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Tracey DeLaney
West Virginia Wesleyan

Making the unknown known

A woman with short brown hair and glasses, wearing a blue polo shirt, stands next to a large radio telescope dish. The dish is mounted on a metal structure and is pointed towards the sky. In the background, a brick building with windows is visible under a clear blue sky.

Tracey DeLaney

West Virginia Wesleyan College

A close-up view of a radio telescope dish, showing its intricate metal structure and various components. The dish is set against a background of a starry night sky with a bright star visible.

Dr. Tracey DeLaney stands with the radio telescope she built at WVWC with the help of an undergrad student.

Dr. Tracey DeLaney has always been fascinated with the stars and planets. More than just an observer of the sky, though, DeLaney asks those thought-provoking “why” and “how” questions that are so common in the mind of a scientist.

DeLaney, an assistant professor of physics and engineering at West Virginia Wesleyan College (WVWC), grew up in rural Minnesota and followed a slightly different track in her pursuit of an astrophysics degree than you may expect. She started by joining the United States Army. Following her service in the military, she enrolled at the New Mexico Institute of Mining and Technology.

Fast forward through an undergraduate degree then a Master’s and Ph. D., DeLaney found herself applying for jobs and needing to make a decision whether to pursue a research-centric route or a teaching route. When she got a job offer in the teaching track at a primarily undergraduate college in West Virginia, she knew it would be a perfect fit because it reminded her of her roots.

Hanging on her office wall today at WVWC is an image that has arguably captivated her the most over the years: Cassiopeia A, a supernova remnant in the constellation Cassiopeia. It is the brightest extrasolar radio source in the sky at frequencies above 1 GHz. The supernova occurred approximately 11,000 light-years away within the Milky Way. The expanding cloud of material left over from the supernova now appears approximately 10 light-years in width from Earth's perspective.

Or, as DeLaney so unambiguously puts it: “Cassiopeia A is basically blown up star guts.”

Cassiopeia A has provided exceptional data for studying the anatomy of a supernova explosion. Because it is young and relatively close to Earth’s solar system, it can be observed carefully with many instruments – including a radio telescope at WVWC. In a few hundred years or so, its scattered remains will have completely mixed together, erasing important clues about how the star lived and died. For this reason, research about it is ongoing and something DeLaney will likely continue throughout her career.

In the meantime, she challenges the thinking of her undergraduate students at WVWC and dares them to ask the same kinds of questions that she asks, such as: “Why does that star look that way? What causes that planet to appear that color? How does everything work together?”

“I discovered that the teaching route is definitely for me. It is very rewarding to see a student make a connection and know that you helped in the process.”

Tracey DeLaney

“I discovered that the teaching route is definitely for me,” DeLaney said. “It is very rewarding to see a student make a connection and know that you helped in the process.”

Those moments of clarity are what ignite her to provide even more opportunities for WVWC students through additional research opportunities.

“I don’t want good students evaporating away if they don’t get summer internships elsewhere, so I help find projects and funding to keep them engaged in research here on campus,” she said.

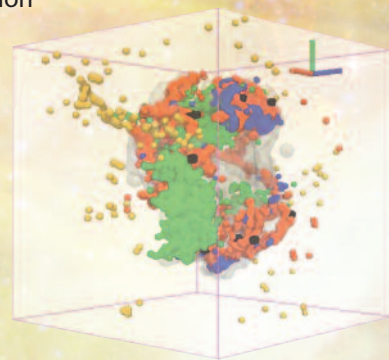
For example, she applied for a West Virginia Science and Research Instrumentation Grant last year, was chosen and received money to build a radio telescope atop the Christopher Hall at WVWC. Then she secured additional money from the NASA West Virginia Space Grant Consortium. All of that groundwork gave her an opportunity to pay a student to help her build that telescope on campus – and reap the benefits of what may be discovered as a result in the future.

Additionally, she includes her students in research involving multi-wave length observations of radio waves - which is funded by West Virginia’s five-year National Science Foundation EPSCoR Research Infrastructure Improvement (RII) grant.

