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Nadja Spitzer
Marshall University



The silver lining of research:

Nadja Spitzer is your basic scientist. This doesn't mean she isn't unique or exceptional, though. In fact, she was recently recognized as a National Science Foundation (NSF) CAREER award recipient, and as Marshall University's first faculty member to lay claim to that title, that makes her kind of extraordinary.

She is a neuroscientist who's interested in learning what things in the environment are doing to the body's nervous system at the very fundamental, cell level. She said that while basic science research has been falling by the wayside in recent years, it's what she is most passionate about.

"I love nothing more than being in my lab and finding out how things work," said the enthusiastic Spitzer, an assistant professor of biological sciences in the College of Science at Marshall.

She said that she is most interested in the basic research that establishes the groundwork of scientific understanding. This CAREER award, which comes with funding of more than \$500,000 over a five-year period, is allowing her to do just that.

Spitzer earned the NSF's prestigious award to study how exposure to silver nanoparticles could be affecting the brains of children and adults.

While silver has been used as a cleaning agent since ancient days when Romans would put water into silver canteens to keep it fresh, the pure manufactured silver nanoparticles, or tiny beads of silver, are a different story. They can be found in many consumer-based products on the market today. Spitzer explained it has been discovered that the nanoparticles cross through membranes and can easily enter tissues like the brain. While this happens in very low levels, the particles have a propensity to accumulate in the body and don't go away over time. Consequently, she is concerned with what could happen to the human body after years of increased exposure.

In her lab, Spitzer and her student researchers are interested in learning about the changes or damage that may be happening in the human brain due to this exposure.

"I've always been concerned about the things to which we are exposed in our environment," she explained.

While the long-term results of her research will likely play a part in developing guidelines for the use of silver nanoparticles in products labeled "antibacterial" (along with the release of the particles into the environment), the short term effect is already evident by watching her interaction with Marshall students in her lab.

"I've always been concerned about the things to which we are exposed in our environment."

Nadja Spitzer





Nadja Spitzer, Marshall University

She notes it all begins in the classroom.

"It feels good that I can help my students see that science is really awesome," she said.

Spitzer has always been a fan of science and math. She recalls exploring nature as a kid and being eager to learn algebra in the 7th grade. It was during her senior year of high school, though, when she went to a college class with a friend that she fell in love with the atmosphere of academia and determined that's where she needed to be for life.

So it just seems natural that she's equally as passionate about the other segment of her CAREER award: outreach.

She created the Herd Science Program as an offshoot of Marshall's already popular (and maxed out) Brain Expo. The goal is to show kids, particularly in rural West Virginia counties, that science is fun and accessible to them by demonstrating scientific concepts about the nervous system and brain in entertaining, interactive ways.

Spitzer said, "I want to show kids that they can do science as their job when they grow up, and that it's really fun!"

The plan is for Herd Science to go on the road to elementary schools at least once a month.

She said, "Not only is this program good for the elementary kids, it's really good for Marshall students too. It teaches them a habit of public education and how to explain science to non-scientists."

Speaking of which, she also plans to start a brand new course at Marshall about communicating science to the public. She'll begin teaching it in the fall of 2017.



In her lab, Nadja Spitzer talks with students Robert Cooper who just finished his Master's Degree, and Kristen Brown, an undergraduate majoring in biochemistry.

about West Virginia science and research

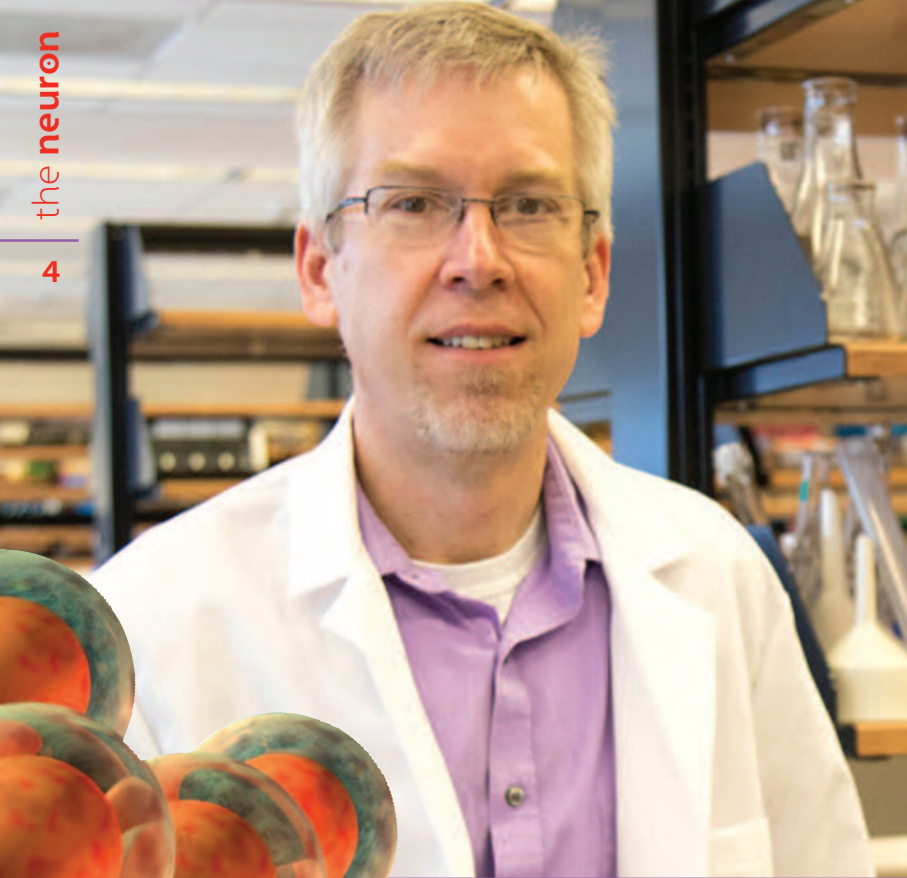
The Neuron is produced by the WV Higher Education Policy Commission's Division of Science and Research. The Division coordinates federal and state scientific research grants, including WVEPSCoR, to academic institutions in West Virginia and conducts outreach activities to broaden the public's understanding of science, technology, engineering and mathematics (STEM).

