are passionate about presenting science to kids in a fun and exciting way," added Dr. James Walters, BSC Assistant Professor of Biology. "These events provided a great opportunity for our students to give back to the community, while changing kids' perceptions about science."

Top photo: Dr. James Walters discusses DNA molecule structure with an interested young student during the Bluefield State College Biomedical Club's presentations.

WVSU **students tour Stonewall Gathering System Pipeline**

A group of West Virginia State University (WVSU) students visited a horizontal directional drilling (HDD) site along Interstate 79 near Weston, W.Va. over the summer. The site is part of the right-of-way of the construction of the Stonewall Gathering System Pipeline (SGS) that will transmit gas from production wells in the northern part of the state to an interstate transmission line in Braxton County. Upon completion, this $450 million project will have a transmission capacity of approximately 1.4 billion cubic feet per day.

The students, working with WVSU research scientist Dr. Amir Hass on evaluating the use of spent HDD mud as soil amendment, were able to see and learn about a project of this type firsthand. Precision Pipeline LLC is constructing the 55-mile pipeline and hosted the tour, which included a visit to a drill site where Southeast Directional Drilling conducts a 3,100-feet-long drilling of a 48-inch diameter hole approximately 300 feet underneath the highway. The 36 inch SGS pipeline will later be pulled back into place and welded to the pipeline at an open-cut tranche, connecting the northern and southern parts of the pipeline.

"HDD technology allows the crossings of ecologically sensitive areas, such as wetlands, creeks and heavily used infrastructure such as highways and railroads, without disturbing the landscape or disruption of commerce," Hass said.

Large volumes of spent water-based bentonite are produced during HDD operations, and HDD operators are looking into applying the mud on nearby lands.

"Farmers and landowners like to know what are the short- and long-term benefits and risks associated with the use of the spent mud on their land," Hass said. "Our research is aimed at providing answers to such concerns."

Hass's research project, funded in part by the Pennsylvania Natural Resources Conservation Service, will lead to the development of recommendations for the use of spent HDD mud as soil amendment.

Grants promote STEM education in eastern panhandle

Grants from the Eastern West Virginia Community Development Foundation will allow Shepherd University to help promote education in science, technology, engineering and math (STEM).

One of the grants, totaling $2,000, went to Reza Mirdamadi, associate professor of engineering and chair of the Department of Computer Science, Mathematics and Engineering. It will allow Shepherd to continue working with students in grades 6-12 in Jefferson, Berkeley and Morgan counties who are interested in robotics. The money will be used to provide robot kits and training for science classes and clubs at middle and high schools and to community organizations such as 4-H, Boy Scouts and Girl Scouts. The training will prepare them to compete at the annual ShepRobo Fest in March 2016.

Another $1,000 grant went to Dr. Jordan Mader, assistant professor of chemistry, and Dr. Sytil Murphy, assistant professor of physics who will use the money to invite 20 high school students per month to participate in a hands-on STEM workshop conducted by Shepherd faculty or Shepherd student groups.

Marshall hosts **cell phone forensics training** for **law enforcement investigators**

The Marshall University Forensic Science Center hosted a cell phone forensics workshop in early August to provide law enforcement officers from various states with training on investigative techniques for collection and analysis of evidence. Marshall University Digital Forensics sponsored the workshop conducted by Cellebrite, an internationally recognized leader in digital forensic training for mobile devices.

Law enforcement officers from Kansas, North Carolina, Pennsylvania and Huntington as well as Marshall University's Digital forensic faculty attended the workshop, which provided training for intermediate and advanced cell phone forensic examinations. Attendees learned advanced and intermediate techniques to collect and analyze evidence from cell phones, including deleted data.

"This type of training is critically important." said John Sammons, Director of the Marshall University undergraduate Digital Forensics program. "Cell phones and mobile devices are so prevalent in today's society. The potential to find relevant evidence on a suspect's phone is exceedingly high. Conducting a forensic examination of a suspect's phone is now standard procedure in most criminal investigations."

Marshall researcher receives **federal grant** to **study obesity** and **aging**

Nalini Santanam, professor in the department of pharmacology, physiology and toxicology at the Marshall University Joan C. Edwards School of Medicine, has been awarded a federal grant to continue her work on obesity and aging with regard to heart disease.