She also has a passion for reaching out to community members. Twice a month she puts on a planetarium show at the West Virginia Wesleyan College Planetarium, a 40-seat facility that has a Spitz A3P projector that was installed in 1968. She also regularly engages school and civic groups for special events at the facility.

DeLaney has a few other projects up her sleeve – a “Planet Walk” that would be a massive-scale setup of the planets devoted to educating the public about each planet; a “Universe in the Park” event that would show off the night sky and draw in those who wouldn’t attend a planetarium show; and the continuation of the annual Junior Science and Humanities Symposium, a STEM scholarship competition sponsored by the U.S. Army, Air Force and Navy – which she co-chairs.

“Sometimes it’s hard for people to understand the types of job opportunities – and really cool science stories – that are out there just waiting for them to discover,” she said. “I like to think I have a part in making it all a little more accessible.”



A view of Cassiopeia A as mapped into 3D. This mapping was made with the data from NASA's Chandra X-ray observatory (black showing silicon, green showing iron), NASA's Spitzer Space Telescope (red showing argon, blue showing neon, gray showing sulfur) and ground-based visible light images (yellow showing sulfur and oxygen).

about West Virginia 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 research will provide workforce training in the region by educating and training faculty and students in the use of new water quality, modeling and environmental engineering technologies."

Dr. Jeffrey Kovatch

Marshall researchers partnering on **\$3.8 million NSF grant to study water quality**

Two Marshall University researchers are partnering with colleagues at Murray State University and the University of Kentucky on a \$3.8 million National Science Foundation (NSF) EPSCoR RII Track 2 grant to study toxic algae blooms.

Funds from the four-year grant will provide advanced environmental sensor systems, train students and faculty in their use and help apply the sensors to solutions for an emerging environmental problem common in both states.

Dr. William Ford is an assistant professor of engineering and one of the Marshall researchers working on the project. He said harmful algae blooms, or Cyano-HABs, have been identified as a water quality threat in West Virginia and Kentucky, impacting drinking water and irrigation sources, as well as energy production.

"Although much world-wide attention recently has been focused on harmful algae blooms, the causes of blooms are not well understood," he added. "Rapid changes in land use, the effects of climate change on precipitation quantity and distribution, and increasing human population pressures on energy production complicate studies done to date."

Ford said the 33 new sensors provided through this grant will allow the researchers to monitor water chemistry, weather conditions and other factors for the purpose of developing predictive models that can better explain and forecast conditions leading to toxic algae blooms.

The other Marshall researcher is Dr. Jeffrey Kovatch, associate professor of biological sciences, who said another important aspect of the project is to provide mentoring of early career faculty and undergraduate, graduate and post-doctoral students from the region.

"This research will provide workforce training in the region by educating and training faculty and students in the use of new water quality, modeling and environmental engineering technologies," said Kovatch. "Another advantage is that the scientific collaborations resulting from this research will forge working relationships that will endure beyond the project."

College of Science Dean Dr. Chuck Somerville added, "Multidisciplinary research is becoming increasingly important in today's interconnected world, and this project is a wonderful example of scientists from different disciplines and institutions cooperating on research that will help address a common problem for people in our region."

Other investigators associated with the grant include Dr. David White and Dr. Susan Hendricks of Murray State University and Dr. James Fox of the University of Kentucky.



Engineering professors to utilize **Green Bank telescope** in **K-12 teacher research experience**

When a group of teachers from four West Virginia counties get asked what they did on their summer vacation in fall 2017, they will have an out-of-this-world answer, thanks to a grant received by a research team from West Virginia University (WVU).

Natalia Schmid and Kevin Bandura, faculty members in the Lane Department of Computer Science and Electrical Engineering, have been awarded a grant of \$577,815 from the National Science Foundation that will allow them to team with the WVU Center for Gravitational Waves and Cosmology and the Green Bank Observatory (GBO) in Green Bank to create a research experience for teachers. The program—Digital Signal Processing (DSP) in Radio Astronomy—will provide high school teachers with hands-on experience using high-quality, open source software development tools, in both research engineering and educational settings.

