the NEURON

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Summer 2017

Dr. Eric Blough
Marshall University

The many hats of a scientist

Dr. Eric Blough

Marshall University

A few titles to describe Marshall University's Dr. Eric Blough: a founding member of the university's pharmacy faculty, the school's director of pharmacology and toxicology and assistant dean for curriculum. Prior to those, he served as director of the Marshall University Center for Diagnostic Nanosystems and as an associate professor of biological sciences.

A copious researcher and writer, the university landed Blough as a new hire in 2003 as a result of a National Science Foundation EPSCoR Research Infrastructure Improvement (RII) grant. Though that particular grant's time period has come and gone, he stayed put in Huntington and is now involved in West Virginia's current five-year EPSCoR grant.

He said, "I am thankful for the EPSCoR program because, without it, I would never have had the opportunity to come to Marshall. There is tremendous potential here, and I'm so pleased to be part of it."

Blough's connection to the state's current RII grant is within a project called the Appalachian Freshwater Initiative. In this role, he is using genetically modified C. elegans (small worms living in the soil), which give off fluorescence when they are stressed. By exposing these worms to different water samples from around the state, he is hoping to determine if exposure to different chemicals that are present in water affects the ability of these organisms to reproduce and develop into adults.

"Because these animals are at the bottom of the food chain, anything that might negatively impact them could have effects on the higher organisms and the ecosystem that feed on them," he said.

Blough is also currently part of a research team at Marshall that recently received a U.S. patent for a new method of treating sepsis and other inflammatory disorders using nanoparticles. According to the Centers for Disease Control, sepsis is a complication caused by the body's overwhelming and life-threatening response to an infection, which can lead to tissue damage, organ failure and death.

In fact, according to the National Institutes of Health, every year, severe sepsis strikes more than a million Americans. It's been estimated that between 28 and 50 percent of these people die—which is more than the number of United States deaths from prostate cancer, breast cancer and AIDS combined. In fact, the number of sepsis cases per year is on the rise. This is likely due to increased awareness and tracking of the condition, an aging population, the increased longevity of people with chronic diseases, the spread of antibiotic-resistant organisms, an upsurge in invasive procedures and broader use of immunosuppressive and chemotherapeutic agents.

Photos by Rick Haye, Marshall Univiersity photographer

Challenging this potential epidemic, Blough said his research team's new treatment method and associated applications demonstrate that cerium oxide nanoparticles can be used to effectively treat sepsis rather than the traditional method of antibiotics.

While nanomaterials do exist in our day-to-day life in many forms, their biomedical application is not yet fully vetted – making Blough's patented treatment cutting-edge.

"Our data suggest that a single intravenous injection of our particles reduces sepsis-induced mortality by about 80%, at least in laboratory models," he said. "Because these particles target the inflammatory cells in the liver we think that this procedure could be used to treat a number of different disorders including spinal and burn injuries, trauma, radiation exposure and inflammatory liver disorders – basically any number of diverse medical conditions where systemic inflammation may play a role."

A key advantage of using the cerium oxide nanoparticle treatment versus an antibiotic, which is part of the current standard treatment plan, is that there is no refrigeration needed. The nanoparticles also have a long shelf life - making them ideal for developing countries where storage facilities are lacking or totally absent.

Beyond the lab and into the classroom, Blough is recognized as an award-winning faculty member. He was recently selected as the Dr. Charles E. Hedrick Outstanding Faculty Award winner for 2016-2017. Other awards include the 2005 Marshall Distinguished Artists and Scholars Award (Jr. Level), the 2009 Marshall Distinguished Artists and Scholars Award (Sr. Level) and the 2009 John and Frances Rucker Outstanding Graduate Advisor Award. In fact, Blough has been nominated for multiple teaching, research and advising awards nearly every year since joining the faculty at Marshall.

Understanding that scientific research developments do not typically come about as a solo endeavor, he is quick to credit those around him at Marshall and has an eye toward how it all comes together in the first place.

"Continued funding for research is crucial to helping West Virginia - and the United States - move forward," he said.

> "Continued funding for research is crucial to helping West Virginia - and the United States - move forward."
>
> *Dr. Blough*

Blough oversees the work of lab assistants Vani Pathuri and Sushma Penta.

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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WVU's Wu named **Fellow of Royal Society of Chemistry**

WVU professor and prior Neuron magazine featured scientist, Nick Wu has been named a Fellow of the Royal Society of Chemistry.

Nianqiang "Nick" Wu, professor of mechanical and aerospace engineering at West Virginia University (WVU), has been named a Fellow of the Royal Society of Chemistry (FRSC).

"This is the collective outcome of the administrative support, the effort of all my students and the investment in research infrastructure at WVU," said Wu. "My independent academic career grows from the root at WVU."

The Royal Society of Chemistry (RSC), founded in 1841, is the United Kingdom's professional body for chemical scientists and the largest organization in Europe for advancing the chemical sciences. The society partners with industry and academia; promotes collaboration and innovation; advises governments on policy; and promotes the talent, information and ideas that lead to great advances in science. The designation FRSC is given to a group of elected Fellows who have made outstanding contributions to chemistry. As of 2016, only 108 scientists have earned this designation.

