

NIH awards WVU \$2 million to study link between Alzheimer's disease, chronic stress

Marshall professor and fellow researcher of same name team up to complete research publication

West Virginia State University awarded \$764,792 for Cybersecurity Innovation Center

NEURON

Volume 18 Issue 1

Science, Technology & Research in West Virginia



Research Challenge Grants

How seed funding for university scientists elevates West Virginia

NEURON

Science, Technology & Research in West Virginia

COVER FEATURE, 12 - 15

Research Challenge Grants
How seed funding for university research elevates West Virginia

Meet the three current Research Challenge Grant awardees - Drs. F. Heath Damron, Jianli (John) Hu, and Nasser Nasrabadi - and learn about how particularly relevant their work became in recent years due to a worldwide pandemic, inflated petroleum prices, and concerns over security.

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VOLUME 18 ISSUE 1

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ABOUT

STaR Division: Science, Technology & Research at the West Virginia Higher Education Policy Commission provides strategic leadership for the development of competitive academic research opportunities in science, technology, engineering and mathematics (STEM).

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FROM THE DIRECTOR

GREAT POTENTIAL

Research investments can positively impact our state's future

You might notice this issue looks different. We are in the process of transitioning the Neuron to a brand new design! This update will allow us to continue, and expand, the original feature articles you enjoy while also highlighting the specific programs administered by STaR Division: Science, Technology & Research at the West Virginia Higher Education Policy Commission. We hope you can learn more about the state funding awarded to support our researchers' endeavors as well as the federal programs that reside at our office through the National Science Foundation.

This issue also focuses on our premier funding opportunity: the Research Challenge Grants (RCGs). The RCGs are a substantial investment by the State of West Virginia into scientific research

happening right here. Drs. Damron, Hu and Nasrabadi have accomplished great things in their laboratories, bringing in millions of the follow-on funding needed to sustain Centers at their institution.

Think you have the next great idea? We are now accepting proposals for a new round of RCGs to be awarded later this year. More information can be found at wvresearch.org. We encourage you to think collaboratively and address the needs of our time. Who knows? We might see you on the cover next.



Juliana Serafin, Ph.D.

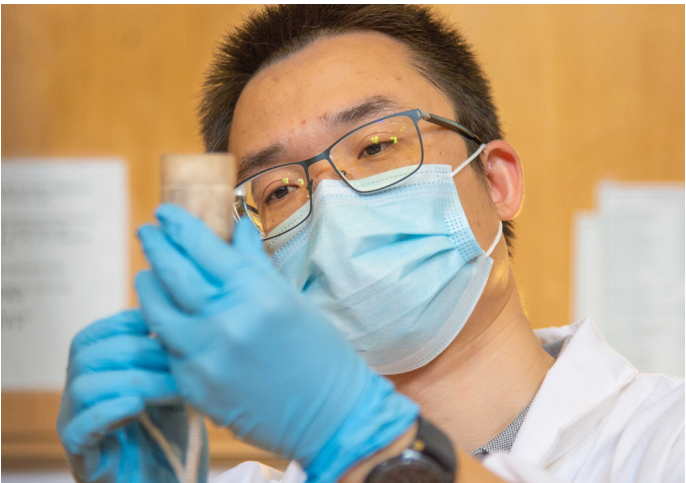
Senior Director of Science & Research,
West Virginia Higher Education Policy
Commission, and Project Director, WV
EPSCoR

Awards & Recognitions



Marshall scientist receives early career award in neuropharmacology

Brandon J. Henderson, Ph.D., an assistant professor of biomedical sciences at Marshall University, received the Division of Neuropharmacology Early Career Award by the American Society for Pharmacology and Experimental Therapeutics (ASPET). He was recognized for his research on flavorants in electronic cigarettes.



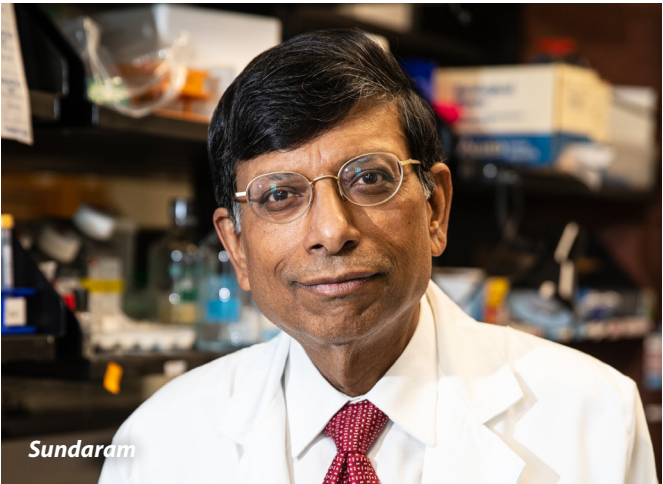
WVU researchers to improve the flow of renewable energy to power plants with \$7.5 million in grants

WVU engineers **Xingbo Liu, Ph.D.**, **Kostas Sierros, Ph.D.**, and **Wenyuan Li, Ph.D.**, (above) are developing technologies to upgrade critical components of power plants that frequently fail due to stress caused by continuous cycling of various energy sources.