Visit www.wvresearch.org for more information.

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“This grant will help provide WVU with the resources they need to carry out advanced research projects and it will enrich our students with hands on experience that will better enable them to compete with other institutions around the country.”

Senator Joe Manchin

WVU researcher receives **\$1.7 million award** to fight cancer

A West Virginia University (WVU) researcher has been awarded \$1.7 million to conduct research into how immunotherapy can strengthen the body's own defenses to improve treatment for breast and lung cancers.

Dr. David Klinke, of the WVU Cancer Institute, was selected by the National Cancer Institute to receive the funding over the next five years. He will identify collateral targets for immunotherapy in breast and lung carcinomas and broaden the clinical benefit available to patients.

“David has a long scientific connection to the Health Sciences Center and the Cancer Institute. We could not be happier for him,” said Dr. Laura Gibson, senior associate vice president for health sciences research and graduate education.

Immunotherapies are poised to transform the therapeutic landscape for cancer, using the body's own defenses to combat disease, Dr. Klinke said. Current therapies take existing cells from patients, expand them, then inject them back in to treat the cancer. Dr. Klinke's research will try to boost the anti-tumor properties of the immune system, without going too extreme in either method.

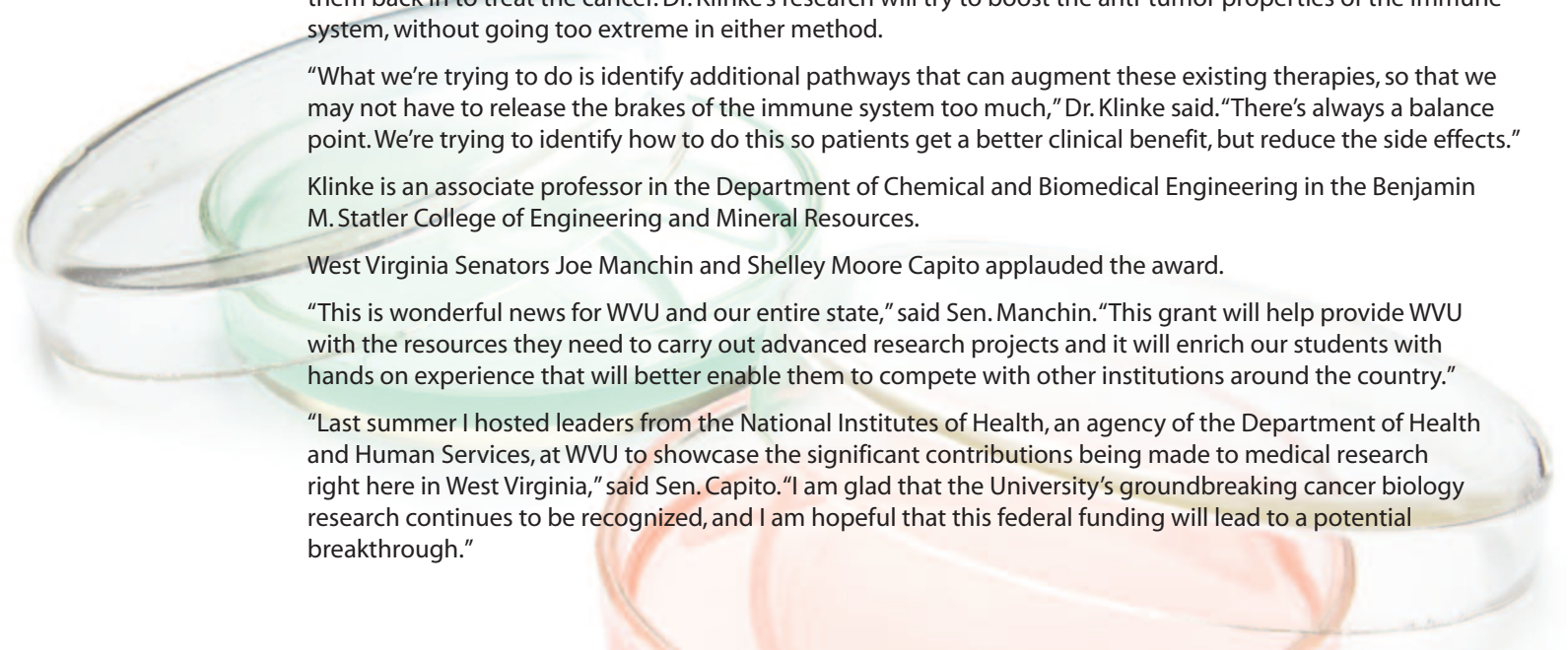
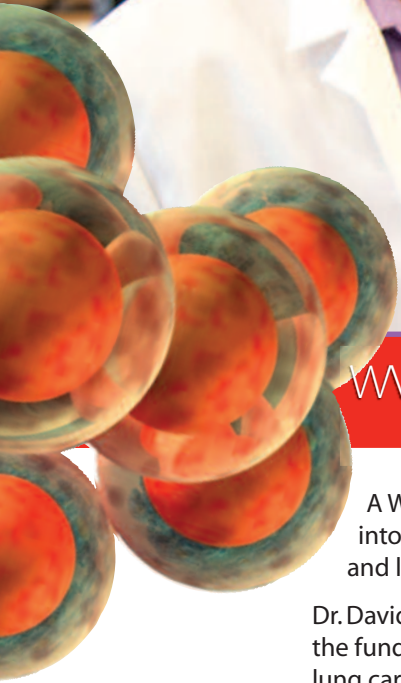
“What we're trying to do is identify additional pathways that can augment these existing therapies, so that we may not have to release the brakes of the immune system too much,” Dr. Klinke said. “There's always a balance point. We're trying to identify how to do this so patients get a better clinical benefit, but reduce the side effects.”