Wu, a materials scientist, conducts research in photocatalysts and photoelectrochemical cells for solar energy harvesting, batteries and supercapacitors for energy storage, chemical sensors and biosensors for healthcare and environmental monitoring. His research is funded by the National Science Foundation, National Institutes of Health and the U.S. Department of Energy.

He received his Ph.D. degree in materials science and engineering from Zhejiang University, China, in 1997. He was a postdoctoral research fellow at University of Pittsburgh from 1999 to 2001 and later directed the Keck Surface Science Center at Northwestern University from 2001-2005. He joined WVU as an assistant professor in 2005 and was promoted to associate professor and professor in 2010 and 2014, respectively. He has published one book and more than 150 journal papers. His papers were cited close to 2,400 times in 2016, achieving a total citation of more than 12,300 throughout his career.

Wu currently serves on the board of directors of the Electrochemical Society and serves as chair of the Sensor Division of ECS. He has received the Benedum Distinguished Scholar Award and the Alice Hamilton Award for Excellence in Occupational Safety and Health: Biological Category. He has won the WVU Statler College Outstanding Researcher Award three times.

"Being named a Fellow of RSC is a well-deserved recognition of the high quality and impact of Dr. Wu's research work," said Jacky Prucz, chair of mechanical and aerospace engineering. "He brings great pride to our Department, the Statler College and the University."

> "This is the collective outcome of the administrative support, the effort of all my students and the investment in research infrastructure at WVU. My independent academic career grows from the root at WVU."
>
> *Nianqiang "Nick" Wu*

Exercise science students assist in NASA-funded research

Students in Marshall University's Department of Exercise Science have had the opportunity to explore age and sex differences in skeletal muscles in mice through a NASA-funded grant project that aims to measure energy levels and provide customized care for injury recovery.

Dr. Kumika Toma, principal investigator for the grant and director of the undergraduate exercise science program, said she began this research in 2014 as part of a NASA-funded project in space biology and medicine that measured how microgravity would impact crew members on extended missions.

"I received the first grant in 2014 and applied for additional funding, which focused on providing educational experiences to high-achieving students interested in STEM areas," Toma said. "These students will finish up their research this summer on sex and age differences in skeletal muscles by conducting experimentation that will measure physical inactivity in mice."

Exercise science students Austin Pinardo, Noah Ichite, Casey Hudock and Ellie Hammond are the four students who were chosen to work alongside Toma for her research.

"We look at the mice and we examine the muscle – how it's used and how it changes – when we suspend one leg. We take a biopsy of the muscle before the suspension process and after to identify these changes and make recommendations on how the muscle could be affected and improved if we were to apply this same concept to an injured or sedentary person," Hudock said.

Hammond, the only graduate student in the group, said this experience has allowed her to take her clinical experience to the next level.

"I currently work in the clinical realm, but I want to eventually work in the field of cardiac and pulmonary rehabilitation and this study gives me the research experience I need to accomplish that," Hammond said.

Toma said she hopes to apply for additional grant funding to continue her research beyond this summer.

The funding received for this project is part of a larger grant-funded research initiative through the NASA West Virginia Space Grant and NASA EPSCoR Programs, which provides research funding for at least 28 additional students and faculty members at Marshall University in 2017.

Above: Exercise science students Austin Pinardo, 20, of Beckley; Noah Ichite, 21, of Pickerington, Ohio; Casey Hudock, 22, of Dublin, Ohio; and Ellie Hammond, 23, of Huntington, work with Dr. Kumika Toma (far right) on her NASA-funded research.

Engineering students take **top honors** in **Target Case Study Competition**

Teams featuring seven engineering students from West Virginia University (WVU) captured the top three places in the Third Annual Target Case Study Competition. Sponsored by the Target Corporation and hosted by WVU's Career Services Center, the competition challenges teams of students in all majors to use their problem-solving skills to provide well-rounded solutions to a business problem.

This year's challenge asked students to creatively think and design strategies that Target could potentially implement to remain competitive in today's modern and rapidly changing retail landscape.

Top honors, and $1,500, went to sophomore industrial engineering majors Seth Porter and C.J. Hores, Dylan Hupp and Stephen Mareske. The team made a number of suggestions including better space utilization to make room for small scale distribution centers at each store, offering same day/next day delivery by Target-owned trucks and manipulation of current inventory in an attempt to make a trip to Target a shopping experience versus a shopping trip.

"Our industrial engineering classes were imperative to our thinking process," Porter said. "Classes that applied real-world applications and process improvement were critical to start making us think creatively and unconventionally like industrial engineers are expected to."

Dr. Micheal Fultz organized a massive donation of equipment (shown here in boxes) to help schools in West Virginia revive their science labs.