WVU neurosurgeon first in the world to treat patient with next-generation IRRFlow system

Nicholas Brandmeir, M.D., neurosurgeon at the WVU Rockefeller Neuroscience Institute, is the first neurosurgeon to successfully treat a hemorrhagic stroke patient using the next-generation IRRFlow® system. IRRFlow is the world's first irrigating intracranial drain that provides a therapeutic approach to relieve intracranial bleeding. Dr. Brandmeir successfully performed the procedure on March 3.



Sundaram honored with VA Merit Review Senior Clinician Scientist Investigator Award

Uma Sundaram, M.D., vice dean for research and graduate education at the Marshall University Joan C. Edwards School of Medicine, was honored by the Hershel "Woody" Williams VA Medical Center for his research on malnutrition and inflammatory bowel disease (IBD). Sundaram is the recipient of the VA Merit Review Senior Clinician Scientist Investigator Award, the most prestigious grant given by the U.S. Veterans Administration grants program.

Awards & Recognitions



Fairmont State University faculty honored by American Society of Civil Engineers

Tabitha Lafferre, assistant professor of civil engineering technology at Fairmont State University, was recently recognized by the American Society of Civil Engineers for her work as a committee co-chair for the 2020 West Virginia Infrastructure Report Card. Other co-chairs included engineers Dave Meadows and Rodney Holbert.



WVSU biotechnology grad student wins highly competitive Borlaug Scholars award

West Virginia State University (WVSU) graduate student **Dinesh Ghimire** has been selected by the National Association of Plant Breeders as a 2022 Borlaug Scholar based upon his accomplishments, academic performance, letter of recommendation and passion for plant breeding.



Shepherd University biology department receives microscopes from NIH

Students taking biology classes at Shepherd University have the opportunity to use two professional-grade inverted fluorescence microscopes recently donated by the National Institutes of Health (NIH). Shepherd is on the approved NIH donation list. **Sara Reynolds, Ph.D.**, assistant professor of biology, inquired about receiving surplus microscopes.



University of Charleston receives \$1.9 million to create Innovation Hub

The **University of Charleston** (UC) will create the UC Downtown Innovation Hub (DIH) to help small businesses in the Kanawha Valley scale up and grow. This includes a business coworking space, business accelerator, coaching, advising, employee training and community event space at the corner of Capitol and Lee Streets in downtown Charleston.

Research Challenge Fund

Established by the state legislature in 2004 to support research and development projects at institutions of higher education in West Virginia

Submit your proposal this summer for the next Research Challenge Grants

New proposals for the next round of **Research Challenge Grants (RCG)** are now being accepted. Teams should emphasize the likelihood that their project will be competitive for additional funding in the future as well as the importance of collaboration.

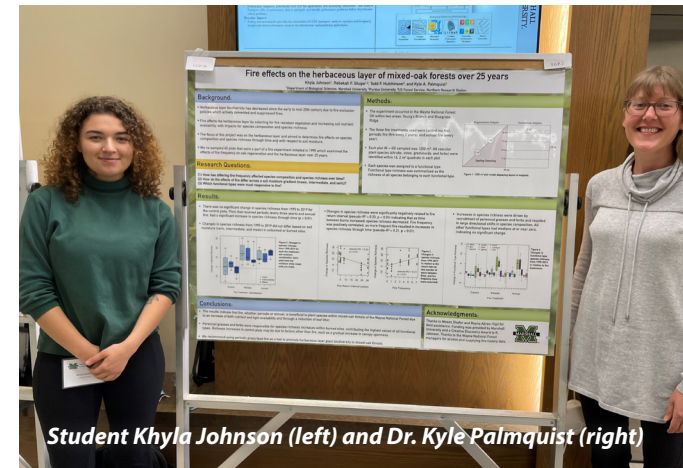
The purpose of a RCG is to provide support for lasting improvements in institutional research capacity, to build toward economic development and to increase West Virginia's ability to compete for federal funding. Specifically, the project should create a research initiative that is competitive for the National Science Foundation (NSF) or the National Institutes of Health (NIH), especially NSF EPSCoR Research Infrastructure Track-1 and Track-2 grants, or NIH IDeA grants.

RCG proposals must describe the strategy and implementation mechanisms to develop and sustain the scientific focus of the proposal and create the potential for economic development. The strategy must have a high probability of realizing stated goals and objectives.

Three projects will be awarded funding. Full proposals must be received by 5 p.m. on August 1, 2022. The anticipated amount for these awards is up to \$1.3 million over five years. Awardees will be notified by October 1, 2022 with grant funding to begin on January 1, 2023. For more information, visit wvresearch.org.

Marshall and WVU awarded next round of STEM Fellows funding

Marshall University (Marshall) and **West Virginia University (WVU)** were awarded funding from the Graduate Student Fellowships in Science, Technology, Engineering and Math (STEM Fellows) to continue attracting and retaining PhD students at their institutions. Marshall seeks to strengthen and expand doctoral education in biomedical research while WVU will work to increase the number, quality and diversity of doctoral students. The grants will begin during the fall semester of 2022 and run through 2026.