Klinke is an associate professor in the Department of Chemical and Biomedical Engineering in the Benjamin M. Statler College of Engineering and Mineral Resources.

West Virginia Senators Joe Manchin and Shelley Moore Capito applauded the award.

“This is wonderful news for WVU and our entire state,” said Sen. Manchin. “This grant will help provide WVU with the resources they need to carry out advanced research projects and it will enrich our students with hands on experience that will better enable them to compete with other institutions around the country.”

“Last summer I hosted leaders from the National Institutes of Health, an agency of the Department of Health and Human Services, at WVU to showcase the significant contributions being made to medical research right here in West Virginia,” said Sen. Capito. “I am glad that the University's groundbreaking cancer biology research continues to be recognized, and I am hopeful that this federal funding will lead to a potential breakthrough.”





Scientific journal publishes groundbreaking peach research by Shepherd professor



A paper senior-authored by a Shepherd University professor, Dr. Clarissa Mathews, was published in a recent issue of the Entomological Society of America's journal, *Environmental Entomology*. The article explores whether special glands on peach trees that produce nectar help keep beneficial bugs in

orchards. Funded through a \$225,000 grant from the United States Department of Agriculture (USDA) National Research Initiative, the research was a collaboration between the USDA Appalachian Tree Fruit Research Station in Kearneysville and Shepherd.

Mathews, chair of Shepherd's Institute of Environmental and Physical Sciences, said some varieties of peach trees have extra floral nectaries, which are glands on their leaves that produce nectar. The research looked at why the trees produce the extra nectar and how it impacts beneficial bugs that are found in orchards.



"We collected the nectar from the leaves, which was a very laborious process of tapping the leaf over and over with a little capillary tube to suck up that nectar," Mathews said. "We then fed the nectar to ladybird beetles, or ladybugs, in the laboratory and watched how that affected them. We looked at how long they lived when they received nectar versus when they didn't receive the nectar, and we looked at what we call fecundity, or reproductive rates."

Mathews said this is one of the first examinations of extra floral nectary glands in orchard crops and how they impact beneficial insects and the pests.

"The great thing is we're getting the news out about the good bugs and how effective they can be if we're not killing them with insecticides and how we can improve our orchards," she said.

The extra floral nectary glands are not present in all varieties of peaches because the breeding process has eliminated them in some varieties. Mathews said the study used Lovell peaches, but other old-time varieties that have the glands include Redhaven, John Boy and Garnet Beauty.

She said one strategy for cutting down on the amount of pesticides needed to keep an orchard healthy is to plant varieties with the glands next to those without them. Mathews said they are still studying how many peach trees are needed to give protection to apples, which don't have the glands at all.



"The great thing is we're getting the news out about the good bugs and how effective they can be if we're not killing them with insecticides and how we can improve our orchards."

Dr. Clarissa Mathews





WVSU Extension Agent Robin Turner demonstrates some of the proper storage and temperature gauging equipment used in the University's new cold chain initiative, which seeks to help W.Va.'s farmers prolong the shelf life of fresh produce.

“The first series of trainings has gone very well, and interest is growing. We are excited to see what’s next.”

WVSU Extension Agent Robin Turner

WVSU’s Cold Chain Initiative seeks to help farmers prolong crop life

A new initiative by West Virginia State University (WVSU) Extension Service seeks to create longer-lasting fruits and vegetables by providing the state’s small farmers with education and resources regarding cold chain technology.

Cold chain technology refers to the proper refrigeration and storage of crops during the time between harvest by the farmer and end purchase by the consumer to help ensure peak freshness. The need to prolong crop life from farm to table has become more visible as the local foods movement has gained momentum in West Virginia and nationwide.

WVSU is providing instruction to 20 farms during the pilot phase of the project, using a series of four workshops. Participants are learning about all aspects of care before harvest, after harvest, all the way to the consumer, using proper cold chain techniques.

Arming the state’s farmers with knowledge about post-harvest technologies will help fill the gap that currently exists in farmer education, Turner said, adding that the resources that do exist tend to target large-scale producers, but not necessarily to the family farmer selling produce at the local farmers market.

WVSU’s project is not only providing the needed education but also the same high-level resources available to large-scale producers - at a more affordable price.

Teaming with the West Virginia National Guard, WVSU Extension Service is helping repurpose many of the state’s former armory sites into agricultural education and resource centers, complete with cold storage equipment and technology that will be readily available to small farmers. Turner has been providing cold chain technology workshops at armory sites already, and word is spreading.

The pilot phase targeted a regional cluster, and organizers plan to expand into new regions of the state soon. In the meantime, Turner will continue working with the pilot participants to ensure they are correctly implementing what they learned during winter training into the farms during the growing season. She will be performing site visits this summer, providing farmers with technologies such as CoolBot thermostatic controllers and cooler systems to incorporate into their practices.