West Virginia State University recognized for **flood relief efforts**

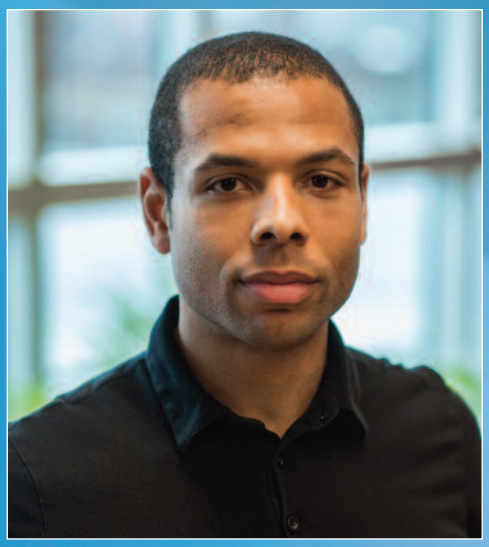
West Virginia State University (WVSU) recently received a Partners for Progress and Prosperity Regional Award (P3) from the American Chemical Society (ACS) for its response to the historic flood that swept through the state in June 2016. Immediately following reports of the devastating nature of the weather event, WVSU students, staff and faculty, as well as the Kanawha Valley Section of the ACS, partnered with the Chemical Alliance Zone (CAZ) to provide assistance to local schools.

"In response to the historic flood of 2016, West Virginia State University quickly pulled together to provide for our community in a way that only the Yellow Jacket Nation can—with an unmatched commitment to serving others. Receiving this esteemed recognition for our service efforts is a testament to our strong community connection and I am proud of our students, faculty, staff and community partners who made a difference for so many," said WVSU President Anthony L. Jenkins.

Led by WVSU Professor Dr. Micheal Fultz, the university worked with CAZ and its members to provide relief to the flood-affected schools by replacing science equipment where floods ravaged labs and nothing could be salvaged.

Donations came in from across the community and the country, including from WVSU alumni, Preiser Scientific and Mylan Pharmaceuticals. Among items collected were spectrophotometers, analytical balances, glassware and drying ovens for science study kits. The items were stored in an unused lab at WVSU.

The award from the American Chemical Society recognizes successful and exemplary partnerships through the support of Science, Technology, Engineering and Mathematics (STEM) Education and research. The groups' efforts earned them the Partners for Progress and Prosperity award plus $1,000 of award money to be used to further recovery activities.



Dr. Brandon Henderson's research has the potential to show how the addictive process occurs in the brain. He is a native of Clayton, Ohio. He joined Marshall University in January after completing postdoctoral work at California Institute of Technology and Yale University.

Marshall researcher receives $650,000 **NIH grant to study nicotine addiction**

Dr. Brandon Henderson, an assistant professor in the department of biomedical sciences at the Marshall University Joan C. Edwards School of Medicine, is the recipient of a $650,000 National Institutes of Health (NIH) grant to continue his work on the study of nicotine addiction.

Henderson's research focuses on a topic particularly relevant to the Appalachian region, where many of the states lead the nation in percentage of smokers.

"Nicotine is the primary addictive component in tobacco products," Henderson said. "Since smoking and chewing tobacco are a primary cause of many forms of cancer, it is very important for us to understand how the addictive process occurs in the brain. As we gain new knowledge, we are better equipped to discover and design ways of treating addiction."

The three-year NIH Pathway to Independence Award, which is awarded to researchers in the early stages of their careers, will allow Henderson and his team to study how the brain is changed by nicotine, specifically dopamine signaling.

"We use techniques in the fields of electrophysiology, microscopy, pharmacology and neuroscience to understand the process of addiction", Henderson said. "With the introduction of electronic cigarettes and flavors, we are now also studying the flavors and their impact on addiction."

"Dr. Henderson's work will provide important new information concerning why tobacco users become addicted to nicotine-containing products," said Gary O. Rankin, Ph.D., vice dean for basic sciences and chair of the department of biomedical sciences. "These findings could also potentially provide the basis for developing new therapies to prevent or treat addiction to nicotine."

> **"Dr. Henderson's work will provide important new information concerning why tobacco users become addicted to nicotine-containing products."**
>
> *Gary O. Rankin*

Jennifer Niemann is a Huntington native and undergraduate student in Marshall's Department of Mathematics.

Marshall mathematics student wins

Jennifer Niemann, an undergraduate student in the Marshall University Department of Mathematics, received a national research award sponsored by the American Statistical Association (ASA) and the Consortium for the Advancement of Undergraduate Statistics Education (CAUSE).

Niemann, a statistics and economics student, was recognized for her work on statistical modeling of environmental data with non-detects, which investigates several methods for analyzing data known to be below detection limit of a measuring device.

She explained, "It is still being debated which method produces the most accurate results when dealing with non-detects, so this paper explores various methods—such as substitution, maximum likelihood estimation and the Kaplan-Meier method—in an attempt to determine the best method for analysis."

Two WVU students **awarded Goldwater Scholarships**

West Virginia University (WVU) has a long history of undergraduate students winning the Goldwater Scholarship, the nation's most prestigious award in mathematics, the natural sciences and engineering.

That history continues in 2017.