Opportunity Grant Program helps fund inaugural research symposium at Marshall

Marshall University (Marshall) hosted the Student Research & Creativity Symposium on April 19 and 20 at the Arthur Weisberg Family Applied Engineering Complex and the Robert C. Byrd Biotechnology Science Center. This inaugural event celebrated and recognized undergraduate and graduate student research and creativity across the campus. Students showcased their work with oral presentations and posters. This was an opportunity for them to show how their work can impact the community.

"Over these two days, undergraduate and graduate students presented their work through poster sessions and oral presentations and invited guest speakers addressed various aspects of research and their paths to successful careers," said **Philippe Georgel, Ph.D.**, professor at Marshall and organizer of the event.

Speakers included representatives from Walt Disney Animation Studios, the National Institutes of Health (NIH), U.S. Air Force, the University of Manitoba and the Manitoba Epigenetic Network.



"Over these two days, undergraduate and graduate students presented their work through poster sessions and oral presentations and invited guest speakers addressed various aspects of research and their paths to successful careers."

- Dr. Philippe Georgel

NSF EPSCoR

**National Science Foundation
Established Program to Stimulate
Competitive Research**

A program that enhances research competitiveness of targeted jurisdictions (states, territories, and a commonwealth) by strengthening STEM capacity and capability through a diverse portfolio of investments from talent development to local infrastructure



Grant No. OIA-1458952



Marshall's McBride serves as guest editor for open access journal Micromachines

Sean McBride, Ph.D., assistant professor of physics at Marshall University, will serve as guest editor for a special issue of Micromachines, a peer reviewed, open access journal on the science and technology of small structures, devices and systems. The journal is published online monthly by Multidisciplinary Digital Publishing Institute (MDPI).

This special issue will provide an overview of the latest innovative utilization techniques and recent developments of novel nanomaterial-based membranes, ranging from their use in the wastewater treatment and water purification, fuel cell and pharmaceutical industries to the healthcare industry, highlighting all the new and exciting applications in between, according to the announcement.

McBride worked on the recent "Waves of the Future" NSF EPSCoR RII-Track 1 project. A paper co-authored by him titled, "Azo-Dye-Functionalized Polycarbonate Membranes for Textile Dye and Nitrate Ion Removal," will be featured in this special issue. Ashton Caruthers, McBride's former student who contributed to the EPSCoR project, also served as a co-author.

Deadline for manuscript submissions is March 15, 2023.

Marshall students excel after experience gained in PERT program

Laura Fortner, a rising senior at Spring Valley High School in Huntington, W.Va., and first-generation college student **Ashton Caruthers** from the Department of Curriculum Instruction & Foundations at Marshall University (Marshall) published a paper on their research conducted during a Preservice and Early Career Research for Teachers program (PERT).

PERT is a unique 35-hour per week, five week summer program where teams consisting of a high school student, high school teacher, undergraduate student and an established research faculty member conduct research.

This experience provided an opportunity to conduct hands-on research at the forefront of the field of water filtration. The program provided opportunities to become better researchers and teachers, to better communicate their research findings and to enhance scientific public speaking skills.

"Overall, it was a very rewarding experience to see them grow and develop over the fast-paced program."

- Dr. Sean McBride

"The PERT program was an excellent opportunity for everyone involved," said **Sean McBride, Ph.D.**, assistant professor of physics at Marshall. "The students had great opportunities such as finding and enhancing their passion for research, developing research skills necessary for collecting and publishing data, making research connections with those on and off campus, and honing their public speaking skills. As their research mentor, it was great to have the opportunity to help hardworking students in the laboratory setting that were interested and excited to learn new material and skills. Overall, it was a very rewarding experience to see them grow and develop over the fast-paced program."

Fortner has since been accepted into the mechanical engineering program at Marshall University for Fall 2022. Caruthers is currently a high school teacher at John T. Hoggard High School in, Wilmington, NC.



GLOBE program allows K12 teachers to experience scientific research

Local teachers strengthened their skills and learned how to engage classrooms with water quality research during a Global Learning and Observations to Benefit the Environment (GLOBE) training at West Virginia State University (WVSU).

"The GLOBE Program is a phenomenal asset to teachers and represents a synergy between the scientific community and local educators," said **Hannah Payne**, director of CASTEM and assistant program director for 4-H Youth Development at WVSU. "This outdoor hands-on training allows teachers to get immersed in the curriculum while also providing everything they need to deliver the program in their classrooms. It's so important that we invest in our local schools and educators, by providing them with the resources that they need to implement science in their classrooms."

This project engaged K12 teachers in authentic research experiences as part of the Appalachian Freshwater Initiative. Teachers learned more about scientific practices and understanding the basics of conducting scientific research. It allowed them to discover patterns and trends in data, demonstrate that science is a long-term endeavor, help them gain confidence in analyzing data and more. GLOBE specifically focuses on assisting teachers in taking instruction back to their own classrooms.