For more information, contact Turner at (304) 421-7433 or turnerrl@wvstateu.edu.

The initiative is supported by the USDA 1890 Capacity Building Grants Program and the 1890 Center for Excellence.



Marshall's Department of Mathematics awarded grant from National Security Agency

A group of faculty within Marshall University's Department of Mathematics has been awarded a \$170,000 grant from the National Security Agency (NSA). The grant will be used to fund undergraduate research and develop a scientific workforce in Appalachia, according to Dr. Elizabeth Niese, principal investigator for the project.

"One of the things in math research that is distinctive is learning how to ask questions and work toward answers we don't already know," Niese said. "Our research will focus on combinatorics and algebra. These fields have applications in computer science and physics."

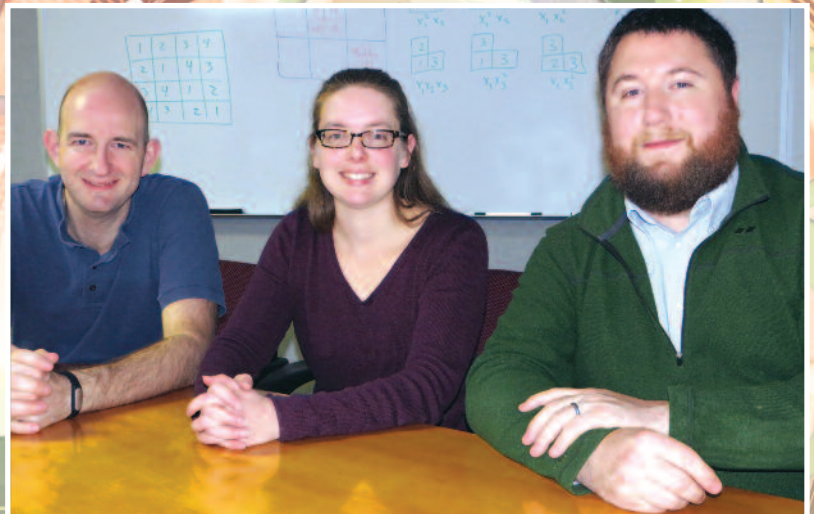
Niese, an assistant professor of mathematics, said nine students from across Appalachia will be invited to attend sessions each summer for the next two years. Colleagues Dr. Carl Mummert and Dr. Michael Schroeder will assist in the supervision of the students' research experiences throughout the project.

"We need more people focused on science and mathematics. We are focusing on students from the general Appalachian region to develop that workforce here in West Virginia," Mummert, co-principal investigator for the grant, said. "We need students from other institutions to work toward these same goals of fostering a stronger mathematics culture in the whole state."

"When crafting this grant proposal, we knew it would benefit our students and help to advance our department's research efforts," Schroeder said. "When students graduate, many are applying for the same job in a competitive job market. It's been shown that students who have undergraduate research experiences have a much greater chance of getting a job, so what we are doing here is twofold: we want to engage students in mathematics and we want to make sure our students are marketable and will get jobs once they graduate."

"We need more people focused on science and mathematics. We are focusing on students from the general Appalachian region to develop that workforce here in West Virginia."

Dr. Carl Mummert



Dr. Michael Schroeder, Dr. Elizabeth Niese and Dr. Carl Mummert (pictured left to right) received a federal grant that has the goal of developing a scientific workforce in Appalachia.

Four WVU students awarded National Science Foundation Fellowships

Four students at West Virginia University (WVU) have been awarded National Science Foundation Fellowships that will allow them to continue their research.

The four, two in the Statler College of Engineering and Mineral Resources and two in the College of Arts and Sciences, were **selected from among nearly 17,000 applications nationwide** for a three-year, \$12,000 cost of education allowance, opportunity to pursue their own course of research.

Two of the students are no strangers to winning prestigious national awards.

Andrew Maloney, a chemical engineering major and Honors College student from Morgantown, and **Trevor Butcher**, a chemistry major and Honors College student from Hollywood, Maryland, were both named Goldwater Scholars in their sophomore year. Both are quick to credit their faculty mentors at WVU, Cerasela Zoica Dinu and Brian V. Popp, respectively, for providing them with the opportunities they needed to be successful.

"I met Dr. Dinu in my senior year of high school and that helped me start my research early in my career," said Maloney. "Starting so early opened a lot of opportunities for me, like presenting at conferences, conducting research abroad and being published each year. This prepared me for graduate school and helped me receive the NSF Fellowship."

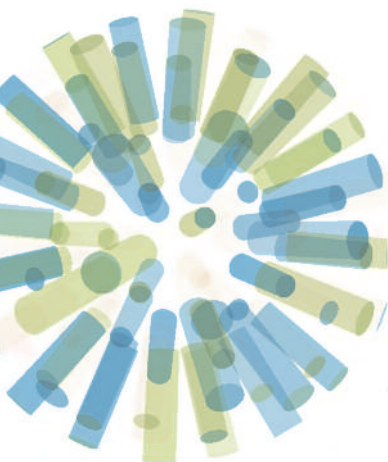
Maloney is headed to MIT, where he will conduct research relative to the pharmaceutical industry.

Butcher credited Popp with providing him with opportunities to attend conferences where he could present his research.

"He worked closely with me, writing grants for a NASA program and the Goldwater Scholarship," Butcher said. "Such in-depth help with scientific writing is rare to find from a professor, but this help ultimately prepared me for applying for the NSF award. Dr. Popp has now allowed me to begin my own research project, and I believe this experience has greatly prepared me for the independence required in graduate school."