Juniors and Honors students Anna Gilpin, a biomedical engineering major from Martinsburg, and Jared Beard, a mechanical engineering major and physics minor from Morgantown, are the 43rd and 44th students at WVU to earn the award since the program's inception in 1986. The scholarship provides as much as $7,500 for tuition, fees, books, room and board for students who demonstrate their aptitude through course work and their own original research.

Gilpin has been conducting research in the area of regenerative medicine since the summer before her sophomore year. She has been working alongside Yong Yang, assistant professor of chemical and biomedical engineering.

"Dr. Yang has been incredibly influential in my pursuit of a Ph.D. and research career in biomaterials for regenerative medicine," Gilpin said. "Since joining his lab as a freshman, he has supported my growth as a researcher by giving me the opportunity to experience and contribute to many aspects of the research process and by working with me to write a review for publication. He has always encouraged me to go the extra mile and strive to achieve the best work possible."

Gilpin has been researching ways to develop a non-damaging method of decellularization using supercritical carbon dioxide, a process that involves isolating the extracellular matrix, or ECM, from its native cells and genetic material. She is currently working to design a stem cell biomanufacturing technique that involves culturing cells that develop into connective tissue, blood vessels and lymphatic tissue within collagen microspheres of physiological stiffness.

"The ECM contains biological and structural components that regulate and support cell function," Gilpin explained. "By isolatingit via decellularization, you can use it as a foundation to create a personalized tissue by adding a patient's own cells back to it. Additionally, it can be used to facilitate cell growth in in vitro cell cultures.

"Regenerative medicine is an exciting field because it has the potential to be hugely impactful for human health through revolutionizing the treatment of a multitude of diseases and disorders," she continued. "It may replace current treatments that are ineffective or inaccessible for patients by harnessing the natural mechanisms of the body, which is ultimately the most powerful tool."

Gilpin had the opportunity to present her research at the 2015 American Institute of Chemical Engineers student conference in Salt Lake City, Utah.

Beard's interest in how things worked led him to mechanical engineering but he was confused on what he might ultimately do with his degree. That all came into focus his freshman year when he had the opportunity to work in the Flexible Electronics for Sustainable Technologies Lab under the direction of Kostas Sierros, assistant professor of mechanical and aerospace engineering. The experience cemented his interest in materials.

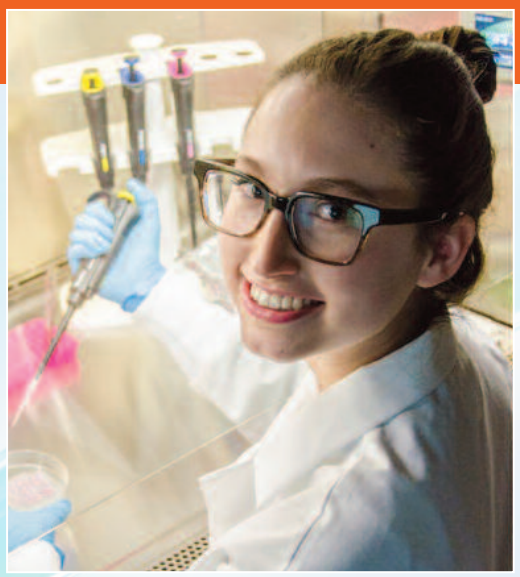
national research award

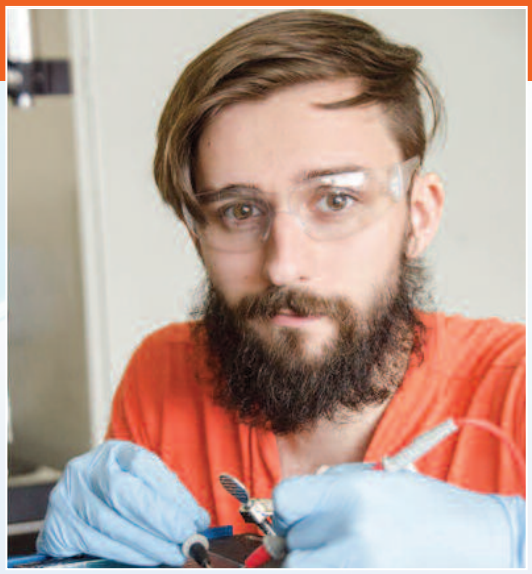
Niemann said she would have never gained the knowledge she has now if it weren't for the faculty in the university's Department of Mathematics.

"The faculty support in our department is really exceptional. I started out just working towards a minor in math, but was encouraged to extend that minor to a major, and then I decided on a statistics major," Niemann said. "I am now planning to continue my education in biostatistics, and this would not be happening without the support of Marshall's math department."

Dr. Avi Mallick, assistant professor of statistics in the department, said Niemann is the perfect example of a talented, diligent and hardworking student.

Mallick said, "I hope this motivates other students to get more involved in research."





WVU students Anna Gilpin and Jared Beard each won prestigious Goldwater Scholarships which covers tuition, fees, books, room and board.