NSF INCLUDES

**National Science Foundation
Inclusion across the Nation of
Communities of Learners of
Underrepresented Discoverers in
Engineering and Science**

A comprehensive national initiative to enhance U.S. leadership in science, technology, engineering and mathematics (STEM) discoveries and innovations focused on NSF's commitment to diversity, inclusion, and broadening participation in these fields



Grant No. HRD-1834586

First2 Network to again host internships and clubs for STEM students across West Virginia

First2 Network (First2) recently announced the locations of upcoming summer internships and clubs. This year's institutions include: **Blue Ridge Community and Technical College, Fairmont State University, High Rocks, Marshall University, University of Charleston, West Virginia University, and West Virginia University Institute of Technology (WVU Tech). Green Bank Observatory** will also be hosting a site through separate funding.

These internships - or summer immersion experiences - are open to students across West Virginia who will be entering their freshman year of college this fall and plan to major in a science, technology, engineering or mathematics (STEM) field. Older, more experienced students are encouraged to apply as mentors. First2 is particularly interested in recruiting first generation and other underrepresented students.

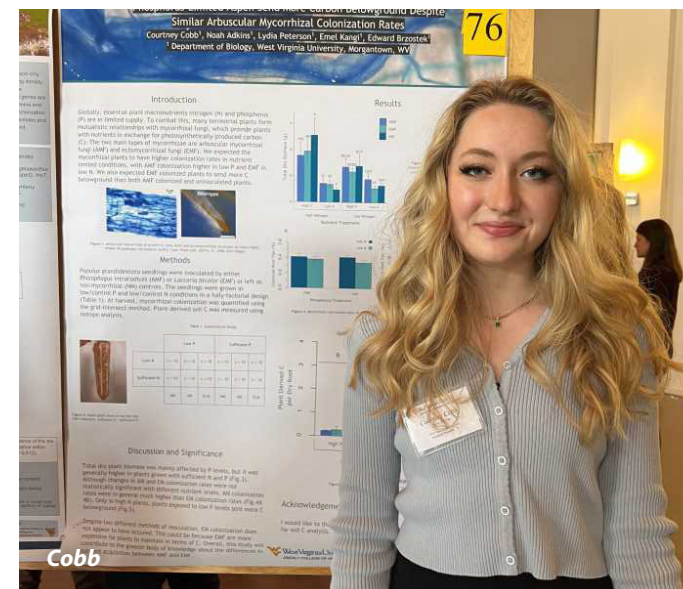
Applications and more information about these internships and clubs can be found online at first2network.org.

Toyota West Virginia donates \$37,250 to support First2 students

Toyota West Virginia recently made a donation to First2 Network to further the impact of summer immersion experiences for students.

This funding will sponsor 10 students, 3 peer mentors and 2 faculty members during First2's upcoming research internships held at various higher education institutions and organizations throughout the state.

Toyota West Virginia has been involved in the First2 Network for about two years. Their support has involved employees serving on the industry advisory board, sponsoring conference materials and attending virtual and in-person conferences.



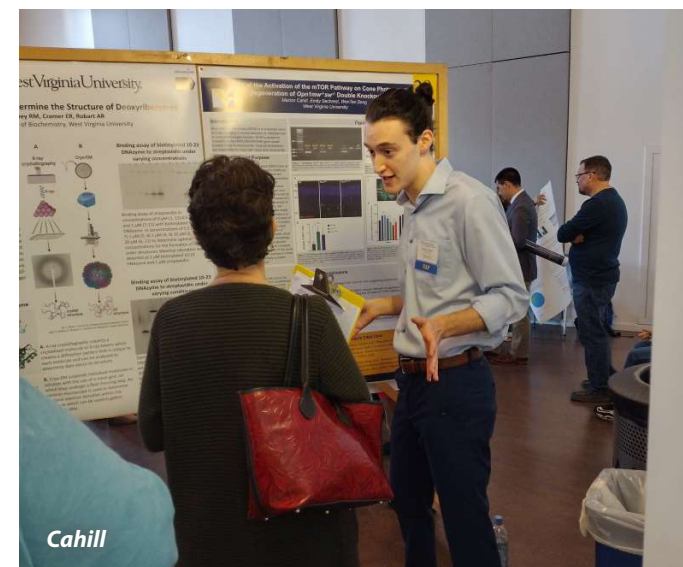
First2 students present research at WVU's spring symposium

Courtney Cobb (above) and **Easton Cahill** (below), both students at West Virginia University, presented their research at the WVU Undergraduate Spring Symposium on Saturday, April 9.

Both students took part in last year's Summer Immersion Experience with First2 and continued their research during the academic year.

Cobb presented a work entitled, "Phosphorus-Limited Aspen Send More Carbon Below Ground Despite Similar Arbuscular Mycorrhizal Colonization Rates."

Cahill presented a work entitled, "Effect of Activation of the mTOR Pathway on Cone Photoreceptor Degeneration of *Opn1mw^{-/-}sw^{-/-}* Mice."