Butcher will attend graduate school at the University of California-Berkeley. He expects to conduct research in the field of reaction discovery and synthetic methodology with an emphasis on transition-metal catalysis.

Morgantown native **Nicholas Ohi**, a mechanical and aerospace engineering major and Honors College student, will stay at WVU to continue his research in autonomous robotics under Assistant Professor Yu Gu. He hopes to one day develop fast traverse capabilities for future NASA Mars rovers, which would allow them to travel up to 100 meters per day from their current 10 meters per day.



Science Foundation graduate fellowships

awarded fellowships from the National Science Foundation (NSF) during their studies at the graduate level.

Resources and two in the Eberly College of Arts and Sciences, **nationwide**. NSF fellows receive a \$34,000 annual stipend for opportunities for international research and the liberty to choose a location at an accredited university.

Ohi credits two projects – the NASA Sample Return Robot Challenge, which WVU successfully completed in 2015, and the NASA Simulation to Flight 1 CubeSat mission, the first spacecraft mission entirely developed in West Virginia – with helping prepare him for graduate school.

“I also took advantage of internship opportunities at the nearby NASA IV&V Facility in Fairmont,” Ohi added, “and the excellent professors and staff at WVU challenged, enabled, inspired and helped me to grow in knowledge, skills and understanding of the possibilities of career directions and research topics that I could pursue.”

A native of Hackettstown, New Jersey, **Joseph Carrara** earned his Bachelor’s Degree in biology at Monmouth University, where he conducted undergraduate research in RNA structure.

“I became interested in studying ecosystem-level response to climate change and I decided to come to WVU because of the great work the biology department does in this field and specifically, to work with my current advisor, Dr. Edward Brzostek,” Carrara said.

The focus of his current research, Carrara said, is on the effects of nitrogen deposition on soil carbon dynamics in forests.

“Carbon dioxide is an important greenhouse gas, which contributes to the warming of the atmosphere,” he said. “Soils store more carbon than both the atmosphere and vegetation combined. As nitrogen deposition is on the rise in many industrialized parts of the world due to the burning of fossil fuels, it is important to study the impacts of increased nitrogen on the world’s soil carbon stores.”



Trevor Butcher



Joseph Carrara



Andrew Maloney



Nicholas Ohi

WVSU research project targets locally-grown hops

West Virginia State University (WVSU) is working to determine the viability of regional hops production in an effort aimed at helping the state's farmers tap into an unmet and continually growing need: locally sourced hops for the craft beer industry.

Hops are flowers of the hop plant and a key flavoring and stability agent in beer production. In conjunction with the West Virginia Department of Agriculture (WVDA), WVSU Extension Service is seeking to determine the varieties of hops that will work best with West Virginia's climate and conditions.

"We are working to connect West Virginia farmers with the commercial production of hops and, in turn, foster new economic development opportunities," said WVSU Extension Agent Brad Cochran. "By the completion of the project, we aim to determine the best hops to grow here in West Virginia to support and expand our brewing industry."

Brewers in West Virginia source their hops from out of state because no one in West Virginia grows the plants. If this project is a success, that will change. Cochran quickly learned that there is interest. Beginning in 2014, 30 West Virginia farmers were selected through a process that saw nearly 100 applicants.

Some early harvests have shown promise, with growers in the northern part of the state recently collaborating with a brewery to use some of their early hops on a special brew. The project is funded through the WVDA's Specialty Crop Block Grants Program.

Students selected for NASA Student Flight Research Opportunity

Air sickness and free falling in a plane may not sound like fun to the typical person, but the West Virginia University, Fairmont State and Shepherd University students who have been accepted into NASA's Student Flight Research Opportunity, may not be typical.

The group will test their magnetic solder joints concept in two test flights aboard a zero gravity aircraft, known as the "Vomit Comet."