Through a six-week summer program, and academic year follow-up, the teachers will gain experience in the research, design, development and prototyping of digital signal processing techniques and applications targeted for the next generation of radio telescopes. DSP computing power allows much of the information that is crucial to radio astronomy—i.e., beam forming, imaging, radio frequency interference mitigation and wide-band high-resolution spectroscopy—to be done in real time. The chance to conduct that research at Green Bank, home to the world's largest fully steerable radio telescope, is icing on the cake.

"Teachers will work in small groups to complete one of two research projects, which they will continue with interested students when they return to their classrooms in the fall," said Schmid. "Teachers will also collaborate with project staff to develop digital signal processing classroom projects that involve an entire classroom of students in DSP activities."

According to Bandura, three cohorts, each composed of 10 high school teachers, two graduate students and undergraduate students, will be engaged in a shared learning community, over the three-year course of the project.

"Our goal is to prepare teachers to implement DSP projects with their students, thus exposing them to exciting STEM career opportunities, which we hope they will one day pursue," Bandura said.

Collaborating with Schmid and Bandura on program implementation are Richard Prestage and Sue Ann Heatherly from GBO.

Teachers will be recruited from school districts involved in Project Lead the Way (PLTW), including the Greenbrier, Mingo, Mineral and Marshall county school districts in West Virginia. PLTW, a nonprofit organization that provides science, technology, engineering and math curriculum and professional development opportunities to K-12 teachers, is a perfect fit for this program, said Robin Hensel, assistant dean of Fundamentals of Engineering at WVU and PLTW West Virginia affiliate director.

"This type of research experience engages teachers with real-world data, expands their science and engineering knowledge, builds their confidence in a new skillset and increases their excitement for the work that scientists and engineers do," said Hensel. "They bring that confidence and passion into the classroom as they teach and inspire their students."

"Teachers will work in small groups to complete one of two research projects, which they will continue with interested students when they return to their classrooms in the fall."

Natalia Schmid



Natalia Schmid



Kevin Bandura

Update: new approach for Parkinson's disease therapy at Marshall featured in national publication



As featured in the Fall 2015 issue of the *Neuron*, Dr. Elmer Price, a professor of biological sciences at Marshall University, was awarded a three-year, \$350,000 research grant from the National Science Foundation last year. This grant funds his research into understanding neurogenesis, the process adult brains use to generate new neurons from preexisting adult neural stem cells.

Price and student researchers Amanda Clark, Arrin Carter and Lydia Hager have now had their research published in the August 1 issue of the journal *Stem Cells and Development*.

Price and his student researchers have discovered a way to recruit adult neural stem cells into regions of the brain which typically lack the ability to replenish neurons. Their findings have tremendous therapeutic potential for cases of neurodegenerative disorders like Parkinson's disease, stroke or traumatic brain injury.

To read a more in-depth article on this research and its implications, visit Price's Scientist Spotlight page at wvresearch.org.

WVSU chemistry professor leads effort to replace science equipment lost in floods

After flood waters destroyed communities throughout West Virginia in late June, West Virginia State University (WVSU), Associate Professor of Chemistry Dr. Micheal Fultz took it upon himself to ensure science education remains part of the schools that were impacted.



Fultz hands off equipment to a high school science teacher.

Shortly after the flood on June 23 that devastated many schools, Fultz organized an effort to collect both monetary and scientific equipment donations that would go to Herbert Hoover High School, Elkview Middle School and Richwood Middle School - the schools whose science programs were affected the most.

"We really need to ensure that students are engaged in the STEM (Science, Technology, Engineering and Mathematics) fields in high school, because if we don't engage them in high school, they won't study those fields when they come to college. And we need more students in the STEM fields, to help develop the future West Virginia economy," Fultz said.

After putting out a call for donations, a variety of individual and corporate donors stepped up to support the effort, including the VWR Foundation, which donated \$25,000 to purchase scientific equipment. In addition to others who wanted to remain anonymous, Dow, Dow Corning, Marshall University, Mylan Pharmaceuticals, the NASA-West Virginia Space Grant Consortium and Preiser Scientific also contributed.