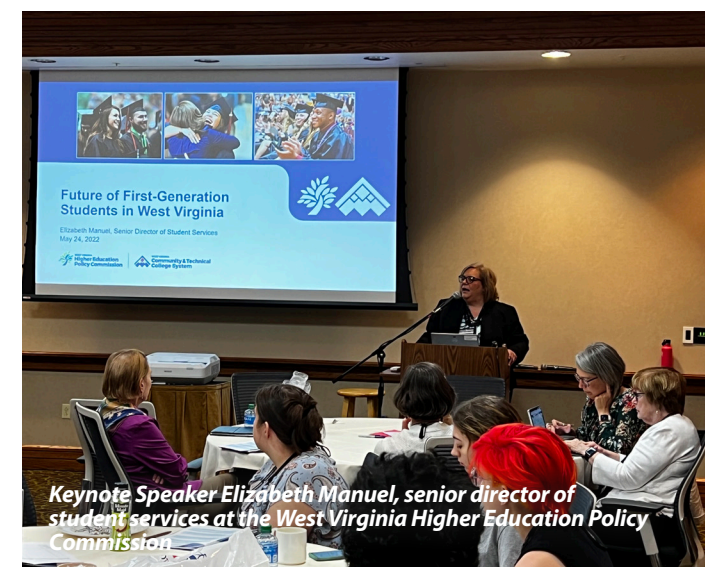


Bi-annual spring conference held virtually and in-person

The First2 Network (First2) hosted its bi-annual conference in May with virtual and in-person options.

"This invite-only event was full of learning and collaboration between students, faculty and staff from multiple institutions of higher education and STEM industry reps from companies including Stockmeier Urethanes, MATRIC, Solvay, Chemours, and Toyota," said **Jade Irving**, First2 Network program coordinator at STaR Division: Science, Technology & Research at the West Virginia Higher Education Policy Commission.

The virtual conference took place on May 16 where partner institutions presented the victories and challenges associated with supporting rural, first-generation and other underrepresented STEM students on their campus. The in-person event - "Recognizing, Measuring, and Sustaining Success" - held on May 23-24 at Stonewall Resort. Attendees participated in workshops, heard from a panel of industry partners, attended an industry expo and more. This conference highlighted a sustainable path forward for First2 and strengthened the pipeline between future STEM graduates and the STEM workforce in West Virginia.





External follow-on funding after initial award of \$1.3 million over five years

\$11.6 million

Center for Innovation in Gas
Research and Utilization

\$23.3 million

Vaccine Development Center

\$24.3 million

Center for Cognitive Computing

Research Challenge Grants

How seed funding for university scientists elevates West Virginia

By Angela Sundstrom

Government, at its core, is about investing. Where do you want your tax dollars to be spent? A 'leap of faith' is not always popular, but it is necessary for innovation. Many of the solutions to today's issues could be sitting in a university laboratory just waiting to be given a chance. Enter, seed funding.

Seed funding, or startup funding, is the first flow of cash awarded to a promising project that allows it to grow and become more competitive. Scientific researchers in West Virginia can look to the Research Challenge Grant (RCG) program for such funding. RCGs are awarded every five years from the Research Challenge Fund, created by the state legislature in 2004 and administered by STaR Division: Science, Technology & Research at the West Virginia Higher Education Policy Commission. They support the creation of university-based research centers to foster economic development and workforce advancement.

Historically, West Virginia's economy was dominated by mineral resources and manufacturing. With these industries shifting in recent decades, it has been crucial to find additional and alternative economic opportunities. The RCG program supports innovative research that has the potential to provide millions of dollars of economic development in the state while diversifying the economy.

All three current projects were awarded \$1.3 million over five years. They leveraged this state funding into further money from federal sources that supported graduate students and postdoctoral fellows and produced publications on important research.

F. Heath Damron, Ph.D., associate professor of microbiology, immunology & cell biology at West Virginia University, applied to support vaccine research projects, facilitate training of the next generation of scientists and physicians, and foster the establishment of industry partners. He is now also the director of the Vaccine Development Center (VDC).

John (Jianli) Hu, Ph.D., Statler Chair Professor in engineering at West Virginia University, pursued the advancement of science and engineering for localized gas utilization. He is now also the director of the Center for Innovation in Gas Research and Utilization (CIGRU).

Nasser Nasrabadi, Ph.D., professor of computer science and electrical engineering at West Virginia University, proposed using advanced learning techniques to conduct fundamental, applied research in data science and exploit big data to address issues. He is also now the director of the Center for Cognitive Computing.

Research does not happen without funding. West Virginia needs to be competitive with states like California, New York and Texas for funding from the National Science Foundation, National Institutes of Health, and other federal agencies. The RCG can assist with competitiveness and help establish researchers as well as students, especially first generation and underrepresented.

"By leveraging the RCG seed funding, now we can compete research grants at the national level," said Hu. "Without this preliminary data or the findings, it's very difficult to compete." Hu found that working with a multidisciplinary team



The **Vaccine Development Center (VDC)** was founded at West Virginia University (WVU) in 2017 with funding from the Research Challenge Grant. According to the VDC website, it supports vaccine research projects, facilitates training the next generation of scientists and serves as the interface between academic research and industrial partners that will lead to economic development. Yet, researchers could not have predicted the urgent need for their work in just a few years' time as the COVID-19 pandemic upended everything.

"If we were not funded by the Research Challenge Grant, we would have not had the flexibility to pivot and build research around COVID-19," said Dr. Heath Damron.

Development of vaccines typically follows a familiar path: preliminary work followed by two to five years of focused scientific research while seeking grant funding. That would not have worked for a quickly evolving situation like COVID, said Damron.