The grant, which totals over $350,000, was announced in late summer by the U. S. Health and Human Services' National Institute on Aging.

"Dr. Santanam is working very hard to address medical issues that are relevant to West Virginians and others in central Appalachia," said Joseph I. Shapiro, M.D., dean of the school of medicine. "This federal award is very important to her research program as well as our entire university."

In congratulating Santanam on her work, Marshall University Interim President Gary White described her as one of Marshall's finest researchers.

"Her work is indicative of the quality of faculty we have at Marshall," White said. "Dr. Santanam's investigations into these common health issues could very well have a significant impact on human health—both right here in our communities and around the world."

The risk of developing obesity, diabetes and cardiovascular disease (cardiometabolic risk) increases with age. And, according to Santanam, though the mechanisms are still unclear, these diseases are directly linked to adipose (fat) tissue dysfunction which increases with age.

"This study will investigate the role of epigenetic regulators and RNA regulatory mechanisms in adipose dysfunction with aging," Santanam said. "Our findings will shed light on the mechanisms that lead to age-related diseases and identify targets to treat them."

"Dr. Santanam's investigations into these common health issues could very well have a significant impact on human health—both right here in our communities and around the world."

Interim President Gary White

Freshman engineering faculty awarded NSF grant

Approximately 50 percent of all incoming freshman at West Virginia University (WVU) who choose to study engineering are not considered calculus-ready, which can hinder their learning and ability to succeed in the major. A trio of faculty in WVU's freshman engineering program has been awarded a National Science Foundation grant to find solutions to help these struggling students.

Lizzie Santiago, teaching assistant professor of freshman engineering, was awarded a two-year, $250,000 grant that enables the Statler College of Engineering and Mineral Resources to create a new pre-engineering course. Santiago and her team of researchers, which includes Melissa Morris and Robin Hensel, will study the development of critical thinking skills among non-calculus-ready freshman engineering students.

"When I became an academic advisor in the Statler College, I noticed that many incoming freshmen lacked the math skills that were vital on the path to an engineering degree," said Santiago. "My research focus has been in attrition for quite some time, so I wanted to take on this project as a combination of my previous research and my goal to better help my students."

The course will be taught by Santiago and Morris, also a teaching assistant professor of freshman engineering, using a project-based approach and the "conceive, design, implement and operate" educational framework, an initiative that stresses engineering fundamentals in the context of real-world systems and products.

"Currently, incoming freshmen who start in algebra and trigonometry cannot begin problem-solving-based engineering courses until they are ready for pre-calculus," explained Morris. "This new course enables them to be involved in these types of engineering courses and feel like they are a part of the Statler College, while developing the critical thinking and math skills that they will need in their future classes and careers."

"This grant is a significant step in WVU's commitment to engage more students in engineering experiences as soon as possible," said Hensel, assistant dean for the freshman experience. "We believe early engagement is crucial to increasing student success and retention."

Lizzie Santiago

Melissa Morris

Robin Hensel

"This grant is a significant step in WVU's commitment to engage more students in engineering experiences as soon as possible."

Robin Hensel

Research will lead to **innovative, stronger W.Va. economy** because of new NSF grant

John Maher, Vice President for Research, Marshall University

The West Virginia Higher Education Policy Commission's Division of Science and Research was recently awarded a National Science Foundation (NSF) Research Infrastructure Improvement (RII) Grant totaling $20 million over the next five years for work at WVU, Marshall and WVSU. The grant program is dedicated to creating research capacity in states like ours that receive relatively small amounts of NSF funding. This research capacity is created by providing resources for our research universities to develop and recruit the faculty and procure the equipment necessary to conduct competitive, world-class research. It's a very important grant program to the state, because the economic diversity and vitality of a region can be correlated very directly with the research and innovation activity that takes place there.

World-class research attracts innovation partners and spawns start-up companies that have staying power. It's also an important program for the nation, as it effectively develops new research capabilities to address the nation's competitive challenges and fuel future innovation.