The Chemical Alliance Zone, the Kanawha Valley Section of the American Chemical Society and the Bioscience Association of West Virginia (BioWV) have also been active in the outreach - which ultimately led to tens of thousands of dollars' worth of materials and equipment contributed so that the schools could rebuild their science labs.

Infant Mortality and Immune Response: A Global Concern

About 1.5 million infants die of infections globally each year. For many years physicians and scientists have understood that the immune response early in life is characterized by deficiencies that are not typically represented in healthy adults and older children. Researchers at the West Virginia School of Osteopathic Medicine (WVSOM), though, believe they have uncovered an aspect of neonatal immunity that represents a therapeutic target.

A WVSOM research group led by Dr. Cory Robinson has identified a small molecule that is produced by cells of the immune system more abundantly in newborns than in adults. This molecule, known as interleukin (IL)-27, has activity that suppresses immunity. Its abundance in babies suggests that it may contribute to some of the limitation in early life immunity. Measures that could be employed to limit the activity of IL-27 could have a significant impact on improving immune responses in newborns and improve clinical outcomes during infection.

This research in his laboratory, funded by the National Institute of Allergy and Infectious Diseases, has long-term potential to not only improve outcomes in developing parts of the world where infant mortality as a result of infection is highest, but it could make a significant impact in West Virginia and across the country where certain populations, such as preterm and low-birth-weight infants, are particularly susceptible to a variety of infections.

Dr. Robinson said, "This research may help lead us beyond understanding limitations in infant immunity and provide a target for intervention."



WVU chemical engineering researcher earns new investigator award

A West Virginia University (WVU) engineering professor has been awarded \$110,000 from the American Chemical Society's Petroleum Research Fund to improve natural gas utilization processes. Fernando Lima, assistant professor of chemical engineering, received the two-year grant from the fund's Doctoral New Investigator program.

Lima will study the design of membrane reactors, a device for chemical reactions and gas separations, for the direct methane aromatization conversion to chemicals and fuels. Methane aromatization is a chemical reaction that creates hydrogen and benzene, important elements in producing complex chemicals and fuels.

"By using this unique approach to design natural gas utilization processes, we can better determine whether current and upcoming utilization processes are feasible from both technological and economical perspectives," said Lima. "In a world where companies are competing for new technologies with narrow margins, it is critical to find ways to improve the use of natural gas."

Lima's research is particularly important in West Virginia and the Appalachian region because of the Marcellus Shale boom.



WVU students win NASA robot competition

On Labor Day evening, a group of 10 West Virginia University (WVU) students gathered around a pile of pizza boxes and textbooks, recapping their weekends and planning for the week of classes ahead.

Pizza, conversation and textbooks. Pretty ordinary evening in the life of college students, right?

But there was – and is – nothing ordinary about these WVU engineering students who had just accomplished the extraordinary – successfully navigating their robot, Cataglyphis, to amass 11 points to win the Level 2 competition for the Sample Robot Return Challenge as part of NASA's Centennial Challenges, bringing home a \$750,000 prize, the largest NASA has awarded in the five-year history of the Challenge.

The goal of the Centennial Challenge is to allow citizens to help NASA solve problems through the sharing of information regarding the technology of rovers that travel to Mars. The information gleaned will help NASA engineers improve those technologies.

In total, the WVU team prevailed over 50 others, winning \$855,000 over three years of competition, including \$5,000 for the Level 1 victory in 2014. That victory qualified the team to compete at Level 2 in 2015, claiming \$100,000 for the first Level 2 victory.

They are the only team to ever win Level 2 – and it's a feat they've achieved for two consecutive years.

The success came through three years of tireless effort from a sharp cross-section of WVU students with an unrelenting commitment to excellence and accuracy. It was that powerful team dynamic that propelled their robot to autonomously collect four samples of varying difficulty levels and point values on a 20-acre field over a two-hour period and return them to the platform.

One of the students is Morgantown native Nick Ohi, who has participated all three years in the competition as he transitioned from an undergraduate to a doctoral student in the mechanical and aerospace engineering program at the Benjamin M. Statler College of Engineering and Mineral Resources.