"Dr. Sierros has helped me grow as a researcher," Beard said. "He has provided me with support and guidance for all aspects of research, from technical writings to designing and conducting experiments. Working in the FEST Lab gave me experience working with both the design and implementation of 3D printing devices and printable materials. This includes work toward developing layers for solar cells and improving our in-house built 3D printer, among other projects."

In 2016, Beard participated in an International Research Experience for Students between WVU and the University of Crete-Foundation for Research and Technology Hellas. He and six other students worked on research projects with photocatalytic, thermochromics and gas sensing materials. Joining him on the trip were Dimitris Korakakis, professor of computer science and electrical engineering, and George Kiriakidis, an adjunct professor in mechanical and aerospace engineering.

"As part of the IRES program, Drs. Sierros and Korakakis provided a forum to engage with all stages of a research project and background knowledge on the culture in Greece," Beard said. "While in Crete, Dr. Kiriakidis offered a new perspective. He was very supportive of both our group's development as researchers and assimilation to the Cretan culture. Furthermore, as a physicist, he offered a new perspective on research. It was one that placed a strong emphasis on understanding the mechanisms behind a process, in addition to the outcomes."

Beard plans to incorporate his interest in materials along with his affinity for programming and interfacing mechanical systems with computers in graduate school. He will be studying ways to integrate robotics and materials science for the improvement of advanced manufacturing processes.

WVSOM researcher hopes to **reduce brain damage** following **stroke** or **cardiac arrest**

Continuing research includes a team member from the Marshall University School of Pharmacy: Dr. Jinsong Hao, an associate professor of pharmaceutical sciences. What if there was an opportunity to drastically reduce the area of the brain that becomes damaged? West Virginia School of Osteopathic Medicine's (WVSOM) research program has a faculty member dedicated to investigating what could do just that, with promising initial results.

Last summer, Dr. Jake Neumann and WVSOM second-year student Rinata Azizbayeva investigated the use of palmitic acid methyl ester as a potential agent that could be utilized during the recovery period, or post cerebral ischemia. Cerebral ischemia is when blood flow to an area of the brain is cut off (for example, during a stroke or cardiac arrest) and when this happens, brain cells are deprived of oxygen and begin to die.

Neumann uses isolated tissue from the brain to directly investigate the neuroprotective properties of the agent on the cells. So far, Neumann's research findings are encouraging. Treatments to limit the ongoing damage in post-ischemia events have resulted in curtailing the normal cellular damage by 50 percent.

Neumann explained, "My research is focused on studying hippocampal neuronal damage following cerebral ischemia and various mechanisms for neuroprotection. My interests include understanding how excitatory and inhibitory neurotransmission is altered following ischemia, investigating various methods to improve synaptic signaling for functional recovery, and identifying pharmacological agents for neuroprotection."

Neumann's background has always been grounded in pharmacology. He received a Ph.D. in pharmacology at Southern Illinois University School of Medicine, and he completed his postdoctoral work at the University of Miami. It is Neumann's hope that this research will decrease the amount of brain damage following cerebral ischemia.

In his pursuit to reduce the recovery time for patients and improve recovery of brain function, Neumann began to formulate a career path that would play to his strengths.

"While my research has been rewarding, I knew that I had always enjoyed teaching/mentoring throughout my life. I wanted to look for the opportunity to take my knowledge of cardiovascular pharmacology and translate it into a strong teaching component. WVSOM was a great fit for me in this way. I have enjoyed the opportunity to translate classroom knowledge into applied research," Neumann said.

Marshall **biotechnology spinoff** receives large grant from **National Institutes of Health**

Progenesis Technologies, a biotechnology company headquartered in Huntington, West Virginia, with ties to Marshall University, has been awarded a Phase II Small Business Innovation Research Grant (SBIR) from the National Institutes of Health (NIH) for $1.06 million over a two-year period.

Progenesis was founded in 2006 by two Marshall University Joan C. Edwards School of Medicine faculty members, Dr. Richard Niles and Dr. Hongwei Yu. It was based on patented discoveries from Yu's research on genetically engineered bacteria that produce the biopolymer alginate used in a variety of applications – including textile manufacturing, food production, wound care and drug delivery.

"This grant provides funding toward the continued development and commercialization of unique polymers produced by non-pathogenic bacteria," said Niles, chief operating officer for Progenesis and an emeritus faculty member of the School of Medicine. "Currently, these alginates are extracted from brown seaweed, but this compound has a fixed composition that limits its performance. The grant allows for additional work on our engineered alginates, particularly to enhance their performance in advanced wound care."

Dr. Joseph I. Shapiro, dean of the Joan C. Edwards School of Medicine, said the new funding means continued research opportunities for the region.

"Progenesis is an innovative company and has great potential for expansion," Shapiro said. "We look forward to their future successes, particularly in the field of medicine."

Throughout its existence, Progenesis has had a strong relationship with Marshall University. The original patent is held by the Marshall University Research Corporation and the company has an exclusive worldwide license.

"Progenesis Technologies is exemplifying the power of university-originated research in driving economic development," said John Maher, Ph.D., vice president for research at Marshall University. "The award of this highly competitive grant for the further development of their innovation provides solid external validation of their technology."