"Instead, what we were able to do is leverage some resources here at WVU, including the high containment facility, which allows for biosafety level three (BSL-3) research," he explained. SARS-COV-2 is a BSL-3 agent which requires work within high containment. "Having the Research Challenge Grant allowed us to do the pilot work necessary to establish the COVID models. To be able to study antibodies. To be able to study vaccines. We have studied all of the major variants. I would say the RCG Grant had us positioned to be able to do that."

It is not ethical to take experimental vaccine directly into humans so animal models are used to understand and predict if an immune response will be the same. Then, researchers can move forward with safety trials in people. Any vaccine intended for people is likely to have had \$5 to \$10 million of research performed before ever reaching a human being.

"The major way that vaccines work is they cause the body to produce antibodies and the antibodies can stop the pathogen by blocking it or sticking to it or causing your immune cells to pick up the pathogen and kill it," Damron said. "So, we do a lot of work to understand antibodies."

The VDC has also had success in developing vaccines unrelated to COVID-19 and continues to do so. This includes potential vaccinations for pertussis, Lyme disease and bacterial pneumonia.



The Marcellus Shale, a sedimentary rock running miles beneath earth's surface from approximately New York to Tennessee, provides an opportunity for extracting natural gas.

According to assessments from the U.S. Geological Association in 2019, the Marcellus Shale and Point Pleasant-Utica Shale formations of the Appalachian Basin contain an estimated 214 trillion cubic feet of undiscovered, technically recoverable continuous resources of natural gas. Dr. John Hu and his team from the **Center for Innovation in Gas Research and Utilization (CIGRU)** at West Virginia University are working to build necessary infrastructure so natural gas found in West Virginia can also benefit West Virginia.

CIGRU consists of a multidisciplinary group of researchers in science, engineering, environmental policy, law and finance conducting research relevant to gas, oil and chemicals. This allows for a holistic approach.

Hu explains that building pipelines is expensive, especially in a mountainous state like West Virginia. However, leaving a gas well stranded after test drilling leads to gas flaring or burning that produces wasteful emissions. His team proposes transforming natural gas into useful chemicals that are then sold locally or transported out-of-state for profit.

The chemicals in question - benzene toluene xylene (BTX) - are aromatic hydrocarbons. They are high value petrochemical materials and important to refineries, including in the production of gasoline.

"These chemicals are made from petroleum. The petroleum price is subject to politics," Hu said.

Recent events, like Russia's invasion of Ukraine and the economic sanctions that followed, especially on oil, have emphasized this point as the United States and other countries look for alternatives and tap reserves.

"We are making monomers, not creating brand new chemicals to penetrate the market. These chemicals are made today from petroleum, but we are trying to make them from the natural gas which is cheaper and the supply is under our control whereas petroleum, not our control."

Hu hopes producing these chemicals from natural gas will minimize the usage of petroleum and benefit long term national energy security.



Biometrics sounds complicated, but it's founded in tasks many Americans use daily on their smartphones: facial recognition and fingerprinting technology.

Dr. Nasser Nasrabadi directs the **Center for Cognitive Computing** at West Virginia University, a reference to the technologies that enable self-learning systems to use deep learning, pattern recognition and natural language processing to mimic the way the human brain works. He also started the Biometrics & Identification Innovation Center.

"The RCG allowed me to recruit more students to expand my portfolio to other research topics," Nasrabadi said. "One of those research topics was doing more work on face recognition at a distance, identifying people approaching a building or establishment."

Such technologies are utilized by federal agencies, including the Federal Bureau of Investigations (FBI) and the U.S. Department of Defense (DOD). Since several of these agencies also have a presence in West Virginia, specifically at the I-79 Technology Park, students have had success gaining experience and employment locally.

His team has also received funding from federal institutions, including the Intelligence Advanced Research Projects Activity (IARPA) within the Office of the Director of National Intelligence.

Nasrabadi explains that people can generate or manipulate faces so that images are not recognized by face recognition algorithms. In some cases, they can even morph two people with similar characteristics into a new image.

"If you're putting pictures on Facebook, that's one of the dangers," he said. "That you put all these faces on Facebook, people can use it and recognize you."

Monitoring faces upon entering buildings or scanning fingerprints to confirm identity can be used as prevention. A simple scan could reveal whether a person is wanted for crimes. Biometrics have also been utilized in Afghanistan with soldiers scanning fingerprints of suspected terrorists to avoid attacks.

Privacy is a concern with such technology, but Nasrabadi assures that no faces are stored with facial recognition programs.

"We do not save the actual face," he said. "What we save is the template, which is an encrypted version of your biometrics. A bunch of numbers. We never actually keep the template of the individuals."

throughout WVU as well as partnering with faculty at Marshall University (Marshall) strengthened the project's capabilities to be more competitive nationally.

Nasrabadi is quick to highlight the accomplishments of his students, including one who earned Best Student Paper in Biometrics at an Institute of Electrical and Electronics Engineers (IEEE) conference.

"That actually put, in one sense, our university on the map with regard to biometrics," Nasrabadi said. "It is already well known that we do a lot of biometrics at WVU from my department. That was one of the advantages that I basically gained by having this funding from the Research Challenge Fund."