After last year's victory, Ohi didn't miss a beat. He and his teammates were ready to get back in the lab and improve their robot for the 2016 competition. They often invested more than 100 hours per week to perfect software, programming and the mission plan.





And improve it, they did.

"Our biggest improvement from last year was giving the robot the ability to autonomously make decisions, and that strategy really paid off for us," Ohi said. "We added a lot of new features to make it smarter. We modified sensors and adjusted the camera to take one photo of the samples instead of nine, which sped up the process."

According to Ken Stafford, director of the Robotics Resource Center at competition host school Worcester Polytechnic Institute and competition judge, those improvements were critical in the team's successful performance.

"WVU is always a lot of fun to watch in the Challenge, but they really stole the show this year," Stafford said. "They had some strong physical improvements that allowed their robot to make fast decisions and pick up samples faster. They had absolutely superior navigation, which was a big key for them."

One of many people who is proud of that success is Gene Cilento, Glen H. Hiner Dean of the Statler College.

"The Statler College is elated with the success of our students in this NASA Sample Return Robot Challenge," Cilento said. "Their passion and enthusiasm, and dedication of our faculty mentors, has been phenomenal. They have achieved significant national exposure for themselves and West Virginia University. We will use this success and award to continue to grow robotics education and research at WVU."

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Ken Stafford, director of the Robotics Resource Center



President-elect of American Chemical Society Speaks at WVSU



Dr. Allison A. Campbell, the President-elect of the American Chemical Society (ACS), spoke to students and faculty at West Virginia State University (WVSU) in September about her upcoming term as president of the ACS. She also discussed her duties as the associate laboratory director for earth and biological sciences at the Department of Energy's Pacific Northwest National Laboratory (PNNL).

Campbell's appearance at WVSU was part of a visit to the Kanawha Valley. In addition to her presentation, she met with representatives of the Chemical Alliance Zone, MATRIC and Dow Chemical. She also met with local science teachers to discuss how the ACS can help them in the classroom.

At the PNNL, Campbell sets the vision and strategy for research in support of the Department of Energy's Office of Biological and Environmental Research and National Institutes of Health. She leads an impressive research directorate of more than 530 staff members.

WVSU Associate Professor of Chemistry Dr. Micheal Fultz, who invited Campbell to speak, was recently named as a member of the 2016 class of Fellows of the ACS. The first WVSU faculty member to be selected for the prestigious honor, Fultz was recognized for his outstanding achievements in and contributions to science, the profession and the ACS.

Outreach project **broadens horizons** via **sunscreen research**

Dr. Rosalynn Quinones, a Marshall University Assistant Professor of Chemistry, recently combined her knowledge of analytical chemistry and nanoparticles to develop a research project for high school student Abdullah Hijazi and his teacher Tamara Westfall.

Together, they tested sunscreens for active ingredient concentrations. They were able to use equipment such as high performance liquid chromatography, cyclic voltammetry and electron paramagnetic resonance spectroscopy - which are not available in the school system.

The team work was made possible because of a program at Marshall called PERT: Preservice and Early Career Research for Teachers.

Westfall said, "Using this equipment gave us a better understanding of how a real lab works and the importance of properly following procedure."

From this experience, Hijazi and Westfall co-authored a publication in the Journal of Chemical Education. Abdullah and Tamara said the experience allowed each of them to do research and implement new ideas with a real world sample (the sunscreen).

Hijazi said, "I would say that doing research, even for a short period of time, has helped me understand how much hard work it takes to prove even the smallest of things."

The PERT program, and mentorship opportunities like it, is made possible because of funding via West Virginia's current five-year National Science Foundation Research Infrastructure Improvement EPSCoR grant.



Marshall's School of Medicine receives nearly \$2.4 million grant to study nutrition to treat disease

Uma Sundaram, M.D., vice dean for research and graduate education at the Marshall University Joan C. Edwards School of Medicine, has received a five-year \$2.39 million grant from the National Institutes of Health (NIH) to study gastrointestinal absorption of amino acids,

specifically glutamine, and its effects on inflammatory bowel disease (IBD), which is particularly prevalent in West Virginia and the Appalachian region.