Continuing research includes a team member from the Marshall University School of Pharmacy: Dr. Jinsong Hao, an associate professor of pharmaceutical sciences. Additionally, the company has received support from Marshall Health, which is the faculty practice plan of the School of Medicine.

The NASA Space Day event was free and several school groups, like the one shown, used the opportunity for a STEM-focused field trip.

West Virginia State University hosts **NASA Space Day, Research Symposium**

West Virginia State University (WVSU) hosted NASA Student Partnership for the Advancement of Cosmic Exploration (SPACE) Day in April on the university's Institute campus.

An exhibit featuring WVSU alumna Katherine Johnson, whose accomplishments at NASA were the basis for the film "Hidden Figures," was on display inside Hamblin Hall as part of the day's events. The event also featured a variety of hands-on activities designed to teach young people about science and space exploration.

The day included NASA Langley's travelling exhibit and a robotics station, rocketry station, a flight simulation and an exhibit on journeying to Mars. In addition, participants were able to build their own satellite out of Legos and tour an exhibit on the science of cycling that included a wooden bike, fat tire bike and electric bike.

More than 400 students from eight area elementary, middle and high schools attended.

The WVSU College of Natural Sciences and Mathematics also hosted its annual Research Symposium throughout the day, which featured a keynote address from Dr. David Atkinson of NASA's Caltech Jet Propulsion Laboratory.

"We are very excited to host NASA SPACE Day alongside the College of Natural Sciences and Mathematics' 22nd Annual Research Symposium day," said Dr. Naveed Zaman, dean of the College of Natural Sciences and Mathematics. "NASA's interactive displays and engaging activities, and WVSU students' research presentations, inspire the younger generation of scientists. I am also very thankful to our college students who are always ready to volunteer for these events."

The day was sponsored by the NASA West Virginia Space Grant Consortium in collaboration with WVSU, the NASA IV&V Facility and NASA Langley.

WVU students experiment with artificial intelligence to detect fake news

Students and faculty at West Virginia University (WVU) aren't waiting for internet giants like Google and Facebook to provide solutions to fake news. The WVU Reed College of Media, in collaboration with computer science students and faculty at the WVU Benjamin M. Statler College of Engineering and Mineral Resources, hosted an artificial intelligence (AI) course at its Media Innovation Center that included two projects focused on using AI to detect and combat fake news articles.

Students in the senior-level computer science elective course worked in teams to develop and implement their own AI programs under the instruction of Don McLaughlin, research associate and retired faculty member of the Lane Department of Computer Science and Electrical Engineering.

Stephen Woerner, a computer science senior, is on one of the teams charged with creating a system that detects fake news articles. His team's approach utilized a machine learning system to analyze text and generate a score that represents each article's likeliness that it is fake news. Woerner added that this score is accompanied by a breakdown that explains the rating and provides transparency.

"Artificial intelligence can have all the same information as people, but it can address the volume of news and decipher validity without getting tired," Woerner said. "People tend to get political or emotional, but AI doesn't. It just addresses the problem it's trained to combat."

"Fake news isn't just a media problem," said Dana Coester, associate professor in the Reed College. "It's also a social and political problem with roots in technology. Solving that problem requires collaborating across disciplines."

Research Associate Don McLaughlin lectures to computer science students during a class hosted at the WVU Media Innovation Center.