Supporting junior faculty to help confirm their credibility at a higher level may also bring in additional funding and support students. Nasrabadi said that even though he is an established professional in his field, the RCG allowed him the flexibility to expand his portfolio into new research areas.

"If you have more money, faculties can do more things," he said.

Damron, a West Virginia native and graduate of Marshall, said it was a job offer from WVU that brought him back to the Mountain State. The RCG helped him to form the VDC, allowing them to both attract outside funding and partner with industry.

"Honestly, the endorsement of receiving the RCG and the endorsement of the University by calling us a Center gave us credibility that allowed us to actually work with industry partners," Damron said.

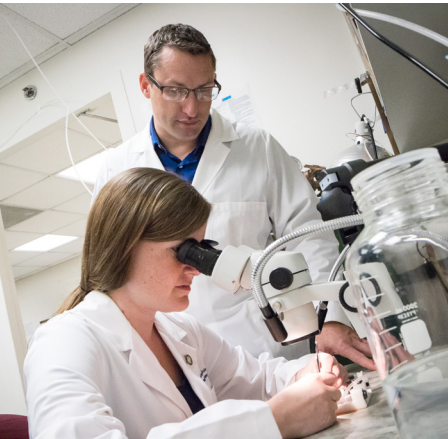
Damron explained that the investment resulted in numerous jobs and educational opportunities for native West Virginians. He emphasized how he hopes the state's primary natural resource will become its people and that industries will choose to set up in the state because it has retained its brainpower and is ready to build towards prosperity through education and research.

"West Virginia exports everything. We export a lot of our talent. I believe that the state's institutions can continue to move towards economic development by attracting partnerships with companies, especially in the biomedical sector. We have excellent training here and we should continue to improve retaining our talented students," Damron said.

The initial state funding of \$3.9 million was leveraged into a combined \$59 million in additional federal funding to support research, graduate students and postdoctoral fellows while producing hundreds of publications.

STaR Division is currently accepting requests for proposals for the next round of Research Challenge Grants to be awarded later this year.

News briefings



NIH awards WVU \$2 million to study link between Alzheimer’s disease, chronic stress

One in nine Americans age 65 or older has Alzheimer’s disease, according to the Alzheimer’s Association. That’s about 6.2 million people. If current trends continue, that number will likely swell to 12.7 million by 2050.

Paul Chantler—a researcher with the West Virginia University School of Medicine—is working to change those trends. He and his colleagues are investigating the link between chronic stress and Alzheimer’s disease. In particular, they’re using animal models to explore how xanthine oxidase—a naturally occurring enzyme—may sabotage the brain’s blood vessels in Alzheimer’s patients.

The National Institutes of Health awarded WVU \$2 million for the effort.

“Billions of dollars have been spent looking specifically at how amyloid tangles, tau and plaque processes in the brain contribute to dementia,” said Chantler, an associate professor

in the Department of Exercise Physiology and the Department of Neuroscience. “The research has done really well in animal models, but when it made it to clinical trials, it’s fallen flat on its feet. So, NIH wanted to prioritize examining the vascular contributions to dementia. That’s where my research fits in well.”

He and his team—which includes School of Medicine researchers James Simpkins and Eric Kelley—want to gain insight into how vascular changes in the brain may exacerbate Alzheimer’s patients’ cognitive decline.

They’ll also identify the effects that chronic psychological stress has on the disease’s progression, and they’ll use a medication to block the problematic xanthine-oxidase pathway and see whether doing so keeps the brain’s vasculature healthy.

Marshall forms cybersecurity partnership with West Virginia National Guard, Forge Security

Marshall University’s Institute for Cyber Security is teaming up with the West Virginia National Guard and Forge Security LLC to enhance cybersecurity efforts and strengthen the future of cyber security professionals.

These partnerships “will do wonders to support cybersecurity readiness in the state,” said Dr. Dave Dampier, director of Marshall’s Institute for Cyber Security.

West Virginia State University awarded \$764,792 for Cybersecurity Innovation Center

West Virginia State University (WVSU) was awarded a \$764,792 grant by the Kanawha County Commission for the establishment of a Cybersecurity Innovation Center (CIC) at the university.

The funding comes from American Rescue Plan (ARP) funds that can be used to assist communities recovering from the COVID-19 pandemic.

“We are grateful to the Kanawha County Commission for their support in helping us to establish the Cybersecurity Innovation Center at West Virginia State University. As West Virginia struggles to emerge from the pandemic, and overcome the economic disparities that were compounded by the pandemic, establishment of a strong and diverse economic foundation for the future is critical,” said WVSU President Ericke Cage.

Establishment of the CIC will begin immediately with the hiring of a director, investment in the technology infrastructure needed to deliver the programs and development of curriculum for university students as well as community outreach.

The first cohort of cybersecurity students will enroll in Fall 2022, the first community outreach programs will begin during the 2022-2023 academic year and K-12 youth programs will begin in the summer of 2023.

News briefings



Marshall professor and fellow researcher of same name team up to complete research publication from different continents

It first sparked some confusion back in 1992, and it may be sparking some confusion to this day. Marshall University’s Dr. Philippe Georgel (left, above), a professor in the Department of Biological Sciences, has a colleague with the same name, doing research in the same field, but based at Université de Strasbourg.