"I'm very excited that our team of researchers, led by Dr. Sundaram, has received this very important grant," said Joseph I. Shapiro, M.D., dean of the School of Medicine. "It is an important boost to our existing research operation in that it provides new extramural funding, which is mission critical as we face declining state support."

The project, "Regulation of amino acid absorption in the mammalian small intestine," will look at the regulation of glutamine absorption in the intestine in relation to inflammatory bowel disease in hopes of developing better nutritional therapies.

The condition predisposes sufferers to a higher rate of colon cancer. According to the West Virginia Department of Health and Human Resources, colon cancer is West Virginia's second leading cause of cancer-related deaths.

"This project will tackle a very significant health issue in West Virginia," said Sundaram, who is the Principal Investigator of the grant. "Our work will focus on immune-based nutritional treatment for IBD. It will also have a potential application for preventing the growth of colon cancers, which are more malignant and common in IBD, a condition that impacts our state and Appalachia."

Marshall University President Jerry Gilbert said the grant is an indication of the university's growth in the area of externally funded research.

"Building a robust research platform is essential to our university's growth and development," Gilbert said. "The school of medicine and its leadership are to be commended for their hard work and dedication in fostering an environment conducive to garnering funding for substantial academic research."

The R01 grant is the original and historically oldest grant mechanism used by the NIH and is considered the most prestigious. This R01 is the largest grant of its kind to date for Marshall.

"This project will tackle a very significant health issue in West Virginia."

Dr. Uma Sundaram



WVU-led research shows loss of tree diversity could lower global forest productivity

The world's forests constitute the most varied and diverse terrestrial ecosystems on the planet, and are home to thousands of species of plants, animals and micro-organisms.

A new study coordinated and co-authored by West Virginia University researchers says that conserving these diverse forests not only retains a species-rich environment, but also maintains the forests' output and services for future generations.

The study, which was published in *Science* on October 14, reveals that biodiversity – the variety of living things on Earth – in forests promotes productivity. In other words, when the number of tree species increases, so does the amount of timber that can be harvested. They also found the opposite to be true – a decline in biodiversity would result in an accelerating decline in forest productivity.

The study was operated under the Global Forest Biodiversity Initiative by Jingjing Liang, lead author and assistant professor of forest ecology in the Davis College of Agriculture, Natural Resources and Design at WVU; Peter B. Reich, professor and F.B. Hubachek senior chair in forest ecology at the University of Minnesota and tree physiology resident fellow at the Institute on the Environment; and Thomas W. Crowther, Marie Curie fellow at the Netherlands Institute of Ecology.

Tens of thousands of forestry professionals collected the underpinning data for the study, which extended over a period of 150 years. In total, data was collected from more than 770,000 plots consisting of more than 30 million trees across more than 8,700 species. It took into account all major global forest ecosystems across 44 countries and territories.

Ultimately, the researchers want to increase understanding of the intrinsic link between human and nature, generating insights into the potential benefits of integrating and promoting conservation in forest resource management and forestry practices.

The findings of this study will provide baseline information for the United Nations Convention on Biological Diversity, the United Nations Framework Convention on Climate Change and the United Nations Convention to Combat Desertification.

To read more details about the research and its implications, visit wvresearch.org and click the Scientist Spotlight link for this issue of the *Neuron*.



National Science Foundation grants WVSU \$300,000 for bioenergy research

The United Nations predicts that by the year 2050, the world's population will grow to more than 9 billion, resulting in the need for an enhanced system of food production and supply. To address this problem, West Virginia State University (WVSU) has received \$300,000 from the National Science Foundation for a research project focused on creating robust, high-energy crops for changing environments, such as reclaimed surface mine lands.

"This National Science Foundation grant enables important research conducted right here in the heart of the Kanawha Valley to potentially address food sustainability and nutrition around the globe," said Dr. Anthony L. Jenkins, President of West Virginia State University.