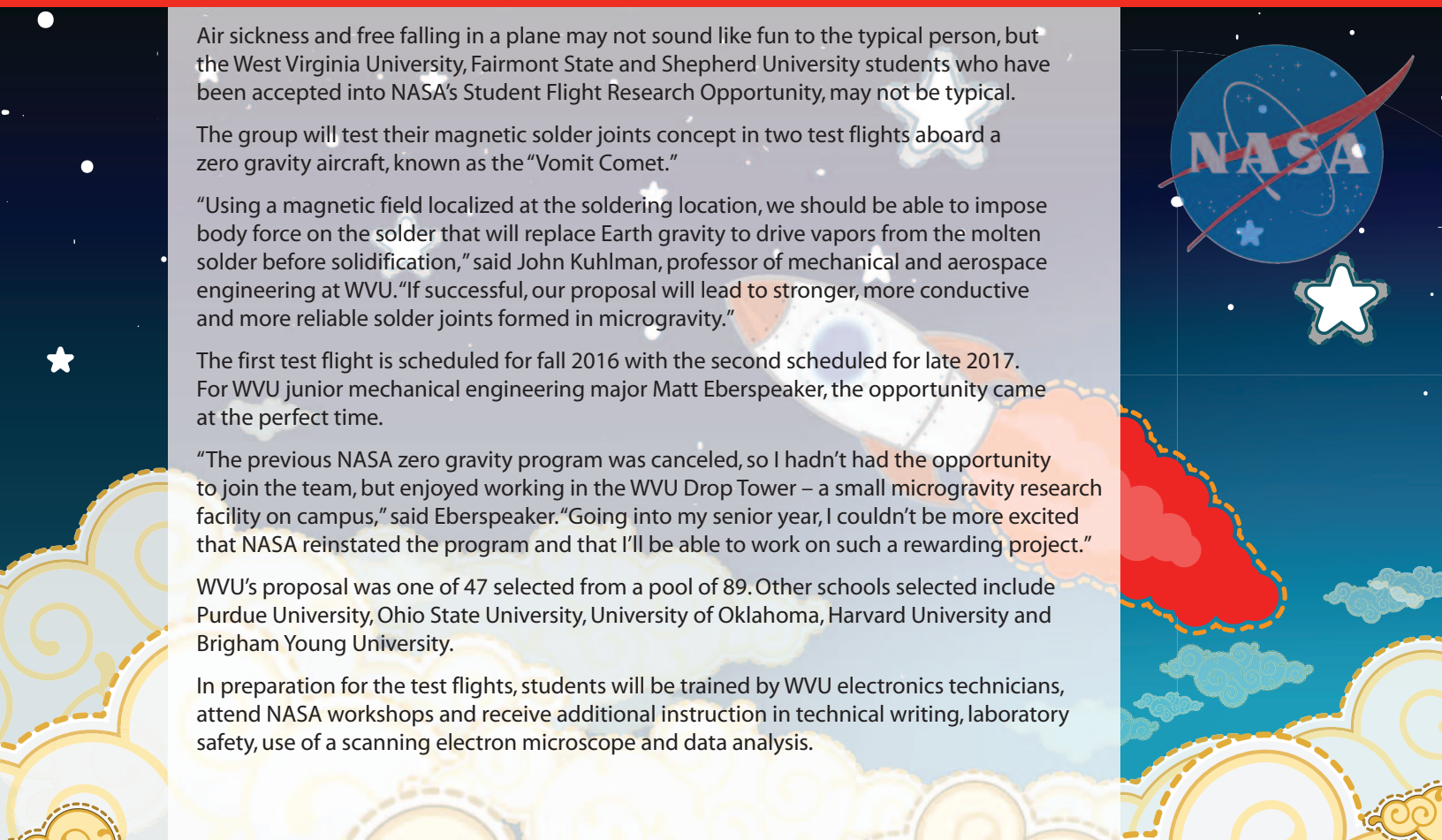
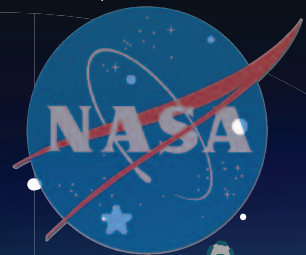
"Using a magnetic field localized at the soldering location, we should be able to impose body force on the solder that will replace Earth gravity to drive vapors from the molten solder before solidification," said John Kuhlman, professor of mechanical and aerospace engineering at WVU. "If successful, our proposal will lead to stronger, more conductive and more reliable solder joints formed in microgravity."

The first test flight is scheduled for fall 2016 with the second scheduled for late 2017. For WVU junior mechanical engineering major Matt Eberspecker, the opportunity came at the perfect time.

"The previous NASA zero gravity program was canceled, so I hadn't had the opportunity to join the team, but enjoyed working in the WVU Drop Tower – a small microgravity research facility on campus," said Eberspecker. "Going into my senior year, I couldn't be more excited that NASA reinstated the program and that I'll be able to work on such a rewarding project."

WVU's proposal was one of 47 selected from a pool of 89. Other schools selected include Purdue University, Ohio State University, University of Oklahoma, Harvard University and Brigham Young University.

In preparation for the test flights, students will be trained by WVU electronics technicians, attend NASA workshops and receive additional instruction in technical writing, laboratory safety, use of a scanning electron microscope and data analysis.



Student-run design expo connects students with industry

This spring nearly 150 students, staff, faculty, alumni and members of industry packed the WVU Tech Center Ballroom for the 2016 WVU Tech Design Expo. Now in its second year, the expo allows students from various disciplines to share their senior design projects ranging from automated golf carts and concrete canoes to smart house technology and portable solar power.



Tavon Johnson, a senior mechanical engineering student and expo co-founder, said this year's expo drew in twice as many attendees as last spring's inaugural event.

"When we first opened up, people were excited and ready to see what our students have been working on all year. We had a line," he said.

Johnson said this year's expo was about more than showing senior projects. For him, it's about an exchange of ideas.

"This allows students to see projects from other disciplines and to see how their work might fit those projects. For example, I'm working with wind turbines and my project is oriented towards mechanical engineering. There are a lot of electrical components though, and so someone with an electrical engineering background can put their knowledge to work when they're exploring my project," he said.

This year's expo also invited members of industry to review research and serve as project judges.

"It's a good way to build connections and show what we're doing here on campus," said Johnson.

"Hopefully, we're also finding research that matches the interests of companies in the region. Together, maybe we can make something great out of these projects."

Alan Comer was one of these attending industry professionals. A graduate of WVU Tech's mechanical engineering program, Comer now works for a Denmark-based oilfield manufacturing company out of Cranberry, Pennsylvania. He said he was impressed with the work of the students featured in the expo.

"They've been great. What I've learned as an engineer is that communication skills can be as important as your engineering skills when it comes to these projects. This is enabling the students to go out and present their work in an intelligent way. It's valuable practice," he said.

Mechanical engineering professor Dr. Farshid Zabihian served as a faculty advisor for the expo. He said that the event's success stemmed from the fact that it's student-driven.

"This is all student work and it's led by students. They do everything. It is a young event, but even in the second year, we're so very happy with the way it has been done," he said. "We're definitely on the right track."



Pictured is Joel Kouakou (top) and LS Wang (bottom). Both are WVU Tech mechanical engineering students who graduated in May 2016.



WVU mechanical engineering student named Redesign Challenge finalist

A West Virginia University (WVU) student has been named a top 10 finalist in Stratasys' 2016 Extreme Redesign 3D Printing Challenge for his innovative 3D Bone Fixation System.