West Liberty University announces new **Master Degrees in biology**

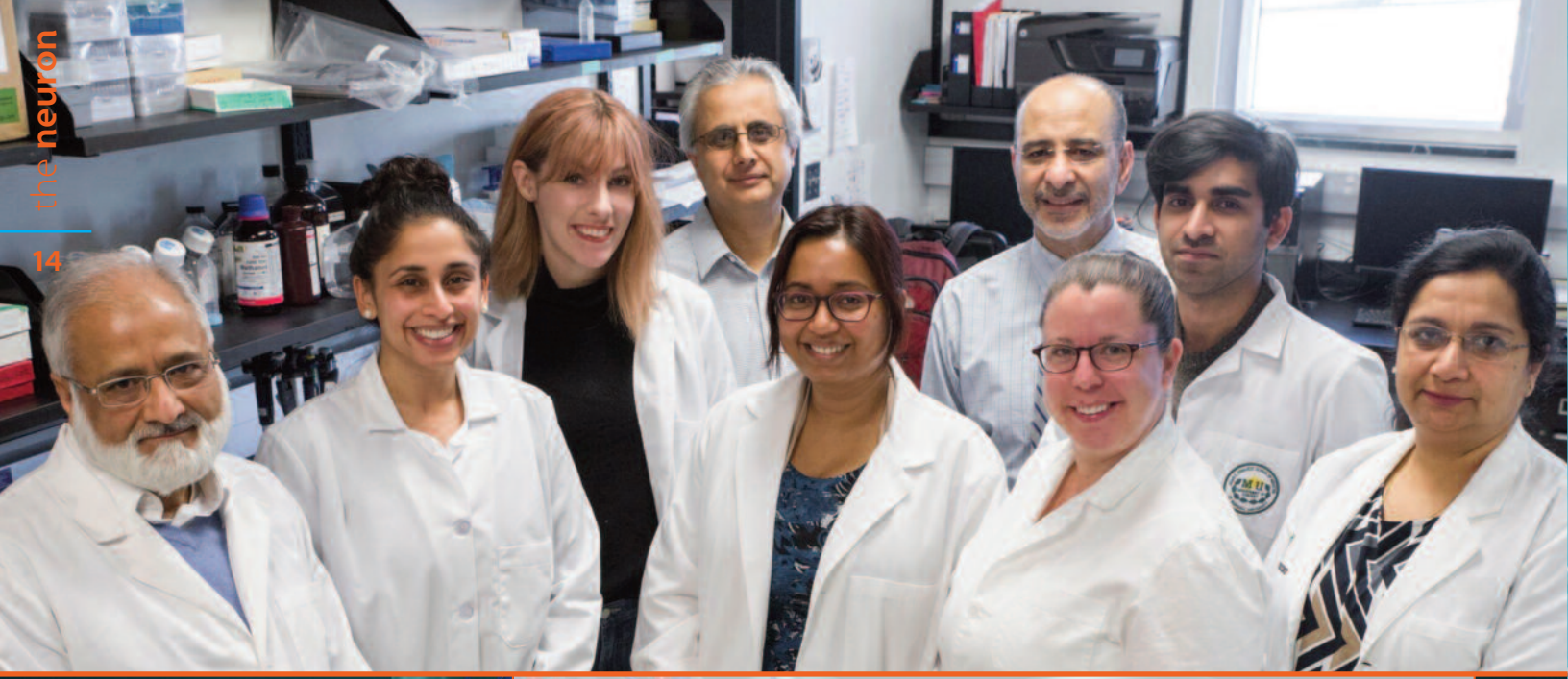
Dr. Joseph Horzempa explains to a local reporter the value of the new master's in biology degree program at WLU's press conference announcement in June.

West Liberty University (WLU) recently received approval from the Higher Learning Commission for two new science degrees, a Master of Arts (MA) in Biology and a Master of Science (MS) in Biology.

"We are pleased to offer these new master degrees to our region and the state of West Virginia. Currently, no small college in the state offers the Master of biology, so we are excited to be the first and we encourage undergraduates to take a look at the opportunities that these degrees offer," said Dr. Stephen Greiner, WLU president.

The MS in biology often leads to jobs such as research technicians for the pharmaceutical industry or academic labs, environmental consulting work or entry into doctoral programs. The MA in biology prepares students for professional schools such as dental or medical school.

"There are a number of reasons that I believe these are important degrees for West Liberty University; one is simply to increase scholarly activities in the sciences in the Mountain State," said Dr. Joseph Horzempa, associate professor of biology and program director for the new degrees. "The other is that these graduate degrees will certainly help our residents find careers in their field."



This Marshall University Joan C. Edwards School of Medicine research team has successfully demonstrated that pNaKtide can attenuate the development of experimental nonalcoholic fatty liver disease and atherosclerosis. Pictured left to right, front row: Muhammad A. Chaudhry, M.A.; Krithika Srikanthan, M.D.; Alexandra Nichols, B.S.; Amrita Mallick, Ph.D.; Rebecca L. Klug, M.D. and Komal Sodhi, M.D. Back row: Saroj Sigdel, M.D.; Mehiar El Hamdani, M.D. and Athar Nawab, B.A.

Marshall School of Medicine researchers **advance research affecting metabolic syndrome** and **related conditions**

Building on their recent research focusing on a peptide, pNaKtide, designed to block the oxidant amplifying function of the cellular sodium-potassium pump, researchers at the Marshall University Joan C. Edwards School of Medicine have successfully demonstrated that pNaKtide can reduce the development of nonalcoholic fatty liver disease (NAFLD) and atherosclerosis.

The findings were published in the March 15 edition of "Scientific Reports," an online journal from the publishers of Nature.

"We studied pNaKtide, a peptide developed by Dr. Zijian Xie, director of the Marshall Institute for Interdisciplinary Research (MIIR), along with Dr. Jiang Tian of the University of Toledo and myself, in two strains of mice fed a typical "Western diet" high in fat and fructose," said Joseph I. Shapiro, M.D., dean of the School of Medicine and senior author of the publication. "Our results showed that pNaKtide was very effective at ameliorating the development of NAFLD and atherosclerosis associated with this Western diet. If this agent can ultimately be developed into a medication, it may have substantial utility on disease processes endemic to this region."

The researchers noted marked improvements in insulin sensitivity, dyslipidemia, aortic streaking and weight gain in the C57Bl6 mouse model. In addition, significant reduction in low density lipoprotein ("bad" cholesterol) and increases in high density lipoprotein ("good" cholesterol) concentrations were observed. In the ApoE knockout mouse, which rapidly develops atherosclerosis, the aforementioned biochemical improvements were also seen and were associated with marked decreases in atherosclerosis.