The competitive grant award will provide hands-on research and training for six undergraduate students and establish a collaborative partnership for faculty and graduate students with the University of Nebraska-Lincoln.

"This research will advance knowledge in the field of plant biotechnology by characterizing for the first time previously unidentified mechanisms regulating seed storage compounds and unlock new and creative avenues for enhancing molecular engineering of plant crops," said Dr. Sanjaya, director of WVSU's Energy and Environmental Science Institute and the project's lead scientist.

Sanjaya hopes the research will ultimately attract industry and academic partners to the region, enhancing economic development and workforce opportunities.

Researchers named first WVU Tech Golden Bear Scholars

Faculty members are more than professors. They're often writers, artists, musicians or tinkerers. They're scientists and engineers with storied careers in the industries that run the world. That's why WVU Tech created the Golden Bear Scholars program. The new program recognizes two faculty members each academic year for their "exceptional record or nationally visible achievement in research, scholarship or creativity."

Scholars receive an award of \$2,500 that can be used towards research support, research salary or academic travel. In addition to the funding award, selected professors are relieved of one course for the academic year, which means more time to spend on research projects. This year, those scholars are Dr. Houbing Song, assistant professor of electrical and computer engineering, and Dr. Deborah Chun, assistant professor of mathematics.

Dr. Nigel Clark, provost at WVU Tech, said the program is part of the university's push to keep faculty engaged in research initiatives.

"Immersion in research creates teachers who are more current in their area and more connected with their field. It also boosts recognition of the institution – great scholarship sets great universities apart," he said.



Left to right: Dr. Houbing Song, Nigel Clark and Dr. Deborah Chun

Alternative energy comes to campus with **solar panel installation**

A solar panel array was recently installed next to the library on the campus of Fairmont State University (FSU), and it's a result of a \$10,000 grant from the Dominion Foundation.

The FSU College of Science and Technology applied for a grant with the help of Dr. Don Trisel, dean of the college; Dr. Erica Harvey, a chemistry professor at FSU; and Amantha Cole, Title III project director for FSU.

The Dominion Foundation is not the only organization that helped get the solar panels installed on campus. Mountain View Solar from Berkeley Springs installed the solar panels. Mountain View Solar is a West Virginia company, and the solar panels that were installed were made in the United States, Trisel said.

The total cost of the solar panel project was \$21,000. The grant from the Dominion Foundation provided \$7,500 of that money and the College of Science and Technology contributed \$7,500. Mountain View Solar installed the solar panels for free and included some extra solar panels for free, helping to make the installation larger, Trisel said.

Trisel said the solar panels will be set up to provide data about their energy production. The data will be on the FSU College of Science and Technology's Facebook page. He also plans to install a TV monitor in the third-floor lobby of the Science and Engineering Building on campus that will periodically show the data from the solar panels.



WVSU awarded **sizeable U.S. Department of Energy Grant**

West Virginia State University (WVSU) received a nearly \$250,000 grant from the U.S. Department of Energy (DOE) to study removing selenium and nitrate from wastewater produced in the electric power generation process.

The project will investigate and determine a feasible and cost-effective process for designing photosynthetic organisms capable of sequestering selenium and nitrates from flue gas desulfurization wastewater, which is a byproduct of coal-fired electrical power generation. Work on the three-year project began in October and is led by Dr. Sanjaya, director of WVSU's Energy and Environmental Science Institute.

"In this process we are trying to use green algae and plants that grow naturally to sequester, or remove, the nitrate and selenium from the flue gas," Sanjaya said. "This process could have a lot of potential for the Appalachian region, and throughout the entire United States."

The project was one of nine funded nationwide by the DOE's University Training and Research program, and the only project in West Virginia.

"There were only nine universities in the nation to be awarded these prestigious and highly competitive energy-related grants, inclusive of institutions such as The Ohio State University and Virginia Tech," said Dr. Orlando F. McMeans, vice president of research and public service for WVSU. "This grant speaks to the level and quality of applied research taking place at West Virginia State University."