Zachary Stevens first came to WVU as a biology student in 2004 with the dream of becoming a surgeon. When he realized that wasn't in the cards, Stevens applied to the School of Dentistry. When he was waitlisted, Stevens went into exercise physiology.

During his first year, he was diagnosed with thyroid cancer and was forced to withdraw to complete treatments. In remission, Stevens struggled with what to do next. He went back to school, but just didn't feel dentistry was the right fit. With a biology degree, exercise physiology credits and personal experience with the healthcare industry under his belt, Stevens started a career in medical sales—selling bone fixation systems. He soon realized, though, that he could design something better.

"What I saw in the field was a set of plates and screws that were one-size-fits-all solutions that involved multiple incisions," said Stevens, a Charleston, West Virginia, native. "I knew there was a way to make plates designed for the individual."

Stevens enrolled in WVU with the goal of creating his version of a bone fixation system. Now a senior mechanical engineering major, Stevens' design uses 3D imaging to create customized bone plates specific to an individual's body structure and body mass index. According to Stevens, this will reduce a large percentage of plate failures.

"We see plates fail because people's body structure or weight aren't correct for that plate, but it was all the surgeon had, so they used it," he said.

The plates will also reduce rejection, a frequent issue when a body tries to get rid of a foreign material. A two-stage plate, the outside wall consists of osteoclasts – bone cells that absorb bone tissue during growth and healing – that will break down over the length of the healing process. Osteoblasts – cells that secrete proteins for bone formation – will then be revealed to convert what is left of the plate into bone. Patients will never have to have the plate removed or worry about going through a metal detector again.

Kostas Sierros, assistant professor of mechanical and aerospace engineering, encouraged Stevens to enter his design in the competition during his additive manufacturing course, which teaches students about technologies and innovative approaches to design and manufacturing.

"This is a highly competitive contest by one of the biggest names in 3D printing," said Sierros. "Zach's selection is a great reassurance for him to further his interests in this area."

Stevens is working to patent his designs through WVU's LaunchLab and the Office of Technology Transfer.

" This is the reason I came back to school to be an engineer, I just like the idea of making life a little better and easier for everyone."

Zachary Stevens

Middle school students take part in crime scene investigation event

Forensic science graduate students and faculty recently hosted a crime scene investigation event for middle school students from the Heart of Appalachia Talent Search Program at Marshall University's Crime Scene House. About 38 middle school students from Mason and Wayne counties attended the "CSI Huntington" event.

Students became crime scene investigators for a day to solve a mock murder case where they learned about forensic science investigative techniques. Evidence from the mock crime scene was placed throughout the house where students received lectures and demonstrations as well as participated in hands-on activities to solve the case.

Topics included DNA analysis, latent print identification, drug testing, blood spatter analysis, toolmark examination, crime scene investigation, questioned documents and AFIS (Automated Fingerprint Identification System software) as well as digital forensics examination.

Dr. Pamela Staton, professor of forensic science in the graduate program at Marshall, is the faculty adviser for the CSI Huntington events.

"CSI Huntington is a forensic science program that seeks to expose students and teachers to various career opportunities especially in the areas of science, technology and mathematics, which includes forensic science," she said.

Teachers or representatives of student organizations who are interested in scheduling a CSI Huntington workshop should contact Staton for more information at 304-634-5263. Workshops also are available to other groups upon request.



Toyota funding keeps students engaged in STEM throughout the summer

A longstanding relationship between Toyota Motor Manufacturing West Virginia and WVU Tech continues. The school announced recently that Toyota has provided funding for programs designed to keep both college and high school students working on STEM projects throughout the summer months.

The company donated over \$12,000 to the Society of Automotive Engineers (SAE) Baja buggy team for their 2016 competitive season. Each year, the team builds a Baja-style racing buggy from the ground up. Students handle every detail of the buggy from conceptualization and design to constructing the vehicle competing in maneuverability, acceleration, braking and endurance events.

Toyota has also pledged \$30,000 for WVU Tech's STEM Summer Academy for Girls. Launched in 2015, the program brings high school girls to campus for a five-day immersion in STEM fields. Participating students work on hands-on projects and experiments, hear from female STEM professionals, explore career options and present what they have learned to their parents. The 2016 Academy will take place on July 24-29.

Dr. Zeljko Torbica, dean of the Leonard C. Nelson College of Engineering and Sciences at WVU Tech, said Toyota's support for SAE and the academy is invaluable to the success of the programs.

"These programs show students what engineers and scientists do in real life. They provide quality experiences that make these students better engineers and scientists when they do decide to follow those paths. Toyota understands the importance of this type of outreach, and we're very grateful for their financial support and the time and talent they share with our university on a regular basis," he said.



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Middle and high school students **compete** in the **West Virginia Bridge Design and Build Contest**

On Saturday, May 21, the West Virginia Bridge Design and Build Contest finals took place at the Arthur Weisberg Family Applied Engineering Complex at Marshall University. The contest includes both computer-based bridge design and construction of a balsa bridge for load testing. The qualifying round of the contest was open to West Virginia middle and high school students and focused only on the bridge design aspect, where students submitted bridge designs with the objective of designing the lowest cost bridge that will hold a required minimum load. At the conclusion of the qualifying round on Friday, April 1, the top-ranked teams were invited to compete in the finals. Eleven middle school teams and eleven high school teams participated in the finals.