"Collectively, our study demonstrates the oxidant amplification loop controlled by the sodium-potassium pump significantly contributes to the development and progression of NAFLD and atherosclerosis," said Dr. Komal Sodhi, a researcher with the School of Medicine and first author of the study. "With these findings, we can better understand ways to treat or even prevent these conditions from occurring."

More research is needed before testing on humans can begin. This research was supported by grants from the National Institutes of Health and generous donations from the BrickStreet Foundation and the Huntington Foundation Inc.

Extension programs bring research-based knowledge to the people

Matt Browning
Director of Communications for Research and Public Service, West Virginia State University

Matt Browning

Bringing the university to the people was the founding mission of the national Cooperative Extension System, established in 1914 through the Smith-Lever Act. Extension programs nationwide are bringing the research-based knowledge of the land-grant university system to the people in ways that are practical, applicable and more pertinent than ever before.

West Virginians are fortunate to have two land-grant universities within the state: West Virginia University, founded through the Morrill Act of 1862, and my institution, West Virginia State University (WVSU), founded through the Second Morrill Act of 1890. Together, our extension programs are reaching thousands of people in all 55 counties.

At WVSU, our portfolio takes a non-traditional approach to programming. For instance, our 4-H programs focus on hands-on science education for youths, while our agriculture efforts teach farmers and growers what are typically considered alternative production methods – beyond the traditional garden and field plot approach.

Community gardening has become a cornerstone of our efforts. At the Carroll Terrace residential complex on Charleston's East End, we've established and helped to maintain a thriving community garden for more than a decade, providing residents with the knowledge and skills to grow their own fresh fruits and vegetables in an area of town known as a food desert. The garden has proven to ease the financial burden many seniors face. Noted one participant, "I no longer have to choose between buying fresh vegetables and buying my medication."

The production of specialty crops has also become a staple in our endeavors, with projects educating small farmers in southern West Virginia about mushroom production, small fruit production, and a project being piloted to determine the feasibility of West Virginia-grown hops for the craft beer industry. This research project involves working with farmers throughout the state to trial various hops plants to determine those best suited for West Virginia's climate. The goal is to provide a locally sourced product to the state's expanding list of craft breweries.

Extension reaches beyond the farm as well. Community and economic development projects throughout central and southern West Virginia are working to bolster tourism, engage and educate entrepreneurs and help our small towns thrive. Through our partnership with the New River Gorge Regional Development Authority, extension agents are on the ground throughout southern West Virginia, while in Charleston, our efforts led to the establishment of the capital city's first co-working space for the creative economy at the WVSU Economic Development Center on the West Side. Meanwhile, our outreach efforts for K-12 audiences are bringing hands-on STEM learning opportunities to youths throughout the region, helping to create the scientists of tomorrow.

Lastly, our staff works tirelessly to make life better for West Virginians while also enriching the learning opportunities for our students. WVSU students in majors such as the sciences, social work and education are working alongside our extension agents to receive firsthand experience and training relating to their areas of study.

As an 1890 Land-Grant University, WVSU has a tripartite mission of teaching, research and extension. By creating a robust and diversified extension program portfolio, WVSU Extension Service has and will continue to integrate its efforts to ensure that we are helping to better West Virginia in each of those mission areas.

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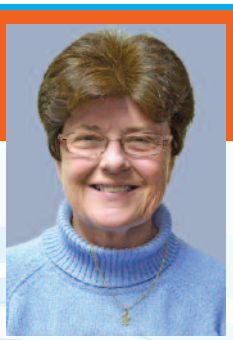
FROM THE DIRECTOR:
Partners in progress



Partners in Progress is the partial title of the award that WVSU received for its flood relief efforts which helped resupply some of our local schools with valuable scientific equipment after the historic June 2016 flood which swept through our state.

Our community members as well as professionals from internationally-renowned companies came together to make sure that no science students would be left without the ability to complete their science courses in the school year that followed. The award was well-earned, and Dr. Fultz is to be applauded for spearheading that effort.

However, if you look through this entire issue with the lens of partnership in mind, I think you'll see some of the stories in a new light, and I would be remiss to let this opportunity go by without showing some recognition. For example, we see exercise students at Marshall who had an opportunity to partner with their professor on some exciting NASA-funded research - proving that you never know what type of research you'll have the chance to get involved with when you choose a STEM major.

While not outright identified as such, I would also assert that the competition which challenged WVU students to creatively think and design strategies that Target could implement showcases the fact that their corporate structure values fresh input from young minds.

One of the most exciting partnerships in this issue, from my perspective, is the one you read about in the story titled, "Biotechnology spinoff receives large grant from NIH." That biotech spinoff is Progenesis Technologies which has been closely related to Marshall University from its inception. The reason I'm so excited to follow the continued success of Progenesis is because the company's initial funding came from a West Virginia Research Challenge grant, which our office manages.

So, you see, partners in progress is more than a casual quip or the name of an award. It takes considerable collaboration for scientific research to be truly successful. In the future as you read articles related to the STEM fields, I challenge you to look for the partners.

Jan R. Taylor, Ph.D.
Director of Science and Research
West Virginia Higher Education Policy Commission