West Virginia has been a recipient of an award from this program continuously for over twenty years, and it has led to amazing progress in research capability and achievement in West Virginia. However, with this new one, I expect we'll see much more, and I'd like to explain my optimism.

First of all, the overall approach and expectations have been ramped up by the NSF. Up-front, they are making measurement and accountability a built-in component to make sure we are progressing. Then they are driving things forward in terms of research competitiveness, and the workforce preparation and innovation that we will obtain. A key goal is advancement of innovation and the associated economic development and promoting the formation of partnerships and collaborations to advance these goals. As we put the complementary skills and unique outlooks of these collaborations to work both within academia and the commercial sector, we'll see better focus on the big questions we're tackling and make faster progress by leveraging the complementary skills and perspectives.

Secondly, and this is very important, we have a multi-pronged approach. An experienced NSF-funded team from WVU is leading a statewide effort to detect gravitational waves with radio astronomy. While gravitational waves are not household items, the innovations in the computations to achieve this may someday very well be, as the innovations in handling large data sets are translated into real life.

Closer to earth, the Appalachian Freshwater Initiative has collaborators from West Virginia University, West Virginia State University and Marshall University assembled to tackle some of the most critical scientific problems associated with understanding and managing the state's water resources. From our state's nickname "the birthplace of rivers" to the role our great rivers play in our ecology, infrastructure and commerce, freshwater resources contribute an immense amount to the state. All three institutions are working together to develop competitive capability, and the work includes everyone from field researchers to computer scientists.

As this effort progresses, we'll see the commitment to collaboration fuel discovery and innovation, and all three institutions – as well as West Virginia as a whole - will benefit greatly.

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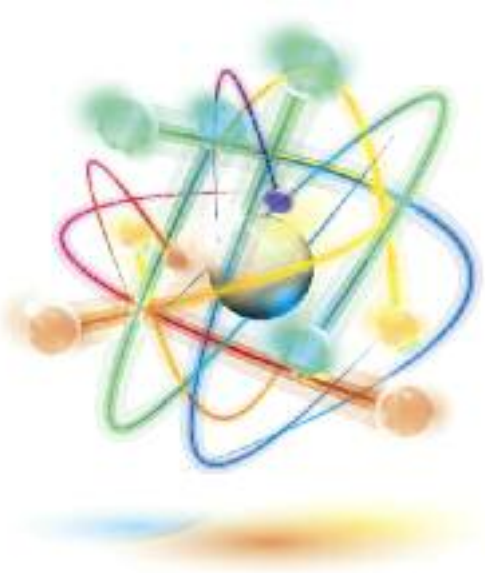

FROM THE DIRECTOR:
Coming to Charleston:
Bill Nye the Science Guy

We are thrilled to be hosting **Bill Nye the Science Guy**, who will be our next featured scientist in the Chancellor's STEM Speaker Series lineup!

Bill Nye has spent most of his life making science and technology entertaining and accessible. Combining his talents as a scientist, inventor, comedian and author, he has attracted adults and children to the wonders of science so he naturally aligns with our mission of connecting a broad audience of West Virginians with fascinating science topics. His lecture will be family-friendly and motivating in nature so we hope lots of middle and high school students will join us.

Thanks to a collaboration with the Clay Center, this event will take place in the Maier Foundation Performance Hall at the Clay Center for the Arts and Sciences on Nov. 19, 2015. Because of our ongoing mission of bringing interesting science topics to the general public, admission to the event is free. However, because of the costs associated with bringing such an internationally-renowned speaker to the state, we secured partners to help financially support this event. A full list of our partners is available on our website, and I encourage you to go check out the list to see who has committed dollars to help bring science to our state! Once the event was officially announced at the end of September, we were pleasantly flabbergasted at the rapid response from people across our state. In fact, the tickets were gone almost as soon as they became available in the Clay Center's box office!

Our Chancellor's STEM Speaker Series is designed to promote the importance of research and the science, technology, engineering and math (STEM) fields to the general public in West Virginia. We are in the midst of planning a spring 2016 Speaker Series event. If you'd like to get involved in it with us or find out more details, please contact Communications Manager Amanda Ramey at amanda.ramey@wvresearch.org or 304-558-4128.

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