The teams competed against one another in two rounds of bridge design, with each round consisting of different design scenarios. Gift cards ranging from \$50 to \$200 were awarded based on the combined costs of the bridges for the two rounds. The top three bridge design teams in each division were:

MIDDLE SCHOOL:

- 1ST PLACE: **Justin Dargo** and **Hunter Hall** (St. Francis de Sales)
- 2ND PLACE: **Alina Mackowiak** (St. Francis de Sales)
- 3RD PLACE: **Nathan Calvert** and **Davon Hampton** (Edison Middle School)

HIGH SCHOOL:

- 1ST PLACE: **Nikita Zinzuwadia** and **Alyssa Christiansen** (Woodrow Wilson High School)
- 2ND PLACE: **Anthony Chen** (University High School)
- 3RD PLACE: **Summer McElwain** (Greenbrier East High School)

In addition to the bridge design portion, the finalists were mailed materials to construct a balsa bridge that met certain specifications. Those bridges were also load tested as part of the final competition in May. All teams that constructed a balsa bridge doubled the award amount they earned in the bridge design portion of the contest. Most of the bridges were loaded until they failed, which allowed the strength-to-weight ratio to be calculated for each bridge. The most aesthetic was also selected for each division. The winners of the balsa bridge building were:

- MIDDLE SCHOOL MOST AESTHETIC BRIDGE: **Emily Turner** (Summers Middle School)
- MIDDLE SCHOOL HIGHEST STRENGTH-TO-WEIGHT RATIO: **Alina Mackowiak** (St. Francis de Sales)
- HIGH SCHOOL MOST AESTHETIC BRIDGE: **Carlton Wykle** and **Jeremy Giese** (Greenbrier East High School)
- HIGH SCHOOL HIGHEST STRENGTH-TO-WEIGHT RATIO: **James Dishner** and **John Mullis** (PikeView High School)

Sponsors of this year's contest were the West Virginia Department of Transportation Department of Highways, Rahall Transportation Institute, Marshall University College of Information Technology and Engineering, the Mid-Atlantic Transportation Sustainability University Transportation Center and BridgeWalk.

Mission mandated research

Dr. Orlando F. McMeans

Vice President for Research and Public Service, West Virginia State University

West Virginia State University (WVSU) is celebrating its 125th anniversary not only as an institution of higher education but also as a historically black, land-grant university founded on March 17, 1891, under the Morrill Act of 1890. Institutions established or designated under this act are commonly referred to as "1890 Institutions." As such, WVSU is congressionally mandated, as are all land-grant universities, to deliver educational programs and provide services to its students, stakeholders and communities via the tripartite mission of teaching, public service and research.

As a land-grant institution, research is a cornerstone of the University's mission. Research, whether basic or applied, seeks to answer important questions and address important issues by way of discovery. That level of discovery advances knowledge and understanding, underpins academic instruction, improves quality of life and enhances economic development. Land-grant universities, such as WVSU, have greatly contributed to and benefited from technological and societal advances associated with research.

For more than 15 years, WVSU has strategically emphasized the advancement of its research mission by creating new programs to support faculty and student research and by becoming increasingly active in the acquisition of funding to support research from state, federal and private entities. In fact, the University had \$50,000 in research funding in 1999 and currently receives nearly \$10 million annually to support innovative research activities. The University utilizes these funds not only to support basic research but also as leverage to garner additional federal and private dollars in support of the development and implementation of cutting-edge applied research programs.

WVSU has developed a portfolio of salient and well-established research programs, which both contribute to scientific discourse and benefit the general public. These programs include aquaculture, human health and cancer research, environmental remediation, microbial ecology, horticulture, plant/crop improvement via molecular biology and genetic engineering, soil science, specialty crop agriculture, waste management and socioeconomic research.

Research is a vital component of the advancement of a higher education institution's mission. Just as important, research is vital to the progression of the state of West Virginia. To that fact, funding to support research is critical, as it can serve as an economic engine for the state. This economic impact derived from research comes in many forms, including the creation of patents, growing entrepreneurial enterprises and the strengthening of existing industries via research collaboration.

As WVSU's research portfolio expands, we will continually seek opportunities to partner with state, federal, corporate and local agencies to advance our mutual research missions. Those collective missions share a common goal to utilize research to address socioeconomic, environmental and other important issues, with the ultimate aim of increasing the quality of lives for our communities and the clientele served in the state of West Virginia and beyond.





FROM THE DIRECTOR: STEM + kids = success

Are American kids being adequately prepared in the sciences to compete in a highly competitive, global high-tech workforce? A majority of American parents say no, according to a poll by NPR, the Robert Wood Johnson Foundation and the Harvard School of Public Health.

I believe that all kids are little scientists. This is especially evident when they ask all those 'why' and 'how' questions! By ensuring that they continue to experience the fun and excitement of science as they grow older, we can methodically create a new generation of scientists, researchers, innovators and entrepreneurs. This is why we share and promote the many STEM outreach activities that our colleges and universities make available. We want to see more West Virginia kids keeping that love of science within them – whether or not their eventual career is in a STEM field.

In this issue of *The Neuron* alone, you'll see an article about middle school students participating in a crime scene investigation event at Marshall; middle and high school

students competing in the West Virginia Bridge Design and Build Contest and Toyota supporting programs at WVU Tech designed to keep high school students working on STEM projects during the summer months. This is in addition to the many STEM camps you can find on college campuses for kids of all ages.

It's never too late to support or reveal the fun of discovery with the kids in your life as they grow older. One way is to keep up-to-date with STEM events in your community that they could attend. Be sure to follow us on social media because we share details about outreach events and opportunities on a regular basis. For more information on the poll I mentioned, you can search NPR's website for this article: "To Make Science Real, Kids Want More Fun."

Jan R. Taylor

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