The first time they connected over the phone, they joked about submitting a paper together. Finally, 30 years later, they made it happen.

Strasbourg’s Georgel was recently on sabbatical in Nouméa, New Caledonia, where he was investigating potential causes for a high propensity of gout.

“He was wondering if some specific aspects of nutrition could be contributing to individuals’ sensitivity to develop gout,” Marshall’s Georgel explained. “Certain types of food have been linked to gout, but we were interested in a better understanding of the molecular aspects of diet

and their effect on expression of genes involved in gout. My own interest in investigating diet, cancer and epigenetics provided the second element of our collaborative manuscript.”

“He does have a solid understanding of epigenetics and I was interested in learning more about gout and inflammation, so our choice went for ‘Diet, Gout and Epigenetics,’” Marshall’s Georgel said. “A few months later, we had a solid draft and were now trying to find a good match to publish it. The name of the authors’ order did not really matter. My homonym put me first and him second and last by default, and both of us were corresponding authors, no favoritism allowed. Frontiers in Immunology ended up as our top choice for submission, and we were lucky enough to get our work accepted for publication in that journal.”

Their research was published in the Fall 2021.

Glenville State University, West Virginia School of Osteopathic Medicine enter partnership

Representatives from Glenville State University and the West Virginia School of Osteopathic Medicine (WVSOM) met to welcome Glenville State as a partner in the Pre-Osteopathic Medicine Program (POMP) at WVSOM on February 18.

WVSOM partners with affiliate undergraduate institutions for the program, which is designed for students who have an interest in osteopathic medicine and plan to enter osteopathic medical school.

“We’re excited about this partnership with the West Virginia School of Osteopathic Medicine. We see this as a win not only for our students in making a more streamlined process for them as they matriculate to medical school, but also as we work together to tackle the various issues with staffing and healthcare in this country. I am pleased that Glenville State is a partner in this pipeline program,” said Glenville State University President, Dr. Mark A. Manchin.



Commentary

Why Communicating Science is More Important Than Ever



Wahl

To me, science communication is a vital part of doing science. Being able to produce results is one thing, but being able to communicate those results to a range of audiences, from funding agencies to the general public, is a whole other skill. It can be just as important as doing experiments and publishing the results. In that sense, science communicators act as translators, taking the advanced science of research labs and extracting the jargon, distilling the equations in phrases and condensing the results in a figure to translate it from the language of one group of people - the scientists - to another group of people - the general public.

Who's the best candidate for explaining the complex language of science? The people who speak it best: the scientists! How can scientists best convey their work to the public? In science communication, the tools used are often analogies and examples that relate the science to something people see in their

everyday lives. For example, the change in pitch of an approaching ambulance's siren is a perfect example of the Doppler shift, and the rotating beam of a lighthouse can help explain the periodic pulses generated by pulsars. Another communication technique is using hands-on demonstrations, where people can experience the concepts for themselves, like a moving lamp and spheres to show the phases of the moon.

There are many different ways scientists can communicate their results to everyday people. Many give public talks through programs such as Astronomy on Tap, which highlights scientists from local institutions in a very casual setting. Another form of science communication is through popular science books, which can engage readers of all ages and backgrounds. These books range from beginner - such as "Little Leonardo's Fascinating World of Astronomy," which was written by PhD candidate Sarafina Nance and talks about everything from dark matter to binary systems and is geared toward very young children - to advanced like Brian Greene's "The Elegant Universe" - which gives a non-mathematical view of string theory and is geared toward people with a background in physics and astronomy. Twitter is also a powerful medium. Scientists can share their work with colleagues by doing a thread, or series, of tweets on their new paper. The medium allows features such as GIFs and emojis, which help make their science fun. I personally have made use of this medium, making threads on pulsar topics, which have both taught people about a fairly niche field but also helped me understand my science better.

Communicating science is vital to the scientific process, both to let funders and colleagues know what you are doing, but also to get the public excited about your work. If you can get a first grader excited about exoplanets or pulsars and inspire the next generation, you've done your job.

Haley Wahl is currently finishing up her PhD in physics at West Virginia University, working under the supervision of Dr. Maura McLaughlin as part of the NANOGrav collaboration. She began her science communication training through work at the WVU Planetarium and gained science writing experience through writing for *Astrobites*. She's currently serving as the American Astronomical Society Media Fellow and plans to pursue a career in science writing after graduate school.

PROPOSAL REVIEW SERVICE

Available to all STEM faculty at West Virginia's colleges and universities

Email your proposal, the solicitation to which you are responding, and any reviews of prior submissions to Dr. Juliana Serafin, senior director of science and research, STaR Division: Science, Technology & Research at the West Virginia Higher Education Policy Commission, at juliana.serafin@wvresearch.org. All proposal materials must be sent at least three weeks before necessary revisions are needed for submission.

A close-up, slightly blurred view of a person's hands typing on a silver laptop keyboard. The laptop screen is open and displays the text "Do you need feedback on your next grant proposal?" in a clean, sans-serif font. The word "feedback" is highlighted in a bright green color. The background is softly blurred, showing what appears to be a desk with some plants and office supplies.

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