Residents are important in the “wild and wonderful”

Jonas Leveque and Dr. Robert C. Burns

School of Natural Resources, West Virginia University

When thinking about West Virginia, we think of the “wild and wonderful”: the natural wonders and the large diversity of resources that are accessible. Most importantly, though, West Virginia is the story of West Virginians. When talking about natural resources management, the study of social sciences and the human dimensions of natural resources are a key component to effective management. People are part of the environment in which they live, and the way they perceive it impacts their behaviors and the environment.

It is critical to understand how people perceive their environments because it drives future direction for environmental protection. We now see a challenge with protected areas like the Grand Canyon being potentially threatened by human activities. If people are not aware about resources and how fragile these are, they may not see how some activities may threaten these resources and, in turn, their own environments. Here in West Virginia, the Experimental Program to Stimulate Competitive Research (EPSCoR) received a \$20 million grant from the National Science Foundation to study gravitational waves and also water quality in West Virginia. As part of the team identifying biological, chemical and physical characteristics of West Virginia’s water quality, I have been conducting research relating the public to water quality.

After the Elk River spill in Charleston in January 2014 which affected more than 300,000 people, it made a lot of sense to understand how people perceive the quality of their tap water. As a matter of fact, many other incidents occurred in the United States in the past two years. We can certainly remember the case of Flint, Michigan, and how lead contaminated the water resources of its inhabitants. Our preliminary study in Morgantown, West Virginia, focused on how residents perceived the risks associated with drinking from the tap and how they perceived the quality of their tap water.

Our results showed that the lower residents’ perceived risks associated with their tap water, the more they would think their water quality was high, which confirmed one of our hypotheses. Surprisingly, a significant amount of respondents were neutral in their responses, reflecting a lack of knowledge on the issue. Interestingly, 37% of the respondents primarily drank from bottled water. This suggests a divide between public perceptions and the factual water quality that is measured by instruments. These results have implications because people have to support decisions in favor of water quality protection that will protect them and West Virginia’s resources.

If West Virginians are not aware of the water quality nor of the environmental risks, they may not grant the right power to the institutions that can protect them directly. This is the reason why one of the missions of EPSCoR is to educate residents of West Virginia. We can hope that this mission will help West Virginia to stay “wild and wonderful” for decades to come.

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FROM THE DIRECTOR: A common theme

At first glance you may not pick up on an overriding theme in this issue of the Neuron. As always, it's jam-packed with good news about interesting science, outreach and research happening in our great state. But I would suggest that there is, in fact, an underlying premise.

Much of the news you read about in this quarterly magazine are a result of federal funding in some way. In fact, the National Science Foundation's EPSCoR program saw such opportunity in our state that, last year, we were awarded a five-year grant totaling \$20 million to further investigate water quality and gravitational wave research because of our state's history of balancing industrial development with environmental concerns and being host to the world's largest, fully steerable radio telescope, respectively.

Research efforts for this Research Infrastructure Improvement grant are being led by teams at Marshall, WVSU and WVU with additional support from Shepherd University and West Virginia Wesleyan College via Tracey DeLaney who, not coincidentally, is the featured scientist on the cover of this issue.

West Virginia has benefited enormously from investments from the federal government and from state programs such as the Bucks for Brains and Research Challenge Funds. However, like most sectors of our state's economy, we are struggling with reductions in state funding. For example, the Research Challenge Fund, a statutory program

which is managed by our office to provide grants to colleges and universities for research, has seen significant reductions. These trends are troubling, as funding research is a critical instrument for diversifying our economy and ensuring prosperity.

Research and development projects at our state's colleges and universities spur innovation and production to create new industries and jobs. Although we are facing challenging economic realities, we cannot afford to neglect investments in our future. The seeds we plant now in our labs and research centers will bear fruit in our private sector economy down the road.

West Virginia is fortunate to continue to receive funding and support from federal agencies to sustain research and development efforts and see us through these tough times. But we cannot rely solely on federal support forever. If we are to usher in a new era of economic prosperity for our state, we must renew our commitment to science and research and find a way to support our scientists, researchers and entrepreneurs. We cannot afford to save money by disinvesting in our future.

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